

HIGH DEMAND OCCUPATIONS

The entire B.C. workforce is grouped into 500 occupations and all are important to the economy of the province. All projected job openings need to be matched to people so that there is continued growth in the prosperity of British Columbians.

The job openings forecast for each of the 500 occupations is provided in Appendix 6. However, some of the occupations do offer better future prospects than others. To help people in B.C. to make more informed and effective career, education or training decisions, all 500 occupations have been ranked to show their relative position in terms of future job opportunities. This ranking was then used to make a list of High Demand Occupations.⁵

Using the data from the High Demand Occupations list provides the opportunity to focus on occupations that have a stronger need for additional workers than many other occupations. The list is developed by asking the three questions in Figure 3.1.

FIGURE 3-1: Criteria of High Demand Occupations List



Information on how the list is developed and the methodology used is included in Appendix 4.

When considering career options, there are many factors to keep in mind. This is discussed later in this report in the “Work as a Personal Choice” section of the Emerging Themes chapter.

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5 The B.C. Labour Market Outlook 2017 Edition included a list of 73 High Demand Occupations plus eight priority health occupations. This year, the list is expanded to 100 occupations plus 13 priority health occupations.



HIGH DEMAND OCCUPATIONS LIST

TABLE 3-1: List of High Demand Occupations, B.C., 2018-2028

Occupation	Job Openings 2018-2028	Wage Rate Low 2017	Wage Rate Median 2017	Wage Rate High 2017	NOC Code
High Demand Occupations in Management Usually Requiring a Combination of Education and Work Experience (33 Occupations)					
Retail and wholesale trade managers	20,600	\$14.42	\$28.00	\$52.88	0621
Restaurant and food service managers	7,800	\$12.67	\$18.75	\$38.46	0631
Senior managers - financial, communications and other business services	5,100	N/A	N/A	N/A.	0013
Facility operation and maintenance managers	4,800	\$19.85	\$35.10	\$57.00	0714
Computer and information systems managers	4,800	\$26.44	\$43.27	\$69.40	0213
Financial managers	4,700	\$21.03	\$40.86	\$67.31	0111
Corporate sales managers	4,700	\$17.79	\$36.35	\$49.04	0601
Banking, credit and other investment managers	4,100	\$24.04	\$41.03	\$60.10	0122
Senior managers - construction, transportation, production and utilities	3,900	\$21.50	\$47.65	\$90.77	0016
Advertising, marketing and public relations managers	3,500	\$19.64	\$38.00	\$75.00	0124
Senior managers - trade, broadcasting and other services	3,500	\$20.00	\$36.91	\$76.91	0015
Insurance, real estate and financial brokerage managers	3,300	\$21.00	\$42.56	\$75.90	0121
Managers in agriculture	3,200	N/A	N/A	N/A	0821
Managers in transportation	3,000	\$19.75	\$35.00	\$64.90	0731
Home building and renovation managers	2,900	\$14.00	\$20.00	\$32.61	0712
Accommodation service managers	2,900	\$15.00	\$24.00	\$36.06	0632
Other administrative services managers	2,700	N/A	N/A	N/A	0114
Managers in social, community and correctional services	2,500	\$23.47	\$38.46	\$62.50	0423
Human resources managers	2,300	\$22.85	\$34.19	\$57.69	0112
Senior managers - health, education, social and community services and membership organizations	2,100	\$16.31	\$37.29	\$75.50	0014
Other business services managers	2,100	\$20.00	\$32.31	\$51.28	0125
Managers in customer and personal services	2,000	\$15.00	\$21.63	\$35.00	0651
School principals and administrators of elementary and secondary education	1,700	\$24.00	\$41.96	\$52.88	0422
Purchasing managers	1,600	\$20.10	\$37.56	\$65.22	0113
Administrators - post-secondary education and vocational training	1,300	\$17.86	\$36.89	\$61.10	0421
Engineering managers	1,200	\$33.00	\$50.75	\$72.31	0211
Senior government managers and officials	1,200	\$24.66	\$48.52	\$79.51	0012
Recreation, sports and fitness program and service directors	1,000	\$11.35	\$26.03	\$47.07	0513
Managers - publishing, motion pictures, broadcasting and performing arts	800	\$18.33	\$29.42	\$49.04	0512
Utilities managers	800	\$15.13	\$45.05	\$85.39	0912
Architecture and science managers	600	\$16.31	\$39.44	\$75.39	0212
Government managers - economic analysis, policy development and program administration	500	\$25.98	\$41.66	\$62.39	0412
Other managers in public administration	500	\$30.77	\$47.80	\$62.50	0414
High Demand Occupations Usually Requiring Bachelor's, Graduate or First Professional Degree (26 Occupations)					
Financial auditors and accountants	10,800	\$17.00	\$27.88	\$47.00	1111
Elementary school and kindergarten teachers	10,100	\$20.51	\$32.05	\$46.63	4032
Information systems analysts and consultants	8,700	\$23.08	\$38.46	\$52.88	2171
Computer programmers and interactive media developers	8,000	\$22.00	\$38.46	\$55.77	2174
Other financial officers	6,600	\$20.19	\$32.31	\$57.69	1114
Lawyers*	5,400	\$39,811*	\$106,361*	\$269,702*	4112
Professional occupations in business management consulting	4,800	\$20.00	\$36.00	\$51.43	1122

Occupation	Job Openings 2018-2028	Wage Rate Low 2017	Wage Rate Median 2017	Wage Rate High 2017	NOC Code
Software engineers and designers	4,800	\$24.04	\$38.46	\$52.88	2173
Professional occupations in advertising, marketing and public relations	4,300	\$16.00	\$27.00	\$48.08	1123
College and other vocational instructors	4,000	\$17.00	\$33.65	\$50.48	4021
Civil engineers	3,900	\$20.19	\$35.00	\$67.00	2131
University professors and lecturers	3,800	\$17.31	\$38.46	\$69.23	4011
Business development officers and marketing researchers and consultants	3,300	\$16.00	\$31.25	\$43.59	4163
Human resources professionals	3,100	\$17.58	\$32.05	\$54.87	1121
Producers, directors, choreographers and related occupations	3,000	\$15.81	\$26.44	\$60.00	5131
Social workers	2,800	\$19.00	\$30.00	\$42.00	4152
Family, marriage and other related counsellors	2,600	\$18.00	\$26.74	\$37.45	4153
Web designers and developers	2,300	\$16.00	\$25.00	\$50.00	2175
Authors and writers	2,100	\$11.35	\$25.48	\$37.50	5121
Health policy researchers, consultants and program officers	1,800	\$19.00	\$30.42	\$49.45	4165
Architects	1,700	\$22.66	\$30.77	\$40.00	2151
Financial and investment analysts	1,600	\$18.46	\$33.52	\$50.00	1112
Natural and applied science policy researchers, consultants and program officers	1,300	\$24.62	\$35.00	\$53.37	4161
Securities agents, investment dealers and brokers	1,300	N/A	N/A	N/A	1113
Computer engineers (except software engineers and designers)	1,100	\$25.48	\$40.50	\$50.61	2147
Psychologists	1,000	\$16.00	35.35	\$51.00	4151
High Demand Occupations Usually Requiring Diploma, Certificate or Apprenticeship Training (33 Occupations)					
Administrative officers	17,100	\$15.00	\$23.38	\$33.00	1221
Social and community service workers	11,800	\$15.00	\$19.50	\$28.85	4212
Accounting technicians and bookkeepers	10,600	\$13.13	\$20.83	\$32.05	1311
Administrative assistants	9,700	\$14.42	\$22.00	\$30.00	1241
Early childhood educators and assistants	8,900	\$13.00	\$16.95	\$24.04	4214
Real estate agents and salespersons*	7,100	\$23,016*	\$44,753*	\$103,667*	6232
Automotive service technicians, truck and bus mechanics and mechanical repairers	6,400	\$14.00	\$28.00	\$38.46	7321
Graphic designers and illustrators	5,000	\$15.38	\$25.50	\$37.00	5241
Hairstylists and barbers	5,000	\$11.35	\$14.00	\$22.50	6341
Program leaders and instructors in recreation, sport and fitness	4,900	\$12.00	\$20.00	\$27.92	5254
Technical sales specialists - wholesale trade	4,600	\$14.00	\$25.38	\$46.63	6221
Property administrators	4,000	\$11.54	\$20.00	\$33.76	1224
Police officers (except commissioned)	3,800	\$25.50	\$40.00	\$50.71	4311
Insurance agents and brokers	3,500	\$14.00	\$22.00	\$35.90	6231
Financial sales representatives	3,300	\$13.75	\$23.08	\$33.65	6235
Computer network technicians	3,300	\$21.60	\$33.65	\$57.69	2281
Electronic service technicians (household and business equipment)	3,000	\$15.70	\$23.00	\$38.31	2242
Retail sales supervisors	2,800	\$11.51	\$18.27	\$33.65	6211
Supervisors, supply chain, tracking and scheduling co-ordination occupations	2,700	\$15.00	\$22.00	\$40.06	1215
Legal administrative assistants	2,700	\$15.00	\$24.00	\$32.00	1242
Executive assistants	2,200	\$17.50	\$25.50	\$31.28	1222
User support technicians	2,200	\$18.00	\$28.97	\$48.08	2282
Medical administrative assistants	2,000	\$15.00	\$22.00	\$31.25	1243
Airline pilots, flight engineers and flying instructors	1,600	N/A	N/A	N/A	2271
Paralegal and related occupations	1,500	\$13.85	\$27.00	\$45.67	4211
Insurance adjusters and claims examiners	1,500	\$14.00	\$31.00	\$48.00	1312

Occupation	Job Openings 2018-2028	Wage Rate Low 2017	Wage Rate Median 2017	Wage Rate High 2017	NOC Code
Firefighters	1,400	\$27.00	\$40.00	\$52.00	4312
Aircraft mechanics and aircraft inspectors	1,400	\$20.90	\$34.00	\$45.19	7315
Human resources and recruitment officers	1,400	\$17.79	\$27.00	\$38.46	1223
Supervisors, finance and insurance office workers	1,300	\$17.87	\$28.72	\$46.15	1212
Photographers	1200	N/A	N/A	N/A	5221
Non-commissioned ranks of the Canadian Armed Forces	1200	\$16.21	\$28.21	\$37.38	4313
Customs, ship and other brokers	300	\$11.35	\$21.85	\$39.50	1315

High Demand Occupations Usually Requiring High School and/or Occupation Specific Training (8 Occupations)

Receptionists	9,600	\$11.35	\$17.58	\$25.00	1414
Food and beverage servers	8,200	\$11.35	\$11.35	\$15.69	6513
Home support workers, housekeepers and related occupations	7,100	\$11.35	\$16.75	\$23.00	4412
Home childcare providers	4,700	\$11.35	\$12.00	\$21.60	4411
Taxi and limousine drivers and chauffeurs	2,900	\$11.35	\$15.38	\$30.00	7513
Couriers, messengers and door-to-door distributors	1,800	\$11.35	\$12.50	\$25.00	1513
Letter carriers	1,600	\$18.00	\$25.00	\$28.00	1512
Mail, postal and related workers	1,300	\$11.35	\$18.00	\$26.00	1511

High Demand Health Occupations (Priority Health Occupations identified by the B.C. Ministry of Health) (13 Occupations)

Occupation	Employment 2018	Wage Rate Low 2017	Wage Rate Median 2017	Wage Rate High 2017	NOC Code
Family physicians*	6,218**	\$41,800*	\$209,000*	\$405,800*	3112
Nurse Practitioners	N/A	N/A	N/A	N/A	-
Health care assistants	34,717	\$16.00	\$21.00	\$27.00	3413
Physiotherapists	3,758	\$20.00	\$37.00	\$44.76	3142
Occupational therapists	2,200	\$31.00	\$38.42	\$42.00	3143
Geriatricians*	49**	\$107,300*	\$282,900*	\$434,200*	-
Licensed practical nurses	9,612	\$22.60	\$27.00	\$29.50	3233
Perfusionists	59**	\$48.60	\$50.37	\$52.43	-
Specialty registered nurses	47,396	\$23.00	\$37.00	\$43.00	3012
Psychiatrists*	838**	\$70,900*	\$239,700*	\$480,200*	-
Sonographers	743	\$20.21	\$37.11	\$48.56	3216
Paramedics	3,182	\$17.00	\$26.78	\$39.66	3234
Dermatologists*	66**	\$76,800*	\$320,600*	\$643,900*	-

Notes:

- Occupations **highlighted** refer to moving to balance occupations. These are occupations that have fallen in the ranking relative to other occupations and will be monitored for possible elimination from the list in the next edition if current conditions continue.
- The wage rate refers to the Job Bank hourly wage rate (from Employment and Social Development Canada) which was updated in 2017, unless otherwise noted. For occupations with a "*", the annual wage rate is provided as the hourly wage rate is not available. In some cases, no wage data is available and this is indicated with "N/A".
- Employment figures marked with a "**" refer to 2017 employment estimates from the B.C. Ministry of Health. Employment data for other health occupations refer to 2018 employment estimates from the Labour Market Outlook.
- Wage data for Perfusionists, Family physicians, Geriatricians, Psychiatrists, and Dermatologists is from the B.C. Ministry of Health, representing gross earnings before the payment of office and other overhead expenses.

Which industries contain the largest number of High Demand Occupations?

The total employment of High Demand Occupations is estimated to be over 1,062,000 in 2018. They are spread across a wide range of industries and there is not a strong concentration in a small number of industries. The top industry accounts for about six percent of High Demand Occupation employment, which is not a large share. Even the top 10 industries only represent about half of total employment (please see Table 3-2).

TABLE 3-2: Top 10 Industries with the Largest Employment of High Demand Occupations, 2018

Industry	Employment 2018	Share to All Industries
Hospitals	65,900	6.2%
Legal, accounting, design, research, and advertising services	65,500	6.2%
Other retail trade (excluding cars and personal care)	64,400	6.1%
Repair, personal and non-profit services	59,100	5.6%
Social assistance	56,700	5.3%
Food services and drinking places	49,500	4.7%
Ambulatory health care services	49,400	4.6%
Finance	49,200	4.6%
Elementary and secondary schools	45,700	4.3%
Real estate rental and leasing	42,500	4.0%
Other industries	514,600	48.4%
All industries	1,062,400	100.0%

Table 3-3 shows the top 10 industries with the highest share of High Demand Occupations as part of their employment. These are the industries that have the highest dependence on these occupations. Overall, the High Demand Occupations represent 42 percent of total employment in 2018. However, they represent 88 percent of employment in both Social assistance and Computer systems design and related services.

TABLE 3-3: Top 10 Industries with the Highest Concentration of Employment of High Demand Occupations, 2018

Industry	Employment High Demand Occupations Total	Employment All 500 Occupations Total	Employment Share of High Demand Occupations
Social assistance	56,700	64,100	88%
Computer systems design and related services	42,100	47,800	88%
Insurance carriers and related activities	25,200	32,000	79%
Real estate rental and leasing	42,500	54,700	78%
Community colleges	7,900	10,300	77%
Finance	49,200	65,800	75%
Nursing and residential care facilities	38,500	51,800	74%
Legal, accounting, design, research, and advertising services	65,500	91,900	71%
Publishing industries	8,700	12,300	71%
Hospitals	65,900	101,200	65%
Other industries	660,300	1,969,500	34%
All industries	1,062,400	2,501,100	42%

Emerging Themes

AUTOMATION OF WORK

Emerging technologies have revolutionized our personal and professional lives for decades. They also have the potential to make life easier and increase the efficiency of the province's economy. Smartphones, tablets, web-based applications, self-serve kiosks, online banking and even artificial intelligence (AI) are a large part of what we rely on day to day. Automation is so prevalent in our lives that it is often taken for granted and goes unnoticed.

Automation is the use of technology to replace, change or assist physical or mental tasks done by human beings. In many ways, it makes life and work easier. Yet, with it comes an underlying fear that machines will replace people; that automation will cause unemployment. In fact, it can increase the productivity of workers, allowing individuals to accomplish repetitive or mundane tasks more quickly or effectively and with fewer errors. And it can open doors for the person to undertake more interesting, rewarding and valuable duties as a part of their job. History shows that automation creates new tasks and new types of jobs.⁶ The nature of these new tasks and the speed at which they are adopted will both be shaped by the decisions of individual workers and employers.

As discussed in Appendix 5, the Outlook forecast incorporates an assumption that some basic level of automation will take place in such a way that the historical labour productivity⁷ growth trend will continue over the next 10 years. However, analysts have highlighted the possibility that we could see more rapid rates of automation than what is assumed in this forecast.⁸ This section of the *Outlook: 2018 Edition* investigates the possible impact.

Over the next 10 years, employment is not expected to be reduced as a result of automation. Based on the findings of Frey and Osborne (2013), specific positions will only be affected in that some tasks will be automated, not the whole job. Still, it is realistic to recognize that the process of automation and the transition to new technologies by employers can impact industries and occupations positively or negatively or a combination of both.

Industries struggling with labour shortages can benefit from automation. For example, even with young people starting out in the workforce, in-migration and immigration, the province is still facing a gap of about 130,000 job openings. There is a need to find additional people or ways to meet this need. More rapid automation could play a role in filling this gap.

Some workers may find it challenging to adapt to changes that come from increased automation. They may lack specific skills and competencies that would allow them to take on new tasks or new positions. Others may not be able to change their place of residence in order to be closer to better job opportunities; a lack of transportation or concerns about losing specific benefits through a job change could also be barriers in this area.

Overall, the prospect of increased automation in British Columbia is expected to be positive. It will help to address shortages. It will also help workers to focus on higher value tasks that rely on more innate human traits such as communication, critical thinking and social perceptiveness.

6 Daron Acemoglu and Pascual Restrepo (2018), *Artificial Intelligence, Automation and Work*.

7 Labour productivity is the amount of Gross Domestic Product produced per worker.

8 Creig Lamb (2016), *The Talented Mr. Robot: The impact of automation on Canada's workforce*. Brookfield Institute and Carl Frey and Michael Osborne (2013), *The Future of Employment: How susceptible are jobs to computerisation?* University of Oxford.

Automation will open up new opportunities. Certainly workers will be needed to develop, install and maintain the new technologies. Also, the nature of jobs will shift and increase demand for new skills. For example, in the banking industry, the adoption of Artificial Intelligence (AI) Platforms such as Robo-advisory services and e-transfers did not result in the elimination of front line jobs. However, it did dramatically change the duties of customer representatives shifting from typical tasks of answering basic questions to undertaking a broader and more complex range of sales and customer service responsibilities.

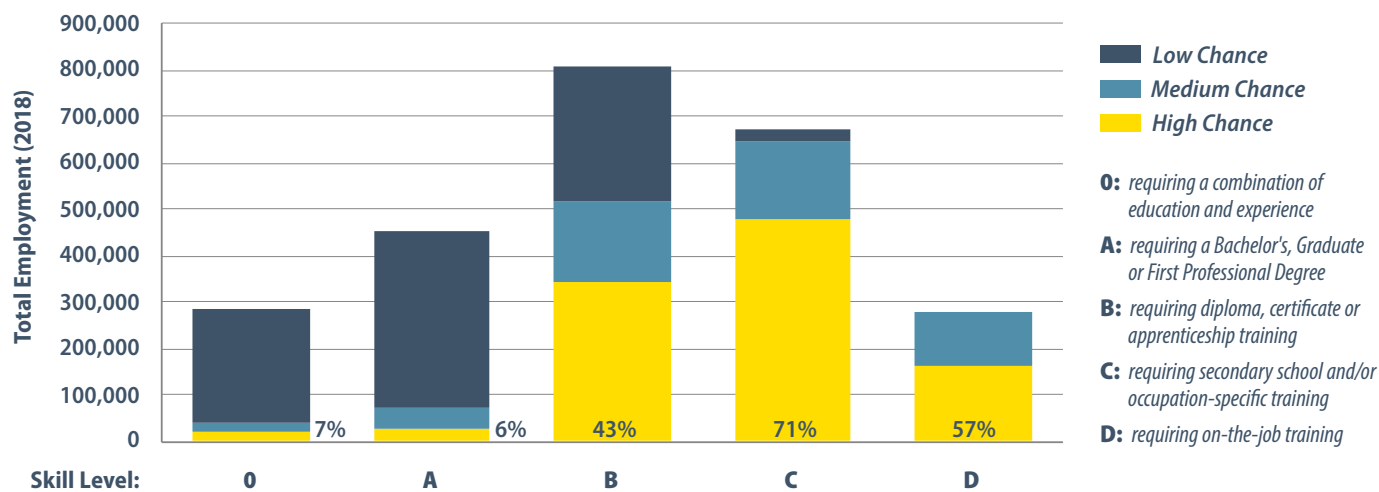
Government can help raise awareness of the benefits and risks of automation so that the education and training system is ready to help people prepare for and adjust to changes.

WHAT COULD THE IMPACT BE?

Based on the findings of Frey and Osborne (2013)⁹ and Lamb (2016)¹⁰ (researchers who reported on the likelihood of automation being adopted for each occupation), it is estimated that 36 percent of the 500 occupations in B.C. have a high chance of being affected by automation. These occupations represent 166,000 of projected job openings over the next 10 years. This potential for change offers both challenges and tremendous opportunities for the people of B.C.

As illustrated in Figure 4-1, the impact of automation is likely to be concentrated in lower-skilled jobs. Among the occupations that typically require only high school, over 70 percent of workers have a high chance of being affected by automation in part of or the entire job. For those that usually require less than high school, 57 percent of workers have a high chance of being affected. Occupations that, as a rule, need a degree generally have a low chance—six percent of current employment—of facing the possibility of being affected.

FIGURE 4-1: Estimated Automation Impact on the Number of Employment by Skill Level



Automation continues to be a topic of research interest around the world. Some researchers point to the risk that dramatic advances in artificial intelligence (AI) and machine learning could change or eliminate jobs at a much higher rate of change than an average worker or workforce can adapt to. At the other end of the spectrum, some studies contend that impacts based on the Frey & Osborne analysis of automation are over-estimated.¹¹

However, most studies are consistent in showing that the likelihood of being automated are not distributed equally across occupations. The importance in establishing policies and programs to facilitate retraining and, when needed, provide social protection for those unable to adapt is also highlighted.

The research shows general agreement about “bottlenecks to automation.” There is a range of skills and competencies that are difficult to automate. These include: “social intelligence, such

⁹ Carl Frey and Michael Osborne (2013).

¹⁰ Creig Lamb (2016).

¹¹ See the literature survey (and their own estimates) in Nedelkoska, L. and G. Quintini (2018), “Automation, skills use and training”, *OECD Social, Employment and Migration Working Papers*, No. 202, OECD Publishing, Paris. <http://dx.doi.org/10.1787/2e2f4eea-en>

as the ability to effectively negotiate complex social relationships, including caring for others or recognizing cultural sensitivities; cognitive intelligence, such as creativity and complex reasoning; and perception and manipulation, such as the ability to carry out physical tasks in an unstructured work environment.¹²

In B.C., many of the occupations that have a high chance of automation are currently experiencing labour shortages.¹³

Automation could offer an opportunity for workers to earn higher wages and is an example of the importance of an individual's ability to adapt to changing technologies and the needs of employers. Going forward, a person's long-term success in the labour market will rely on their adaptability and capacity to develop transferable skills and competencies.

This information points to the importance of British Columbians understanding the skills and competencies that will be in highest demand in the future, so that they can be as resilient and adaptable as possible.

DEMAND FOR SKILLS AND COMPETENCIES

The people of this province will need a strong foundation of skills and workforce competencies as they plan their career paths and go after the opportunities offered in the 21st Century economy.¹⁴ As discussed in the previous section, technological advancements such as artificial intelligence, robotics and automation are shaping the future demand for skills and competencies. Additionally, it is expected that about 77 percent of job openings will require people with post-secondary education.

Job seekers and workers can benefit from a greater understanding of the skills and competencies that are needed by employers. As a contribution to this understanding, this section describes the skills and competencies necessary for the future job openings in British Columbia. Demand for skills and competencies for 500 NOC occupations¹⁵ is estimated by linking B.C.'s projected job openings to the U.S. Labour Department dataset called O*NET¹⁶ (Occupational Network Information). This projection is based on the current structure of the skills and competencies required to match people to good jobs. These results are summarized in Figure 4-2.

The study reveals a strong demand for people skills—namely **communication skills** such as **active listening, speaking and reading comprehension**—as well as **critical thinking** (please see definitions in Appendix 1).

The findings show that demand for STEM¹⁷-related skills and competencies, such as **programming, science, mathematics (or numeracy), and technology design**, are critical for particular occupations such as computer programmers, software engineers, mathematicians,

As measured by future B.C. job openings, these are some of the top occupations with a high chance of being affected by automation:

- » Retail salespersons
- » Food counter attendants & kitchen helpers
- » Accounting technicians and bookkeepers
- » Administrative officers
- » General office support workers
- » Drivers
- » Cooks
- » Accounting and related clerks
- » Administrative assistants
- » Food and beverage servers
- » Receptionists
- » Cashiers
- » Carpenters
- » Shippers and receivers
- » Heavy equipment operators
- » Welders

These are all jobs that employers are currently having difficulty in filling, based on above average reported vacancy rates.

12 Ibid. p. 6.

13 Based on analysis of data from Statistics Canada's Job Vacancy and Wage Survey. The top 16 occupations in terms of future job openings, with a high chance of being affected by automation all currently are ranked above average in terms of vacancies.

14 "Skills" is the ability to perform tasks due to one's knowledge, learning or practice. "Competencies" is the ability to apply skills and knowledge to perform complex tasks well and to adapt easily to the activities of a variety of jobs. See Appendix 1 for additional definitions.

15 NOC stands for National Occupational Classification. Three occupations have been dropped through the process of mapping the O*NET dataset in SOC (Standard Occupational Classification) to NOC, including Commissioned Officers of the Canadian Armed Forces (NOC 0433), Other religious occupations (NOC 4217) and Non-Commissioned ranks of the Canadian Armed Forces (NOC 4313).

16 U.S. Department of Labor, Employment and Training Administration, O*NET database version 22.3 released in May 2018, <https://www.onetcenter.org/database.html>. See Appendix 1 for additional information about the concepts in this data set.

17 STEM stands for Science, Technology, Engineering and Mathematics.

statisticians and actuaries, physicists, and chemists. However, these skills are not ranked highly across the wide range of other occupations.

The competencies required to do a job vary across occupational groups as a result of the nature of the work. For instance, **social perceptiveness** and **service orientation** are very important for health and sales & service occupations, while **operation and control** are essential for natural resources, agriculture and related production occupations as well as those in manufacturing and utilities. Likewise, 100 percent of projected job openings for management occupations highly require active listening skills, compared to 19 percent for manufacturing and utilities occupations (please see Figure 4-3).

As the types of skills and competencies needed in the labour market continually shift and evolve, it is crucial to proactively align B.C.'s workforce to meet the demands of a changing world. Employees looking for new ways to differentiate themselves in the labour market can add value to their credentials by learning new skills and competencies and by gaining higher levels of proficiency in their existing ones. Continuing education and training programs, at all levels, are necessary to give the existing workforce the opportunities to upgrade their abilities in order to succeed in today's and tomorrow's economy.

Top skills of the future

- » *Active listening is identified as a "very important" skill for 73 percent of total projected job openings in B.C.*
- » *Speaking is "very important" for 65 percent of job openings.*
- » *Reading comprehension is "very important" for 56 percent of job openings.*
- » *Critical thinking is "very important" for 55 percent of job openings.*

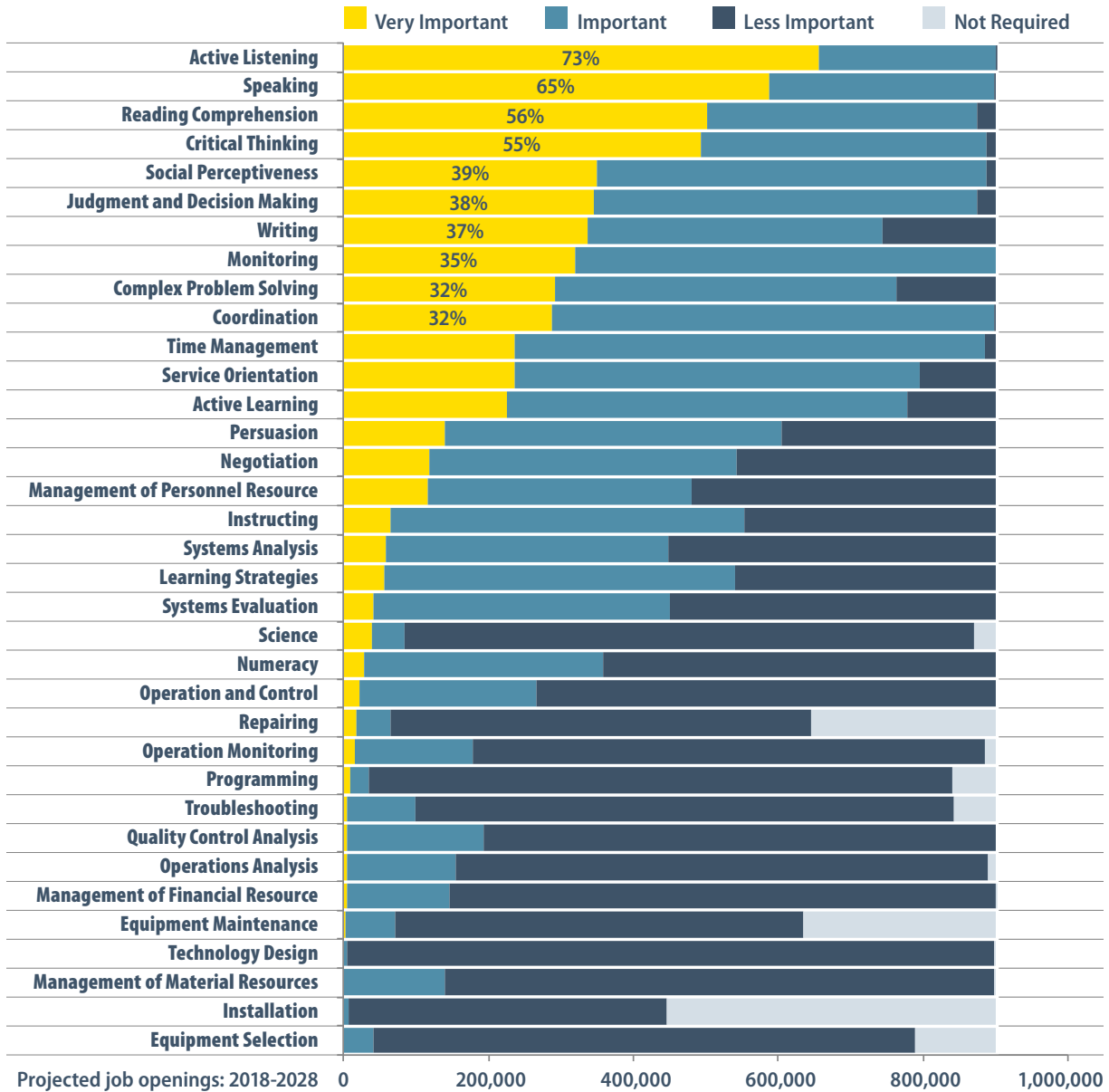
Top competencies of the future

- » *Social perceptiveness and judgement and decision making are identified as "very important" for almost 40 percent of job openings.*

(Please see Figure 4-2 for more details.)



FIGURE 4-2: Projected Demand for Skills and Competencies, B.C., 2018-2028



Source: The analysis was based on the U.S. Department of Labor, Employment and Training Administration's O*NET database version 22.3, released in May 2018, <https://www.onetcenter.org/database.html> and British Columbia Labour Market Outlook: 2018 Edition.

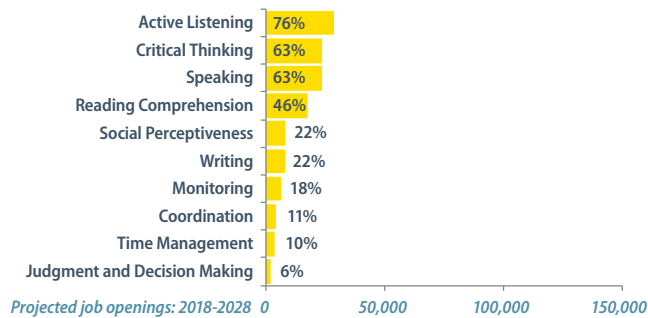
Note: The chart indicates the share of projected job openings for each of the 35 work-related skills and competencies identified as "very important" in descending order.

FIGURE 4-3: Projected Demand for Skills and Competencies by Occupational Group, B.C., 2018-2028

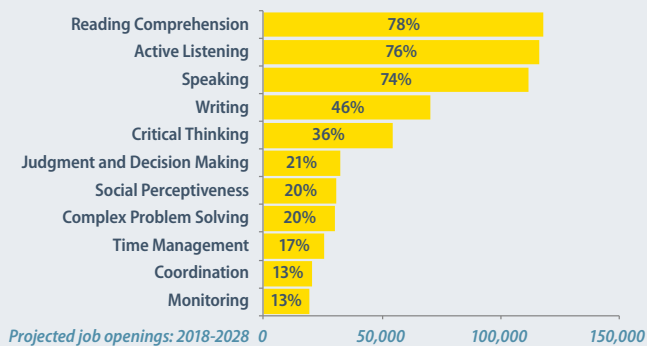
Management occupations



Occupations in art, culture, recreation and sport



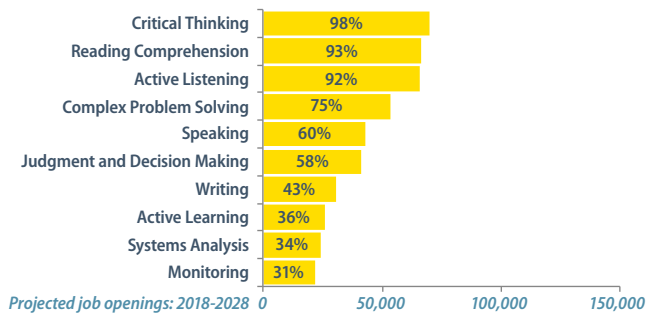
Business, finance and administration occupations



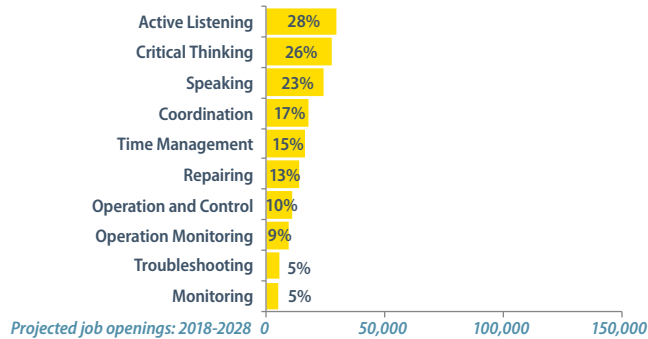
Sales and service occupations



Natural and applied sciences and related occupations



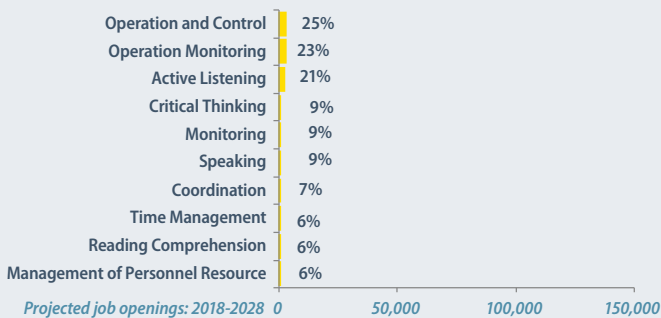
Trades, transport and equipment operators and related occupations



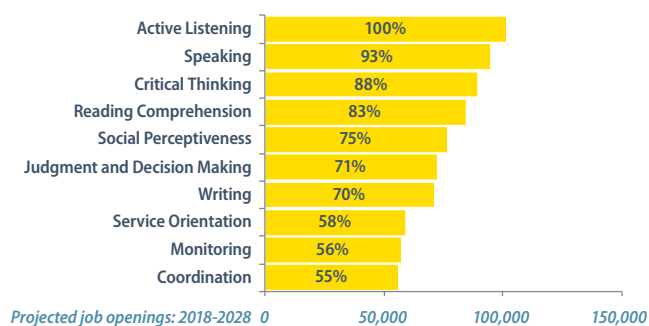
Health occupations



Natural resources, agriculture and related production occupations



Occupations in education, law and social, community and government services



Occupations in manufacturing and utilities



Source: The analysis was based on the U.S. Department of Labor, Employment and Training Administration's O*NET database version 22.3, released in May 2018, <https://www.onetcenter.org/database.html> and British Columbia Labour Market Outlook: 2018 Edition.

Note: The chart indicates the share of projected job openings for each of the 35 work-related skills and competencies identified as "very important" in descending order.

THE MEANING OF WORK

This report covers a wide range of factors for people to consider when planning their working life. Identifying which jobs will be in high demand in the future is one step. Understanding the education, skill and competency requirements can help pinpoint what is needed to succeed on a chosen career path. And, establishing a clear view on a person's current education credentials, skills and competencies can help each person to more fully decide on the right career choice for them moving forward.

Another set of factors for both learners and job seekers to consider is how they—as individuals—define work and how career decisions can be shaped by their personal characteristics. Most workers in B.C. need to work in order to afford today's cost of living. Still, to the extent that it is possible, job seekers can also take stock of what they value in life and use that as a guide for their career choices. For example, acknowledging and addressing individual requirements around work/life balance helps create success in the long run.

Key questions to ask include:

- ▶ What does work mean to you?
- ▶ How does work factor into the other things you want to do in life?
- ▶ What are your abilities, work styles, values and occupational interests and how do these affect your career plans?

Defining the Meaning of "Work"

Much of traditional labour market analysis is based on the concept of working for an employer (employment) or customers/clients (self-employment) that involves both:

- ▶ the exchange of labour for money; and
- ▶ being measured by official labour market statistics.

In reality, there are many other types of work that generate personal and social benefits. Examples include:

- ▶ Caring for children, the elderly and other people with other needs
- ▶ Running a home
- ▶ Harvesting and hunting for food or other goods
- ▶ Fulfilling cultural, community, religious, family and other duties or responsibilities
- ▶ Charitable work/volunteering

With this in mind, there are many people who are not officially counted as being "employed" or in the "labour force," yet they are generating real benefits in other types of unmeasured or non-professional work.

In addressing the need to identify “additional supply requirements” referred to in Chapter 2, it is important to acknowledge this. It could be the case that because individuals have other responsibilities and preferences outside of conventional employment, they have less time available for “official” work than might be presumed.

Personal Characteristics

A person’s history, experiences, preferences and interests are key factors to take into consideration when making career decisions. From thinking about which jobs most suit an individual’s experience, skill sets and abilities to which position would offer the most professional or personal satisfaction—taking a holistic rather than segmented view is important. Understanding—on a personal level—what would enable a person to thrive in their work life is also a key factor for success.

Employers realize the value of understanding these elements and typically consider them when reviewing whether a prospective candidate is a good fit for a role and the organization.

The O*Net content model, referred to in the previous section on skills and competencies, provides one example of how to categorize, measure and define personal characteristics. These are enduring personality traits that may influence work performance and the capacity to acquire the knowledge and skills necessary for effective work performance.

The O*Net framework for personal characteristics has four main categories:

- ▶ **Abilities** are a person’s foundational qualities that influence job performance.
- ▶ **Work values** are aspects of work that are made up of specific personal, professional, ethical or emotional requirements that are important to a worker to achieve a sense of satisfaction from their job.
- ▶ **Work styles** are individual elements of how an individual performs tasks and can affect how well they do a specific job.
- ▶ **Occupational interests** address a person’s preferences for their work focus and environment.

Example: Linking Career Decisions To Occupational Interests

The High Demand Occupations list provided earlier in this report is based on criteria that is distinct from personal characteristics—and separate from skills and competencies.

The High Demand Occupations list is based purely on the number of expected job opportunities and how easy it is currently and will be moving forward to get a job in each occupation. While it is a useful list to consider in career planning, it does not reflect any individual’s particular mix of abilities, styles, values and interests. Since it is projected that there will be opportunities in all of the occupations listed over next the 10 years, it also means that there are employment prospects for workers with wide-ranging interests.

For example, a person might consider a range of elements within the context of their occupational interests when career planning. They would do this by taking the search beyond what jobs are available and digging deeper to find out what work would fit with their interests, knowledge, skills and longer-term plans. Figure 4-4 provides for each category of O*Net occupational interests, a sample of some of the larger occupations that have a high connection to each occupational interest category.

FIGURE 4-4: Sample Occupations by O*Net Occupational Interest Group¹⁸

HANDS-ON <i>"practical, hands-on"</i>	SOCIAL <i>"working with and helping people"</i>	ARTISTIC <i>"design and self-expression"</i>
<ul style="list-style-type: none"> » Electrical and electronics engineers » Aerospace engineers » Cooks » Carpenters » Automotive service technicians » Electricians » Electronic service technicians » Welders » Painters » Heavy-duty equipment mechanics » Material handlers » Drivers » Heavy equipment operators » Sawmill machine operators » General farm workers 	<ul style="list-style-type: none"> » Teachers » Social workers » Family, marriage and other related counsellors » Professional occupations in religion » Post-secondary teaching and research assistants » Physiotherapists » Educational counsellors » Occupational therapists » Early childhood educators and assistants » Licensed practical nurses » Massage therapists » Paramedical occupations » Practitioners of natural healing » Nurse aides, orderlies and patient service associates » Food and beverage servers 	<ul style="list-style-type: none"> » Teachers » Producers, directors, choreographers and related occupations » Web designers and developers » Musicians and singers » Authors and writers » Painters, sculptors and other visual artists » Architects » Editors » Actors and comedians » Journalists » Urban and land use planners » Early childhood educators and assistants » Graphic designers and illustrators » Drafting technologists and technicians » Interior designers and interior decorators
INVESTIGATIVE <i>"thinking and working with ideas"</i>	ENTERPRISING <i>"business and risk taking"</i>	ROUTINIZED <i>"established rules and procedures"</i>
<ul style="list-style-type: none"> » Computer programmers and interactive media developers » Software engineers and designers » Civil engineers » General practitioners and family physicians » Electrical and electronics engineers » Specialist physicians » Mechanical engineers » Pharmacists » Biologists and related scientists » Dentists » Psychologists » Geoscientists and oceanographers » Dietitians and nutritionists » Urban and land use planners » Industrial and manufacturing engineers 	<ul style="list-style-type: none"> » Retail and wholesale trade managers » Restaurant and food service managers » Construction managers » Corporate sales managers » Manufacturing managers » Real estate agents and salespersons » Chefs » Retail sales supervisors » Insurance agents and brokers » Retail and wholesale buyers » Conference and event planners » Retail salespersons » Sales and account representatives—wholesale trade (non-technical) » Tour and travel guides » Outdoor sport and recreational guides 	<ul style="list-style-type: none"> » Financial auditors and accountants » Database analysts and data administrators » Librarians » Administrative officers and assistants » Accounting technicians and bookkeepers » Executive assistants » General office support workers » Receptionists » Accounting and related clerks » Storekeepers and parts persons » Data entry clerks » Casino occupations » Survey interviewers and statistical clerks » Cashiers » Store shelf stockers, clerks and order fillers

¹⁸ Note: occupations can be aligned to more than one interest category. See Appendix 1 for description of each category.

APPENDIX 1: Definitions

LABOUR MARKET DEFINITIONS

- ▶ **Expansion Job Openings:** New job openings that arise due to economic growth between 2018 and 2028.
- ▶ **Immigrants:** Net in-migration from persons moving to British Columbia from outside of Canada.
- ▶ **Labour Demand:** The number of employed people plus unfilled positions.
- ▶ **Labour Supply:** The labour force, encompassing those who work and those who are actively looking for work.
- ▶ **Net Additional Supply Requirements:** This concept captures different types of mobility in the labour market, such as people re-entering the labour market after a period of absence or increasing their skills later in life.
- ▶ **Net In-Migration:** Net of the inflow and outflow of persons from/to B.C. Persons could be moving from/to other provinces or from outside of Canada.
- ▶ **People from other provinces:** Net in-migration from jurisdictions in Canada outside of the province of British Columbia.
- ▶ **Replacement Job Openings:** Job openings to fill positions that are generated by a permanent exit from the labour force from 2018-2028. This includes exits due to retirements, illness, disabilities, deaths and other reasons.
- ▶ **Young People Starting Work:** Persons, 17-29 years old, starting work for the first time after graduating from/leaving the education system.



O*NET SKILLS AND COMPETENCIES DEFINITIONS ¹⁹

The O*NET is a comprehensive database that contains information on occupational characteristics as well as worker characteristics and requirements for almost 1000 occupations based on the Standard Occupational Classification (SOC). The O*NET database is collected and updated through ongoing surveys of workers in each occupation supplemented in some cases by occupation experts. The database describes occupations in terms of the skills, knowledge, education, abilities and work values required as well as how the work is performed in terms of tasks, work activities and other work characteristics.

The O*NET dataset identified a total of 35 work-related skills.

- ▶ 10 basic skills (called skills in this report)
 - ▶ Reading Comprehension, Active Listening, Writing, Speaking, Numeracy, Science, Critical Thinking, Active Learning, Learning Strategies, and Monitoring; and
- ▶ 25 cross-functional skills (called competencies in this report)
 - ▶ Social Perceptiveness, Coordination, Persuasion, Negotiation, Instructing, Service Orientation, Judgment and Decision Making, Systems Analysis, Systems Evaluation, Time Management, Management of Financial Resources, Management of Material Resources, Management of Personnel Resources, Operations Analysis, Technology Design, Equipment Selection, Installation, Programming, Operation Monitoring, Operation and Control, Equipment Maintenance, Troubleshooting, Repairing, and Quality Control Analysis.
- ▶ **Active Learning:** *Understanding how new information could be used to solve current and future problems in making decisions.*
- ▶ **Active Listening:** *Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.*
- ▶ **Competencies:** *Ability to perform specific tasks well and to adapt easily to the activities of a variety of jobs.*
- ▶ **Complex Problem Solving:** *Being able to solve novel, ill-defined problems in complex, real-world settings.*
- ▶ **Co-ordination:** *the organization of the different elements of a complex initiative or activity so as to enable items, tasks and people to work together effectively.*
- ▶ **Critical Thinking:** *Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.*
- ▶ **Equipment Maintenance:** *Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.*
- ▶ **Equipment Selection:** *Determining the kinds of tools and equipment needed to do a job.*
- ▶ **Installation:** *Installing equipment, machines, wiring, or programs to meet specifications.*
- ▶ **Instructing:** *Teaching others how to do something.*
- ▶ **Judgement and Decision Making:** *Considering the relative costs and benefits of potential actions to choose the most appropriate one.*
- ▶ **Learning Strategies:** *Choosing and using training, instructional methods and procedures appropriate for the situation when learning or teaching new things.*
- ▶ **Management of Financial Resources:** *Determining how money will be spent to get the work done and accounting for these expenses.*
- ▶ **Management of Material Resources:** *Ensuring the appropriate use of equipment, facilities and materials needed to do identified tasks and projects.*
- ▶ **Management of Personnel Resources:** *Motivating, developing and directing people as they work, and identifying the best people and skill sets for the job.*
- ▶ **Monitoring:** *Keeping track of and assessing your performance, other individuals, or organizations to make improvements or take corrective action.*

¹⁹ Source: The definitions related to skills and competencies are adapted from the U.S. Department of Labor, Employment and Training Administration's O*NET Content Model, <https://www.onetcenter.org/content.html>

- ▶ **Negotiation:** Bringing others together and trying to reconcile differences.
- ▶ **Numeracy:** Using mathematics to solve problems.
- ▶ **Operation and Control:** Controlling operations of equipment or systems.
- ▶ **Operation Monitoring:** Watching gauges, dials or other indicators to make sure that a machine is working properly.
- ▶ **Operation Analysis:** Analyzing operational and product needs to create a design.
- ▶ **Persuasion:** Convincing others to change their mind or behaviour.
- ▶ **Programming:** Writing computer programs for various purposes.
- ▶ **Quality Control Analysis:** Conducting tests and inspections of products, services or processes to evaluate quality or performance.
- ▶ **Reading Comprehension:** Understanding written sentences and paragraphs in work-related documents.
- ▶ **Repairing:** Repairing machines or systems using the needed tools.
- ▶ **Science:** Using scientific rules and methods to solve problems.
- ▶ **Service Orientation:** Actively looking for ways to help people.
- ▶ **Skills:** Ability to perform tasks as a result of one's knowledge, learning or practice.
- ▶ **Social Perceptiveness:** Being aware of others' reactions and understanding why they react as they do.
- ▶ **Speaking:** Talking to others to share information effectively.
- ▶ **Systems Analysis:** Determining how a system should work and how changes in conditions, operations and the environment will affect outcomes.
- ▶ **Systems Evaluation:** Identifying measures or indicators of system performance and the actions needed to improve or correct performance, while meeting the goals of the system.
- ▶ **Technology Design:** Creating or adapting equipment and technology to serve user needs.
- ▶ **Time Management:** Managing one's own time and the time of others.
- ▶ **Troubleshooting:** Determining causes of operating errors and identifying solutions.
- ▶ **Writing:** Communicating effectively through composing text as appropriate for the needs of the audience.

The O*NET dataset is measured in two different scale types, a five-point importance scale and a seven-point level scale. Importance scale indicates the degree of importance a particular "skill" is to the occupation. Level scale indicates the degree to which a particular "skill" is required or needed to perform the occupation. The importance scale was used in the analysis.

O*NET OCCUPATIONAL INTERESTS DEFINITIONS

- ▶ **Hands-on** – Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals and real-world materials like wood, tools and machinery. Many of the occupations require working outside and do not involve a lot of paperwork or working closely with others.
- ▶ **Social** – Social occupations usually involve working with, communicating with, and teaching people. These occupations often involve helping or providing service to others.
- ▶ **Investigative** – Investigative occupations typically include working with ideas and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.
- ▶ **Enterprising** – Enterprising occupations are often comprised of starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and they often deal with business.
- ▶ **Artistic** – Artistic occupations often require working with forms, designs and patterns. They typically require self-expression and the work can be done without following a clear set of rules.
- ▶ **Routinized** – Routinized occupations frequently require following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.