

Study: Skill requirements of jobs of postsecondary graduates

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Jobs held by graduates of architecture and engineering programs in 2011 required the highest skill levels among male and female bachelor's degree holders from the various disciplines. A new study also found that jobs held by graduates of education, visual and performing arts, and humanities programs generally required lower level skills than other bachelor's degree graduates.

While many previous studies have examined the earnings of graduates from different academic programs, students may consider other factors when choosing a program, such as the skills required in actual jobs obtained by program graduates. Although bachelor's degree graduates from programs such as architecture and engineering often held jobs that were very closely related to their studies, this was not always the case among other graduates. To date, information on the specific skills required in the jobs held by Canadian postsecondary graduates has not been available.

To address this data gap, a new study used the 2011 National Household Survey to examine full-time paid jobs in the Census reference week held by 25 to 34 year-old men and women whose highest level of postsecondary study was completed in Canada. The occupations in which individuals worked were assigned skill levels based on the US Occupational Information Network Database, which is a survey of job incumbents and job analysts.

The survey breaks down skill levels from 0 (not important) to 7 (the highest level). In total, 35 occupational skill requirements were examined, such as reading comprehension, writing, mathematics, complex problem-solving, troubleshooting and time management.

Graduates from 11 broad academic programs were then ranked according to the level of occupational skill requirements in the jobs that they held. Importantly, the study did not look at the skills possessed by graduates, but rather at the skills required in the jobs that they held.

Male architecture and engineering bachelor's degree graduates in Canada ranked first among the 11 programs, with the highest skills required for their job in 26 of the 35 skill categories. Their female counterparts ranked first in 23 of the 35 skills. Graduates from this discipline held jobs requiring not only the highest levels of mathematics, science, and technological skills, but also the highest reading comprehension, writing, and resource management skills. The only area where they did not place near the top was in social skills, where they were near the average.

Mathematics, computer and information sciences graduates in Canada also tended to hold high-skilled jobs. Male bachelor's degree graduates were among the top three programs in 17 of the 35 skill areas. Their female counterparts were among the top three programs in 16 of the 35 skills. Once again, these graduates held jobs generally requiring above-average reading comprehension and writing skills. Male bachelor's degree graduates in business, management, and public administration, as well as female bachelor's degree graduates in health and related fields, also held jobs requiring a wide-range of diverse, high-level skills.

In contrast, bachelor's degree graduates from education, visual and performing arts, and humanities almost always ranked near the bottom with regards to the level of skills required in their jobs. This was the case with respect to reading comprehension, writing and resource management skills, among others.

The study also looked at the skill content of jobs held by college graduates. While skill requirements were almost always higher among bachelor's degree holders than among college graduates from the same discipline, the relative ranking of disciplines tended to differ at each level.

In general, the study suggests that men and women with higher levels of educational attainment generally held jobs requiring higher skill levels than high school graduates. This was the case even for bachelor's degree graduates from education, visual and performing arts, and humanities.



However, skill requirements did not always rise with educational attainment. For example, technical operation and maintenance skill requirements were higher among men with no university degree than men with a university degree. Also, doctoral graduates held jobs that required lower resource management skills than other university graduates.

Table 1
Occupational Information Network (O*NET) skill level rankings across fields of study, bachelor's degree graduates, men

	Education	Visual and performing arts	Humanities	Social and behavioural sciences	Business, management and public administration	Physical and life sciences	Mathematics, computer and information science	Architecture and engineering	Agriculture, natural resources and conservation	Health and related	Personal, protective and transportation services
	field of study and ranking										
Reading comprehension	9	11	10	7	4	3	2	1	6	5	8
Writing	8	11	10	5	2	3	4	1	7	6	9
Mathematics	10	11	8	6	2	4	3	1	5	9	7
Science	11	10	9	8	7	3	5	1	4	2	6
Process, complex problem solving and systems											
Active learning	7	11	10	8	2	5	3	1	9	4	6
Complex problem solving	11	10	9	7	4	5	2	1	6	8	3
Critical thinking	11	10	9	6	3	8	2	1	7	5	4
Judgement and decision making	10	11	9	7	2	6	3	1	8	5	4
Learning strategies	1	11	7	10	4	5	8	3	9	2	6
Monitoring	6	11	10	7	4	8	5	1	9	3	2
Systems analysis	11	10	9	5	3	4	2	1	6	8	7
Systems evaluation	10	11	9	7	3	6	2	1	8	5	4
Social											

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Active listening	9	11	8	5	2	7	6	1	10	3	4
Coordination	4	11	9	6	5	7	8	1	10	2	3
Instructing	1	11	9	8	7	6	4	2	10	3	5
Negotiation	3	9	6	2	1	8	11	7	10	4	5
Persuasion	10	11	6	2	1	9	8	4	7	3	5
Service orientation	3	10	5	4	2	7	8	11	9	1	6
Social perceptiveness	2	11	6	5	4	7	9	8	10	1	3
Speaking	9	11	8	4	1	6	10	2	7	3	5
Technical operation and maintenance											
Equipment maintenance	11	6	7	9	10	5	4	1	2	8	3
Equipment selection	11	5	7	9	10	4	2	1	3	6	8
Installation	11	3	5	6	9	4	2	1	7	10	8
Operation and control	11	7	6	8	10	4	9	3	2	5	1
Operation monitoring	11	7	8	9	10	6	3	1	4	5	2
Quality control analysis	8	7	9	10	11	5	2	1	3	6	4
Repairing	11	5	7	9	10	4	3	1	2	8	6
Troubleshooting	9	7	8	10	11	5	2	1	4	6	3
Technical design and analysis											
Operations analysis	11	6	10	7	3	5	2	1	4	9	8
Programming	11	9	7	6	5	3	1	2	4	10	8
Technology design	10	3	8	9	7	4	2	1	5	6	11
Resource management											
Management of financial resources	11	10	6	3	2	8	5	1	4	9	7
Management of material resources	11	10	9	7	2	8	6	1	3	5	4
Management of personnel resources	10	11	9	6	3	8	5	1	7	4	2
Time management	3	11	10	7	5	8	4	1	9	6	2
	number										
Sample size	3,357	1,455	3,824	7,301	12,150	3,153	4,700	10,303	1,055	2,309	233

Note(s): Sample: Men age 25 to 34 whose highest level of education is a bachelor's degree and who studied in Canada; men who worked 30 hours or more in reference week as an employee and had a valid occupation code. Graduates whose field of study was "other" were excluded.

Source(s): Statistics Canada, 2011 National Household Survey; and US Department of Labor, Occupational Information Network, version 17.0.

Table 2
Occupational Information Network (O*NET) skill level rankings across fields of study, bachelor's degree graduates, women

	Education	Visual and performing arts	Humanities	Social and behavioural sciences	Business, management and public administration	Physical and life sciences	Mathematics, computer and information science	Architecture and engineering	Agriculture, natural resources and conservation	Health and related	Personal, protective and transportation services
	field of study and ranking										
Reading comprehension	11	10	9	8	5	6	3	1	4	2	7
Writing	11	10	9	7	2	6	4	1	5	3	8
Mathematics Science	11	10	9	7	4	5	2	1	3	6	8
	9	11	10	8	7	3	5	1	4	2	6
Process, complex problem solving and systems											
Active learning	10	11	9	8	4	6	3	1	5	2	7
Complex problem solving	10	9	11	8	4	7	2	1	3	5	6
Critical thinking	11	10	9	7	3	8	4	1	6	2	5
Judgement and decision making	10	11	9	8	4	7	3	1	5	2	6
Learning strategies	1	11	10	8	5	4	6	3	9	2	7
Monitoring	6	11	10	9	3	8	7	2	4	1	5
Systems analysis	11	10	9	6	3	8	2	1	5	4	7
Systems evaluation	10	11	9	6	4	8	2	1	5	3	7
Social											
Active listening	11	10	8	5	2	7	6	4	9	1	3
Coordination	3	10	11	5	4	9	8	2	6	1	7
Instructing	4	11	10	8	7	5	3	2	9	1	6
Negotiation	9	8	7	3	1	11	10	4	6	2	5
Persuasion	11	9	8	5	2	10	7	3	6	1	4
Service orientation	4	8	5	3	2	7	9	11	10	1	6
Social perceptiveness	2	10	6	3	4	7	9	8	11	1	5
Speaking	11	10	9	6	2	7	8	3	5	1	4
Technical operation and maintenance											
Equipment maintenance	11	6	8	9	10	2	4	1	3	7	5
Equipment selection	6	7	9	10	11	3	2	1	5	4	8
Installation	11	3	7	8	9	5	2	1	4	10	6
Operation and control	11	6	9	8	10	5	7	2	1	4	3
Operation monitoring	11	7	9	8	10	3	5	1	4	2	6
Quality control analysis	6	8	9	10	11	3	2	1	5	4	7
Repairing	11	6	7	8	10	2	3	1	4	9	5
Troubleshooting	7	8	10	9	11	3	2	1	5	4	6
Technical design and analysis											
Operations analysis	11	5	10	7	3	6	2	1	4	8	9
Programming	11	10	8	6	5	4	1	2	3	9	7
Technology design	11	3	9	7	8	4	2	1	5	6	10
Resource management											
Management of financial resources	11	7	9	6	2	10	4	1	3	5	8
Management of material resources	11	7	9	6	4	8	5	1	3	2	10
Management of personnel resources	11	10	9	7	3	8	5	1	4	2	6
Time management	5	11	10	7	3	9	4	1	8	2	6
	number										
Sample size	10,583	2,293	5,701	12,695	12,962	4,184	1,233	2,451	1,055	8,573	180

Note(s): Sample: Women age 25 to 34 whose highest level of education is a bachelor's degree and who studied in Canada; women who worked 30 hours or more in reference week as an employee and had a valid occupation code. Graduates whose field of study was "other" were excluded.

Source(s): Statistics Canada, 2011 National Household Survey; and US Department of Labor, Occupational Information Network, version 17.0.

Table 3
Mean of Occupational Information Network (O*NET) skill level scores by education level, men

	Less than high school	High school	Trades	Registered apprenticeship	College	Bachelor's	Master's	Doctorate	Professional degree
Education level and mean									
Reading comprehension	2.895	3.126	3.062	3.059	3.524	4.005	4.178	4.524	4.585
Writing	2.515	2.771	2.685	2.680	3.155	3.664	3.844	4.182	4.142
Mathematics	2.072	2.226	2.274	2.498	2.543	2.986	3.033	3.115	2.535
Science	0.674	0.759	0.995	1.196	1.334	1.692	1.961	2.402	2.366
Process, complex problem solving and systems									
Active learning	2.447	2.662	2.677	2.793	3.071	3.489	3.611	3.826	4.109
Complex problem solving	2.623	2.778	2.808	2.892	3.111	3.418	3.518	3.589	3.827
Critical thinking	2.999	3.189	3.188	3.237	3.526	3.823	3.914	4.057	4.385
Judgement and decision making	2.633	2.814	2.815	2.918	3.154	3.530	3.663	3.721	4.123
Learning strategies	2.184	2.384	2.367	2.525	2.707	3.086	3.211	3.545	3.303
Monitoring	2.899	3.073	3.048	3.080	3.362	3.656	3.691	3.756	3.687
Systems analysis	1.932	2.159	2.226	2.392	2.637	3.070	3.169	3.114	3.175
Systems evaluation	1.906	2.158	2.213	2.401	2.659	3.133	3.199	3.087	3.052
Social									
Active listening	2.946	3.146	3.068	3.067	3.445	3.802	3.915	4.034	4.357
Coordination	2.966	3.080	3.050	3.183	3.255	3.425	3.449	3.388	3.613
Instructing	2.361	2.538	2.568	2.719	2.866	3.180	3.308	3.735	3.436
Negotiation	2.244	2.477	2.327	2.337	2.703	2.987	3.002	2.810	3.468
Persuasion	2.404	2.647	2.527	2.550	2.900	3.242	3.293	3.192	3.846
Service orientation	2.502	2.713	2.595	2.586	2.898	3.129	3.155	3.095	3.558
Social perceptiveness	2.617	2.812	2.688	2.669	3.046	3.349	3.415	3.418	3.812
Speaking	2.821	3.038	2.937	2.906	3.351	3.729	3.869	4.141	4.339
Technical operation and maintenance									
Equipment maintenance	1.429	1.196	1.808	2.340	1.234	0.466	0.313	0.278	0.118
Equipment selection	1.227	1.052	1.537	1.986	1.194	0.727	0.588	0.585	0.610
Installation	0.490	0.422	0.846	1.372	0.605	0.298	0.222	0.133	0.078
Operation and control	2.319	2.085	2.505	2.783	1.978	1.134	0.907	0.812	1.220
Operation monitoring	2.496	2.400	2.707	2.943	2.481	2.037	1.836	1.733	1.785
Quality control analysis	2.283	2.156	2.549	2.899	2.320	1.974	1.771	1.715	1.351
Repairing	1.376	1.147	1.811	2.434	1.211	0.450	0.306	0.269	0.100
Troubleshooting	1.762	1.584	2.121	2.612	1.742	1.179	1.002	0.925	0.771
Technical design and analysis									
Operations analysis	1.228	1.434	1.489	1.675	1.981	2.461	2.658	2.669	2.659
Programming	0.340	0.505	0.465	0.391	0.958	1.359	1.362	1.320	0.598
Technology design	0.655	0.742	0.884	1.087	1.104	1.277	1.235	1.211	1.077
Resource management									
Management of financial resources	1.113	1.302	1.206	1.320	1.522	1.867	1.872	1.418	1.869
Management of material resources	1.284	1.394	1.384	1.509	1.571	1.771	1.762	1.483	1.773
Management of personnel resources	2.236	2.419	2.388	2.532	2.684	2.958	2.995	2.742	3.138
Time management	2.688	2.840	2.824	2.913	3.084	3.333	3.404	3.400	3.604
	number								
Sample size	23,765	60,512	20,493	20,584	59,044	49,840	10,101	1,280	2,162

Note(s): Sample: Men age 25 to 34 who worked 30 hours or more in the reference week as an employee and had a valid occupation code; individuals with certificates below or above a Bachelor's degree as well as individuals whose postsecondary education was located at an institution outside of Canada were excluded. Postsecondary graduates whose field of study was "other" were also excluded.

Source(s): Statistics Canada, 2011 National Household Survey; and US Department of Labor, Occupational Information Network, version 17.0.

Table 4
Mean of Occupational Information Network (O*NET) skill level scores by education level, women

	Less than high school	High school	Trades	Registered apprentices hip	College	Bachelor's	Master's	Doctorate	Professional degree
Education level and mean									
Reading comprehension	3.086	3.351	3.317	3.180	3.596	3.922	4.130	4.493	4.554
Writing	2.761	3.033	3.007	2.915	3.292	3.614	3.839	4.124	4.144
Mathematics	2.099	2.295	2.267	2.222	2.428	2.629	2.711	2.801	2.490
Science	0.450	0.560	0.801	0.891	1.041	1.486	1.896	2.352	2.408
Process, complex problem solving and systems									
Active learning	2.562	2.797	2.828	2.845	3.055	3.384	3.556	3.797	4.054
Complex problem solving	2.552	2.731	2.702	2.700	2.901	3.210	3.388	3.533	3.752
Critical thinking	3.114	3.323	3.321	3.347	3.501	3.723	3.860	4.026	4.336
Judgement and decision making	2.656	2.838	2.787	2.770	2.999	3.393	3.576	3.733	4.075
Learning strategies	2.384	2.567	2.571	2.638	2.807	3.203	3.313	3.551	3.279
Monitoring	2.985	3.146	3.095	3.073	3.294	3.597	3.673	3.740	3.676
Systems analysis	1.942	2.183	2.173	2.144	2.444	2.792	2.976	2.986	3.109
Systems evaluation	1.916	2.163	2.147	2.207	2.401	2.865	3.025	2.970	3.010
Social									
Active listening	3.153	3.393	3.401	3.318	3.612	3.823	3.959	4.114	4.333
Coordination	2.948	3.055	2.990	2.947	3.162	3.420	3.462	3.427	3.600
Instructing	2.508	2.667	2.687	2.728	2.865	3.141	3.321	3.686	3.437
Negotiation	2.497	2.680	2.596	2.524	2.755	2.988	3.043	2.910	3.416
Persuasion	2.615	2.818	2.756	2.761	2.935	3.184	3.286	3.254	3.777
Service orientation	2.927	3.079	3.131	3.101	3.209	3.298	3.316	3.292	3.570
Social perceptiveness	2.865	3.022	3.060	3.027	3.240	3.522	3.602	3.659	3.813
Speaking	3.057	3.287	3.286	3.197	3.501	3.744	3.910	4.160	4.302
Technical operation and maintenance									
Equipment maintenance	0.421	0.328	0.322	0.497	0.292	0.152	0.142	0.096	0.061
Equipment selection	0.479	0.393	0.454	0.689	0.431	0.378	0.344	0.368	0.494
Installation	0.091	0.074	0.064	0.152	0.060	0.054	0.058	0.032	0.036
Operation and control	1.331	1.157	1.163	1.243	1.077	0.817	0.763	0.703	1.079
Operation monitoring	1.797	1.779	1.875	1.927	1.825	1.693	1.672	1.532	1.746
Quality control analysis	1.582	1.462	1.481	1.651	1.466	1.519	1.512	1.425	1.314
Repairing	0.381	0.299	0.282	0.415	0.242	0.142	0.139	0.092	0.038
Troubleshooting	0.861	0.738	0.830	1.038	0.760	0.690	0.726	0.665	0.659
Technical design and analysis									
Operations analysis	1.038	1.251	1.214	1.381	1.494	1.942	2.323	2.368	2.597
Programming	0.443	0.590	0.524	0.428	0.714	0.852	0.984	0.959	0.540
Technology design	0.541	0.620	0.650	0.702	0.750	0.864	0.962	0.933	0.952
Resource management									
Management of financial resources	1.177	1.334	1.254	1.194	1.343	1.465	1.533	1.322	1.729
Management of material resources	1.190	1.288	1.297	1.285	1.340	1.555	1.589	1.394	1.661
Management of personnel resources	2.264	2.437	2.395	2.364	2.544	2.840	2.952	2.787	3.103
Time management	2.713	2.876	2.847	2.779	3.019	3.300	3.405	3.419	3.593
	number								
Sample size	9,469	35,395	11,386	3,535	57,539	61,910	12,909	1,053	3,106

Note(s): Sample: Men age 25 to 34 who worked 30 hours or more in the reference week as an employee and had a valid occupation code; individuals with certificates below or above a Bachelor's degree as well as individuals whose postsecondary education was located at an institution outside of Canada were excluded. Postsecondary graduates whose field of study was "other" were also excluded.

Source(s): Statistics Canada, 2011 National Household Survey; and U.S. Department of Labor, Occupational Information Network, version 17.0.

Definitions, data sources and methods: survey number [5178](#).

The research paper [Do Postsecondary Graduates Land High-skilled Jobs?](#), which is part of the *Analytical Studies Branch Research Paper Series* ([11F0019M](#)), is now available.

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