

Analysis of the Economic Impact and Return on Investment of Education

THE ECONOMIC VALUE OF
DURHAM COLLEGE OF APPLIED ARTS AND TECHNOLOGY

March 2018



EXECUTIVE SUMMARY

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Durham College of Applied Arts and Technology (Durham College) creates value in many ways. This study investigates the economic impacts created by Durham College on the regional economy and the benefits that the college generates in return for the investments made by its key stakeholder groups—students, society, and taxpayers.

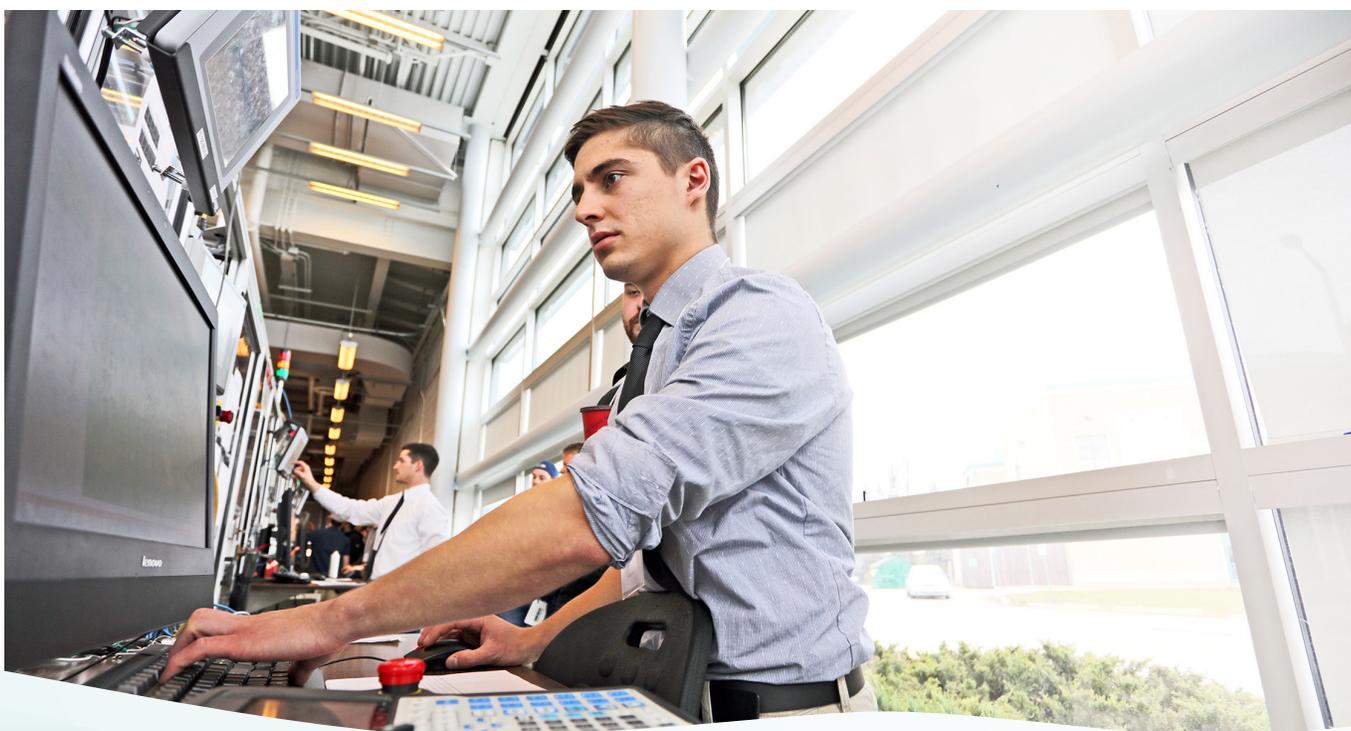
The value of Durham College influences both the lives of students and the Durham Region economy. The college serves a range of industries in the Durham Region and supplies local businesses with skilled workers. Society as a whole in Ontario benefits from an expanded economy and improved quality of life. The benefits created by Durham College extend as far as the provincial government, in the form of increased tax revenues and public sector savings.

This study investigates the economic impacts created by Durham College on the business community and the benefits that the college generates in return for the investments made by its key stakeholder groups—students, society, and taxpayers. The region the college serves is defined as the

Regional Municipality of Durham (Durham Region). The following two analyses are presented:

- **Economic impact analysis**
- **Investment analysis**

All results reflect student and financial data for fiscal year (FY) 2016-17. Impacts on the regional business community are reported under the economic impact analysis. Results are measured in terms of added income. The returns on investment to students, society, and taxpayers are reported under the investment analysis. Both analyses are described more fully in the following sections.



Economic impact analysis

Durham College promotes economic growth in the Durham Region in a variety of ways. The college is an employer and buyer of goods and services, and the living expenses of students benefit local businesses. In addition, Durham College is a primary source of education to regional residents and a supplier of trained workers to regional industries.

OPERATIONS SPENDING IMPACT

Durham College is an important employer in the Durham Region. In FY 2016-17, the college employed faculty and staff equivalent to 1,622 full-time employees. Of these, 73% lived in the Durham Region. Total payroll at Durham College was \$105.2 million, much of which was spent in the region for groceries, eating out, clothing, and other household expenses.

Durham College is itself a large-scale buyer of goods and services. In FY 2016-17, the college spent \$62 million to cover its expenses for facilities, professional services, and supplies.

The total income that Durham College created during the analysis year as a result of its day-to-day operations was \$153.8 million, which is equivalent to supporting 2,320 jobs in the region. This figure represents the college's payroll, the multiplier effects generated by the spending of the college and its employees, and a downward adjustment to account for funding that the college received from local sources.

STUDENT SPENDING IMPACT

Approximately 7,620 students relocated to The Durham Region to attend school at Durham College in FY 2016-17, including international students. In addition, a number of in-region students would have left the area for other education opportunities if not for the existence of Durham College. While attending, these relocated and retained students spent \$117.8 million to purchase groceries, rent accommodation, pay for transportation, and so on. A significant portion of these expenditures occurred in the region, generating \$34.1 million in new income in the economy during the analysis year, equivalent to supporting 978 jobs.

ALUMNI IMPACT

The education and training Durham College provides for regional residents results in the greatest impact. As shown in Figure 1, since the college was established,

TABLE 1: Impacts created by Durham College in FY 2016-17

ADDED INCOME	JOBS SUPPORTED
\$153.8 million	2,320
Operations spending impact	
\$34.1 million	978
Student spending impact	
\$725.4 million	6,260
Alumni impact	
\$913.3 million	9,558
Total impact	

students have studied at Durham College and entered the workforce with newly acquired skills. Today, thousands of former students are employed in the Durham Region.

During the analysis year, former students of Durham College generated \$725.4 million in added income in the region, equivalent to supporting 6,260 jobs. This figure represents the higher wages that former students earned during the year, the increased output of the businesses that employed the former students, and the multiplier effects that occurred as former students and their employers spent money at other businesses.

TOTAL IMPACT

The total impact of Durham College on the regional economy during the analysis year amounted to \$913.3 million, equal to the sum of the operations spending impact, the student spending impact, and the alumni impact. The added income is equal to approximately 4.9% of the region's gross regional product. By comparison, this contribution that the college provides on its own is twice as large as the entire Transportation & Warehousing industry in the region.

The total impact is also expressed in terms of the jobs supported by the added income; they are calculated by jobs-to-sales ratios specific to each industry. Durham College's impact supported 9,558 jobs in the Durham Region economy. For perspective, this means that one out of every 24 jobs in the Durham Region is supported by the activities of Durham College and its students.

A portion of the total \$913.3 million is broken out into an industry-by-industry impact ordered by added income. Table 2 outlines the top industries impacted by Durham College. Because industries have different jobs-to-sales ratios, the associated jobs supported by Durham College differ by impact. Nonetheless, these are impacts that would not have been generated without the college's presence.



FIGURE 1: Durham College alumni working in-region today

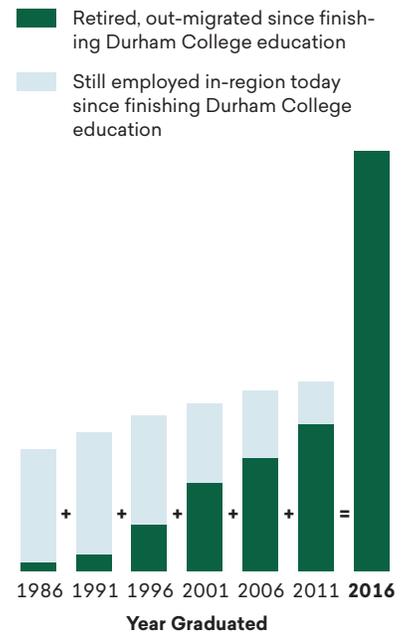


TABLE 2: Top industries impacted by Durham College

TOTAL INCOME (MILLIONS)	JOBS SUPPORTED
\$128.7	322
Utilities	
\$94.8	1,272
Health Care & Social Assistance	
\$89.6	693
Manufacturing	
\$66.7	553
Public Administration	
\$54.0	396
Finance & Insurance	
\$479.5	6,323
All other industries	
\$913.3	9,558
Total impact	

Investment analysis

Investment analysis is the process of evaluating total costs and measuring these against total benefits to determine whether or not a proposed venture will be profitable. If benefits outweigh costs, then the investment is worthwhile. If costs outweigh benefits, then the investment will lose money and is considered unprofitable. This study considers Durham College as an investment from the perspectives of students, society, and taxpayers. The backdrop for the analysis is the entire Ontario economy.

STUDENT PERSPECTIVE

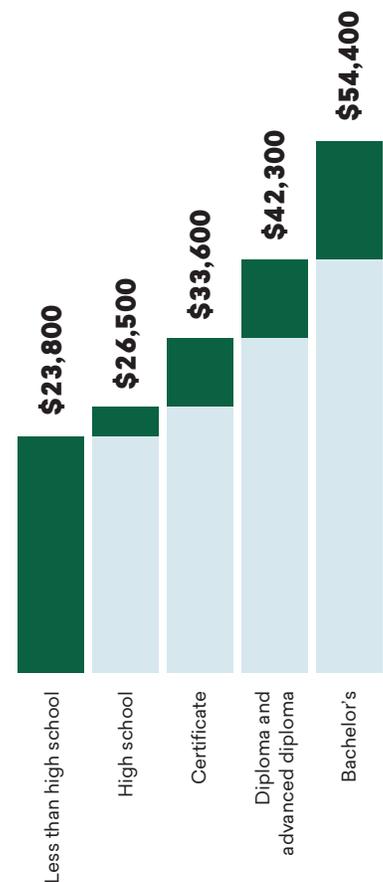
In FY 2016-17, Durham College served 20,718 credit students and 1,577 non-credit students. In order to attend school, students paid for tuition, fees, books, and supplies. They also gave up money that they would have otherwise earned had they been working instead of attending school. The total investment made by Durham College's students in FY 2016-17 amounted to \$281.3 million, equal to \$67.2 million in out-of-pocket expenses plus \$214.2 million in forgone time and money.

In return for their investment, Durham College's students develop the skills required for an increasingly globalized workplace and receive a stream of higher future wages that will continue to grow throughout their working lives. As shown in Figure 2, mean income levels at the midpoint of the average-aged worker's career increase as people achieve higher levels of education. For example, the average diploma and advanced diploma graduate from Durham College will see increased earnings of \$15,800 per year at their career midpoint in Ontario compared to someone with a high school diploma or equivalent. Over a working lifetime, this increase in earnings amounts to an undiscounted value of approximately \$666,760 in higher earnings.

The present value of the higher future wages that Durham College's students will receive over their working careers is \$1.5 billion. Dividing this value by the \$281.3 million in student costs yields a benefit-cost ratio of 5.3. In other words, for every \$1 students invest in Durham College in the form of out-of-pocket expenses and forgone time and money, they will receive a cumulative of \$5.30 in higher future wages. The return on investment to students (i.e., the benefit-cost ratio less the cost of the original investment) thus comes to \$4.30 in benefits returned over and above every \$1 in costs.

The average annual rate of return for students is 20.0%. This is a favourable return compared, for example, to the less than 1% return per annum that is generally expected from saving money in today's standard bank savings accounts.

FIGURE 2: Average earnings by education level at career midpoint in Ontario



Source: Emsi complete employment data.



SOCIAL PERSPECTIVE

Durham College aims to improve the socioeconomic well-being of the local and provincial community by increasing students' earning potential and by positively influencing the health and lifestyle habits of students. As a result, society as a whole in Ontario benefits from the presence of Durham College in two major ways. The first and largest benefit to society is the added income created in the province. As discussed in the previous section, students earn more because of the skills they acquire while attending Durham College. Businesses also earn more because the enhanced skills of students make them more productive. Together, higher student wages and increased business output stimulate increases in income across the province, thereby raising prosperity in Ontario and expanding the economic base for society as a whole.

Benefits to society also consist of the savings generated by the improved lifestyles of former students. Education is statistically correlated with a variety of lifestyle changes that generate social savings across three main categories: 1) health, 2) crime, and 3) income assistance. Health savings include avoided medical costs associated with smoking, alcoholism, obesity, and mental illness. Crime savings include reduced criminal justice system expenditures, lower victim costs, and increased productivity of individuals who are working rather than spending time in custody. Income assistance savings include the reduced demand for employment insurance benefits and employment-related social assistance.

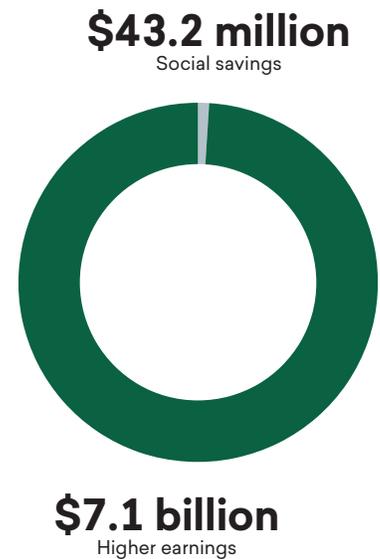
Figure 3 shows the present value of the added income and social savings that will occur in Ontario over the working lifetimes of Durham College's FY 2016-17 students. Added income amounts to a present value of \$7.1 billion due to the increased lifetime incomes of students and associated increases in business output. Social savings amount to \$43.2 million, the sum of health, crime, and income assistance savings in Ontario. Altogether, total benefits to society equal \$7.1 billion (in present value terms).

Society invested \$399.3 million in educations from Durham College during the analysis year. This includes all expenditures by Durham College, all student expenditures, and all student opportunity costs. For every \$1 of this investment, society as a whole in Ontario will receive a cumulative value of \$17.90 in benefits, equal to the \$7.1 billion in benefits divided by the \$399.3 million in costs. These benefits will occur for as long as Durham College's FY 2016-17 students remain employed in the provincial workforce.

TAXPAYER PERSPECTIVE

From the taxpayer perspective, benefits consist primarily of the taxes that provincial government will collect from the added income created in the province. As Durham College's FY 2016-17 students earn more, they will make higher tax payments. Employers will also make higher tax payments as they increase their output

FIGURE 3: Present value of higher earnings and social savings in Ontario



and purchase more supplies and services. By the end of the students' working careers, provincial government will have collected a present value of \$1.2 billion in added taxes.

A portion of the savings enjoyed by society also accrues to provincial taxpayers. Former students are more employable, so the demand for income assistance reduces. Improved health habits lower the former students' demand for provincial health care services. Former students are also less likely to commit crimes, so the demand for law enforcement services reduces. All of these benefits will generate a present value of \$17.2 million in savings to provincial taxpayers.

Total benefits to taxpayers are \$1.2 billion, equal to the sum of the added taxes and public sector savings. Comparing this to the taxpayer costs of \$73.4 million—equal to the funding that Durham College received from provincial government during the analysis year—yields a benefit-cost ratio of 16.0. This means that for every \$1 of public money invested in Durham College, taxpayers receive a cumulative value of \$16.00 over the course of the former students' working lives. In other words, taxpayers fully recover the cost of the original investment and also receive a return of \$15.00 in addition to every \$1 they paid.

SUMMARY OF INVESTMENT ANALYSIS RESULTS

Table 3 presents the results of the investment analysis for all three of Durham College's major stakeholder groups—students, society, and taxpayers. As shown, students receive great value for their educational investment. At the same time, the investment made by provincial taxpayers to the college creates a wide range of benefits to society and returns more to government budgets than it costs.

TABLE 3: Summary of investment analysis results

	STUDENT PERSPECTIVE	SOCIAL PERSPECTIVE	TAXPAYER PERSPECTIVE
Present value benefits (thousands)	\$1,493,590	\$7,149,432	\$1,173,509
Present value costs (thousands)	\$281,338	\$399,319	\$73,438
Net present value (thousands)	\$1,212,253	\$6,750,113	\$1,100,071
Benefit-cost ratio	5.3	17.9	16.0*
Rate of return	20.0%		

* Differences between 2014 study results and 2017 study results are due in part to the methodology improvements across models.

Conclusion

The results of this study demonstrate that Durham College creates value from multiple perspectives. The college benefits local businesses by increasing consumer spending in the region and supplying a steady flow of qualified, trained workers into the workforce. It enriches the lives of students by raising their lifetime incomes and helping them achieve their individual potential. It benefits society as a whole in Ontario by creating a more prosperous economy and generating a variety of savings through the improved lifestyles of students. Finally, it benefits provincial taxpayers through increased tax receipts across the province and a reduced demand for government-supported social services.

ABOUT THE STUDY

Data and assumptions used in the study are based on several sources, including the FY 2016-17 academic and financial reports from Durham College, industry and employment data from Statistics Canada, outputs of Emsi's input-output model, and a variety of studies and surveys relating education to social behavior. The study applies a conservative methodology and follows standard practice using only the most recognized indicators of investment effectiveness and economic impact. For a full description of the data and approach used in the study, please contact the college for a copy of the main report.



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