

# Western Washington University

*Prepared by the Center for Economic and  
Business Research*

Impact Analysis  

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2017-2018



**MAKE WAVES.**

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## Introduction

Western Washington University connects in ways both large and small to Whatcom County, Washington State, the nation and the world. By partnering with local and national vendors, leveraging public and private partnerships, bringing students and their families, visiting scholars and tourists to the area, hosting popular sporting and performing arts events, and hiring high-quality staff and faculty, Western is an integral part of the economic fabric of northwestern Washington. Of course, the greatest contribution we make to our state is our graduates; in 2017-18 Western Washington University conferred 3,854 degrees. This report discusses our approach to quantifying Western's economic contribution to both Whatcom County and Washington State.

Western Washington University's last economic impact report was conducted in 2014. This report is not a continuation of any previous reports, as the methodology, inputs, and approach to this impact study differ from previous attempts to quantify Western's economic influence. There is extensive variability in approach and execution of any contribution or impact analyses. As such, this analysis and report primarily serve not for external comparison, but rather as a tool to measure internal growth over time. It is Western's intention that this report serve as a guide and baseline for future analyses to be done to gauge the marginal shifts in Western's economic impact.

This impact analysis attempts to quantify Western's economic impacts to Whatcom County and Washington State through an economic Input-Output modeling approach. This returns a dollar amount and a multiplier for the two areas, generated by a combination of economic data for the regions and dollar value of direct University or student spending, University-dependent tourism spending, and key partnership activities connected to University resources.

## Executive Summary

Western Washington University has a significant economic impact on the local community as the third-largest employer in Whatcom County, as a purchaser of local goods and services, and as a hub for research, teaching, and development in Bellingham, Washington. This analysis attempts to quantify the monetary and employment effects of University operations and presence on the surrounding region.

Western’s impact on the local economy reaches beyond just those it employs or teaches. The money spent at Western ripples through the economy of Washington State, creating external jobs, salaries, and opportunities. Some economic impacts spread into nearby British Columbia, or throughout the U.S., although these impacts are relatively small and out of the scope of this report.

Many of Western’s operations produce *economic value* such as with technology transfer, the support of the surrounding community, and the promotion of an educated workforce, but not all of these produce easily measurable *monetary value*, and there remains some variability in the interpretations of the output. The numbers generated by Western’s impact analysis do not attempt to include the entire sociological, environmental, and developmental impacts of Western Washington University. Therefore, included are the most measurably accurate outputs of the general university operations.

Western’s contribution to the local economy naturally fluctuates year-by-year, due to changes in capital budgets and construction projects, state and private funding, the economic/political climate, public events, and other unique circumstances. To more effectively and accurately record Western’s actual impact, superfluous spending or economic stimulus were not included. Rather, included in this report are only internal and external expenditures that align with Western’s core mission and goals as a university.

This study was conducted by the Center for Economic and Business Research (CEBR) at Western Washington University using expenditure data for the fiscal years 2017 and 2018. This impact analysis consists of six categories: Capital Expenditures, Student Expenditures, Tourism, Payroll, impact outcomes of Western’s Small Business Development Center (SBDC), and Recent Graduate Salaries. A large portion of Western’s impact (41.35 percent) is generated by its capital expenditures, payroll, and SBDC, which are uniformly recorded by Western and are non-interpretible. The dollar value of all inputs is \$682,432,421.03.

	Model Results	
	<u>Whatcom County</u>	<u>Washington State</u>
<b>Total Output</b>	\$ 473,415,249.6	\$ 971,940,496.2
<b>Multiplier</b>	1.53	2.48

We note that little information is available to capture the University’s public/private partnerships which reduces the overall multiplier or impact measured within our analysis. It is our hope that future impact analyses will be able to include this critical data point.

Western’s total impact on Whatcom County is \$473 million, with a multiplier of 1.53. This indicates that a \$1 change in spending will generate an additional \$0.53 in Whatcom’s economy through indirect (business to business) and induced (consumer/employee spending) effects. The Washington State impact is \$971.9 million, with a multiplier of 2.48. This indicates that a \$1 change in spending will generate an additional \$1.48 in Washington’s economy through indirect and induced effects.

## Input-Output Models

This study is founded on a regional input-output model (I-O model) design, used to measure a university's impact on the regional economy. These types of models are based on the premise that any initial change in economic activity creates additional changes in an economy, usually represented by an increase in jobs or dollars as a result of the initial economic change. I-O models, while an accurate measure of the outputs of a university's economic impact, do not include the societal impacts of a university related to knowledge or technology transfer.

The results of I-O models are dependent on both the defined region and the scope of university activities. Western has a direct and sizable impact on Whatcom County, but satellite locations and partnerships with neighboring businesses, cities, and industries push Western's influence to a wider scope, although still largely within the bounds of Washington State.

This regional boundary allows the model to account for leakage of money outside of the defined boundaries. If Western "imports" goods from other states, the economic impact for Washington State is lower than it would be if Western had bought that good from a Washington State producer since the dollars flow outside the state rather than to a local producer located within the regional economy. From this information, I-O models produce regional multipliers that are indicative of the impact of a dollar amount inputted into the defined region.

## University Impact Model Limitations

University economic impact models generally measure the impact of some change to an industry's output for the defined region. For example, an impact model that contained the total direct spending attributable to Western Washington University would calculate the effect on Whatcom County and Washington State as if another Western was "dropped" into the economy. This is generally an inaccurate way to measure the impact that a University has on the surrounding economy, for several reasons.

First, the impact that Western has on Bellingham and Whatcom County has developed over the course of WWU's 125-plus-year existence. Trying to separate the two would be an impractical and inaccurate measurement of the relationships between them. It is more representative of the relationship to discuss an increase or decrease in spending, as this effect is both more likely to occur and still affects the economy without removing the entire framework established by the University.

However, the multipliers generated for both Whatcom County and Washington State are linear, meaning that they are determined by industry and location rather than the size of the institution. The software used, IMPLAN, takes into account the regional production of goods and services for the defined areas and produces outputs and multipliers based on the industry mix of spending unique to Western.

This is a crucial piece in understanding Western's relationship to the local and regional economies. Western may increase or decrease the operating budget or student count in the upcoming years, which may change the impact that Western has on the economy. Despite this effect on the economy, the multipliers, or the power of Western's dollar, will remain the same. For Western to change its multiplier, it would need to substantially expand its operations to exist in other industries or locations.

With this in mind, the multipliers for the two defined areas, Whatcom County and Washington State will differ. By definition, the multiplier for Washington State will be larger than the Whatcom County

multiplier, as the Washington State output includes the Whatcom results. As Western expands its geographic reach, and therefore the flow of dollars, the difference between the two multipliers will increase.

### Best Practices

University impact analyses are conducted in a variety of ways, as the best practices are in a state of constant improvement, and the analyses are produced to aid different university goals and operations. Western has utilized the Economic Impact Guidelines 2014 publication by the Association of Public and Land-Grant Universities (APLU) and the Association of American Universities (AAU) to guide and shape this analysis. These guidelines are considered the best practice for this type of analysis.

The Economic Impact Guidelines warn against using investment terminology such as “return on investment” or “leverage” to describe a University’s impact, as this type of language has varied meanings. Often, these phrases misconstrue the nature of the economy that surrounds a university, as dollars spent are not invested, just as the outputs are not returns, since they are not returned to, or owned by, the original provider of funds, which is, in this case, Western and its staff and students. The output ratios outline the impact made on either Washington State’s or Whatcom County’s economy for each dollar spent. The two outcomes of this model – the increase in economic activity (in dollars) and the resulting multipliers – represent not returns on the inputs, but rather a specified pattern and relationship between Western’s operations and the County and State economies.

## Methodology

This analysis was conducted using IMPLAN, an input-output software that was recommended by APLU for university impact analyses. CEBR created several different models to generate a big-picture overview of Western’s economic impact. The first model examined the impacts made on Whatcom County, followed by a second model run to determine the impacts made on Washington State. These two outputs return Western’s impact on both Whatcom County and Washington State, which generate an overview of the flow of jobs, dollars, and impacts from Western’s general university activity.

Both models include an identical set of inputs, with the exception of Recent Graduate Salaries, which is only included in the Washington State model. As such, the outputs of the model differ only in this single variable and on the multipliers for the defined region. The inputs outlined below only represent the spending done by, or as a result of, general University activities.

Over a third of university input value (41.35 percent) is composed of university capital expenditures, payroll, and the Small Business Development Center (SBDC). While data for these models were gathered from a multitude of sources, these three inputs are generated by the university finance department and are uniformly recorded, leaving no room for error or interpretation. The other 58.65 percent of input dollars generated by Western came from Student Expenditures (15.90 percent), Tourism (0.75 percent), and Recent Graduates Salaries (42 percent).

	Input Weights	
	Total	Percent of Whole
<b>Recent Graduates</b>	\$ 286,623,396	42.00%
<b>Payroll</b>	\$ 184,292,085	27.01%
<b>Students</b>	\$ 108,512,287	15.90%
<b>Capital Expenditures</b>	\$ 84,980,894	12.45%
<b>SBDC Impact Outcomes</b>	\$12,900,000	1.89%
<b>Tourism</b>	\$ 5,123,759	0.75%

Twice, this study used a categorized expenditure distribution that is generated by IMPLAN and based on government data of consumer and university spending. The first concerns University Spending for Goods and Services, which amount to approximately \$33.5 million. For efficiency purposes, Western does not record a more itemized receipt of where (physical location) funds are spent. Therefore, this analysis relies on the IMPLAN University Expenditure distribution, which includes all materials, food, energy, waste, construction and other purchases typically made by a university. Where certain University expenditures were known, the spending pattern was modified to reflect Western’s unique spending pattern.

The second use of IMPLAN's preset expenditure ratios was in relation to student expenditures. As a public university, Western utilizes cost of living expenditure estimates that are federally generated per quarter for student stipend amounts, as well as transportation costs. However, where student personal spending specifically occurs is not recorded by the University or the federal estimate of student expenditures. For this reason, this analysis utilizes IMPLAN's average personal expenditure ratios for a household earning less than \$15,000 annually.

This report uses the total input and offers a breakdown of the subcategories associated with each of the four main categories. The numbers reported correspond to dollar amounts spent in the Whatcom County area, either by the University or its students, faculty, and staff. It is important to note that the ratios and weights generated by the inputs may not have the same proportional impact on the economy, since some sectors contribute more to the area than others due to leakage. The actual impacts and multipliers will be outlined in the Outcomes and Results section of this report.

### Model Inputs

This impact analysis is composed of six categories: university capital expenditures, student expenditures, tourism, payroll, SBDC, and recent graduates' salaries. Of the six categories, university expenditures, the SBDC, and payroll are uniformly reported and recorded, leaving no room for interpretation error. Both student expenditures and tourism were estimated using a combination of reported populations and estimated spending using local estimates for utilities, hotel rates, gas, internet access, and food. Following is an overview of how data was gathered, estimated, analyzed, and reported for each input.

### Capital Expenditures

University capital expenditures is recorded by the University Budget Office and is broken into several subcategories, including Construction and Land (49.53 percent of Cap. Ex.), Utilities (10.9 percent of Cap. Ex.), and Goods and Services (39.48 percent of Cap. Ex.), resulting in a total of \$98 Million in University Capital Expenditures. Of these subsets, utilities is further broken down into eight categories: water & sewer, refuse, natural gas, electricity, steam plant, recycling, hazardous material disposal, and other.

The largest sub-component of University Expenditures is Construction, which totals \$42.1 Million or nearly 50 percent of the total capital expenditures. Construction data is wildly variable year-to-year. Within the last five years, Western has financed a complete remodel of Carver Gym, Viking Union expansion to house a new Multicultural Center, and a new science lab addition. While the projects vary in cost, the pattern of expansion and improvements remain and are not inconsequential. For these reasons, the Center used average construction spending over the last five years to represent the university's typical annual construction spending. This was the only category in which spending was averaged over a longer time frame.

The second-largest sub-category is Goods and Services, totaling \$33.5 Million or about 39.48 percent of the total Capital Expenditures spending. Since the details of this number are not recorded or distributed, IMPLAN's general university goods and services ratio was utilized to generate the distribution of the goods and services budget towards specific items such as food, software, or maintenance materials to determine the flow of dollars through the relevant industries.

### Student Expenditures

Student Expenditures were derived using enrollment numbers to determine the base population multiplier for individual expenditures. Since students who live on campus pay their rent to Western, this becomes part of the University budget. As such, these on-campus rent rates were not included as inputs to avoid double counting. However, on-campus food expenditures at any of the dining halls, coffee shops, or any prepackaged food purchases are not paid to the University but rather to independent contractors. For this reason, on-campus food spending was counted for both on and off-campus students.



Due to Bellingham's relatively small size, housing costs are not consistently tracked for just the specific University area. To generate a conservative and consistent estimate of housing costs, the University of Washington's Runstad Department of Real Estate's county-level rent rates for two-bedroom apartments were used. Since this data is consistently produced biannually and externally, it is usable and replicable for future impact analyses.

Winter quarter rent is an average of the two reported rent rates, in fall and spring. The fall 2017 average rent per person for a two-bedroom unit in Whatcom County was \$524, with winter quarter rising to \$538 and spring rising still to \$552. While not all students live in two-bedroom units, it is the most common arrangement for off-campus apartments.

These county-level numbers may be lower than the average rent closer to the University, which may naturally be inflated due to increased demand. However, this analysis was conducted to operate as a conservative or base-estimate for Western's impact. It is also the case that many students share a room off-campus, bringing down the average rent and consequently, student expenditures. Using the county-wide rates offsets some of the accidental over-estimation of Bellingham rent rates that would occur due to this unreported room sharing.

Other components of the student expenditures category include utilities such as water, electricity, garbage, and transportation. Considering that rent in the Bellingham area often includes water and garbage, the local rates for those utilities were removed from the average rent rates to eliminate the possibility of double counting, and to allow for a more specific categorization of rent money and its in- and outflow through the economy. Internet access, electricity, and utility-excluded rent rates were gathered by using local rates and usage estimates for two-person households. All separately gathered inputs were removed from IMPLAN's personal expenditures distributions to avoid double-counting.

On-campus meal-plan purchases are recorded, as well as off-campus voluntary purchases of those meal plans. Off-campus student food expenditures fluctuate based on their previous standard of living, current income, dietary restrictions, and availability of options. For this reason, the weighted average of meal plan prices was used as a monthly food expenditure rate for off-campus students. Using the meal plan costs implied an average of \$300 a month in total food spending per off-campus non-meal plan student, which includes groceries, alcohol, and both casual (fast food and take out) and full-service restaurants. Assuming that 50 percent of all food expenditures is composed of grocery spending, alcohol and restaurants each consume 10 percent of food spending, and casual dining takes the last 30 percent, student food spending for both on and off-campus amounts to a total of \$27.5 Million.

Finally, personal expenditures and transportation costs were estimated using the 2017-2018 Estimated Annual Expenses as generated by the Financial Aid Department, at \$256 and \$140 a month for all students. This generates a total input of \$38,278,669 in student personal expenditures.

Tuition or other fees paid to the university were not included since this money is received by Western and spent as part of the Capital Expenditure or Payroll budgets for the university. Since this flow of funds is accounted for in any sections concerning direct university spending, the student expenditures category does not include tuition to avoid double-counting.

### Tourism

Tourism includes sport event attendance, student visitors, prospective student and admissions tours, and commencement celebrations. While Western hosts a variety of art events, workshops,

presentations, summer youth programs, and other events that may bring in tourism money to the local economy, these events are either 1) not consistently occurring, 2) not part of Western's mission, or 3) attendance was not reliably measured.

For all visitor spending, the Center utilized the Bellingham Whatcom County Tourism Department's average spending per day for out-of-town visitors. This number is composed of food and gas spending (\$42 per day), and hotel expenditures (\$111 per night). Since there is above-average demand for hotels around the three main commencement ceremonies that causes price spikes, the yearly average price that was used may produce a lower output. Utilizing the yearly average eliminates the variability that would occur if rates were aggregated each quarter.

However, not all who visit Western stay in hotels, and a survey of individuals flying into the Bellingham International Airport reported that over 59 percent of all visitors who stay the night choose to stay with family or friends in the area. This still contributes to the economy in the form of gas, food, or other purchases in the area, averaging around \$42 per day spent in Bellingham per visitor group.

The attendance rates for commencement ceremonies are recorded by the registrar's office through ticket sales. The impact numbers for commencement ceremonies are generated using the same lodging and day trip costs, at \$153 for hotel and \$42 for other expenditures, respectively. Assumptions were also made for the number of nights spent around the commencement ceremonies and are as follows: 25 percent of all commencement visitors stayed one night, 25 percent stayed two nights, and the remaining 50 percent traveled up for the day and did not stay in Bellingham overnight. Due to our relative closeness to both Vancouver and Seattle, day trips are common among visitors.

Commencement visitor spending makes up 49 percent of all tourism spending or 0.50 percent of the total impact of Western. Sporting event tourism makes up the next largest dollar input at 34% of all tourism spending, with general campus visitors contributing nearly 17 percent of the remaining tourism dollar inputs. Campus visitors were estimated using yearly visitation estimates for freshmen, sophomores, juniors, and seniors on campus, as well as assumptions regarding how many nights they stayed.

Assuming that 25 percent of freshmen, on average, receive four one-night visits per year and that half of those people stay with family and friends, this amounts to over \$40,000 per year in freshmen visits. If 50 percent of freshmen receive two visits per year, and the remaining 25 percent receive one visit per year, then total freshmen visitation amounts to about \$221,000 a year in inputs. Following similar logic, with decreased visitation rates per higher class standing, visitation rates for sophomores and juniors produce nearly \$450,000 a year, since there are more than double the number of sophomores and juniors than freshmen.

Total sporting event attendance reached 919,000 people in the 2017-2018 academic year. An internally-sponsored survey of sporting events reported that most attendees were not Western students, generating a 50% out-of-town attendance rate. Since 60 percent of those are taking a day trip to watch the event, this results in \$1.3 Million in hotel, food, and gas expenditures from just sports tourism for the year.

Western receives over 25,000 visitors a year in admissions tours alone, with about 25 percent of these individuals staying the night at hotels or motels. Admissions tours generates over 1.2 million dollars in direct impact every year, behind commencement and sporting events.

Tourism expenditures reached \$5.1 Million, or 0.75 percent of all inputs. This 0.75 percent is mostly composed of graduation attendees, at \$1.9 Million (0.5 percent), followed by athletics at \$1.3 Million (0.35 percent), admissions tours at \$1.2 Million (.18 percent) and student visitors at \$661,891 (0.17 percent).

### Payroll

Employment, enrollment, wage data, and salary data were gathered through information requests to the respective internal departments to ensure their accuracy. Included in payroll expenditures are all faculty, staff, and all student employment wages, that are paid by Western. Payroll consists of a single number given by the university, kept separate from other capital expenditures due to the large portion of the entire dollar input that it makes up (27.01 percent).

### The SBDC

The Small Business Development Center at Western directly impacts the local and regional economies through the nature of their work. The SBDC network tracks multiple outcome metrics for the businesses it interacts with. For the purposes of the impact analyses for this report only reported investment activity, which includes both cash and loan investments, are utilized. Western's SBDC clients reported \$12.9 million in dollars invested in 2018, which contributes nearly 2% of the entire university inputs.

### Recent Graduate Salaries

A large portion of the impacts that Western produces is attributable to the students that graduate and contribute to the economy as an employee. Western graduates on average earn higher wages than they would have without their degree, meaning that this added economic stimulus is attributable to Western. However, there are caveats to this assumption, which are outlined below.

First, Western's graduate salary data is only collected one year after graduation, where graduates may not yet be working in their desired career, and does not fully capture the long-term effects on a salary that a degree may have. Second, there is no guarantee that Western graduates would have forgone a degree had Western not existed, nor can it be claimed that proportionately more students would come to Western given an increase in spending. Third, while Western has produced salary-earning graduates for nearly 130 years, not all of that economic value can be attributable to Western, as some of the economic value created is due to worker experience, rather than just their degree.

Despite these three shortcomings in the data, some steps can be taken to reduce the risk of overstating Western's impact while including graduate salary data. Since Western's data collection of salary information is not comprehensive enough for this analysis, US salary numbers were combined with Western graduation rates for both Bachelor's and Master's degrees. Since Western alumni generally move away from Bellingham post-graduation, all impact numbers are run for Washington State only, as applying alumni salary data to Whatcom County would overstate the impact that Western has on the region.

To further mitigate overstating Western's impact, the marginal difference in annual salary due to degree attainment was utilized. For graduates with a Bachelor's degree, this would be the difference between the average salary with a Bachelor's degree, and the average salary with an Associate's degree. The final input of recent graduate salaries is \$286.6 million, or 42 percent of the total value of all inputs.



## Outcomes and Results

This section of the report will provide a breakdown of the variety of results generated through IMPLAN and an overview of the results for each area. There are both multiplier effects and output types.

### Effects

The three effects produced by the model are Direct, Indirect, and Induced. These describe the type of impact produced by university spending. Direct impacts are determined by the spending in each industry, and if that industry exists within the defined region. For Washington State, this number is almost equal to the total input amount, since nearly everything a university needs is produced within this region. Indirect effects are generated through an evaluation of local business-to-business (B2B) purchases, while induced effects are a result of household purchases, such as student, faculty, or staff spending. The total effects are the sum of all of these three types.

### Multipliers

The three outputs produced by the model are Employment, Labor Income, and Total Value Added. This report will focus the analysis on the Employment and Output.

Employment is a representation of the direct, indirect, and induced jobs produced by western's operations. Western directly employs a number of individuals and buys things in the local economy which are produced by other individuals, creating indirect jobs through business to business purchases. Western's employees purchase goods and services, which are produced by other individuals, creating induced jobs through household purchases. The sum of these three is the total employment impact.

Output follows the same logic as employment for direct, indirect, and induced effects, but output measures the dollar effects on the specified regions. Direct effects are the dollars spent locally, indirect effects are the dollars spent through B2B transactions, induced effects are the dollars spent by households, and the total effect is the sum of all dollar effects is the total output of the model.

There are two types of multipliers that can be calculated from this information: Type 1, which excludes induced effects, and SAM Multipliers, which include induced effects. Type 1 multipliers look specifically at B2B transactions, while Type SAM multipliers take into account all effects generated by university spending. This report will focus on the Type SAM multipliers, which paint a more accurate picture of Western's impacts on the economy.

### Whatcom County

Western’s total employment impact on Whatcom County is 4,268 jobs. This produces a SAM multiplier of 1.42, with a Whatcom County impact of \$473.4 million dollars, and a total input of \$395.8 million. The output generated shows a 19.6 percent increase in total impacts from the inputs of Western's operations.

Whatcom County		
	<u>Employment</u>	<u>Output</u>
Direct Effect	2,956	\$ 308,449,842
Indirect Effect	316	\$ 44,531,472
Induced Effect	957	\$ 120,433,936
<b>Total Effect</b>	<b>4,268</b>	<b>\$ 473,415,250</b>
<b>Multipliers</b>	<b>1.42</b>	<b>1.53</b>

Western’s employment impacts total 4268 jobs, which accounts for nearly 4 percent of the entire Whatcom County workforce. In 2017 Western employed over 1700 individuals, meaning that the employment output represents a 151% employment increase from Western’s direct employment.

### Washington State

The Washington State outputs will always be much higher – due to the leakage that occurs in Whatcom County. Since Whatcom is a small area that “imports” many of its goods from around the state, many of Whatcom County’s dollars go to companies and producers within Washington State. When Western spends money on goods, only a small percentage of it stays within Whatcom County, a much larger percent stays within the state, and the rest of it flows out to other points along the supply chain.

The total impact for Washington State is just under \$972 million, with a multiplier of 2.48, or a 148 percent increase from the inputs of Western’s operations. This is a 105 percent increase from the total Whatcom County impact or a \$498.5 million increase. The total employment impact is 7161 jobs, generating a multiplier of 2, which means that for each individual Western hires or supports through spending, another worker is hired indirectly due to that economic stimulus.

Washington State		
	<u>Employment</u>	<u>Output</u>
Direct Effect	3,577	\$ 391,878,153
Indirect Effect	296	\$ 59,171,261
Induced Effect	3289	\$ 520,891,082
<b>Total</b>	<b>7161</b>	<b>\$ 971,940,496</b>
<b>Multipliers</b>	<b>2.00</b>	<b>2.48</b>

## Conclusion

Western Washington University spending has a multiplier of 1.53 for Whatcom County and 2.48 for Washington State. While these two numbers will always differ due to the relationship between counties and states, a portion of this difference can be explained by the movement of graduates across the state. A large portion (42 percent) of Western's impact is generated by graduate salaries and are not limited to Whatcom County. For this reason, the Whatcom County model does not include this variable.

Western produces a large employment impact as well, accounting for nearly 4 percent of the entire Whatcom County workforce. Western's direct Washington State workforce of 3,534 doubles to 7,100 when accounting for the indirect and induced effects of Western's operations.

The outputs generated by this model are one method of attempting to capture the scope of Western's economic impact on both Whatcom County and Washington State. As is the nature of data, there will be limitations both in what information is available and in the interpretation methods. This report serves to outline our best efforts to mitigate those limitations and aid in future impact analyses.

## Further Reports

There are several pieces of information that would aid in closing the gaps in the currently-available data used in this report. While noting these do not improve the current analysis, it does develop a record of what shortcomings are acknowledged and noted for future analysis improvements.

Western, as with most universities, attempts to best utilize its resources to assist local and regional businesses and industries. One way this is executed on campus is through the shared use of lab space and other innovation related campus resources, which produces economic value through its promotion of innovation. Currently, Western is in the process of developing a method of accurately recording and calculating the economic impact of such partnerships, to be included in future impact reports.

Partnerships, both private and public, are utilized as a way to promote real-world engagement with students to enrich their education while simultaneously assisting local businesses, municipalities, industries, and communities. The benefits of these partnerships are often intangible but do produce indirect economic stimulus, which can be monetarily measured.

Finally, there are improvements to be made in the realm of salary data analysis, as Western's recent partnerships allow for better data collection and reporting of graduate outcomes. This information, combined with a more comprehensive look at the locations, industries, and salaries of recent graduates will allow for a more accurate representation of the impact that Western graduates have on both Whatcom County and Washington State.

These shortcomings are recorded to promote the further development of accurate data collection and analysis methodology. It is our hope that these pieces will be included in future reports to better capture the extent of Western's economic impact.