

2005

The value of the Coffs Harbour Education Campus to the Coffs Coast regional economy: a regional input-output analysis: report to Coffs Harbour Education Campus

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Publication details

Sutton, T, Fuller, D, Wilde, SJ & Mason, S 2005, 'The value of the Coffs Harbour Education Campus to the Coffs Coast regional economy: a regional input-output analysis: report to Coffs Harbour Education Campus', Centre for Enterprise Development and Research: CEDAR Research report no. 2, Southern Cross University, Coffs Harbour, NSW.

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A Regional Input-Output Analysis

by

Tim Sutton, Don Fuller, Simon Wilde and Stephen Mason

Centre for Enterprise Development and Research
Southern Cross University
Coffs Harbour Campus

CEDAR Research Report No. 2

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EXECUTIVE SUMMARY

- This paper examines the economic impact of the Coffs Harbour Education Campus (CHEC) on the Coffs Coast region. The region has been defined to consist of the local government areas of Coffs Harbour, Bellingen and Nambucca.
- CHEC is an educational campus which combines offerings from three partners: Southern Cross University, TAFE NSW and the Senior College. The Senior College consists of secondary students studying years 11 and 12. CHEC is situated in Coffs Harbour on the NSW mid-North coast.
- The estimation of CHEC's economic impact on the region is based on the use of an input-output matrix which models the industry sectors of the region and the way in which these sectors interact to form the whole regional economy. This approach allows a logical and supportable method of determining the contribution of CHEC's operations to the region's economy.
- The specific input-output model used is embodied in the computer-based model, REMPLAN. REMPLAN was acquired from La Trobe University and is being further developed in a collaborative project involving Southern Cross University and La Trobe University.
- The impact of CHEC on the region's economy is determined by using the number of employees at CHEC as an input to the model. The model is then able to estimate the impact on output, employment, household income and value added within the Coffs Coast region.
- An additional section of the paper considers the contribution to the region's economy resulting from students who move to the Coffs Coast region in order to study at CHEC. Such students add to the region's economy by consuming not only Education sector services, but also non-Education sector services.
- The impact of Coffs Harbour Education Campus on the Coffs Coast regional economy is summarised below (including the impact of out-of-region students):

Measure	Value	Share of region
Region's annual output attributable to CHEC	\$78m	2 %
Region's employment attributable to CHEC	835 jobs	3 %
Region's annual household income attributable to CHEC	\$36m	3 %
Region's value added attributable to CHEC	\$50m	2 %

- The approach used in considering the impact of out-of-region students is thought to be conservative. As a result, it is likely that, with more robust data, the true impact on the Coffs Coast region's economy is more substantial than that shown here. This area is therefore a good candidate for future research.
- The CHEC facility offers the Coffs Coast region, and particularly the community's younger members, educational and career-development opportunities which may not otherwise be readily available. However, CHEC offers more to the region than the opportunity or potential for *future* education and prosperity, it is a significant employer in its own right and, via the economic activity which it generates, a substantial *current* contributor to the region's economy and employment.

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2. INTRODUCTION

Coffs Harbour Education Campus (CHEC) is a multi-sector education campus in Coffs Harbour, New South Wales. The campus combines the educational offerings of Southern Cross University, TAFE NSW – North coast Institute, and the Coffs Harbour Senior College.

The purpose of this paper is to estimate the impact which CHEC has on the economy of the Coffs Coast region. “Coffs Coast” is the combination of the local government areas of Coffs Harbour, Nambucca and Bellingen.

A description of the campus and its background is followed by a discussion of the methodology employed in this report. The estimated contribution of CHEC to the regional economy has then been discussed.

The economic impact of the campus is estimated using an input-output matrix methodology, as embodied in the computer-based REMPLAN regional modelling software.

Input to the REMPLAN model is the number of employees at CHEC. Using the number of employees, the model determines the direct value output of the campus which is then subjected to multipliers in order to determine the total impact on the region. The impact is expressed in terms of four measures: total output, employment, household income, and value added. See the Glossary for descriptions of these terms.

A proportion of the students who study at CHEC come from outside the Coffs Coast region. This paper also discusses the economic impact of these out-of-region students. That section is concerned with the students’ consumption of non-education goods and services. While there are limitations associated with data used as input to the model in this section, the availability of additional information can enhanced future research.

3. BACKGROUND – COFFS HARBOUR EDUCATION CAMPUS

Coffs Harbour Education Campus (CHEC) is a partnership between Southern Cross University (SCU), TAFE NSW - North Coast Institute (NCI), and the Department of Education and Training, through the Coffs Harbour Senior College (CHSC).

This is a unique partnership, which brings together three sectors of education on the one site. The campus was officially opened in February 1995, and has, through the contributions of the three partners, received international recognition as a centre of excellence in education and training. This is confirmed by the wide range of visitors from interstate and overseas who are anxious to understand the work that is being undertaken through the partnership. Students move easily between the sectors and a range of opportunities exist for students to gain credit for any further study they may wish to undertake. The campus is a world leader in this regard.

The partners, individually and collectively, have contributed significantly in providing education and training opportunities for students in the Coffs Coast region. These opportunities enable students to make real choices in terms of their education and training and career options.

Capital expenditure of nearly \$50m has ensured that excellent facilities are now available to students from the three partners. These facilities are considerably enhanced by the ongoing development of the Residential College, which houses approximately 96 students.

More than 5,000 students enrol in programs offered by Southern Cross University, North Coast Institute of TAFE and Coffs Harbour Senior College each year and over 400 staff are engaged in delivery and support of these programs.

The intellectual and social capital now available is a significant resource in terms of the future development of the region. Collaboration has led to the establishment of the CHEC English Language Centre - an economic driver in its own right - the development of residential facilities, and the ongoing development of the Technology Park and the Innovation Centre in concert with the Coffs Harbour City Council. Regional considerations are a critical element in the planning by the partners and the campus generally.

4. METHODOLOGY

Summary

This report has been prepared using REMPLAN to determine the economic impact of CHEC on the Coffs Coast regional economy. REMPLAN is a computer-based, regional input-output matrix.

Input - Output

Overview of Input–Output Modelsⁱ

Input-output is a tool often used for estimating the impacts of [an economic activity] on a regional economy. The main attraction of the input-output model is that it provides a very detailed picture of the structure of the economy at a particular point in time. This is achieved by disaggregating all the productive activities in the economy into industry sectors and documenting all the transactions (purchases and sales) that occurred during the time period (usually one year) between these sectors. The input-output model is, in essence, a set of regional accounts and thus provides a basis for the detailed analysis of inter-sectoral relationships within the economy.

The classical input-output model is described by the following matrix equation:

$$\mathbf{X} = \mathbf{AX} + \mathbf{Y} \quad (1)$$

Where \mathbf{X} is the vector of sectoral gross outputs, \mathbf{A} is the matrix of regional intermediate input or regional purchase coefficients, and \mathbf{Y} is a vector of total final demands by sector. The coefficients a_{ij} of \mathbf{A} are defined as the amount purchased by sector j from sector i per unit of output of sector j . Equation (1) simply states that gross output of each industry equals intermediate demand sales (\mathbf{AX}) to other industries for further processing plus final demand sales (\mathbf{Y}) of end products to consumers, including households, government, and for export. By rearranging and converting to differences, this equation can be rewritten as

$$\Delta\mathbf{X} = (\mathbf{I} - \mathbf{A})^{-1} \Delta\mathbf{Y} \quad (2)$$

Which allows us to calculate the change in industry production levels $\Delta\mathbf{X}$ in response to the change in industry final demands $\Delta\mathbf{Y}$. $\Delta\mathbf{Y}$ can incorporate any element of final demand expenditure.

The Structure of an Input-Output Transactions Matrixⁱⁱ

The input-output matrix can be divided into four quadrants. These segments are shown in Table 1 which is a simplified example of an input-output matrix. The industry sectors used in the example are Agriculture, Manufacturing and Services.

The **Intermediate Quadrant** is made up of transactions between firms in the local region. Working down the column headed Manufacturing, we can see that this sector purchases \$40 from Agriculture, \$20 from its own sector and \$40 from the services sector. Working

across the rows, the Agricultural sector sells \$20 to its own sector, \$40 to Manufacturers and nothing to the service sector.

The **Final Demand Quadrant** records sales of locally produced goods and services within the region (consumption and investment by Households, Government and Firms) and to people outside the region (Exports).

The **Primary Inputs Quadrant** represents payment to Households (wages and salaries), Firms (gross operating surplus)*, Governments (taxes on goods and services) and to producers outside the region (Imports) all of which provide primary inputs (labour and capital).

	Intermediate Quadrant			Final Demand Quadrant				Total Output
	Agriculture	Manufacturing	Services	Households	Government	Investment	Exports	
Agriculture	20	40	0	20	0	0	20	100
Manufacturing	20	20	10	75	10	10	55	200
Services	0	40	10	25	20	5	0	100
Payments for:	Primary Inputs Quadrant			Primary Input Absorbed by Final Demand Quadrant				
Households	40	45	70	5	0	0	0	160
Government	10	15	5	0	0	0	0	30
Imports	10	40	5	0	0	0	5	60
Total Input	100	200	100	125	30	15	80	650

Table 1 A simplified Input-Output Matrix. Read down a column for sector inputs (purchases). Read across a row for sector outputs (sales).

Note that the columns and rows (or the inputs and outputs) for each industry sector (Agriculture, Manufacturing and Services sectors) will balance. The total of the column for Manufacturing of \$200 matches the total of the row for Manufacturing, and the same will be seen for the other two sectors.

It is also possible to compare regional exports (\$80) and regional imports (\$60) to see whether or not there is a trading surplus, as there is in this example.

* Gross Operating surplus is not included in this particular example.

Economic Multipliers

In any economy, the addition of new (exogenous) output or employment for a particular sector will lead to an increase in the gross product for that economy. The total increase in the gross product of the economy will be greater than the exogenous output due to the effect of “economic multipliers”.

Thus, if the manufacturing sector finds additional demand of, say, \$200, it will require inputs from other sectors in order to produce that \$200 of output. Those sectors will in turn require inputs from other sectors, and “multiplier” rounds will occur.

Through the use of input-output matrices, a series of coefficients can be determined. These coefficients allow the modelling of impacts to the economy. Such impacts can be measured not only in terms of the direct impact (the new output) on the sector which is expanding, but the total impact on all sectors and therefore the total impact on gross product for the region.

Assumptions Underlying Input-output Modelling

Some care needs to be taken in the use of input-output data and it is important the underlying assumptions are kept clearly in mind. Certain assumptions need to be made in utilising an input-output approach. The main assumptions are:

- (i.) Fixed production coefficients, which imply constant returns to scale. That is to say that if we wanted to double output of sector j , we would have to double all of its inputs with no evidence of scale economies.
- (ii.) We are also assuming that regional performance matches national average performance.
- (iii.) Input proportions will remain the same and there will be no change in technology. As long as the model is kept up to date this latter concern should not pose a threat to its effectiveness, except as a tool for long-term forecasting.
- (iv.) Homogeneity amongst sectors. It is assumed that each industry sector produces a fixed set of products that are not produced by any other sector. While it is possible to have some overlap e.g. liquor sold in hotels (the Retail sector) and in cafes (the Accommodation, Cafes and Restaurants sector). Such an assumption should not inhibit the validity of the model to any great extent.
- (v.) No supply constraints and that the intermediate and household sectors will be able to service any increases in final demand. This assumption could weaken the predictive capacity of the model in cases where increases in overall demand could bring about factor shortages and raise prices in the short term. However in most day-to-day cases increased factor demand should not cause substantial problems for the approach.

REMPPLAN

REMPPLAN is a Regional Economic Modelling and Planning system which was developed by Ian Pinge of La Trobe University's Economic Research Unit.

Southern Cross University is in the process of forming a collaborative partnership with La Trobe which aims to further develop the REMPLAN system.

REMPPLAN is a computer-based model which combines various data in order to create a *regional* input-output matrix. The data used is: regional employment data (based on *destination* of employment, rather than residence), the national input-output transaction table, and the consumer price index.

The version of REMPLAN used to prepare information in this document is based on the "Coffs Coast" region. The region consists of the local government areas of Coffs Harbour, Nambucca and Bellingen.

The model provides regional input-output matrices at 3 levels of sector aggregation: 17 sectors, 35 sectors or 106 sectors. The sector aggregations are consistent with Australian Bureau of Statistics coding. The model also tabulates employment figures (by number of employees) by industry sector.

In addition to providing static data for the Coffs Coast region, REMPLAN has the facility to model impacts on the regional economy. That is, the user is able to enter impacts in terms of changes in direct output or direct employment for a particular sector or mix of sectors. These direct impacts then flow through the model in order to provide detailed information on the total impact, both direct and indirect, to the regional economy. That is, the model provides detailed information on the changes in output, employment, household income and value added which result from a change in the direct output of one or more sectors. Economic impact scenarios can be conducted for both actual, as well as hypothetical changes within the region's economy.

5. METHOD

Overall Approach

This report was prepared using the REMPLAN model for the Coffs Coast Region (local government areas of Coffs Harbour, Bellingen and Nambucca).

REMPPLAN was used to model the impact on the Coffs Coast economy resulting from the existence of the Coffs Harbour Education Campus (CHEC).

In order to measure the impact of CHEC, employment figures for CHEC were entered to the REMPLAN model. The source of these figures, and the reasoning behind their use, are described in the following sections.

Having entered the employment data to REMPLAN, tables of the total regional impact were extracted. Those tables are included in this report and form the basis of the analysis of the impact of CHEC on the regional economy.

The section headed *Estimating the Impact of Student Consumption* discusses the impact on the Coffs Coast economy of students who come to the region in order to study at CHEC. Data limitations have led to the exclusion of this impact from the central analysis. However, the impact of out-of-region students is considered to be an area which merits further research.

Employment Figures for CHEC

Employment figures are entered to REMPLAN using total number of persons. The mix of full-time and part-time staff within those figures is assumed to be similar to the national mix of these employment patterns within the Education sector.

Number of persons employed was entered to the Education sector employment numbers field within REMPLAN.

The number of employees includes all staff directly employed on the campus including academic, administrative and facilities staff in all three sectors (Senior College, TAFE, SCU). In total, there are 450 people employed at CHEC.ⁱⁱⁱ

The number of employees, when entered into REMPLAN, provides an estimate of the direct impact on output of the education sector caused by these employees. The model then determines the total linked and induced impacts of this initial employment on the regional economy.

It is considered appropriate to measure the initial impact in this manner because all employees are directly employed in the education sector and therefore contribute to that sector's output. Without CHEC, this output would not exist within the region.

Assumptions and Limitations of the Approach

A number of assumptions and limitations, which apply to input-output matrices generally, are discussed in the earlier section on input-output matrices. Additional assumptions and limitations are listed below.

1. Assumption: The existence of CHEC will not, despite its large size relative to the regional Education sector, change the multipliers and coefficients within the model.
2. Assumption: Demand which is currently met by CHEC will not shift to other institutions. This assumption is thought to be robust for the university and TAFE sectors within CHEC, but demand which is met by the Senior College would be likely to shift to other schools within the region.
3. Limitation: The exclusion of the economic impact of out-of-region students from the analysis results in a likely under-estimation of the total impact of CHEC on the Coffs Coast regional economy.

6. SIMULATION

Impact Tables from REMPLAN

After performing the steps described in the earlier section headed **Method**, the impact of CHEC on the output and employment for the Coffs Coast region was estimated as shown in the tables which are presented in **Appendix 1 – Impact Tables – CHEC Output**

Analysis of Impact

Summary of Impact Figures

The impact simulation indicates that Coffs Harbour Education Campus's contribution to the region is as follows:

1. **Total output:** \$69.2M with the major impacts being in the following sectors:

a. Education	\$30.3M
b. Retail	\$ 8.8M
c. Manufacturing	\$ 5.3M

2. **Income to households:** \$33.6M with the major impacts being in the sectors:

a. Education	\$22.7M
b. Retail	\$ 3.0M
c. Health & community services	\$ 1.1M

3. **Employment:** 763 jobs with the major impacts in the sectors:

a. Education	470 jobs
b. Retail	104 jobs
c. Accommodation, restaurants and cafes	32 jobs

4. **Value added:** \$45.1M with the major impacts in:

a. Education	\$26.0M
b. Retail	\$ 4.7M
c. Property, Business Services	\$ 2.0M

Discussion

Total Output

The impact of CHEC on the total output of the region is \$69M. Total output as a result of CHEC therefore represents 1.8% of the region's total output.

It is noteworthy that the Education sector has a larger type 2 output multiplier than most other sectors. The type 2 output multiplier defines the magnitude of the total impact on the region's output for a given change in a sector's output. The larger the multiplier, the larger the total impact from a change in a given sector's output.

The type 2 output multiplier for the Education sector is 2.382. Therefore, the total increase in the region's output which results from an increase of, say, \$1m in the

Education sector's output is \$2.382m; thus ranking it second amongst the 17 sectors which have multipliers ranging from 2.395 down to 1.592.^{iv}

Employment

The direct employment of 450 staff is, in itself, a significant contributor to the regional economy. When the effect of multipliers is taken into account, the total number of regional jobs as a result of CHEC is 763. This figure represents approximately 2.7% of the region's jobs and demonstrates that a significant proportion of the employment in the region is linked to CHEC's operations in the region.

The boost in Retail sector jobs of 104 is relatively large, but perhaps not surprising given that the Retail sector is the largest contributor to employment in the region.^v

The boost in Accommodation/Cafes/Restaurants sector jobs is 32. Whilst this figure represents only 1% of total jobs in this sector, it provides an important stimulus to an area of the economy which is highly seasonal.

Household Income

The Education sector is heavily reliant on the input of wages and salaries. As such, the sector makes a strong contribution to household income and consumption activity in the region. Additionally, total output caused by CHEC leads to a need for industries to employ more people, thus further increasing total household income in the region.

Accordingly, at \$33.6m, household income as a result of CHEC accounts for 3% of total household income for the region. This is a significant portion for one organisation within the region.

Value Added

Value added is the value of all inputs except imports. Value added represents the value by which goods and services have increased due to inputs from the Coffs Coast region. Value added in the Coffs Coast region due to CHEC is \$45M, or 2.4% of the region's total value added.

7. ESTIMATING THE IMPACT OF STUDENT CONSUMPTION

Methodology

This section discusses the economic impact on the Coffs Coast region of the students who come to the region in order to study at CHEC. The impact of “out-of-region” students is not included in other sections of this report. It is confined to this supplementary section of the report due to the limitations of the data available for out-of-region student numbers.

Students are the consumers of the majority of the output of the Education sector. Generally, the consumers of a firm’s output are not directly considered when modelling the impact of the firm on an economy. Consumers are assumed to exist in the economy prior to the firm’s (changed) output and therefore do not need to be added to the model to any extent beyond the output of the firm which they consume.

In the case of students from outside the region however, the above assumption needs to be relaxed. Out-of-region students come to the area due to CHEC, and would not otherwise be in the region. It is therefore appropriate to include not only their consumption of education services but their consumption of other goods and services in the region.

Approach

The consumption of services other than education by out-of-region students has been determined as follows.

1. Determine the number of out-of-region students.^{vi}
2. Determine a student’s typical consumption pattern for services and products other than in the Education sector.^{vii}
3. Multiply the above two figures to obtain total non-Education consumption by out-of-region students
4. Input the total consumption figures to the model as a direct expenditure/output impact in the appropriate sectors.

Simulation

Impact

After performing the steps described in the above section **Approach**, the impact of out-of-region CHEC students on the output and employment for the Coffs Coast region was estimated as shown in the tables presented in **Appendix 2 – Impact Tables – Out of Region Students**.

Note the following regarding the tables.

1. The tables show columns for the Final Demand (effectively what was entered to the model), the Industrial Effect (demand in the Intermediate Quadrant after the

impact), the Consumption Effect (demand in the Final Demand Quadrant after the impact), and the total effect.

2. The tables show type 1 and type 2 multipliers. These multipliers represent the multiplier which is applied to Final Demand in order to obtain the Industrial Effect and the Consumption Effect, respectively.

Analysis of Impact

The impact simulation indicates that consumption by out-of-region students contributes to the region as follows:

1. **Total output:** \$9.2M with the major impacts being in the following sectors:
 - a. Retail \$ 2.6 m
 - b. Property, Business Services \$ 2.1 m
 - c. Accommodation, restaurants and cafes \$ 1.1 m
2. **Income to households:** \$2.6M. The major impacts were in the sectors:
 - a. Retail \$ 0.9 m
 - b. Property, Business Services \$ 0.6 m
 - c. Accommodation, restaurants and cafes \$ 0.3 m
3. **Employment:** 72 jobs with the major impacts being in:
 - a. Retail 31 jobs
 - b. Accommodation, restaurants and cafes 10 jobs
 - c. Property, Business Services 10 jobs
4. **Value added:** \$4.5M with the major impacts being in:
 - a. Retail \$ 1.4 m
 - b. Property, Business Services \$ 1.0 m
 - c. Accommodation, restaurants and cafes \$ 0.4 m

Discussion

Whilst the impact on the region's economy resulting from out-of-region students is, at \$9.2M, considerably smaller than that resulting from CHEC's direct output, it is nonetheless substantial.

The 72 jobs resulting from the consumption by out-of-region students provides an important stimulus to regional employment.

The total impact of CHEC, taking into account the campus's direct output (via CHEC employee figures) *and* out-of-region students' non-Education consumption can be summarised as follows:

Measure	Value	Share of region
Region's annual output attributable to CHEC	\$78m	2 %
Region's employment attributable to CHEC	835 jobs	3 %
Region's annual household income attributable to CHEC	\$36m	3 %
Region's value added attributable to CHEC	\$50m	2 %

These figures demonstrate clearly that the Coffs Harbour Education Campus accounts for a significant portion of the region's economy.

The approach used in considering the impact of out-of-region students is thought to be conservative. As a result, it is likely that, with more robust data, the true impact on the Coffs Coast region's economy is more substantial than that shown here. This area requires future research.

8. CONCLUSION

The Coffs Harbour Education Campus provides a substantial stimulus to the Coffs Coast region in terms of educational and career prospects, as well as contributing to the region's intellectual and social capital. This paper shows that CHEC is also a significant contributor to the region's economy.

CHEC's contribution to the region's output, after multipliers, is \$69.2m. This equates to 1.8% of the region's total output.

The economic activity generated in the region by CHEC's operations is an important driver of employment in the region. Taking into account both the direct and flow-on impacts of CHEC's operations, it is estimated that a total of 763 jobs are generated. This represents 2.7% of the region's total jobs.

As well as the economic activity which CHEC generates in the Education sector, and the flow-on effects of that activity, CHEC causes students to move to the region. These out-of-region students consume not only the educational services of CHEC but other non-Education sector goods and services. If the effect of out-of-region students is included in the analysis, the overall contribution of CHEC to the region's economy is even more substantial: \$78m in regional output and 835 jobs.

The CHEC facility offers the Coffs Coast region, and particularly the community's younger members, educational and career-development opportunities which may not otherwise be readily available. However, CHEC offers more to the region than the opportunity or potential for future education and prosperity, it is a significant employer in its own right and, via the economic activity which it generates, a substantial current contributor to the region's economy and employment.

GLOSSARY^{viii}

Output	Equates to revenue generated by each sector in the region.
Employment	The number of people whose work is located in the region and/or sector. These people can be permanent, casual, full-time or part-time employees. They may not reside in the region.
Household income	The value of wages and salaries earned by employees who work in the region.
Value added	The increase in the value of a good at each stage of the production process. The act of production is essentially the process of transforming raw materials and natural resources into goods and services that have greater value.

APPENDIX 1 – IMPACT TABLES – CHEC OUTPUT

The tables in this appendix represent the REMPLAN-generated estimate of the impact of the CHEC output on the Coffs Coast region.

Note the following regarding the tables.

1. The tables show columns for the Final Demand (effectively what was entered to the model), the Industrial Effect (demand in the Intermediate Quadrant after the impact), the Consumption Effect (demand in the Final Demand Quadrant after the impact), and the total effect.
2. The tables show type 1 and type 2 multipliers. These multipliers represent the multiplier which is applied to Final Demand in order to obtain the Industrial Effect and the Consumption Effect respectively.

ECONOMIC IMPACT ANALYSIS – COFFS HARBOUR EDUCATION CAMPUS				
OUTPUT				
Coffs Coast Region				
FILL IN EXPECTED ANNUAL CHANGES IN FINAL DEMAND COLUMN				
SECTOR	Final Demand \$m	Industrial Effect	Consumpn Effect	Total
Agriculture, Forest, Fishing	-	0.05	1.06	1.11
Mining	-	0.00	0.03	0.03
Manufacturing	-	0.77	4.48	5.25
Electricity, Gas, Water	-	0.34	1.40	1.74
Construction	-	0.01	0.08	0.09
Wholesale Trade	-	0.22	1.82	2.04
Retail Trade	-	0.16	8.66	8.82
Accomm, Cafes, Restaurants	-	0.16	3.22	3.38
Transport, Storage	-	0.20	1.29	1.49
Communication Services	-	0.24	1.23	1.47
Finance, Insurance	-	0.26	2.77	3.03
Property, Business Services	-	0.62	3.67	4.29
Govt Admin & Defence	-	0.17	0.32	0.50
Education	29.05	0.16	1.10	30.31
Health & Community Serv	-	0.02	1.77	1.79
Cultural & Recreational Serv	-	0.10	1.92	2.02
Personal & Other Services	-	0.05	1.78	1.84
TOTALS	29.05	3.55	36.61	69.21
Output Multipliers		Type 1	Type 2	
		1.12	2.38	

ECONOMIC IMPACT ANALYSIS – COFFS HARBOUR EDUCATION CAMPUS

HOUSEHOLD INCOME \$m

Coffs Coast Region

SECTOR	Final Demand	Industrial Effect	Consumpn Effect	Total
Agriculture, Forest, Fishing	-	0.01	0.17	0.17
Mining	-	0.00	0.00	0.00
Manufacturing	-	0.13	0.76	0.89
Electricity, Gas, Water	-	0.04	0.16	0.20
Construction	-	0.00	0.02	0.02
Wholesale Trade	-	0.06	0.52	0.58
Retail Trade	-	0.05	2.90	2.95
Accomm, Cafes, Restaurants	-	0.04	0.76	0.80
Transport, Storage	-	0.05	0.31	0.36
Communication Services	-	0.06	0.30	0.36
Finance, Insurance	-	0.07	0.79	0.86
Property, Business Services	-	0.16	0.97	1.13
Govt Admin & Defence	-	0.08	0.15	0.24
Education	21.73	0.12	0.82	22.67
Health & Community Serv	-	0.01	1.13	1.14
Cultural & Recreational Serv	-	0.03	0.49	0.52
Personal & Other Services	-	0.02	0.68	0.70
TOTALS	21.73	0.94	10.91	33.58
Income Multipliers		Type 1		Type 2
		1.04		1.55

ECONOMIC IMPACT ANALYSIS – COFFS HARBOUR EDUCATION CAMPUS

EMPLOYMENT

Job numbers

Coffs Coast Region

SECTOR	Final Demand	Industrial Effect	Consumpn Effect	Total
Agriculture, Forest, Fishing	-	0.4	8.2	8.5
Mining	-	0.0	0.1	0.1
Manufacturing	-	2.9	16.9	19.8
Electricity, Gas, Water	-	0.6	2.6	3.2
Construction	-	0.1	0.5	0.5
Wholesale Trade	-	1.4	11.7	13.1
Retail Trade	-	1.8	102.2	104.1
Accomm, Cafes, Restaurants	-	1.5	30.3	31.8
Transport, Storage	-	1.0	6.1	7.0
Communication Services	-	0.9	4.6	5.5
Finance, Insurance	-	1.1	11.2	12.3
Property, Business Services	-	2.9	16.8	19.7
Govt Admin & Defence	-	1.2	2.3	3.5
Education	450.0	2.5	17.0	469.5
Health & Community Serv	-	0.3	27.6	27.9
Cultural & Recreational Serv	-	0.8	15.3	16.1
Personal & Other Services	-	0.6	19.9	20.5
TOTALS	450.0	19.9	293.3	763.2
Employment Multipliers		Type 1	Type 2	
		1.04	1.70	

ECONOMIC IMPACT ANALYSIS – COFFS HARBOUR EDUCATION CAMPUS

VALUE ADDED \$m

Coffs Coast Region

SECTOR	Final Demand	Industrial Effect	Consumpn Effect	Total
Agriculture, Forest, Fishing	-	0.03	0.57	0.60
Mining	-	0.00	0.01	0.02
Manufacturing	-	0.24	1.38	1.62
Electricity, Gas, Water	-	0.17	0.71	0.88
Construction	-	0.01	0.04	0.04
Wholesale Trade	-	0.09	0.69	0.78
Retail Trade	-	0.08	4.58	4.66
Accomm, Cafes, Restaurants	-	0.07	1.34	1.40
Transport, Storage	-	0.09	0.60	0.69
Communication Services	-	0.14	0.72	0.86
Finance, Insurance	-	0.16	1.67	1.82
Property, Business Services	-	0.29	1.71	2.00
Govt Admin & Defence	-	0.09	0.17	0.25
Education	24.90	0.14	0.94	25.97
Health & Community Serv	-	0.02	1.39	1.41
Cultural & Recreational Serv	-	0.05	0.96	1.01
Personal & Other Services	-	0.03	1.00	1.03
TOTALS	24.90	1.68	18.48	45.06
Value Added Multipliers		Type 1	Type 2	
		1.07	1.81	

APPENDIX 2 – IMPACT TABLES – OUT-OF-REGION STUDENTS

Note the following regarding the tables.

1. The tables show columns for the Final Demand (effectively what was entered to the model), the Industrial Effect (demand in the Intermediate Quadrant after the impact), the Consumption Effect (demand in the Final Demand Quadrant after the impact), and the total effect.
2. The tables show type 1 and type 2 multipliers. These multipliers represent the multiplier which is applied to Final Demand in order to obtain the Industrial Effect and the Consumption Effect, respectively.

ECONOMIC IMPACT ANALYSIS – COFFS HARBOUR EDUCATION CAMPUS				
OUTPUT				
Coffs Coast Region				
FILL IN EXPECTED ANNUAL CHANGES IN FINAL DEMAND COLUMN				
SECTOR	Final Demand \$m	Industrial Effect	Consumpn Effect	Total
Agriculture, Forest, Fishing	-	0.1	0.1	0.1
Mining	-	0.0	0.0	0.0
Manufacturing	-	0.3	0.3	0.6
Electricity, Gas, Water	-	0.1	0.1	0.2
Construction	-	0.0	0.0	0.0
Wholesale Trade	-	0.1	0.1	0.3
Retail Trade	1.8	0.2	0.7	2.6
Accomm, Cafes, Restaurants	0.8	0.1	0.2	1.1
Transport, Storage	0.4	0.1	0.1	0.6
Communication Services	-	0.1	0.1	0.2
Finance, Insurance	-	0.1	0.2	0.3
Property, Business Services	1.0	0.8	0.3	2.1
Govt Admin & Defence	-	0.0	0.0	0.1
Education	-	0.0	0.1	0.1
Health & Community Serv	-	0.0	0.1	0.1
Cultural & Recreational Serv	0.4	0.1	0.1	0.6
Personal & Other Services	-	0.0	0.1	0.2
TOTALS	4.3	2.1	2.8	9.2
Output Multipliers		Type 1 1.48		Type 2 2.15

ECONOMIC IMPACT ANALYSIS – COFFS HARBOUR EDUCATION CAMPUS				
HOUSEHOLD INCOME \$m				
Coffs Coast Region				
SECTOR	Final Demand	Industrial Effect	Consumpn Effect	Total
Agriculture, Forest, Fishing	-	0.0	0.0	0.0
Mining	-	0.0	0.0	0.0
Manufacturing	-	0.0	0.1	0.1
Electricity, Gas, Water	-	0.0	0.0	0.0
Construction	-	0.0	0.0	0.0
Wholesale Trade	-	0.0	0.0	0.1
Retail Trade	0.6	0.1	0.2	0.9
Accomm, Cafes, Restaurants	0.2	0.0	0.1	0.3
Transport, Storage	0.1	0.0	0.0	0.1
Communication Services	-	0.0	0.0	0.0
Finance, Insurance	-	0.0	0.1	0.1
Property, Business Services	0.3	0.2	0.1	0.6
Govt Admin & Defence	-	0.0	0.0	0.0
Education	-	0.0	0.1	0.1
Health & Community Serv	-	0.0	0.1	0.1
Cultural & Recreational Serv	0.1	0.0	0.0	0.2
Personal & Other Services	-	0.0	0.1	0.1
TOTALS	1.2	0.5	0.8	2.6
Income Multipliers		Type 1		Type 2
		1.44		2.13

ECONOMIC IMPACT ANALYSIS – COFFS HARBOUR EDUCATION CAMPUS

EMPLOYMENT

Job numbers

Coffs Coast Region

SECTOR	Final Demand	Industrial Effect	Consumpn Effect	Total
Agriculture, Forest, Fishing	-	0.5	0.6	1.1
Mining	-	0.0	0.0	0.0
Manufacturing	-	1.0	1.3	2.3
Electricity, Gas, Water	-	0.1	0.2	0.3
Construction	-	0.1	0.0	0.2
Wholesale Trade	-	0.7	0.9	1.6
Retail Trade	20.8	2.2	7.9	30.9
Accomm, Cafes, Restaurants	7.1	0.7	2.3	10.1
Transport, Storage	1.8	0.5	0.5	2.7
Communication Services	-	0.4	0.4	0.7
Finance, Insurance	-	0.5	0.9	1.4
Property, Business Services	4.6	3.7	1.3	9.6
Govt Admin & Defence	-	0.3	0.2	0.5
Education	-	0.2	1.3	1.6
Health & Community Serv	-	0.1	2.1	2.2
Cultural & Recreational Serv	3.0	0.6	1.2	4.8
Personal & Other Services	-	0.2	1.5	1.7
TOTALS	37	12	23	72
Employment Multipliers		Type 1	Type 2	
		1.31	1.92	

ECONOMIC IMPACT ANALYSIS – COFFS HARBOUR EDUCATION CAMPUS

VALUE ADDED \$m

Coffs Coast Region

SECTOR	Final Demand	Industrial Effect	Consumpn Effect	Total
Agriculture, Forest, Fishing	-	0.0	0.0	0.1
Mining	-	0.0	0.0	0.0
Manufacturing	-	0.1	0.1	0.2
Electricity, Gas, Water	-	0.0	0.1	0.1
Construction	-	0.0	0.0	0.0
Wholesale Trade	-	0.0	0.1	0.1
Retail Trade	0.9	0.1	0.4	1.4
Accomm, Cafes, Restaurants	0.3	0.0	0.1	0.4
Transport, Storage	0.2	0.0	0.0	0.3
Communication Services	-	0.1	0.1	0.1
Finance, Insurance	-	0.1	0.1	0.2
Property, Business Services	0.5	0.4	0.1	1.0
Govt Admin & Defence	-	0.0	0.0	0.0
Education	-	0.0	0.1	0.1
Health & Community Serv	-	0.0	0.1	0.1
Cultural & Recreational Serv	0.2	0.0	0.1	0.3
Personal & Other Services	-	0.0	0.1	0.1
TOTALS	2.1	1.0	1.4	4.5
Value Added Multipliers		Type 1	Type 2	
		1.47	2.16	

NOTES

- i West, G. and A. Gamage, "Macro Effects of Tourism in Victoria, Australia: A Nonlinear Input-Output Approach", in *Journal of Travel Research*, Vol. 40, August 2001, pp. 101-109.
- ii Adapted from the REMPLAN Training Manual, La Trobe University.
- iii Provided by the Executive Director of Coffs Harbour Education Campus, Mr Warren Grimshaw.
- iv REMPLAN Table of Regional Multipliers.
- v Retail is the most significant sector in the region in terms of employment. Retail accounts for approximately 5,600 jobs with the next highest sector, Health and Community Services, accounting for approximately 3,400 jobs. Note that "jobs" refers to persons employed, whether full-time or part-time.
- vi Out-of-region student numbers based on information from:
 - SCU: Quality and Academic, Student Profile Report 2002-2004.
 - TAFE: Greg Robson, Campus Manager, TAFE
 - Senior College: Peter Cameron, Director, Senior College.
- vii 2006 Study Options, Southern Cross University, 2005, page 11.
- viii From REMPLAN Training Manual, La Trobe University.