Calculating the productivity of *innovation*

Using a Simplified Cost-Benefit Analysis to Promote Effective Practice

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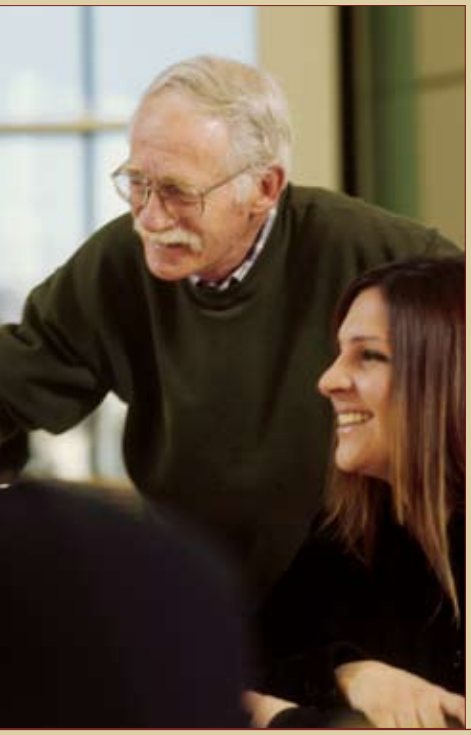

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Executive Summary

In the current climate of budgetary constraints and increased accountability, productivity is emerging as a major issue within higher education policy discussions. In 2007, the National Conference of State Legislatures published its Blue Ribbon Commission: Improving Higher Education Performance and Productivity, which advocated that higher education be held to the same productivity standards as other areas of state government. More recently, the Lumina Foundation for Education's "Making Opportunity Affordable" initiative focused its efforts on increasing productivity within two-year and four-year public colleges and universities through intentional investments that maximize student, parent, and taxpayer dollars.

Although some analysts have recommended changes in state funding mechanisms to help prioritize certain outcomes, the reality is that colleges urgently need to be able to make good decisions under existing policies.

The call from public policy experts, foundations, and the general public is loud and clear: "Improve student outcomes, and at the same time, increase the cost-effectiveness of programs." Implicit in this message is the mounting pressure for public higher education to utilize the same business and strategic planning models that "for-profit" entities use in their strategic planning process.

Though some analysts have recommended changes in state funding mechanisms to help prioritize certain outcomes, the reality is that colleges urgently need to be able to make good decisions under existing policies. The Simplified Cost-Benefit Analysis model presented in this report is designed to aid colleges in the evaluation of productivity. The methodology is based on the assumption that additional resources are required to increase student success, that community colleges are under-funded, and that the funding that colleges receive is based on enrollments rather than outcomes.

In the enrollment-driven approach to fiscal stability, program improvement is seen as a cost rather than an investment in student success. The simplified cost-benefit analysis demonstrates how investment in innovation can result in increased revenue, over time, through increased retention. The model gives faculty and administration a way to evaluate the productivity of innovations by determining whether — and when — the upfront costs of implementing effective strategies will be recouped with the revenue generated from increased retention.

The example used in this study is based on data from the Community College of Denver's English as a Second Language (ESL) Learning Community pilot, funded through a grant from the Lumina Foundation for Education to the Colorado Community College System Foundation. In this example, costs are calculated on the basis of additional costs per student. Revenue is determined on the basis of student success, by calculating increased retention and credit hours over time. Costs are examined in two contexts — the costs to run the pilot intervention program and the costs to operate the intervention at scale. Costs and revenues are then analyzed in terms of time to break-even and long-term fiscal benefit to the college.

Data from the ESL Learning Community example show that even within the short-term, the financial benefit to the institution is greater than the additional cost of the intervention. Break-even is reached within only a few terms, establishing the case for bringing the intervention to scale and sustaining it over time. The ESL Learning Community example demonstrates how a simplified cost benefit tool can

provide administrators with the information needed to make timely, data-driven decisions related to sustaining or institutionalizing programmatic innovations.

Several logistical and institutional constraints work against the widespread incorporation of the model into the strategic planning process. These include the capacity of Institutional Research departments to track data, the lack of communication between programmatic and fiscal divisions, and the historical patterns of strategic planning, which favor the status quo. Despite these constraints, the authors view the model as a valuable tool that can aid colleges in their shift from short-term cost considerations to a more strategic analysis of productivity. In addition, we see the model as having immediate application in two areas critical to the evolution of effective practice and to student success — continuous program improvement and the evaluation of grant-funded innovation.

Examples of the Simplified Cost-Benefit Analysis and a template that allows practitioners to enter and analyze their data are available online at the following sites: **http://www.cccs.edu/Research/costeffect.html** or **http://www.communitycollegecentral.org**.

Introduction

In the current climate of budgetary pressures and increased focus on outcomes, community college leaders face difficult choices around the allocation of resources. At the same time that administrators are being asked to work within decreased budgets, they are also being held accountable for improved student outcomes, with an emphasis on degree and certificate completion for all student populations, and specifically, underserved populations. In short, community colleges are expected to increase productivity, by improving student achievement using existing resources.

The traditional measure of institutional success relies on continued enrollment growth. To address the challenges inherent in moving from an enrollment-based accountability to an outcome-based accountability, colleges must adapt the strategic planning process in ways that will link effective practice, student outcomes, and the actual costs of implementing successful strategies. By linking the cost of inputs to revenue from increased retention, the focus shifts from short-term revenue streams based on enrollment to long-term productivity based on student success.

Longitudinal data plays an important role in helping colleges understand the relative success of different student populations and programs. However, in the new paradigm of productivity, strategic planning requires a detailed understanding of both costs and outcomes. The Simplified Cost-Benefit Analysis provides colleges with a methodology to evaluate the cost effectiveness of investments in specific programs and strategies. Through the collection of a limited amount of data, this tool provides program administrators and college leadership with the information needed to answer the question of whether the costs of implementing a specific intervention can be recouped within a reasonable amount of time to warrant the continuation and/or expansion of the program/strategy.

To successfully compete in the college business cycle, where business decisions are made on an annual or term basis, programs require a model that will yield an early proof of cost effectiveness. The Simplified Cost Benefit Analysis provides college leadership with the information needed to make timely, data-driven decisions related to approving, sustaining, or institutionalizing programmatic innovations.

By engaging faculty and program staff in a transparent process that links continued program investment with student outcomes the Simplified Cost-Benefit Analysis enhances the relationships between the programmatic and business sides of the college, furthers authentic communication, and allows staff to work collaboratively toward the shared goal of improving outcomes for students.

METHODOLOGY FOR THE SIMPLIFIED COST-BENEFIT ANALYSIS

The methodology for calculating the Simplified Cost Benefit Analysis was developed with funding from the Ford Foundation — Bridges to Opportunity project and is part of the outcome analysis of the Colorado Lumina Initiative for Performance. The goal of the methodology is to identify the point at which a specific strategy or program reaches breakeven, or the point at which revenue equals or exceeds additional costs.

The example presented here was based on the revenues and costs of the ESL Learning Community strategy piloted at Community College of Denver through a Lumina Foundation for Education grant awarded to the Colorado Community College System Foundation. The intervention consisted of a learning community that combined ESL classes in reading, writing and speaking. Other inputs were case management/advising, costs for additional instruction and curriculum development, and program coordination.

In this example, outcomes for students in the intervention were compared to outcomes of ESL students who did not participate in the intervention. A preliminary analysis of these outcomes indicated that students in the intervention demonstrated higher GPAs, rates of course completion, and retention.

In the normal course of new program design and implementation, it is program staff members who track outcomes. A common mistake made by program staff is thinking that by providing data that shows improved outcomes, they have made a compelling case for the institutionalization of their programs. If the question of productivity rested solely on improved outcomes, then evidence of improved outcomes would be the major driver of decision making. However, an analysis of productivity calculates both program effectiveness and cost effectiveness, by looking at the relationship between costs and outcomes. This is where the Simplified Cost Benefit Analysis enters the process, by including the first part of the productivity question — improved outcomes — and answering the second part of the productivity question, "Is the intervention cost effective?" or, "Can the startup costs be recouped within a reasonable period of time?"

Cost of Intervention

The first task of the cost analysis is to give program administrators detailed information on the additional per student costs of their intervention. In calculating costs for this study, only those costs above the costs already being incurred to serve traditional ESL students were included. These catagories of costs are generally accessible to program administrators as part of their budget oversight. There was no attempt in this study to calculate the total cost of educating an ESL student or an attempt to evaluate any impact on fixed costs at the institution when the intervention is brought to scale. (This type of analysis requires full knowledge of the institution and would need to be done by experts in the finance office.) To arrive at the cost of the intervention, we looked at total additional costs of the intervention, the average per student cost, and projections of what additional costs would be incurred if the intervention went to scale.

The average per student cost is calculated by dividing the additional input costs for the program by the number of students in the program. Scale differs based on the individual intervention. This intervention scale is 60 students, based on CCD's ESL enrollment patterns[6]. The Cost Analysis is supplied in **Exhibit 1**.

Exhibit 1

Cost Description		Average Per Student Cost	
		Pilot Study	To Scale[6]
		45	60
Project Management			
$12,000	**Pilot:** 0.5 FTE project director to implement	**$267**	**$0**
$0	**To Scale:** no additional cost — coordination assumed by ESL Chair		
Student Ambassadors			
$975	**Pilot: 1 @ $975 per semester**	**$22**	**$16**
$975	**To Scale: 1 @ $975 per semester**		
Instruction/Curriculum Development			
$3,600	**Pilot:** 6 instructors @ $600 stipend/semester	**$80**	**$85**
$5,100	**To Scale:** 6 instructors @ $600/semester plus $1,500 curriculum development		
Educational Case Manager			
$8,800	**Pilot:** 0.4 FTE per semester = $8,800	$196	$147
$8,800	**To Scale:** 0.4 FTE per semester = $8,800		
	Average per Student Cost[7]	**$564**	**$248**
	Total Cost For Intervention[5]	**$25,375**	**$14,875**

5 This is the incremental cost of providing the intervention that is above and beyond the cost already incurred for the comparison group.
6 Scale is determined based on the number of students enrolled in ESL. At capacity there are three ESL learning communities with 20 students in each. (20 students is the class capacity for an effective ESL classroom.)
7 The cost for the intervention is a one-time cost. The intervention lasts only one term.

Benefit of Intervention

In designing the calculation for institutional benefit, the goal was to provide a user-friendly model that would allow program staff to track cost effectiveness with minimal input from the college's Institutional Research department. Only a small number of data elements are required to calculate institutional benefit: Number of Students, Total Credit Hours, and Revenue per Credit Hour. Although revenue per credit hour actually increased over time, it was kept constant in 2005 dollars in order to simplify the comparison between programs in the pilot phase and at scale.

Exhibit 2 displays an example of the base data from which the institutional benefit was calculated for the CCD ESL Learning Community strategy. The data in the shaded cells have been calculated from other data. For a full set of data, please see Appendix II or go online to: **http://www.cccs.edu/Research/costeffect.html.**

Benefit to the institution is defined by calculating additional revenue attributable to the program, based on the increase in semester-to-semester retention and the difference in average credit hours between students in the intervention and those in the comparison group. When students in an intervention take more credits and retain at a higher rate than students in a comparison group, the difference in revenue represents a benefit to the institution.

In estimating the benefits of the program, we looked only at the monetary benefits derived from increased retention and credit hours. All of the increase in retention is treated as net revenue. Reduced costs associated with returning students versus new students, and/or any intrinsic value attributable to more education, such as the increased value of a student as an employee or a citizen, were not considered. In the same way that there are incremental benefits that are difficult to quantify there are also some costs associated with the retention of these students that are difficult to quantify, such as overhead. However, our premise is that a significant portion of the revenue will be available to offset the cost of the intervention.

One factor that will vary by state is whether or not credit hours are fully funded. In this analysis, credit hours are fully funded. In situations where there is a limit on funding and additional credit hours over a specified cap are not funded, this model provides a powerful argument for reallocating funding internally to increase the overall productivity of the institution. Clearly, the policy of not fully funding student FTE does not encourage increased retention or enrollment above the funding cap. This may impact student success by making retention and completion initiatives too costly. This would be an important policy hurdle to overcome.

Exhibit 2 — Data

Spring 2005 CCD ESL Lumina Cohort		Spring 2005	Summer 2005	Fall 2005	Spring 2006	Summer 2006	Fall 2006
Comparison	Number of Students	45	11	18	17	3	10
	Total Credit Hrs	316	64	155	134	24	76
	Average Credit Hrs	7.0	5.8	8.6	7.9	8.0	7.6
	Retention Rate		0.24	0.40	0.38	0.07	0.22
Intervention	Number of Students	45	14	30	27	16	18
	Total Credit Hrs	433	76	286	228	74	162
	Average Credit Hrs	9.6	5.4	9.5	8.4	4.6	9.0
	Retention Rate		0.31	0.67	0.60	0.36	0.40
Revenue per Credit Hour		**$146.80**	**$146.80**	**$146.80**	**$146.80**	**$146.80**	**$146.80**

Exhibit 3 demonstrates what can occur when intervention programs produce higher rates of student retention and credit-taking behaviors. In fall 2005, the ESL intervention group enjoyed a 26.7 percent higher retention rate as well as higher average credit hours per student (9.5 v. 8.6) than the comparison group. The result of increased retention and higher average credit hours produced a benefit to the institution of $472.48 per student:

- Additional Average Per Student Retention Revenue is calculated by multiplying Average Per Student Revenue by the rate of increase in retention to the next term
  ($1,264.11 x 26.7% = $337.10).

- Additional revenue based on credit hours is calculated by subtracting the average per student revenue earned in the comparison group from the average per student revenue earned in the intervention group for that term
  ($1,399.49-$1,264.11 = $135.38).

Together these two sources of additional revenue equal $472.48 per student for fall 2005. Although not every semester shows the same pattern, the overall increased retention and credit-taking behaviors of the two groups over ten terms resulted in a cumulative average per student revenue of $2,198, an amount that would not have been realized without the intervention. The full term by term benefit calculation is provided in Appendix I and is available online at: **http://www.cccs.edu/Research/costeffect.html**.

Exhibit 3
Average per Student Revenue

Term 3	Fall 2005	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	8.6	$146.80	$1,264.11	40.0%
	Intervention	9.5	$146.80	$1,399.49	66.7%
	Difference in Retention Rate				26.7%
	Difference in Revenue based on Credit Hours[1]			$135.38	
	Additional Average Per Student Retention Revenue[2]			$337.10	
	Total Additional Average Per Student Revenue[3]			**$472.48**	

1 Students in the treatment cohort take more credit hours on average than those in the comparison group.
2 Students in the treatment cohort retain to the next semester at a rate that is generally higher than the comparison group and the revenue from that increased retention is accounted for here. (Comparison Average Per Student Revenue multiplied by the Difference in Retention Rate)
3 The sum of the difference in revenue based on credit hours and the additional average per student retention revenue.

Cost-Benefit Analysis

Exhibit 4 provides the results of the cost-benefit analysis as applied to the ESL Learning Community intervention. As judged by this analysis, the program represents a positive investment and reaches a break-even point (costs = benefits) in the third term. By the third term, due to increased credit-taking and retention of students in the intervention, a cumulative $854 of average per student revenue is generated, resulting in a cumulative average per student net revenue greater than zero ($854 - $564 = $290). When the intervention is brought to scale, using the average per student costs at scale and the same benefits derived from the increased retention and credit-taking behavior observed in the pilot, the intervention pays for itself within one term.

Only a few terms are necessary to recoup costs (the break-even point at which costs are equal to benefits). On the other hand, institutional benefit continues to increase over time resulting in an incentive to the college to continue and/or expand the program. In the example of the ESL Learning Community intervention pilot, over the course of ten terms the resulting average per-student net benefit was $1,634. The additional average per student cost for the intervention is $564 for the pilot program. The average per student revenue produced by the intervention over the first ten terms is $2,198, and exceeds the costs by $1,634 per student.

Exhibit 4
Simplified Cost Benefit Analysis Summary*

		Pilot	Scale
Average Per Student Cost		-$564	-$248
	Additional Average Per Student Revenue	$382	$382
Term 1	Cumulative Average Per Student Revenue	$382	$382
	Cumulative Average Per Student Net Revenue[8]	-$182	$134
	Additional Average Per Student Revenue	$0	$0
Term 2	Cumulative Average Per Student Revenue	$381	$381
	Cumulative Average Per Student Net Revenue[8]	-$182	$134
	Additional Average Per Student Revenue	$472	$472
Term 3	Cumulative Average Per Student Revenue	$854	$854
	Cumulative Average Per Student Net Revenue[8]	$290	$606
	Additional Average Per Student Revenue	$340	$340
Term 4	Cumulative Average Per Student Revenue	$1,194	$1,194
	Cumulative Average Per Student Net Revenue[8]	$630	$946
	Additional Average Per Student Revenue	-$156	-$156
Term 5	Cumulative Average Per Student Revenue	$1,037	$1,037
	Cumulative Average Per Student Net Revenue[8]	$473	$789
	Additional Average Per Student Revenue	$404	$404
Term 6	Cumulative Average Per Student Revenue	$1,441	$1,441
	Cumulative Average Per Student Net Revenue[8]	$877	$1,193
	Additional Average Per Student Revenue	$236	$236
Term 7	Cumulative Average Per Student Revenue	$1,677	$1,677
	Cumulative Average Per Student Net Revenue[8]	$1,113	$1,429
	Additional Average Per Student Revenue	-$142	-$142
Term 8	Cumulative Average Per Student Revenue	$1,536	$1,536
	Cumulative Average Per Student Net Revenue[8]	$972	$1,288
	Additional Average Per Student Revenue	$418	$418
Term 9	Cumulative Average Per Student Revenue	$1,953	$1,953
	Cumulative Average Per Student Net Revenue[8]	$1,389	$1,705
	Additional Average Per Student Revenue	$245	$245
Term 10	Cumulative Average Per Student Revenue	$2,198	$2,198
	Cumulative Average Per Student Net Revenue[8]	$1,634	$1,950

Gold shaded cells signify the break-even point. At scale this intervention breaks even within the first term. The pilot breaks even during the third term.

8 The Cumulative Average Per Student Net Revenue is calculated by adding the negative Average Per Student Cost to the Cumulative Average Per Student Revenue.

* *Numbers may not add due to rounding*

Exhibit 5 portrays the conclusion of the Simplified Cost Benefit Analysis over the first ten terms of the intervention.

Exhibit 5
Simplified Cost Benefit Analysis

Pilot		
	Cumulative Average Per Student Revenue	$2,198
	Average Per Student Cost for the Pilot	$564
	Net Benefit after ten terms	**$1,634**
	The break-even point (costs = benefits) takes place in Term 3	
Scale		
	Cumulative Average Per Student Revenue	$2,198
	Average Per Student Cost at Scale	$248
	Net Benefit after ten terms	**$1,950**
	The break-even point (costs = benefits) takes place in Term 1	

Discussion

The Need: ***In the present environment of increased accountability and increased fiscal pressure, college leadership is faced with difficult decisions about where, and at what level to invest in program improvement.***

Funding for program innovation often flows from foundations or public ventures concerned with the low success rate of disadvantaged populations. While "soft funds" bring great flexibility, the procedures necessary to evaluate the long-term fiscal viability of the innovations they support are seldom built into program design. Grant-funded programs are further marginalized from the strategic planning process by an organizational culture that views them as transitory. Researchers often refer disparagingly to these programs as "boutique" programs, suggesting that their cost renders them unsustainable. Even when a program shows a measurable impact, the practitioners and administrators who most clearly understand the potential value of the innovation may lack the tools necessary to make the fiscal case for institutionalization.

The Challenge: ***In a perfect world, a user-friendly model that predicts "break even" and projects revenue would be welcomed into the strategic planning process.***

There are several constraints that work against the adoption of this model, including the limited institutional research capacity of community colleges, whose mission has traditionally excluded "research". Productivity is coming into sharper focus as part of the national debate on increased access, but strategic business decisions are still more likely to focus on potential enrollment rather than productivity, with limited input from the instructional side of the college.

Numerous subjective factors feed into the decision making process, such as the passion and interests of the president and vice presidents, the influence of the business community and/or other major constituencies, internal departmental politics and historical alliances.

The strategic planning process is the organizational structure entrusted with long term planning, but it often functions to legitimize the status quo or to support the prerogatives of key stakeholders rather than to evaluate the relative merits of competing college priorities. Numerous subjective factors feed into the decision making process, such as the passion and interests of the president and vice presidents, the influence of the business community and/or other major constituencies, internal departmental politics and historical alliances.

Discussions of productivity are likely to surface during periods of declining enrollment or fiscal crises, but these discussions are unlikely to find their way into the strategic planning process without either a strong commitment from senior leadership or a clear directive from the foundations and/or external sources that fund innovation. Despite these constraints, we see two situations where a cost-effectiveness model can provide immediate value — continuous program improvement and grant-funded program evaluation.

Continuous Program Improvement:

The ability to analyze costs and outcomes can be an important tool in the shift from a focus on enrollment to a focus on student success, as well as a valuable resource in the continuous improvement process. Practitioners often feel a disconnect between their personal understanding of program effectiveness and the business decisions that control the fate of these programs. Working with the data can lessen this disconnect, deepen practitioners' understanding of cost effectiveness, and strengthen their ability to engage with the strategic planning process in a meaningful way. By helping practitioners and program staff bridge the gap between the types of data collected by institutional research and staff's own understanding of program effectiveness the model gives practitioners the tools to adapt their programs and to communicate the importance and value of their programs in the language of business.

Practitioners often feel a disconnect between their personal understanding of program effectiveness and the business decisions that control the fate of these programs.

Evaluation of Grant-Funded Programs:

In the case of foundation and other grant-funded efforts, the model provides valuable information on the relative productivity of different strategies, which in turn, can help funders make informed decisions about the course of future investments. The information gained from an analysis of productivity can also serve a variety of stakeholders whose agendas include cost effectiveness, student success and policy development. Foundations may provide the initial funding for innovation, but ultimately it is the college that must provide the proof of concept that will make the case for the broad-based institutionalization and replication of effective practice.

Appendix 1
Benefit Analysis

Average Per Student Revenue

Term 1	Spring 2005	Program Inception			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	7	$146.80	$1,030.86	n/a
	Intervention	9.6	$146.80	$1,412.54	n/a
	Difference in Revenue based on Credit Hours[1]			$381.68	
	Additional Average Per Student Retention Revenue[2]			$0.00	
	Total Additional Average Per Student Revenue[3]			**$381.68**	
Term 2	Summer 2005	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	5.8	$146.80	$854.11	24.4%
	Intervention	5.4	$146.80	$796.91	31.1%
	Difference in Retention Rate				6.7%
	Difference in Revenue based on Credit Hours[1]			($57.19)	
	Additional Average Per Student Retention Revenue[2]			$56.94	
	Total Additional Average Per Student Revenue[3]			**($0.25)**	
Term 3	Fall 2005	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	8.6	$146.80	$1,264.11	40.0%
	Intervention	9.5	$146.80	$1,399.49	66.7%
	Difference in Retention Rate				26.7%
	Difference in Revenue based on Credit Hours[1]			$135.38	
	Additional Average Per Student Retention Revenue[2]			$337.10	
	Total Additional Average Per Student Revenue[3]			**$472.48**	
Term 4	Spring 2006	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	7.9	$146.80	$1,157.13	37.8%
	Intervention	8.4	$146.80	$1,239.64	60.0%
	Difference in Retention Rate				22.2%
	Difference in Revenue based on Credit Hours[1]			$82.52	
	Additional Average Per Student Retention Revenue[2]			$257.14	
	Total Additional Average Per Student Revenue[3]			**$339.65**	

Appendix 1 *cont.*
Benefit Analysis

Average Per Student Revenue

Term 5	**Summer 2006**	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	8	$146.80	$1,174.40	6.7%
	Intervention	4.6	$146.80	$678.95	35.6%
	Difference in Retention Rate				28.9%
	Difference in Revenue based on Credit Hours[1]			($495.45)	
	Additional Average Per Student Retention Revenue[2]			$339.27	
	Total Additional Average Per Student Revenue[3]			**($156.18)**	
Term 6	**Fall 2006**	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	7.6	$146.80	$1,115.68	22.2%
	Intervention	9	$146.80	$1,321.20	40.0%
	Difference in Retention Rate				17.8%
	Difference in Revenue based on Credit Hours[1]			$205.52	
	Additional Average Per Student Retention Revenue[2]			$198.34	
	Total Additional Average Per Student Revenue[3]			**$403.86**	
Term 7	**Spring 2007**	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	9.18	$146.80	$1,347.89	24.4%
	Intervention	9.16	$146.80	$1,344.38	42.2%
	Difference in Retention Rate				17.8%
	Difference in Revenue based on Credit Hours[1]			($3.51)	
	Additional Average Per Student Retention Revenue[2]			$239.63	
	Total Additional Average Per Student Revenue[3]			**$236.11**	
Term 8	**Summer 2007**	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	5.4	$146.80	$796.91	15.6%
	Intervention	4.2	$146.80	$619.82	20.0%
	Difference in Retention Rate				4.4%
	Difference in Revenue based on Credit Hours[1]			($177.09)	
	Additional Average Per Student Retention Revenue[2]			$35.42	
	Total Additional Average Per Student Revenue[3]			**($141.67)**	

Appendix 1 *cont.*
Benefit Analysis

Average Per Student Revenue

Term 9	**Fall 2007**	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	7.3	$146.80	$1,071.64	22.2%
	Intervention	9.3	$146.80	$1,370.13	33.3%
	Difference in Retention Rate				11.1%
	Difference in Revenue based on Credit Hours[1]			$298.49	
	Additional Average Per Student Retention Revenue[2]			$119.07	
	Total Additional Average Per Student Revenue[3]			**$417.56**	
Term 10	**Spring 2008**	Intervention continues to be followed			
	Average Revenue per Student	Average Credit Hours	Revenue Per Credit Hour	Average Per Student Revenue	Retention Rate
	Comparison	8.6	$146.80	$1,266.15	17.8%
	Intervention	9.1	$146.80	$1,342.17	31.1%
	Difference in Retention Rate				13.3%
	Difference in Revenue based on Credit Hours[1]			$76.02	
	Additional Average Per Student Retention Revenue[2]			$168.82	
	Total Additional Average Per Student Revenue[3]			**$244.84**	
Additional Average Per Student Revenue Through Ten Terms[4]					**$2,198.09**

1 Students in the treatment cohort take more credit hours on average than those in the comparison group.

2 Students in the treatment cohort retain to the next semester at a rate that is generally higher than the comparison group and the revenue from that increased retention is accounted for here. (Comparison Average Per Student Revenue multiplied by the Difference in Retention Rate)

3 The sum of the difference in revenue based on credit hours and the additional average per student retention revenue.

4 The Additional Average Per Student Revenue through ten terms is the sum of the Total Additional Average Per Student Revenue in each term.

Appendix 2

Spring 2005 CCD ESL Lumina Cohort		Spring 2005	Summer 2005	Fall 2005	Spring 2006	Summer 2006	Fall 2006	Spring 2007	Summer 2007	Fall 2007	Spring 2008
Comparison	Number of Students	45	11	18	17	3	10	11	7	10	8
	Total Credit Hours	316	64	155	134	24	76	101	38	73	69
	Average Credit Hours	7.0	5.8	8.6	7.9	8.0	7.6	9.2	5.4	7.3	8.6
	Retention Rate		0.24	0.40	0.38	0.07	0.22	0.24	0.16	0.22	0.18
Intervention	Number of Students	45	14	30	27	16	18	19	9	15	14
	Total Credit Hours	433	76	286	228	74	162	174	38	140	128
	Average Credit Hours	9.6	5.4	9.5	8.4	4.6	9.0	9.2	4.2	9.3	9.1
	Retention Rate		0.31	0.67	0.60	0.36	0.40	0.42	0.20	0.33	0.31
	Revenue per Credit Hour[1]	$146.80	$146.80	$146.80	$146.80	$146.80	$146.80	$146.80	$146.80	$146.80	$146.80

1 Costs and revenue have been kept constant in 2005 dollars for longitudinal comparison purposes.

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