Measuring the Cost of a College Degree: A Case Study of a SUNY Community College

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Abstract

Inspired by a Delta Cost Project White Paper (Johnson, 2009), this study uses different measures of calculating the cost of a college degree at an up-state community college in New York. Departmental cost per credit hour, direct instructional costs, and full costs are calculated and compared. A transcript analysis of the 2008-09 graduates highlights excess credit hours taken and cross-subsidies necessary within degree programs to produce these graduates.

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In his February 2009 address to Congress, President Obama called attention to the problems of higher education and promised a policy agenda to restore the U.S. to its leadership role in student access and completion rates. However, a depressed economy, stagnant or falling state funding for public higher education, and public resistance to rising tuition, are all impeding access to a postsecondary education recognized as essential in a global economy.

In order to achieve the goal of increasing the proportions of Americans with high quality degrees and credentials, educators agree that the community college must play an important role, particularly if the low income minority students that typically attend these colleges are to be brought into the mainstream (Carnevale, Strohl & Smith, 2009). Almost all of the current discussion over meeting these goals focuses on the revenue side of the issue as colleges look for new monies to help hold down tuition increases in the face of declining public support. Yet, if we are to have a national discussion over the difficult choices that colleges and policy makers face, we must also ask questions about the cost of this service.

This case study provides important information for the cost side of the discussion. It looks at the cost of producing different types of degrees and the internal cross-subsidies by department at Broome Community College (BCC), a public community college in upstate New York. Not only is the information useful in itself, but the methods employed may serve as a model for others to look more closely at costs on the campus or state level.

The Delta Cost White Paper

A notable exception to the emphasis on the revenue side of the college access issue is the work done by the Delta Cost Project. (Its full name is the Delta Project on Postsecondary Education Costs, Productivity and Accountability). The Delta Cost Project is an important effort to illuminate the cost and productivity side of the production of higher education, and has received major funding from the Lumina Foundation. A Delta Cost Project White Paper published in 2009 discusses different approaches to answering the question of what a college degree costs (Johnson, 2009). Although the Delta study was directed at state systems of higher education, the current case study of BCC relies on the methodology they employed, with a few modifications and improvements that fit the data available.

The White Paper asks the question "what does a bachelor's degree cost?" and then outlines five different methods for answering it (Johnson, 2009). Using state level data from Florida (and Illinois to a more limited extent), examples are given of degree costs for all of the programs at eleven public four-year colleges and universities. Costs are measured by the college expenditures that come from the operating budget. Most capital costs are excluded. For Florida this analysis excluded the community colleges because data for a "similar analysis of costs" was not available (p.14). However, the taxonomy and methodology used for calculating degree costs is applicable to the community college and most of it can be used at the campus level. We assume that most colleges have some cost analysis of their degrees but as far as we know, ours is the first published study to attempt such an analysis. Very briefly, the five methods outlined in the Delta Cost White Paper along with the modified definitions used for our study are:

1. Catalog cost - Looks at the college catalog and the courses and credits needed to complete a degree program. Catalog credits are then multiplied by the cost-per-credit-hour for each of the courses in the degree program. This would represent the minimum cost, assuming all courses are taken at the same college, for getting a degree but does not reflect actual student behavior.

2. Transcript cost - Looks at actual student behavior by doing a transcript analysis for each student who gets a degree. The cost for each course on the student transcript is multiplied by the costs-per-credit-hour.

3. Full cost - Includes not only the direct costs of instruction but also the indirect costs. For the BCC study this is added as a separate calculation to the catalog and transcript methods.

4. Regression using IPEDS finance data - Allows better comparison of costs of multi-campus state system with different program mixes. The BCC study of costs does not use this method.

5. Student's cost - Looks at the cost of a degree from the student's perspective rather than that of the institution. This is covered briefly in the BCC study, but it is not our primary emphasis.

Results from Florida

Johnson calculated the costs of all degree programs in the public four-year colleges in Florida. Costs are divided into lower and upper-division undergraduate expenditures as well as degree

costs for master's and doctoral level and professional programs. Looking at the undergraduate degree programs, he found that the average cost-per-credit-hour (direct plus indirect) for the system was $188 for lower-division credits and $275 for upper-division credits (in 2006-07 dollars), with a wide range for different programs at different campuses. The full cost of a bachelor's degree also exhibited a wide range depending on the program and the campus. The average cost for the Florida system (in 2005-06 dollars), based on the catalog method, was $26,485; using the transcript method, it was $33,672; and using the full cost method, it was $40,645 (Lederman, 2009).

The Florida colleges exhibit the familiar pattern of departmental cross-subsidies that are an accepted part of higher education financing. Within this pattern we find that the lower-division undergraduate is the relative cash cow, which helps to support the more expensive upper-division and graduate students. Likewise, students getting bachelor's degrees in English, the social sciences and humanities help to support the more expensive science based programs.

Although community colleges were not included in his study, citing a statewide data base, Johnson estimated that the Florida community college system had an average cost-per-credit-hour of $164 in 2005-06 dollars. This resulted in an instructional cost for the average degree of $13,824 using the transcript method and $33,396 using the full cost method (Johnson, 2009, p. 15).

Our study of BCC degree costs will use four of the five methods outlined by Johnson but in somewhat altered form which allows a greater degree of disaggregation based on programs of study.

Broome Community College

BCC has a single campus college located in the southern tier of New York state about 180 miles from New York City. The college was founded in 1948 and is a member of the State University of New York (SUNY) system. Enrollment for 2008-09 was 5123 FTEs with 68% of the students attending full time. Ninety three percent of the student population is from the New York state (70% from the local county) and 84.4 percent are white Caucasians. Approximately half of the students are enrolled in transfer programs (AA & AS degrees) with the balance in health, vocational/technical and business related programs (mostly AAS degrees). Students on Pell grants made up 32.6 percent of the enrollments.

In 2008-09, 30% of its funding came from the state, 47% from tuition and fees, 21% from local sources and 2% from other. The operating budget was 47.1 million with expenditures of 42.9 million. The unusually large surplus went into the college fund balance in anticipation of future cuts in state funding. In calculating degree costs, this study uses actual expenditures which are less than revenues shown in the operating budget. Actual expenditures show 51.6% going for direct instructional costs and 48.4% for indirect costs. Expenditures were divided in the following way.

Table 1 BCC expenditures categories for 2008-09

	Expenditures	% of total
Instruction	22,137,288	51.6
Academic support	4,477,565	10.4
Institutional support	9,183,081	21.4
Plant and maintenance	4,538,079	10.6
Student services	2,571,349	6.0
BCC Expenditure total	42,907,362	100 %

In the 2008-09 academic year, the college had 1073 graduates who received either associate degrees or certificates. Of these, only 941 graduates fit the requirements for this study (in 37 degree programs and 2 certificate programs). The number of graduates, by program, included in this study is listed in Appendix A.

Costs-per-credit-hour

The method for calculating degree costs suggested by Johnson (2009) requires a calculation of the cost-per-credit-hour of credits applicable to each degree. BCC has been calculating direct instructional costs on the departmental level since 1991-92. Expenditures not directly involved in generating course credits, such as the President's office, IT, etc. have their own cost centers and are considered indirect costs. The process has been refined over time according to strict NACUBO (National Association of College and University Business Officers) standards.

To get the direct instructional costs, all courses taught at the college are allocated to a department according to their catalog designator. Thus courses taught by the English department include all ENG, LIT and other courses taught by the department. If a faculty

member is shared with another department only the proportion of her personnel expenditures used by English are allocated to that department. If faculty have released time for a campus-wide project, that cost is not charged to the department but is allocated to an institutional support budget line. If secretaries are shared, proportional costs are allocated to the appropriate cost center. All costs are proportioned to the proper cost center in a like manner; thus all costs are accounted for and departmental costs reflect the actual expenditures associated with offering the courses taught by that department each semester. A trend analysis of these costs, along with enrollment figures over a period of years, is released to all college personnel and is used as a management tool to help reallocate resources in a way described by Dellow and Losinger (2004). College degree costs, as calculated in the present study, are not part of this analysis.

Costs-per-credit-hour includes all direct instructional costs which are mainly personnel expenditures. To get the full (total) degree costs by program, indirect costs such as student support, administration, etc. are added until all college operating costs are accounted for. For 2008-09 the highest direct instructional departmental cost-per-credit-hour used in this study was mechanical engineering technology at $475 and the lowest was foreign languages and ESL at $72. (For a complete list of the departmental costs used in this study see Appendix B).

For all departmental cost centers at BCC the average direct instructional cost-per-credit-hour for 2008-09 was $144. All but two of the fourteen departments over the average were from the health science or technical/vocational areas. The cost per credit hour equivalent for indirect costs was $29 for academic support, $60 for institutional support, $30 for plant operation and

maintenance, and $17 for student services. These totaled to an average cost-per-credit-hour of $279 for all direct and indirect costs at the college.

It is important to note that the in calculating the full degree cost of a program, indirect costs are spread proportionally over all departments at the college. Twenty years ago an analysis was released which apportioned indirect costs and space costs to the applicable department using shadow prices. This caused quite a stir and led to widespread discontent and distrust of the analysis especially among faculty in the space rich sciences (for a similar experience at neighboring Cornell University, see Ehrenberg, 1999). The effort to charge departments for the dedicated space they used was abandoned and the decision was made to spread all indirect costs proportionally to each department. In our analysis, an indirect cost rate of 48.4% is used in calculating the full degree costs explained below.

The departmental cost analysis we have explained above is done each semester and for the summer term by the college budget officer. She reviews payrolls and verifies that all costs are apportioned appropriately to each cost center. These costs will change depending on such things as faculty salaries, retirements, the mix of part-time faculty used and the number of students enrolled in each class. The departmental costs are particularly sensitive to course enrollments which are inversely related. Cost figures for the past fifteen years, adjusted for inflation, show predictable variations.

Capital costs. In calculating the full degree costs of a program it would be desirable to include a more complete picture of the capital costs per year or per credit hour or FTE. But calculating the cost of land, buildings and equipment for each graduate in our study would be extremely

difficult and is rarely, if ever, included in studies of this nature (besides the cost of calculating them would probably not be worth the benefit). Gordon Winston (1998) has outlined the conceptual and practical problems for estimating yearly capital costs and has shown that they might typically be 25-40 percent of the total cost of educating a student at a four-year college. In another well done study, Vernez, Krop and Rydell (1999), using the Rand Education Simulation Model, estimated that the annualized capital costs were about 23 percent of the total cost per FTE for the California community colleges.

Since our study only includes expenditures from the operating budget, almost all capital costs are excluded. As such, it must be recognized that we are underestimating the total cost of a degree, especially in the most space and equipment rich vocational/ technical programs and in some fine and performing arts departments. However, equipment and the maintenance costs of capital that are part of the budget are included. Those departments that require more equipment such as computers, microscopes, and dental equipment would have somewhat higher costs, other things being equal, and these differences would be reflected in the departmental costs-per-credit-hour used in this study.

Catalog costs

This would be the most common degree cost for colleges to calculate and the easiest for the public to understand. The catalog costs of a degree are calculated by looking at the course credit requirement for each degree program and multiplying the credits taken from each department of the college by the cost-per-credit-hour calculated for that department. Thus, if the dental hygiene degree requires six credits in English we multiply six times the cost-per-

credit-hour for the English department which was $87 and continue that process until all courses are accounted for. The dental hygiene curriculum requires 48 credits of dental courses and so the high cost of the courses taught by that faculty, at $454 per credit hour, makes that degree one of the most expensive at the college. Likewise, the courses taught by the mechanical department would generally only be taken by students going for that degree and thus the high cost would only impact the degree cost of that degree program.

In calculating the catalog costs we sometimes find that the catalog does not specify a particular course but the student is given the option of courses from several departments. Thus, the Liberal Arts (LAAA) degree requires 8 credits in a lab science. In this case the average cost-per-credit-hour for biology, chemistry, physics and physical science is used. Likewise a few degrees have multiple tracks that lead to the same credential but with a different number of credits for each track. For these cases the average is also used in most cases. The few decisions that had to be made here do not bias the results in any significant way. The catalog degree cost is calculated as:

Catalog cost of a degree = cost-per-credit-hour x catalog requirements

Where cost per credit hour = direct instructional expenditures by department/ credit hours required for the degree

The full catalog cost adds the indirect cost of 48.4% to the direct instructional costs for each department. Table 2 gives a quick snapshot of degree costs for the 2008-09 graduates using the catalog method. Appendix C gives a complete list of the degree costs for the 37 degree and two certificate programs used in this study for the 2008-09 year.

Table 2 Catalog Method—Direct Instructional and Full Cost of an Associates Degree using 2008-09 cost per credit (excludes certificates)

	Direct instructional	Full costs (direct + indirect)
College average (unweighted)	$10,247	19,859
College average (weighted)*	9,576	18,558
Program		
High	24,751	47,967
Low	6,102	11,826

*weighted by enrollments

Further discussion of catalog method

Table 2 and Appendix C show the wide range of costs that we get when we calculate degree costs using the catalog method. The highest cost program is about four times more expensive than the lowest cost program. Some of the high costs programs are influenced by the high number of credit hours required for the degree. But most of the cost difference between programs depends on the mix of courses needed for the degree. The program with the largest number of degrees, the Liberal Arts AA degree, shows a full catalog cost of $12,719 because it includes a greater number of low cost courses than the AAS degree programs in most of the vocational/technical degree programs. For our purposes, the catalog method is less useful than the transcript method in calculating degree costs because it has little to do with actual student behavior as they enter the college and move toward a degree. Looking at the 2008-09 graduates in this study, for instance, only 25 students (2.6% of our cohort) had taken the exact number of credits prescribed by the catalog. Most had taken either more or less than the

required number of credits. Tracking the actual course taking pattern of students in each degree program gives us a more accurate measure of the costs of producing that degree for that student.

However, the college has found a practical use for the catalog method because it is the easiest number to explain to the public. It is used as part of a fund raising strategy in seeking local or foundation support for high cost programs that are valued in the community. Appendix E illustrates a typical example compiled for a presentation to the local dental society. In it, the full catalog costs of the dental hygiene degree ($47,968) are compared with the revenue that that particular program brings in from student tuition and fees, and state and local sources ($16,626). The deficit of $31,342 per student (or $940,249 for all graduates) is highlighted to show the additional amount of money that must be raised to ensure the continued supply of graduates for the local labor market.

Transcript cost

This method of calculating costs requires us to examine all of the transcripts of the 2008-09 graduates so as to include all of the courses taken by the graduates. In but four cases the average cost-per-degree program is higher than the catalog cost because, on average, students take more credits than required (see Appendix C and D). Thus the transcript credits include all failed, withdrawn, incomplete, repeated and remedial courses that did not count toward the degree but were supported by college expenditures, minus any courses credited toward the degree that were not taken at the college (mainly transfer, AP and waived courses).

For the academic year 2008-09, BCC granted 1073 degrees. This includes the graduates for fall 2008, spring 2009 and summer 2009. Of these, 19 received more than one degree or certificate, so they were eliminated from the analysis, leaving us 1054 unduplicated graduates. Also eliminated were 100 students (9.4%) who had received a past degree from BCC going back to fall 1977; and 3 students with study abroad credit. The college census date is the third week of classes, so we eliminated any course registration before that time because course grades were not available for these students and the courses do not appear on their transcripts. We also felt that the calculation of the average transcript cost for each degree would not be very accurate for small programs that had fewer than 3 graduates, so we eliminated the ten students from those programs (one degree and two certificates). This reduced our total cohort to 941 graduates (88% of the original cohort of 1073) from 37 degree and two certificate programs who attempted 23,992 courses (range= 15 to 214 credits per student). Of these 691 (73.5%) took more credits than their degree program required, 25 (2.6%) took the exact number called for in the catalog and 225 (24%) took fewer BCC credits than listed in the catalog. This last group includes credits that were transferred, advanced placement or tested out of (waived). The large number of students with attempted credits beyond those required in the catalog should not be a surprise if we remember that the credits attempted includes all remedial, failed, incomplete, and repeated courses that do not count toward any degree. Appendix D shows the average number of credits taken versus the number required for all of the programs in this study.

The number of credits taken over that required will raise the transcript cost of any degree, other things being equal. The degree programs with the highest average number of credits over

the catalog minimum were Industrial Technology: Quality Assurance (37 credits over) and the certificate in Phlebotomy (37 credits over). The lowest number of excess credits was found among the students in AAS degree paralegal program (1 credit over). In three degree programs the average graduate actually had fewer credits taken than required. These were Engineering Science (0.42 credits under) Mechanical Engineering Technology (4.25 credits under) and Clinical Laboratory Technician (17.6 credits under). Remember, credits taken are net of any transfer credits since these were not courses taught and paid for by BCC. The transcript degree costs are calculated as:

The transcript cost of a degree = the direct instructional cost of all courses on each student transcript by department X the cost per credit hour

The full transcript cost adds the indirect costs of 48.4% to the direct instructional costs for each department. Keeping with Johnson (2009, p.15), the issue of inflation over the period the courses were taken was avoided by using constant (2008-09) dollars.

Table 3 gives a quick snapshot of degree costs for the 2008-09 graduates using the transcript method. The complete list of the degree costs for each program using the transcript method, along with a comparison with their catalog cost, can be found in Appendix C

Table 3 Transcript Method-- Direct Instructional and Full Cost of an Associates Degree using 2008-09 cost per credit

	Direct instructional	Full costs (direct + indirect)
College average*	$10,395	$20,146
Program		
High	$ 25,712	$49,829
Low**	$ 6,503	$12,602

* weighted based on the number of graduates in each program

** one lower cost program can be found in Appendix C (MTRC= $6,103) but this is a 30 credit certificate program and not an associates degree

Further Discussion of transcript method

Compared with Florida, the average transcript degree costs at BCC are very close to the average catalog costs. This is due, in part, to the fewer number of credits attempted by BCC graduates. For the Florida four-year public colleges, Johnson (2009) shows that the average student who entered as a freshman (not transfer students) into a typical 120 credit bachelor's degree program "ended up with 131 attempted credits" (p.14). That indicates a remarkably small number of excess credits for a four-year degree program. Our study shows that the college average for the 2008-09 BCC graduates is 11.6 credits in excess of catalog degree requirements, which is about the same as the average Florida graduate in a bachelor's program.

Although Johnson does not include the community colleges in his study he does reference a separate study of the issue of excess credits commissioned by the Florida state legislature. That study (OPPAGA, 2005) followed a cohort of 14,015 students in Florida's 28 community colleges who received associates degrees in 2001-02. It found that "on average students accumulated 21.7 more credit hours than they needed to graduate" (p.2). The spread between the excess

credits at BCC (11.6) and those of the Florida community colleges (21.7) is even greater than it looks since the Florida study excluded all remedial courses and our study did not.

Florida has set a standard of allowing about 12 credit hours over the required amount and incorporated that standard in their system of performance based funding. The excess credits were seen as a problem which cost the state in excess of $30 million a year and the OPPAGA study recommended that the state take steps to remedy the situation. It was suggested that the primary reason for students taking these excess credits was not that courses were dropped or failed (that accounted for less than 9 percent of the excess courses) but rather, poor campus advisement. We might speculate that in addition to a possible advisement problem, the Florida numbers of excess credits are high because of the large Spanish-speaking population in that state (Miami-Dade was the worst "offender" with regard to excess credits). If the Florida students had a number of ESL credits that did not apply toward the degree it might account for some of the difference.

Appendix D shows the excess credits taken by BCC students in this study. The 11.6 percent average is below the budget standard of 12 credits allowable in the Florida system. The lower number may be due in part to fewer ESL students or to better advisement at BCC. On the other hand, it might be that BCC has fewer course failures/withdrawals, or that its students don't change programs as frequently as those in the Florida community college. These are all researchable questions but it was not our purpose to investigate what made the degree costs differ among programs. Colleges wishing to explore this area would need to do a regression analysis with credit hours in excess of required as one of the variables.

With respect to other problems involved in calculating degree costs using the transcript method, it is important to point out that it was necessary to do a good deal of data cleaning and exploration before presenting our final figures. In calculating Appendix D, for instance, on the first run we found that the BUHR program showed that the average graduate had attempted 40 credits over the required number. This seemed like an abnormally high amount so we eyeballed all of the students in each degree program looking for anomalies or rational explanations for either high or low numbers. For the BUHR program we found one student whose transcript showed, in error, 199 credits. He was eliminated from the study.

The BLED certificate also looked suspicious as the average graduate had attempted 64 credits for a 27-credit program. This turned out to have a logical explanation. Students in this program are almost exclusively transfers from other programs, such as nursing, who have accumulated a large number of credits. If they are in danger of failing out of a health science program, or need to leave for some other reason, the college awards them a certificate, assuming they have the required courses. The high cost of this program is not a concern since the marginal costs of awarding the certificate is very low and the student walks away with a marketable credential.

The other degree program with a high number of credits attempted is the ITQA program. This also turns out to have a logical explanation. This is a specially designed degree for students from Latin American that come to BCC through a contract with Georgetown University. Most of these students have very poor English abilities and so a large number of ESL courses, which don't count toward the degree, are found on their transcripts. As we have suggested above,

this ESL factor probably has an even greater impact on the Florida community college degree costs mentioned by Johnson (2009, p. 15)

Looking at the bottom end of the Table in Appendix D, we see that the CLT degree program graduates were 17.6 credits under those required. Did they really have that many transfer credits? Yes. This is BCC's only exclusively online degree program and students do not necessarily come from the local area. Most of the students transferred in credits from colleges in their area and this resulted in far fewer credits taken at BCC for the degree. The MT program had a negative number because one student transferred in a group of credits from a foreign university and thus brought the average for the four graduates of that degree program down to the bottom of the taken vs required list. None of the other programs with a small number of graduates had such outliers. The ES program was the only other degree program where the credits attempted were below those required. This is a transfer program for engineering students which requires a lot of physics and calculus. A number of these students have AP courses from high school which reduces the number of BCC credits taken for the degree.

Our experience has shown that colleges that attempt calculations such as those presented here are advised to be cautious about interpreting the data or making it public before they have checked for anomalies or logical explanations. Having done so, we are reasonably confident that the data presented in our study is as accurate as our database will allow.

Student costs

While little attention has been paid to the cost of producing degrees from the institutional perspective, the same cannot be said about the cost (price) from the student's point of view (as

an example see Baum & Ma, 2008). Here we provide a simplified view of student's costs for purposes of comparison with the other degree costs which are the focus of this study.

Assume we have a BCC student who lives at home, attends full time, has no transfer credit and does not fail or repeat any courses. He/she therefore takes the minimum number of courses prescribed by the catalog over a two year period. We might estimate the cost of a degree for this hypothetical student in the following way.

Table 4 Cost of a degree from the student's perspective (2008-09 dollars)

Tuition & fees	3,597			
Books and supplies	1,400			
Transportation	1,515			
Other expenses	938			
Total/year	$7,450	X 2* years =	$14,900	(for in-state student not on financial aid)

*Calculations assume costs do not increase for year two and that financial aid, shown below, also stays the same.

The total of $14,900 is an estimate of the out-of-pocket costs without considering any financial aid the student might have received. Since the majority of BCC students receive some need-based grants, this would lower the net cost of attending for those students.

Student costs = $14,900

Minus average financial aid (grant) package of $8,516 (4,258 X 2* = 8,516)

Net degree price (cost) for the average student on financial aid = $6,384

The average financial aid package is based on the following calculation: In 2008-09, forty-four percent of BCC students received some form of federal aid and the average grant was $2,750. Sixty-two percent of the students received some type of state or local grant and the average

grant was $1,508. The simple average of these yearly grants (loans are not counted) was $4,258 for one year. This reduced the net costs of the two-year degree to $6,384 for the average student on the average program with the average financial aid package.

The figures in Table 4 were taken from the budget used for financial aid by BCC in 2008-09. Economists would want to add to these costs the wages lost by attending college. These opportunity costs are reduced at the community college because it is common for these students to work, even if attending full-time. We have left the calculation of these lost wages out of the Table 4 since they would differ depending on the student and the ease of finding employment during different phases of the business cycle. The typical financial aid budget would also include money for room and board ($3,790 was the figure used for 2008-09). However, economists would tend to exclude these as educational costs unless they are above those costs that would be incurred by the students who were not enrolled in college. We have assumed that students living at home would not have these extra costs and have left them out of our calculation. On the financial aid side of the ledger we have also left out the average institutional grant of $2,869 for 2008-09 since they were only received by one percent of the students.

Summary

All colleges sell their product (services) for less than it costs to produce and must cover the difference with subsidies from the public or private sector. At BCC this can be seen by comparing the tuition and fee revenue, which we have shown as $3,597per year, with the full

unweighted catalog costs of the average degree program, which we have calculated as $9,930 per year.

We have also seen that within the college the production of different degrees requires cross-subsidies. At BCC the most expensive degree costs $49,829, using the full cost transcript method. These high costs are not covered by the public and private revenue brought in by the students enrolled in that program and therefore must be subsidized by the lowest cost programs within the college budget. As we found in this study, the expensive health and technical programs are subsidized by the relative cash cows in the liberal arts area. Presumably, most community colleges know what these cross-subsidies are but, to our knowledge, a detailed analysis of them has never been published. This study provides a brief look at what it costs a typical community college to produce its degrees and gives some indication of the cross-subsidies by department and by degree produced.

Table 5 provides a quick summary of the departmental and degree costs calculated in this study.

Table 5 Summary of Direct Instructional Departmental Costs per Credit Hour and Range of Full (direct + indirect) Degree Costs Calculated in the Study (in 2008-09 $)

	College Average	High	Low
Instructional costs per credit hour	$144	475	72
Full Catalog Costs	18,558	47,967	11,826
Full Transcript Costs	20,146	49,829	12,602

Additional Considerations and Warnings

Knowing the cost of what you produce is important for any college and must be given considerable weight in an environment where resources are scarce. On the other hand, some of the dangers of accepting the figures we have calculated without detailed examination and further thought have been mentioned in the discussion above. In addition, it is important to point out that the method employed in the transcript analysis, but not in the cost per credit hour by department, attributes all college costs to graduates. If degrees are the final outcome prized by the college or policy makers, then the full cost transcript method is the most accurate way to answer the question of what a degree costs.

However, a degree might be a more reasonable outcome measure at the four-year college than at the community college where not all students enter with an associate's degree in mind. A criticism of the full cost method is that it devalues the other goals that a college or its students may have. Thus, some students may be experimenting with college and decide against getting a degree. Others may be taking only a few courses or expect to transfer before they get a degree. In fact, a study of BCC transfer rates by Romano and Wisniewski (2005) showed that more non-graduates transfer than graduates (although a greater percentage of graduates transfer). It would be wrong to consider the credits earned by non-graduates as a total loss.

A community college has been referred to as a "safe port in a storm" (Betts, and McFarland, 1995). Such a role may have a high value for students and parents in difficult times. Placing a precise dollar value on the non-degree goals that are part of the mission of the community college would be an impossible task. In the end, policy makers are forced to make decisions based not only on the program costs illustrated in this study but also on imperfect information

about the monetary and non-monetary benefits that occur to the students and the community that the college serves.

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Appendix A. List of degree and certificate programs included in study along with program codes and number of graduates for the 2008-09 academic year.

Program Code	Full Program Name and Type of Degree	Number of Graduates (2008-09)
BIM	Business Information Management-AAS	16
BLED	Phlebotomy (Certificate)-CERT	9
BUBA	Business Administration-AS	91
BUBC	Accounting-AAS	13
BUFS	Financial Services-AAS	6
BUHR	Hotel/Restaurant Management-AAS	11
BUIB	Business Administration: International Business-AS	4
BUMM	Marketing/Management/Sales-AAS	28
BUMT	Management-AS	5
BUPL	Paralegal-AAS	13
CJPO	Criminal Justice - Police-AAS	39
CLT	Clinical Laboratory Technician-AAS	24
CSAS	Computer Science-AS	9
CSCT	Computer Technology-AAS	11
CSIS	Computer Information Systems-AAS	5
CT	Civil Engineering Technology-AAS	17
DH	Dental Hygiene-AAS	30
EC	Early Childhood-AAS	16
ES	Engineering Science-AS	13
ET	Electrical Engineering Technology-AAS	3
FS	Fire Protection Technology-AAS	7

Program Code	Full Program Name and Type of Degree	Number of Graduates (2008-09)
HIT	Health Information Technology/Medical Records Technology-AAS	6
HSAS	Human Services-AS	17
HSCD	Chemical Dependency Counseling-AAS	4
ISAS	Individual Studies-AS	46
ISAT	Health Sciences: Individual Studies-AAS	63
ITQA	Industrial Technology: Quality Assurance-AAS	19
LAAA	Liberal Arts: (Model Programs)-AA	149
LAAS	Liberal Arts and Sciences-AS	14
LACM	Communication and Media Arts-AS	38
LAGS	Liberal Arts: General Studies-AS	105
MA	Medical Assistant-AAS	3
MT	Mechanical Engineering Technology-AAS	4
MTRC	Medical Transcription (Certificate)-CERT	10
MUSC	Music-AS	9
PT	Physical Therapist Assistant-AAS	13
RN	Nursing-AAS	46
TLV	Telecommunications Technology – Verizon-AAS	8
XR	Radiologic Technology-AAS	17

Appendix B Direct Instructional Cost per Credit Hour for Departments Generating Credits for Graduates in this Study, from highest to lowest (2008-09 dollars)

Department	Cost per Credit
Mechanical Engineering Tech	475
Dental Hygiene	454
Radiologic Tech	440
Electrical Engineering Technology	371
Civil Engineering Technology	308
Physical Therapist Assistant	299
Nursing	277
Computer Sciences	235
Engineering Science and Physics	190
Chemistry	181
Business Information	163
Clinical Lab Tech	152
Health Information Technology	150
Performing Arts	146
Physical Education	142
Medical Assistant	140
Fine and Media Arts	130
Biology	126
Business Programs, hotel rest,	118
EMT/Paramedic	110
Teacher Ed and Early Childhood	103

Department	Cost per Credit
Criminal Justice	98
Mathematics	96
Psychology and Human Services	94
English	87
Human Development	87
History Philosophy and Soc	74
Foreign Languages ESL and Speech	72
Departmental Average *	144

These costs are different from degree costs but are used in their calculation. Thus, mathematics does not have a degree but does teach students in all degree programs.

* weighted by FTE enrollments

Appendix C Full Catalog vs Full Transcript Costs for 2008-09 Graduates (in 2008-09 dollars)

Program Code	Full Cataloge Cost	Full Transcript Cost	**Difference** *(Full Transcript Cost Minus Full Catalog Cost)*
XR	46,238	49,829	3,590
DH	47,967	49,184	1,217
ET	37,285	47,433	10,148
MT	43,419	41,190	(2,229)
PT	31,153	34,973	3,820
TLV	35,328	33,849	(1,479)
CT	30,085	33,166	3,081
RN	29,628	31,948	2,320
CSAS	20,605	30,941	10,336
CSCT	27,641	29,035	1,393
ES	18,791	18,933	(142)
CSIS	25,219	27,095	1,876
ITQA	18,773	24,804	6,031
BUHR	16,048	24,386	8,337
MA	17,366	20,742	3,375
BUMT	14,647	20,248	5,601
BUMM	14,523	19,821	5,298
MUSC	16,560	19,376	2,816
HIT	18,967	19,073	106
BIM	16,554	18,715	2,160
BUBC	16,190	18,503	2,313
BUFS	15,597	17,937	2,340
ISAT	17,242	17,876	634
LAAS	15,967	17,855	1,888
ISAS	15,357	17,624	2,267
BUBA	14,566	16,755	2,189
LACM	14,496	16,566	2,070
BLED	7,605	16,199	8,594
BUIB	14,194	15,359	1,166
CLT	19,777	15,321	(4,456)
FS	13,256	15,316	2,061
HSAS	13,000	15,146	2,146
HSCD	12,116	15,004	2,888
LAGS	13,161	14,937	1,776
BUPL	15,397	14,539	(859)
LAAA	12,719	14,446	1,727
CJPO	11,826	13,174	1,348
EC	12,248	12,602	354
MTRC	7,886	11,828	3,942

In four of the programs the transcript costs are less than the catalog costs. See text for explanation of this.

Appendix D Average number of credits taken by 2008-09 graduates versus required by program

Program Code	Full Program Name	Ave # of credits taken	Required Hours	Ave Difference
ITQA	Industrial Technology: Quality Assurance-AAS	102	65	37
BLED	Phlebotomy (Certificate)-CERT	64	27	37
CSAS	Computer Science-AS	99	73	26
BUMT	Management-AS	89.4	65	24.4
BUHR	Hotel/Restaurant Management-AAS	93	69	24.2
ET	Electrical Engineering Technology-AAS	92	72.5	19.5
BUMM	Marketing/Management/Sales-AAS	86	67	19
MA	Medical Assistant-AAS	86	67	19
ISAS	Individual Studies-AS	82	63	19
HSAS	Human Services-AS	81	63	18
HSCD	Chemical Dependency Counseling-AAS	82	65	17
MUSC	Music-AS	81	65	16
FS	Fire Protection Technology-AAS	79	64	15
BUFS	Financial Services-AAS	83	68	15
MTRC	Medical Transcription (Certificate)-CERT	44.7	30	14.7
ISAT	Health Sciences: Individual Studies-AAS	74.6	60	14.6
BIM	Business Information Management-AAS	75	63	14
XR	Radiologic Technology-AAS	84	71	13
PT	Physical Therapist Assistant-AAS	84	71	13
BUBA	Business Administration-AS	77	65	12
RN	Nursing-AAS	82.5	71	11.5
BUBC	Accounting-AAS	81	70	11
LACM	Communication and Media Arts-AS	73	63	10

Program Code	Full Program Name	Ave # of credits taken	Required Hours	Ave Difference
CT	Civil Engineering Technology-AAS	79	69.5	9.5
CSIS	Computer Information Systems-AAS	75.4	66	9.4
CJPO	Criminal Justice - Police-AAS	71	62	9
LAAA	Liberal Arts: (Model Programs)-AA	72	64	8
BUIB	Business Administration: International Business-AS	71.1	64	7.1
LAAS	Liberal Arts and Sciences-AS	71.	64	7
CSCT	Computer Technology-AAS	81	74	7
DH	Dental Hygiene-AAS	79	72	7
LAGS	Liberal Arts: General Studies-AS	72.3	66	6.3
EC	Early Childhood-AAS	66	64	2
TLV	Telecommunications Technology – Verizon-AAS	69	67	2
HIT	Health Information Technology/Medical Records Technology-AAS	73	71	2
BUPL	Paralegal-AAS	69	68	1
ES	Engineering Science-AS	67.5	68	-0.42
MT	Mechanical Engineering Technology-AAS	67.25	71.5	-4.25
CLT	Clinical Laboratory Technician-AAS	54.3	72	-17.6

Appendix E Cost and Revenue for Dental Hygiene Degree-AAS (2008-09)

Degree cost			
Direct instructional costs:			
Courses	# credits	Cost per credit	Total cost
History, civics, and social science	3	74	222
Dental Hygiene	48	454	21,792
English	6	87	522
Psychology	3	94	282
Science	8	166	1,325
Clinical lab tech courses	4	152	608
Total direct instructional costs	**72**		**$24,751**
Indirect cost	48.4%		**23,216**
Estimated degree cost			**$47,968**

Degree revenue			
State aid	$2,675 per 30 credit hours		6,420
Tuition	$3,162 annual x 2 years		6,324
Lab fees	$40 per lab x	8 labs	320
Out-of-state tuition	$3,162 annual	(in state assumed)	-
Chargebacks to other counties	$2,180 per 30 credits	(in county assumed)	-
Broome County Support (campus-wide lump sum)	$6,530,710 annual allocated across 4,980 BCC FTE		3,147
Miscellaneous offset revenues (indirect revenue)	Fees, interest, etc. $860,000 allocated across 4,980BCC FTE		415
Total degree revenue			**$16,626**

Degree cost in excess of revenues	**$(31,342)**

# graduates	30
Total program revenues in excess of costs	$ (940,249)