
Appendix 4.3: Course weighting — background and methodology

The Nebraska Legislature in LB 340 has requested that the Coordinating Commission evaluate the weighting of courses used in the community college state aid allocation formula. The Commission is required by statute to determine whether changes in the weighting of courses may be necessary for reimbursable educational units to properly reflect the role and mission of Nebraska community colleges and the cost of providing such courses.

After discussions with the community colleges, it became apparent there was no record of the Nebraska community colleges identifying actual costs and using those costs to determine course weightings in the current formula. The Commission believes that weightings in a formula should be first and foremost a reflection of actual costs of delivery.

There are several methods for determining the cost for delivering courses. The Commission recommended a formal cost study conducted by an outside entity experienced in cost accounting. The community colleges rejected the idea of a formal cost accounting study and suggested a cost study defined by the Commission, in consultation with the community colleges. The Commission developed a cost study with data for the 2007-2008 fiscal year to be compiled by each community college and submitted to the Commission.

Prior to designing the data gathering methods for the cost study, the Commission closely examined cost studies and other documentation supporting formula-driven allocations to community colleges in 16 states and less closely at several other states. The Commission's cost study design utilizes the best aspects of several states' cost studies and is based on Classification of Instructional Programs (CIP) codes. While Nebraska's community colleges currently weight each course taught, weighting factors for other states are based on CIP codes. The Commission chose CIP codes for the Nebraska community college cost study as a means for comparison with other states' established cost studies.

On July 7, 2009, the Commission provided instructions, a spreadsheet, and supporting documentation for the study of instructional costs at Nebraska's community colleges to each community college president and business officer. Comments and concerns were requested by July 14 so the Commission could finalize instructions, send out the final cost study document, and have each community college's completed study submitted to the Commission by September 16, 2009.

On August 21, 2009, the Commission received notification that the business officers had concerns about some of the requested data. The Commission evaluated the concerns and scheduled a meeting with the business officers for September 2, 2009; several community college presidents attended, as well. The Commission listened to the concerns and suggestions, accommodated several of them, and reissued the instructions and spreadsheet on September 4, 2009. The due date for the completed spreadsheets was modified to September 21, 2009.

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Four of the community colleges submitted their completed cost study data on September 21, one on September 22, and one on October 2. The Commission reviewed each spreadsheet, identified errors or misunderstandings of the instructions, notified the colleges, and asked for resubmissions where necessary. On October 16th, the final corrections were received from the community colleges and the Commission began its analysis of the cost study data.

Data analysis

The Commission analyzed the cost study data using standard data processing procedures and descriptive statistics. During the initial phase of this process, the Commission determined that two colleges used a methodology that was different from the methodology used by the other four colleges when they assigned overhead costs¹ to the instructional programs encompassed by each CIP code. Based on an analysis of the data submitted, the Commission determined that the two methodologies did not result in significantly different overhead costs.

Differences in methodology also were revealed when the facility cost data from the six community colleges were analyzed. Contrary to the Commission's instructions for the study, three colleges included the cost of building contents in their facility costs, while the remaining three colleges did not include the cost of building contents. As a result, the facility costs at the colleges that included building contents were significantly higher than the facility costs at the other three colleges, making them directly incomparable. For this reason, the Commission determined that the submitted facility cost data were not usable, and these data were excluded from subsequent analyses of the cost data.

With facility costs excluded from the study, the Commission calculated the cost per FTE for the instruction costs, overhead costs, and instruction-plus-overhead costs of each of the college with programs and courses in each CIP code by dividing the college's reported costs by the college's FTE in each CIP code. Given the costs and cost per FTE for each institution, two averages were computed for each CIP. These averages are defined as follows:

- The **weighted state average** is the total, statewide cost of offering the programs and courses in a CIP divided by the total student FTE for that that CIP.
- The other average, referred to as the **college average**, is the sum of the costs or costs per FTE of the colleges that have reported costs in the CIP divided by the number of colleges with data for that CIP, which can range from one to six.

¹Overhead costs are defined in this study as the sum of the costs reported in the categories PCS 4 (academic support), PCS 5 (student services), PCS 6 (instructional support), and PCS 7 (plant operations and maintenance). (PCS refers to Program Classification Structure.)

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To avoid inflating average costs, the data for a college with less than 1.0 FTE in a CIP code were excluded from the computation and analysis of average costs. This excluded only 7.11 FTE from the total of more than 29,500 FTE reported for 2007-2008.² As a result of the exclusion of these FTEs, three CIP codes were eliminated from the analysis of average costs because they each included only one college reporting an FTE of less than 1.0.

The Commission closely examined the instruction, overhead, and instruction-plus-overhead costs per FTE for each college with programs or courses classified in each CIP, and the Commission compared these costs to the corresponding college averages to determine the extent to which costs per FTE varied from one college to another within each of the 69 CIP codes that were analyzed. In addition, the instruction-plus-overhead costs per FTE for each college were ranked in descending order to determine the range of cost variability within each college and across the six colleges.

Excluding the three highest and three lowest costs per FTE as “outliers,” instruction-plus-overhead costs per FTE for the six colleges ranged from a high of \$16,701 to a low of \$4,605, with the highest cost being 3.62 times higher than the lowest cost per FTE.

To determine the variability across the 69 CIP codes, the weighted state average costs per FTE for instruction plus overhead were ranked in descending order, resulting in a range of \$14,935 to \$5,350, with the highest cost being 2.79 times higher than the lowest. In addition, the Commission compared the weighted state average cost per FTE for instruction plus overhead to the costs per FTE available by CIP from Ohio, Illinois, Texas, and Minnesota. This comparison showed that the costs per FTE in Nebraska were within the range of costs reported by two or more of the four states for 30 (44%) of the 68 CIP codes for which costs could be compared. Of the remaining 38 categories, Nebraska costs per FTE were higher than those of other states for 21 (55%) of the CIP codes and lower for 17 (45%).

Based on results of the comparison of the costs per FTE at Nebraska community colleges to those in four other states and the detailed analysis of the costs per FTE within and across the 69 CIP codes in this study, the Commission concluded that *the weighted state average cost per FTE for instruction plus overhead* is a reasonable and appropriate *cost basis* for developing a weighting system for calculating reimbursable education units (REUs).

As a starting point for drafting a new weighting system, the Commission used the list of CIP codes for Nebraska's six community colleges, ranked in descending order based on their weighted state average costs per FTE for instruction plus overhead. The difference between

² The 4.60 FTE reported by Southeast Community College for the Radio and Television Broadcasting Technology program (CIP 10.0202) also were excluded from the analysis due to this program being discontinued with an unusually high cost per FTE in 2007-2008.

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each cost per FTE and the next lowest cost was calculated to determine if there were any significant breaks or gaps in the data that would be logical division points for the purposes of weighting CIP codes on the basis of comparable costs. Finding that the costs per FTE by CIP were generally continuous, the Commission divided the full range of costs per FTE into six cost categories based on \$1,500 intervals. The resulting cost categories and the number of CIPs in each category are as follows: under \$7,000 (14 CIPs); \$7,000 to \$8,499 (16 CIPs); \$8,500 to \$9,999 (19 CIPs); \$10,000 to \$11,499 (9 CIPs); \$11,500 to \$12,999 (5 CIPs); \$13,000 or higher (6 CIPs).

The Commission computed a weighted state average cost per FTE for the CIP codes that fell into each of the six cost ranges. This average is the sum of the total statewide costs of offering programs and courses assigned to the CIP codes within the cost range divided by the total number of FTE for the CIP codes within the range.

The weight assigned to the CIP codes in each cost range was determined by dividing the weighted state average cost per FTE by \$6,426, which is the weighted state average cost per FTE for the CIP codes in the lowest cost range (under \$7,000). The calculated six weights are 1.00, 1.22, 1.48, 1.68, 1.90, and 2.16.

The Commission calculated the REUs for each college by multiplying the number of FTE in each CIP code by the weight assigned to each code based on relative cost.³ The calculated REUs were then inserted into the current state aid formula for the community colleges using the version of the formula based on full tuition and fees for each institution for 2008-2009. The resulting allocation of state aid was then compared to the allocation using REUs based on the current weighting of courses.

The Commission's methodology in developing a weighting system is certainly not the only one that could be applied. However, it is within the parameters of best practice for work of this type.

³The CIP codes with FTE of less than 1.0 were assigned weights based on their cost per FTE and included in the calculation of REUs.