
The Role of Workforce-Related Noncredit Education and Training In Virginia's Economy

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Executive Summary

This report assesses the role that the workforce-related noncredit education and training services provided by the Virginia Community College System (VCCS) play in Virginia's economy and illuminates the demographic and economic trends that have accentuated the importance of that role. The primary findings from that assessment are:

- A significant slowdown in the growth of the U.S. workforce, coupled with rapidly evolving technological change, are driving a noteworthy increase in the demand for short-term noncredit education. According to some estimates, as much as 75 percent of the U.S. workforce currently requires retraining just to keep pace.
- Nationally, state funding priorities have not adapted to these trends and continue to focus almost exclusively on the traditional college experience.
- VCCS is the primary provider of workforce-related noncredit education in Virginia. In 2006-2007 alone, VCCS offered 3,334 individual workforce-related noncredit courses, provided customized training programs to 1,305 employers, and served 3,000 employers through noncredit open enrollment classes.
- State funding for noncredit education is intended to conform to a 30/70 split, where 30 percent of the funding is provided by the state and 70 percent is provided by the businesses requesting the training. However, because the state's 30 percent share is subject to a fixed appropriation, and that fixed appropriation has not kept pace with the level of noncredit training that VCCS provides, the reality is that business and industry actually pay 90 percent of the training cost.
- Virginia's mechanism for funding noncredit education may place it at a competitive disadvantage relative to neighboring states, like North Carolina, South Carolina, and Maryland, that fund noncredit education using the same per student mechanism that they use to fund credit programs.
- The data demonstrate that, by providing noncredit programs that are geared toward specific occupations, VCCS makes a significant contribution toward

providing short-term skills-focused training in support of some of Virginia's fastest growing occupations.

- More generally, the dollar value of the increased workforce productivity generated by the noncredit education and training that VCCS provided in 2006-2007 was approximately \$17.3 million per year. The present value of the stream of benefits created by that increase in productivity is approximately \$190.4 million. Comparing that present value benefit to the \$22.1 million in total costs associated with it shows that the benefit/cost ratio for VCCS' workforce-related noncredit education and training services is 8.6 – the benefits to Virginia's economy are nearly nine times as great as the costs required to generate those benefits.

This report was prepared by Mangum Economic Consulting, LLC at the request of the Workforce Development Services Division of the Virginia Community College System.

Introduction

Workforce-related noncredit education and training and its role in promoting economic competitiveness have recently become a “hot” topic in the education, workforce, and economic development fields. The purpose of this report is threefold: 1) illuminate some of the demographic and economic issues that are driving this heightened interest, 2) describe the Virginia Community College Systems’ role in delivering workforce-related noncredit education and training services in Virginia, and 3) quantify the economic contribution that those services make to Virginia’s economy. This report was prepared by Mangum Economic Consulting, LLC at the request of the Workforce Development Services Division of the Virginia Community College System.

The Issue

Demographic and economic changes in the U.S. are driving a significant increase in the demand for short-term noncredit education. Estimates from the National Center for Education Statistics indicate that, where there are 15 million individuals enrolled in traditional college programs in the U.S., enrollment in adult education, mostly noncredit, classes is 90 million.¹

There are two primary reasons for this increased demand. The first is demographic. With the aging of the baby-boom generation, the retirement-age proportion of the U.S. population will grow from 12 percent in 2000 to 20 percent in 2030. This will drive a concomitant decline in the working-age proportion of the population. Where the U.S. labor force grew about 1.7 percent per year between 1950 and 2000, by 2030 that growth rate is expected to slow to 0.3 percent – just above zero. One implication of this shift is that the retraining of incumbent workers is becoming more of a priority as new, and more recently trained, workers become harder to find.

The second primary reason for the increase in demand for noncredit education has to do with changes in the U.S. economy. The rapid and ongoing technological evolution of the U.S. economy has brought about a need for equally rapid and ongoing evolution in worker training and education. According to the U.S. Bureau of Labor Statistics’ most recent projections, professional and technical occupations will be the driving force behind U.S. occupational growth for the foreseeable future. These jobs are often at the cutting edge of technological change. This increases demand for the skills-focused short-term training that

¹ Warford, Larry J., “Funding Lifelong Learning: A National Priority,” *Community College Journal*, December 2001/January 2002.

workers need to keep current in their careers. In fact, according to some estimates “75 percent of today’s workforce needs retraining just to keep pace.”²

Unfortunately, however, where new demographic and economic realities have increased the demand for short-term noncredit education, state funding priorities have not kept pace and continue to focus almost exclusively on the traditional college experience.³ In 2000, the State Council of Higher Education for Virginia found that only 23 states provided some level of state support for noncredit education. Seven years later, an analysis by Columbia University’s Community College Research Center found that that number had only increased to 28.⁴

Eleven of the 28 states identified in the Community College Research Center study provided noncredit funding on a per FTE basis (FTEs or full time equivalent students, are a mathematical construct that identifies the number of full annual course loads, or “person years” of education delivered).⁵ This means that noncredit education was funded in the same way that credit programs were funded. Although, the level at which noncredit FTEs were funded was generally only 50 percent to 75 percent of the level at which credit FTEs were funded.

Seven of the 28, including Virginia, provided a fixed amount of funding for noncredit education.⁶ According to the Community College Research Center, however, this fixed amount of funding was,

*...often small relative to the amount of funding that the state provides for credit programs. For example, Minnesota provides \$11.5 million in funds for noncredit programs out of the state’s \$550 million budget for community colleges. Likewise, Virginia provides \$1 million for noncredit programs and \$300 million for credit programs.*⁷

Finally, ten of the 28 states bundled noncredit funding into the colleges’ overall budgets. From a practical perspective, this meant that the colleges had at least

² *Ibid.*

³ 21st Century Workforce Commission, “A Nation of Opportunity: Building America’s 21st Century Workforce,” Cornell University, June 2000.

⁴ Van Noy, Michelle, *et. al.*, “The Landscape of Noncredit Workforce Education: State Policies and Community College Practices,” Community College Research Center, Teachers College, Columbia University, January 2008.

⁵ These eleven states were: California, Florida, Illinois, Iowa, Maryland, Nebraska, New Jersey, North Carolina, Oregon, South Carolina, and Texas.

⁶ These seven states were: Arizona, Minnesota, New Mexico, Pennsylvania, Utah, Virginia, and Wisconsin.

⁷ Van Noy, p.17.

some discretion as to whether to use the funds to support noncredit education or allocate them to other purposes.⁸

These data reveal two important points. The first is that, in general, state funding priorities have not adapted to reflect the increasingly important role that short-term noncredit education plays in maintaining economic competitiveness. The second is that, with respect to Virginia specifically, the Commonwealth's policy of funding noncredit education through a limited fixed appropriation may place it at a competitive disadvantage relative to neighboring states, like North Carolina, South Carolina, and Maryland, that provide noncredit education funding on a per FTE basis.

Noncredit Education and VCCS

In Virginia, the Virginia Community College System (VCCS) serves as the primary provider of noncredit education. Section 23-215.C of the *Virginia Code* requires the VCCS to “maximize noncredit course offerings made available to business and industry.” State funding for these course offerings is intended to conform to a 30/70 split, where 30 percent of the funding is provided by the state and 70 percent is provided by the businesses requesting the training. According to authorizing language in the appropriations bill,

it is the intent of the General Assembly that noncredit business and work-related training courses and programs offered by the community colleges be funded at a ratio of 30 percent from the general fund and 70 percent from nongeneral funds,

where general fund refers to state tax dollars and nongeneral fund refers to the tuition and fees paid businesses and others.

However, because the state's 30 percent share is subject to a fixed appropriation, and that fixed appropriation has not kept pace with the level of noncredit training that VCCS provides, the reality is that business and industry actually pay much more than a 70 percent share of the cost. For example, in 2006-2007 VCCS received \$1.1 million in general fund support for noncredit training. To cover the costs of delivering those services, in that same year it also collected approximately \$21 million in fees from training recipients. This means that business' and

⁸ These ten states were: Alaska, Idaho, Kentucky, Michigan, Mississippi, Montana, North Dakota, Oklahoma, South Dakota, and West Virginia.

industry's cost share for noncredit training was actually around 90 percent, not 70 percent.

Pursuant to their statutory mandate, Virginia's 23 community colleges supply a wide range of noncredit course offerings. These courses provide short-term training in such topics as accounting, basic contractor licensing, CISCO networking, health screening, intermediate EXCEL, land use law, marketing 101, phlebotomy, QuickBooks, small business resources, and web design.

In 2006-2007 alone, the VCCS:

- offered 3,334 individual noncredit courses that were successfully completed by 94,013 individuals,
- provided customized training programs and services to 1,305 employers, and
- provided open enrollment training to 3,000 employers.⁹

The market penetration rate – the percentage of businesses served through these noncredit course offerings – in each community college's service area vary from 1 percent to 36 percent.¹⁰ It is important to note that, with some exceptions, these rates tend to be negatively correlated with the number of businesses in the service area.¹¹ That is to say, the larger the number of businesses, the smaller the proportion of businesses that are served.

The reason that this is important is that this outcome is consistent with, and illustrative of the limitations inherent to, a fixed appropriation that places a ceiling on the level of services that can be provided. To the extent that the allocation of that fixed appropriation across individual community colleges provides a minimum threshold of funding to each institution, it will not be based entirely on the size of each college's potential market, and those institutions serving larger markets will be more constrained in the level of services that they can provide.

⁹ Office of Institutional Advancement, "Where Opportunity Begins: 2006-2007 Annual Report," Virginia Community College System, November 2007.

¹⁰ *Data Source:* Workforce Development Services, Virginia Community College System.

¹¹ The Pearson Rank Order Coefficient between market penetration rate and total number of businesses for Virginia's 23 community college service areas is -0.2164.

Economic Impact

The noncredit education and training services that VCCS provides contribute to Virginia's economy in at least two ways. The first is by providing short-term training that is related to specific occupations. These courses, like computer networking, phlebotomy, or web design, provide workers with occupation-specific skills. The second way in which VCCS' noncredit education and training services contribute to Virginia's economy is by generally increasing the skill level, and thereby the productivity, of Virginia's workforce. This occurs through classes like business writing, intermediate EXCEL, or quality improvement that involve the enhancement of general work-related skills.

Occupation-Specific Training

Table 1 details that subset of noncredit courses offered by VCCS in 2006-2007 that were geared toward specific occupations. The first two columns provide information on the name of the VCCS noncredit course and the number of statewide completers from that course in 2006-2007. The third and fourth columns list the occupation associated with the course according to its official U.S. Bureau of Labor Statistics *Standard Occupation Code* (SOC) and title. To provide some sense of the occupation's relative significance in Virginia's economy, the fifth column provides data on the occupation's projected number of statewide annual openings between 2004 and 2014.¹²

What these data show is that VCCS makes a important contribution toward providing short-term skills-focused training in support of many of Virginia's most high demand occupations. For example, in 2006-2007 VCCS produced enough completers from associated noncredit courses to equal:

- 30 percent of the annual demand for new Bookkeeping and Auditing Clerks (17th largest number of terms of new openings statewide),
- 24 percent of the annual demand for new Tractor Trailer Operators (30th largest number of terms of new openings statewide),
- 28 percent of the annual demand for Computer Support Specialists (41st largest number of terms of new openings statewide),
- 23 percent of the annual demand for Middle School Teachers (69th largest number of terms of new openings statewide), and

¹² *Data Source:* Virginia Employment Commission. The Virginia Employment Commission (VEC) produces occupational employment projections for over 700 individual occupations over a ten year forecast horizon. The projection presented here is for the 2004-2014 forecast horizon.

- 100 percent of the annual demand for Medical Assistants (82nd largest number of terms of new openings statewide).

Table 1: Meeting Critical Occupational Training Needs

Course Name	Total Completers FY 2007	SOC Code	SOC Title	Projected Annual Average Openings 2004 to 2014
Project Management	164	119199	Managers All Other	785
Computer Networking Technician	282	151041	Computer Support Specialists	996
Web Design	112	151099	Computer Specialists All Other	168
Drafting	194	173011	Architectural and Civil Drafters	122
Paralegal	24	232093	Title Examiners Abstractors and Searchers	62
Career Switcher	133	252022	Middle School Teachers Except Special and Vocational Education	566
Teaching Assistant	1	259041	Teacher Assistants	1,099
Interior Design	23	271025	Interior Designers	66
Photography	310	274021	Photographers	130
EMT	280	292041	Emergency Medical Technicians and Paramedics	127
Optician	9	292081	Opticians Dispensing	50
Dental Assistant	593	319091	Dental Assistants	561
CNA, Medical Coding, Medical Office Management, & Phlebotomists	492	319092	Medical Assistants	464
Pharmacy Tech	194	319095	Pharmacy Aides	30

Course Name	Total Completers FY 2007	SOC Code	SOC Title	Projected Annual Average Openings 2004 to 2014
Veterinary Assistant	9	319096	Veterinary Assistants and Laboratory Animal Caretakers	137
Medication Aide, Reiki, & Spirituality	44	319099	Healthcare Support Workers All Other	149
Landscape	25	373011	Landscaping and Groundskeeping Workers	1,493
Cosmetology	23	395012	Hairdressers Hairstylists and Cosmetologists	694
Real Estate	76	419022	Real Estate Sales Agents	1,041
Supervision	18	431011	First-Line Supervisors/Managers of Office and Administrative	1,225
Accounting	428	433031	Bookkeeping Accounting and Auditing Clerks	1,447
Customer Service	55	434051	Customer Service Representatives	2,446
Human Resource Management	111	434161	Human Resources Assistants Except Payroll and Timekeeping	197
Administrative Assistant	58	436011	Executive Secretaries and Administrative Assistants	666
Contractor Licensing	4,614	471011	First-Line Supervisors/Managers of Construction Trades and E	925
Electrician	30	472111	Electricians	642
Plumbing	35	472152	Plumbers Pipefitters and Steamfitters	584
Automotive Maintenance	9	493023	Automotive Service Technicians and Mechanics	1,085
HVAC	29	499021	Heating Air Conditioning and Refrigeration Mechanics and I	347

Course Name	Total Completers FY 2007	SOC Code	SOC Title	Projected Annual Average Openings 2004 to 2014
Computer Programming	12	514012	Numerical Tool and Process Control Programmers	19
CDL	286	533032	Truck Drivers Heavy and Tractor-Trailer	1,175

Enhanced Productivity

As individuals increase their human capital through noncredit education and training, not only do they become more productive, they also increase the productivity of the resources around them. A good example of this would be the difference between what can be accomplished by placing a computer in the hands of a trained user, and what is accomplished when the computer is placed in the hands of an untrained user – same resource, very different result. Moreover, this difference in results has significant economic implications in the aggregate – greater productivity translates into increased economic output from the same resources.

To measure the effect that the noncredit education and training provided by VCCS has on economic productivity and, therefore, Virginia’s economy, we must first know the empirical relationship between training/education and productivity however. Fortunately, a widely cited study by Sandra Black and Lisa Lynch provides that information.¹³ Black and Lynch use new data from the National Center on the Educational Quality of the Workforce to estimate the impact of human-capital investments – education – on productivity. What they find is that a 10 percent increase in training/education level leads to a 4.9 to 8.5 percent increase in the dollar value of manufacturing output, and a 5.9 to 12.7 percent increase in the dollar value of non-manufacturing output.

The next step in the process is to estimate a baseline level of educational attainment for Virginia’s workforce and then determine the contribution that VCCS made to increasing that baseline. Using Virginia-specific data from the

¹³ Sandra E. Black and Lisa M. Lynch, “Human-Capital Investments and Productivity,” *AEA Papers and Proceedings*, vol.86, no.2, May 1996, pp.263-67.

Census Bureau's 2006 American Community Survey on educational attainment¹⁴ and labor force participation¹⁵, we know that in 2006 the human capital embodied in Virginia's workforce consisted of 49,822,069 years of education. In 2006-2007, VCCS contributed to this human capital stock by enrolling 2,647 FTE students in workforce-related noncredit courses.¹⁶

By combining these data with Black and Lynch's empirical estimates and data on statewide economic activity in manufacturing and non-manufacturing,¹⁷ it is possible to determine the value of the enhanced workforce productivity generated by the workforce-related noncredit education and training that VCCS provided in 2006-07. The results of that analysis are provided in Table 2.

The *Upper Bound*, *Lower Bound*, and *Mid-Point* columns in Table 2 correspond to upper and lower limits of Black and Lynch's empirical estimate of the relationship between education/training and productivity and the mid-point between the two. The rows of Table 2 detail the estimated dollar value of the manufacturing, non-manufacturing, and total increase in workforce productivity attributable to the workforce-related noncredit education and training that VCCS provided in 2006-07. As shown in the last row of this table, that total increase in workforce productivity is estimated to be between \$23.6 million and \$11.1 million per year, with a mid-point estimate of \$17.3 million per year.

¹⁴ *Data Source:* U.S. Census Bureau, "Sex by Age by Educational Attainment for the Population 18 and Over," 2006 American Community Survey, Table B15001, and "Sex by Age by Educational Attainment for the Population 25 and Over," 2006 American Community Survey, Table B15002.

¹⁵ *Data Source:* U.S. Census Bureau, "Sex by Age by Employment Status for the Population 16 Years and Over," 2006 American Community Survey, Table B23001.

¹⁶ *Data Source:* Workforce Development Services, Virginia Community College System. A noncredit FTE is defined as 600 contact hours per year.

¹⁷ *Data Source:* Bureau of Economic Analysis. According to these data, in 2006 Virginia's Gross State Product was \$33,223.6 million in manufacturing, and \$326,796.6 million in non-manufacturing.

Table 2: Economic Benefit – Value of Productivity Increase

	Upper Bound	Lower Bound	Mid-Point
VCCS Workforce-Related Noncredit FTE 2006-07	2,647	2,647	2,647
Elasticity – manufacturing	0.85	0.49	0.67
VA GSP 2006 – manufacturing	\$33,223,641,100	\$33,223,641,100	\$33,223,641,100
Productivity Gain – manufacturing	\$1,500,601	\$865,053	\$1,182,827
Elasticity – non-manufacturing	1.27	0.59	0.93
VA GSP 2006 – non-manufacturing	\$326,796,574,791	\$326,796,574,791	\$326,796,574,791
Productivity Gain – non-manufacturing	\$22,053,646	\$10,245,394	\$16,149,520
TOTAL PRODUCTIVITY GAIN	\$23,554,247	\$11,110,447	\$17,332,347

It is important to realize, however, that these estimates of increased workforce productivity are not one-time benefits. Rather, they are part of a stream of economic benefits that continue over the entire time that the noncredit training recipients enrolled in 2006-07 remain active in the workforce. Based on recent analysis of the typical “work-life” of American men and women, we know that that time horizon is approximately 21 years.¹⁸

In order to determine the cumulative value of the increased productivity that these noncredit training recipients contribute to *Virginia’s* economy though, it is necessary to know not only how long they will be in the workforce, but also how many of them are likely to remain in the Commonwealth. These data are available from the U.S. Census Bureau and show that about 2.4 percent of individuals over

¹⁸ See James Ciecka, Seth Epstein, and Jerry Goldman, “Work Life Estimates at Millennium’s End: Changes Over the Last Eighteen Years,” *Illinois Labor Market Review*, vol.6, no.2, Summer, 2000. Based on national data taken from Van Noy (2008), we assume that the average age of noncredit training recipients is 39.

the age of 25 and who have an Associate’s degree or some college leave the state each year.¹⁹

Using these data on expected work-life and out-migration, along with the productivity-driven annual increases in output calculated in Table 2, it is possible to determine the present value, or value in today’s dollars, of the stream of economic benefits generated by the workforce-related noncredit education and training that VCCS provided in 2006-07.²⁰ That present value is between \$258.8 million and \$122.1 million, with a mid-point estimate of \$190.4 million.

Economic Cost

Having determined the economic benefit associated with the workforce-related noncredit education and training that VCCS provided in 2006-07, the next step is to look at the economic cost of those services. Those costs take two forms. In 2006-07 VCCS received \$1.1 million in state general fund support to deliver workforce-related noncredit education and training.²¹ Also during that year, businesses paid \$21.0 million for noncredit education and training services.²² Summing both reveals that the total economic costs associated with the workforce-related noncredit education and training that VCCS provided in 2006-07 was \$22.1 million.

Benefit/Cost Ratio

As shown in Table 3, a comparison of the discounted present value of the stream of economic benefits generated by the workforce-related noncredit education and training that VCCS provided in 2006-07, and the total economic costs associated with that education and training, reveals that the benefit/cost ratio is 8.6 – the benefits to Virginia’s economy are almost nine times as great as the costs required to generate those benefits.

¹⁹ *Data Source:* U.S. Census Bureau, “Residence 1 Year Ago by Educational Attainment in the United States,” *2006 American Community Survey*, Table B07009.

²⁰ Mathematically, this calculation is:

$$(\sum_{1 \text{ to } n} ((\alpha)(1 - \alpha)^{n-1}(V)))/(1 - r)^n$$

Where,

n = 21 work-life years,

α = 0.024 probability of out-migration,

V = the total annual increase in productivity, and

r = 0.0428, the current yield on a 30-year U.S. Treasury bond.

²¹ *Data Source:* Workforce Development Services, Virginia Community College System.

²² *Ibid.*

Table 3: Benefit/Cost Ratio

Total Economic Benefit (mid-point estimate)	Total Economic Costs	Benefit/Cost Ratio
\$190.4 million	\$22.1 million	8.6

Conclusion

This report has assessed the role that VCCS’ workforce-related noncredit education and training services play in Virginia’s economy. What that assessment has shown is that, even though workforce-related noncredit education is becoming increasingly important in ensuring economic competitiveness, state funding priorities have not kept pace with this change and continue to focus almost exclusively on the traditional college experience.

Consistent with its statutory mandate to maximize noncredit course offerings made available to business and industry, in 2006-2007 VCCS offered 3,334 individual workforce-related noncredit courses, provided customized training programs to 1,305 employers, and served 3,000 employers through noncredit open enrollment classes. The analysis presented in this report has shown that these services make a two-fold contribution to Virginia’s economy.

First, the occupation-specific noncredit education and training that VCCS provides supports some of Virginia’s fastest growing occupations. Second, more generally, VCCS’ noncredit education and training services increase the skill level, and thereby the productivity, of Virginia’s workforce. The estimated dollar value of that increased workforce productivity was \$17.3 million in 2006-2007. Moreover, a comparison of the present value of the stream of future benefits created by that increase with its total costs shows that the benefit/cost ratio associated with VCCS’ workforce-related noncredit education and training is 8.6. Put simply, this means that the benefits the Commonwealth derives from these services are nearly nine times as great as the costs required to produce them.