State Council of Higher Education for Virginia
Gap Analysis Memo Addendum

Strategic Plan Development Project

October 3, 2014

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1. Introduction

The State Council of Higher Education for Virginia (SCHEV) has embarked on the development of a statewide strategic plan for higher education in Virginia. SCHEV has contracted with JBL Associates (JBLA), a research firm, to assist in the process. This document is one of a number of reports prepared by JBL Associates in fulfillment of its contract to assist SCHEV.

This document is an Addendum to the previously completed Gap Analysis Memo. The purpose of the Gap Analysis Memo was to summarize the issues of: access, affordability, postsecondary education enrollments and completions; entrants to the workforce; postsecondary education attainment gaps; credential (certificate and degree) programs necessary to meet the state's economic objectives; effects of improved instructional delivery modes and pedagogies; status of academic research capacity and its linkage to public and private funding sources; and measures of access, affordability, efficiency and quality, and to provide six regional analyses and a state summary of these topics. However, due to scheduling constraints, the Gap Analysis Memo focused on the statewide analysis of the supply and demand for skilled workers. This Addendum seeks to address a number of the remaining topics.

2. Survey and analysis of best educational practices

Improving completion rates in higher education has proven difficult, even with the most committed of efforts. Roughly half the students who start college do not finish a degree, and that rate has not changed appreciably over time. For the most part, the predictors of dropping out also have not changed. Being from a low-income family with no college background remains a strong indicator of leaving college with no degree or certificate. Often, students from these backgrounds do not have the academic grounding, life management skills or vision of life after college to sustain them in their studies.

In order to move the dial on college success, efforts to improve college completion must have two key characteristics: they must be *inclusive* and they must be *systematic*. Success will only come from a consistent effort across the entire state and all institutions, not just within specific programs or initiatives. Efforts will also need to be implemented effectively to affect overall success rates in a meaningful way. Most colleges already provide the types of services and programs that have been proven to help students succeed, but too many institutions do not implement them effectively enough to produce large, persistent gains. Improving implementation means sharing best practices, integrating efforts between and across campuses and making the effort consistent across time and across departments. Designing and implementing inclusive, systematic student success strategies requires visionary leadership at all administrative levels, including at the state coordinating level.

The commitment and backing of the faculty, administration and student-support staff to the efforts is also critical. Virginia, and the associated colleges and universities, need to be dedicated to a higher education system that puts student success at the center of their decision-making. Without this commitment, there will be little to no change.

This effort will be most important for those colleges with open or less selective admissions policies. Often, these institutions struggle with the most limited resources, so change will need to result from re-engineering existing programs rather than creating new ones. These institutions must be willing to engage in a continual process of institutional adaptation in order to avoid a downward spiral of rising costs and stagnant, or flagging, enrollment.

All institutional leaders, however, must bear in mind that the process of change is incremental, not revolutionary. That is why it is important to identify and track the combined effects of many small improvements over time, both to help determine what is working and to help keep the issue of improving student success at the center of attention over time. Success will be realized over years, not months.

SCHEV can take some first steps, in conjunction with other agencies, to establish student success as a priority in the Commonwealth and help set the stage for institutional action:

1. Have the governor recognize the completion agenda as a state priority
2. Set clear state targets and goals for completion of target populations
3. Establish an advisory committee or task force on student completion with members from other perspectives such as K-12, workforce agencies and private colleges and universities (more detail on this is found below)
4. Establish state performance measures that include intermediate indicators of long-term success
5. Encourage colleges and universities to engage internally on improving student outcomes
6. Provide professional development activities[i]
7. Implement a state grant aid program with incentives for students to enroll full time, which means 15 units per semester [ii]

One best practice that SCHEV could implement directly would be to coordinate these efforts through a statewide Student Success Center. Several states, Arkansas, Michigan, New Jersey, Ohio and Texas, have developed Student Success Centers as a way to maximize student success efforts across the state.[iii]

A Student Success Center could organize Virginia's colleges around collective action to accelerate efforts to improve persistence and completion. SCHEV could host a center that would provide long-term vision, technical assistance and a shared focus on specific goals for Virginia's colleges as they work in partnership to develop and implement a collective student success agenda. The Center could take the lead in communicating the components of the broader completion agenda to college leaders and in building a cohesive approach to engagement, learning and policy advocacy across the state's colleges and universities. Primary functions of the Center would be:

- **Convening and engagement**:
    - Bring colleges together around the completion agenda
    - Develop faculty leadership
    - Create in-state networks and communities of practice
    - Advance cross-sector alignment and collaboration among colleges, K-12, employers and other government agencies
    - Attend national meetings of importance to the completion agenda and develop a support network of affiliated professionals
- **Student success coordination**:
    - Map and align student success initiatives
    - Create an umbrella framework
    - Marshal resources necessary to accelerate the completion agenda
    - Facilitate resource sharing to promote system-wide efficiency

- **Improve data-based decision making through:**
    - Development of system-wide and institutional metrics
    - Support sharing of non-sensitive data
    - Encourage transparency at all phases
    - Provide, and support the development of, IR capacity
- **Research and knowledge management**:
    - Engage stakeholders through a statewide newsletter
    - Inform decision makers with insightful policy briefs
    - Promote Virginia's institutions with summaries and overviews of their progress
    - Identify and disseminate information on effective best practices
- **Policy**:
    - Set agendas for systemic and legislative change
    - Build state capacity for reform
    - Assist institutions with local policy audits and action

Each college and university will need to develop its own approach to improving student success, but the state can play a critical role in bringing attention to the issue and providing a platform where solutions can be devised and progress made visible. Many national associations and foundations provide resources and support for efforts to improve student success and close the attainment gaps between the rich and poor. Virginia should be an active participant in this growing national network.

3. Survey and analysis of new modes of delivery and pedagogies

Information technology has the potential to enable transformative change that goes beyond improving institutional and administrative efficiency. IT tools to enhance administrative and managerial efficiency and effectiveness have already been adopted by colleges and universities, so the opportunity for additional cost savings in those areas is limited. Technology applications have already replaced legions of clerks and lower-level administrators. Record keeping, bookkeeping, admissions, financial aid, on-line advising and institutional research are examples of functions that have been automated. Further examples include system designers, web managers and tech support personnel who have replaced the clerks and secretaries who were such a hallmark of higher education institutions prior to the information technology era.

The academic functions of colleges and universities have also benefited from improvements in technology. Many libraries provide access to far more virtual and electronic resources than old fashioned books while students and faculty share calendars, schedules, assignments, email and grades online through increasingly ubiquitous course management platforms. Content is often provided online through video clips, simulations, interactive graphics and worksheets that go beyond anything that was ever possible on paper. Today, whole classes can be delivered online, with full support from a live faculty member. A specific example of improving learning and reducing costs with technology is provided in Section 4.

Transformation is about people not technology

All of these technology advances promise greater productivity, more effective learning and lower costs. None of this will be realized, however, without addressing two topics. First, the technologies must be used to restructure the student experience, not merely to improve administrative efficiency. Second, end-users must adopt these tools in their daily practice; merely getting a product or system up and running will not lead to transformative change.[iv]

Realizing the full potential of technology to act as an adaptive fulcrum to leverage innovation and improvement depends on an institution's preparedness:

- The staff must be resourced and trained to deal with new processes on top of the normal load.
- The institution must have a solid technology base in place to support the desired changes.
- The leadership must have a change management process that draws people in from different parts of the college and gives them all ownership of the process and outcomes.

An assessment process that can help institutions develop and implement the changes needed to use IT to transform the education process is available from the Community College Research Center (CCRC): *Evaluating Your College's Readiness for Technology Adoption* (http://ccrc.tc.columbia.edu/publications/evaluating-your-colleges-readiness-for-technology-adoption.html).

Making education available to new populations

Distance learning should be about access, equity and the distribution of quality education to a wider audience in Virginia than can be reached through classroom-based education; cost savings or revenue enhancement should not be primary goals.

Colleges should have specific plans and policy statements for distance learning programs that satisfy the following requirements:

- Identify the educational objectives of each degree program and associated courses
- Identity distinctive student populations to be served and the local, regional, national or global needs to be met, in light of the institution's mission
- Explain how distance learning programs contribute to the mission, goals and objectives of the institution and the education of Virginia's students
- Describe how the proposed distance learning differs from the offerings of other providers

One example of best practices in online education with a proven record of success is the collection of courses developed through the Open Learning Initiative (OLI) at Carnegie Mellon University. The project has developed high-quality courses and contributed original research to improve learning and transforming higher education using technology. These courses go beyond the typical online course by using the latest research on cognitive tutoring to create online courses that are highly effective with minimal faculty participation.

The OLI modules guide students through the equivalent of textbook material while quizzing them frequently along the way. By constantly gauging comprehension, the software maintains a detailed assessment of the strengths and weaknesses of each student and generates new tips and exercises aimed at closing gaps in their understanding. OLI-Statistics students learned a full semester's worth of material in half as much time, and they performed as well or better than did students learning from traditional instruction over a full semester. In some cases, colleges are using these modules to supplement a more traditional class.

Another model resource can be found in The National Center for Academic Transformation (NCAT), which provides leadership in using information technology to redesign learning environments to improve learning outcomes for students. Course redesign using information technology is critical to achieving this outcome. NCAT has undertaken redesign projects that demonstrated significant improvements in student outcomes. Twenty-five of 30 course redesign projects resulted in significant increases in student learning; the other five had outcomes equivalent to traditional formats. Furthermore, eighteen of the 24 projects that measured retention reported a 10 to 20 percent decrease in drop-failure-withdrawal rates.

Each project is unique, but eight basic principles guide the process:

1. Redesign the whole course and establish greater course consistency
2. Require active learning
3. Increase interaction among students
4. Build in ongoing assessment and prompt (automated) feedback
5. Provide students with one-on-one, on-demand assistance from highly trained personnel
6. Ensure sufficient time on task
7. Monitor student progress and intervene when necessary
8. Measure learning, completion and cost

NCAT has undertaken state or system projects in Arizona, Mississippi, New York, Tennessee, Maryland, Minnesota, Ohio and Hawaii. Generally, the redesign process works best with those large, multi-sector courses that enroll the most students and where colleges can realize the greatest learning improvements.[v]

Online and hybrid education

Virginia public colleges and universities already provide a well-developed portfolio of online offerings, both at the university level and the community college level. All citizens in Virginia have access to online degree and certificate programs provided by a public college or university in the state. In addition, multiple private institutions in the Commonwealth offer online programs.

One of the populations for which distance education could be most helpful is the military, given that soldiers may be required to move before they can finish a classroom-based degree started in Virginia and want to continue their studies at the same institution. Virginia is home to several military bases and the Pentagon, which makes serving this population important to the state.

Online education is not effective with all students. Research has consistently shown that community college students who enroll in online courses are significantly more likely to fail or withdraw than are those in traditional classes. Worse still, low-performing students who may be marginal in traditional classes tend to fall even further behind in online courses.[vi]

In contrast, students in hybrid classes that blend online instruction with a face-to-face component perform as well academically as those in traditional classes. Therefore, hybrid education may be an effective alternative to the standard classroom approach, but it is not an easy transition. Faculty members who are committed to using these techniques, and who are well trained in blended and hybrid education and its technologies, are essential to success. Because these approaches change the traditional classroom model, students, too, must have a clear understanding of what is expected of them in this new environment.

Northern Virginia Community College (NOVA) has a course for faculty to help them learn how to design and manage a blended course. The college notes that the process of redesigning a traditional face-to-face course into a hybrid course requires rethinking and transforming assignments and assessments, not just lectures. Effective online communication and discussions are also crucial to the success of any

hybrid course. The specific approach will change depending on the discipline and content of the course, so there are no silver bullets. However, SCHEV could play a role as a clearinghouse for best practices and as a convener of events and sharing opportunities for faculty who are engaged in hybrid learning delivery throughout the state.

A related trend that institutions of higher education are using to make college accessible to broader populations involves reducing the cost of textbooks and other course materials by leveraging emerging forms electronic resource delivery. Textbooks account for a large chunk of students' college expenses — an average of $1,168 per student annually at four-year public colleges, according to College Board. Some U.S. universities are searching for ways to keep more money in students' wallets by making affordable digital textbooks readily available, including offering textbook rentals, but many institutions are seeking even more innovative solutions.

In one approach, called eTexts, institutions partner with commercial service provides to deliver digital textbooks, multimedia supplements, tutorial websites, e-reader/annotation software, and related materials on a specially designed interactive software delivery platform. Textbook publishers provide digital versions of their textbooks, enhanced with the full variety of dynamic, interactive tools that today's students have come to expect from their media. The eText fee is 35 percent or less than the retail price of a physical textbook. One of the leaders of this movement is Indiana University, which for the past 2 ½ years has piloted e-textbooks and a common software platform to read and annotate the texts. The University of Virginia already provides a version of eTexts called "jumpbooks" and potentially could partner with SCHEV develop statewide guidelines and best practices.

Open Educational Resources (OERs) are another approach that aims to reduce, or even eliminate, the cost of textbooks and other educational materials for students. OERs can be loosely defined as any educational resources that can be used and altered freely by faculty members and students. Recently, however, it has been through electronic distribution (facilitated by the innovation of the Creative Commons licensing structure) that OERs have taken on a transformational role in higher education. Originally created to allow open sharing of computer programs (with attribution), the Creative Commons license is now applied to all manner of digital media, including many OERs. Many proponents of OERs envision a future in which all of the information that students need to complete their programs is readily available at no additional cost. For example, the Extended Learning Institute (ELI) at NOVA recently developed an OER General Education Certificate with support from a College Innovation Fund grant from the Virginia Community College System (VCCS). This certificate represents the first half of an Associate's degree and can be completed entirely using OERs. NOVA is continuing to expand its OER course offerings with the goal of creating an entirely OER-based Associate of Science degree program. The college also plans to make these resources available to other community colleges throughout Virginia, while SCHEV could help extend these potential benefits beyond the community college system.

Conclusion

By itself, technology will not reduce costs in Virginia colleges and universities. The greatest improvements in efficiency and productivity will result from transforming the way institutions utilize their resources to improve educational outcomes. Technology can also provide educational opportunity

to more students, improve the educational experience and provide students with greater flexibility. It is not as simple, though, as budgeting for new computers in the classrooms and new servers on campus. It requires the full commitment of the administration to support the professional development of the faculty and staff and to both lead and manage student expectations, all in addition to expanding the campus information technology infrastructure. While this may be difficult to do, these investments are increasingly necessary for all colleges and universities to keep up with the evolving nature of higher education in the 21st Century.

4. Measuring academic efficiency and quality in Virginia

Efficiency and quality need to be considered together. The examples provided here demonstrate some approaches that Virginia might consider. Each approach would require state and institutional participation.

Saving money

Colleges and universities are edging toward an increasingly tight financial situation as state support declines and tuition starts to reach a level that begins to make attendance impossible for an increasing number of students. Cannibalizing institutional resources to help more students pay for college or excluding low-income students who cannot pay are not viable long-term solutions. Colleges and universities must consider moving away from a one-size-fits-all education model in which students largely follow the same calendar and curriculum on their way to collecting 120 credits for a bachelor's degree.

The colleges that succeed will be those that understand the diversity of their students' needs and offer a variety of paths to a degree. This might include a three-year bachelor degree plan, a low-residency option[1], a combination of hybrid and online courses or more co-operative education programs where students can incorporate employment with companies in their fields as a learning-while-earning option, according to Salingo.[vii] This approach is analogous to the practice of companies that segment their customer base to improve revenue and service. Technology is part of this transformation, but it will take a much broader reconsideration of how colleges and universities fulfill their mission to realize these savings.

Most colleges and universities would benefit from a regularly scheduled audit of their operations in order to identify redundant functions, inefficiencies and areas for potential savings. As decentralized, evolving organizations, institutions' costs can increase without their being aware of the causes. There is no shortage of ideas for savings in the literature. Consulting companies thrive on helping colleges and universities identify areas in which the institution can save money. An example of this sort of list is found in an article in *University Business*.[viii] The list includes:

- Join a purchasing consortium for IT equipment
- Eliminate paper wherever possible
- Outfit classrooms so they can serve off-campus students along with in-class students to raise more revenue
- Establish a distance learning division
- Automate temperature controls
- Share software among departments and schools
- Develop online course materials
- Use students as tech support

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[1] A low-residency program (or limited residency program) is a form of education, normally at the university level, which involves some amount of distance education and brief on-campus or specific-site residencies—residencies may be one weekend or several weeks. (http://en.wikipedia.org/wiki/Low-residency_program)

Clearly, the list could be extended, and each college may identify unique solutions that will save money over the long run. Developing and implementing these types of changes can and should be done at the institutional level. Top-down mandates will not lead to success.

Smaller colleges in the same region can develop cooperative projects that save money. Haverford and Bryn Mawr College, small liberal arts colleges situated only a mile apart in Philadelphia, provide an example. Students at one school can take courses or even majors at the other; one-third of students are taking courses on the other campus in any given semester. Library systems are integrated between the colleges and linked to nearby Swarthmore College. IT leaders at both campuses have been working together on three technology projects in an effort to create a seamless experience for students and save on costs with joint implementation of standardized commercial software. There was a conscious effort by the boards and presidents to collaborate across campuses on technology projects with the highest value to work on first as an important money saving step.[ix]

Quality

Academic quality assessment is generally the responsibility of accrediting agencies. States, however, may become interested in the quality of academic programs when employers or constituents complain about inadequate skills of graduates or in response to demands from the professoriate. The following topics address a variety of approaches to assuring quality in postsecondary education, with examples of how they are being applied by other organizations.

Testing and Assessment

Experts generally agree that no single assessment tool or approach can adequately represent collegiate level student learning. There are an increasing number of validated assessment tools and approaches available and colleges and universities are using them more frequently, most often to satisfy accreditation requirements. According to Kuh, et al., classroom-based assessment, national student surveys and rubrics are the top three most valuable or important approaches for assessing undergraduate student learning outcomes.[x]

That classroom-based assessment and rubrics are considered among the most valuable for institution level assessment suggests the usefulness of measures that capture student performance in the contexts where teaching and learning occur. Rubrics generally list specific criteria for a project or piece of work. Each criterion provides a concrete understanding and visualization of the characteristics of successful learning. Each set of standards or criteria generally includes a graduated scale of quality. Other measures may include capstone projects, alumni surveys, classroom performance measures, employer feedback or portfolios. Whatever form they take, these data are then "rolled-up" to the institution level to represent undergraduate student learning outcomes.

The American Association of Colleges and Universities has developed rubrics for undergraduate education that can be used to evaluate quality in undergraduate education.

Intellectual and Practical Skills

- Inquiry and analysis
- Critical thinking
- Creative thinking
- Written communication
- Oral communication
- Reading
- Quantitative literacy
- Information literacy
- Teamwork
- Problem solving

Personal and Social Responsibility

- Civic knowledge and engagement—local and global
- Intercultural knowledge and competence
- Ethical reasoning
- Foundations and skills for lifelong learning
- Global learning

Integrative and Applied Learning

- Integrative and applied learning[xi]

Commercial tests are also available to help assess student learning. ACT offers the Collegiate Assessment of Academic Proficiency (CAAP). CAAP is a standardized assessment program from ACT that enables postsecondary institutions to assess, evaluate and enhance the outcomes of their general education programs. As a national standardized test, CAAP is nationally normed to allow comparison of results to appropriate reference groups. CAAP provides information at the cohort and individual student level that faculty and administrators can use to evaluate their general education programs and identify opportunities to enhance student learning.

These examples suggest the range of assessment sources that are available to colleges and universities and how they might be used to improve education and assure quality at the cohort level, the institutional level and the system level. In order to be effective, they need the support of faculty and institutional leaders, so it is vital that they be implemented in through a broad-based effort that allows all the relevant stakeholders to participate. As a state coordinating board, SCHEV has a particular interest in leading the state's institutions toward a common understanding of how quality can be measured and maintained as part of its role in promoting statewide articulation agreements between colleges and universities. While many of these quality-focused initiatives must take place at the institutional level, SCHEV can help ensure that the dialogue around quality takes place across institutional boundaries by acting as a clearinghouse for information about institutional efforts and brining institutional leaders together to develop a shared vision of academic quality throughout the Commonwealth.

Program review and quality audits

Insuring system-wide academic quality requires a process by which the state can be assured that there is common agreement about what should be and is included in the courses of study taken by students. By requiring program reviews and quality audits, Virginia could ensure that programs meet quality standards and have a process of continuous improvement. An academic audit works like traditional accreditation with one big difference, which is that the process reviews the specific actions institutions have taken, or plan to take, to assure and improve educational quality, especially for undergraduates. Accreditation is less specific in that it defines minimum standards for approved operation and determines if the institution has the requisite resources to meet its goals.

The academic quality audit stresses specificity: e.g., the identification of examples of what institutions have done, how they have done it, what the results have been and how results have been used (or not used) to generate improvement. Other audit activities explore the process for assessing student learning, the institution's outcomes measures and data systems and how the chief academic officer holds the deans accountable for making sure that departments are paying attention to quality, according to Massey.[xii]

The Tennessee Board of Regents, the governing board of the state university and community college system in Tennessee, has been using an academic audit process since 2004 and uses the results as part of the incentive funding formula for colleges and universities in the state. The first step in their process is to have the institution undertake a self-study during which the faculty reviews the key activities in place that regularly improve the quality of teaching and learning. Faculty members reflect on how they organize their work and how they use data to make decisions. The self-study should note opportunities for improvement and identify initiatives for improvement. The academic audit includes a review by peers called the Academic Auditor Team. This team reviews a program's self-study report, conducts a site visit and writes its own report that includes commendations, affirmations and recommendations for continued improvement.[xiii]

Tennessee Quality Audit Principles Focal Areas
- Define quality in terms of outcomes
- Focus on process (how things get done)
- Work collaboratively with ALL stakeholders
- Base decisions on evidence
- Strive for coherence
- Learn from best practice
- Make continuous improvement a top priority

The measurement of quality is central to the state's incentive funding program.[xiv] All public universities and community colleges have been able to earn additional funds (up to 5.45 percent of the institution's state funding) based on quality improvement as measured by a common set of indicators. These measures include program review and accreditation results, student scores on tests of general education and major field tests, licensure rates and more. The measures are weighted differently for community colleges and universities.

Tennessee believes that the incentives have encouraged institutions to build comprehensive evaluation systems whereby they can reliably measure student learning. The Performance Funding Program serves as an accountability instrument for each five-year Master Plan. Between 2010 and 2015, institutions will focus on two quality standards: Quality of Student Learning and Quality of Student Support and Success.

Implementing an academic audit process similar to the one used by the Tennessee Board of Regents in Virginia will require a major, statewide effort. In Tennessee, the program is linked directly to the states performance funding model. Virginia already has such a funding model in place that includes performance-based funding for new programs or initiatives, including those that target quality improvements, innovation and continuous improvement. SCHEV could, potentially, craft an opt-in academic quality audit process, administered by SCHEV, that would provide participating institutions with a clearly defined pathway to meeting the existing requirements for a portion of their performance based funding under TJ21 or establish participation in the audits as a "pre-approved" initiative for inclusion in the institutional six-year plans that would help simplify and streamline their compliance with existing mandates.

Degree Qualifications Profile

The Lumina foundation has been developing a Degree Qualifications Profile (DQP) that borrows from efforts in Europe to develop a systematic process to determine what holders of different levels of degrees should master. Lumina provides a guide to developing profiles.[xv] In the case of the U.S., the levels would be associates, bachelors and masters. The DQP provides a guide for faculty and college leaders to use as they grapple with operationalizing the expectations they have for student competencies at each degree level. The process is designed for academic degrees, but it could be used in more applied programs as well.

According to Lumina, several colleges and universities in Virginia have been working with this concept (Blue Ridge Community College, Christopher Newport University, College of William and Mary, Hampton University, J. Sargeant Reynolds Community College, James Madison University, Norfolk State University, Radford University, Randolph-Macon College and Virginia Commonwealth University).

The DQP organizes proficiencies according to five broad categories:

1. <u>Specialized Knowledge</u>. Beyond the vocabularies, theories and skills of fields of study, this category addresses the knowledge that students in any specialization should demonstrate with respect to the domain.
2. <u>Broad and Integrative Knowledge</u>. This category asks students at all degree levels to consolidate learning from different broad fields of study — the humanities, arts, sciences and social sciences — and to discover and explore concepts and questions that bridge these essential areas of learning.
3. <u>Intellectual Skills</u>. Both traditional and non-traditional cognitive operations are included in these skills: analytic inquiry, use of information resources, engaging diverse perspectives, ethical reasoning, quantitative fluency and communicative fluency. There appears

throughout an emphasis on the capacity to make, engage and interpret ideas and arguments from different points of reference (cultural, technological, political, etc.).

4. <u>Applied and Collaborative Learning</u>. This element emphasizes what students can do with what they know, demonstrated by innovation and fluency in addressing unscripted problems in scholarly inquiry, at work and in other settings outside the classroom. This category includes research and creative activities involving both individual and group effort.

5. <u>Civic and Global Learning</u>. This fifth area of learning addresses the integration of knowledge and skills in applications that facilitate student engagement with and response to civic, social, environmental and economic challenges at local, national and global levels.

At the curriculum and classroom level, instructors and students can refer to the Degree Profile as a common source of understanding and as a point of departure for agreement on more detailed and specific expectations regarding the development of programs, courses, assignments and assessments. At the college and university level, the Degree Profile provides reference points that allow faculty members to articulate and better align institutional student learning outcomes with departmental objectives.

In addition, the focus on student learning in the Degree Profile and its definition of increasing levels of mastery expected as a student progresses through degree levels should:

- Provide a continuing and sustainable emphasis on learning as the proper determinant for the quality and value of degrees to help correct the tendency to view the credential as an end in itself instead of the learning it should represent
- Help align achievement levels defined in terms of specific knowledge, skill and application areas between and among secondary schools and postsecondary institutions
- Help guide students:
  - On what to expect at the next degree level
  - Who intend to transfer from one institution to another
  - Returning to higher education after an absence
- Recognize and give credit for out-of-school learning from employment or unaccredited training programs by adult students
- Develop reference points to assess students' progress and levels of achievement in relation to specific learning outcomes

As with the academic quality audits described above, one potential pathway to implement a DQP in Virginia would be for SCHEV to work directly with the Lumina Foundation, and with the Virginia institutions that are already working in this direction, to establish a statewide DQP or a statewide framework for the development of institutional DQPs. Then, the process of implementing the DQPs at the institutional level could be established as an opt-in program that institutions could use to meet the state goals established under TJ21, with SCHEV providing technical assistance and a repository of best practices, in addition to monitoring participating institutions' progress and publicizing their success.

Summary

These approaches are complementary and address many of the same issues at different operational levels. Quality is an issue at the course level, the program level, the college level and at the state level. Developing a systematic approach to improving quality will take the cooperation of leaders from all these points of view.

5. Regional supply, demand and gap analysis

Virginia's institutions of higher education play a critical role in meeting the state's needs for a skilled workforce. They support the economic wellbeing of their students by providing them with the opportunity to acquire the skills and credentials most sought after by employers. Virginia's institutions also help to ensure that business can find workers with the skills that businesses need to grow in the 21st Century economy. The Gap Analysis Memo evaluated the ability of Virginia's institution to meet this demand at the statewide level. Recognizing, however, that Virginia's regions each have unique labor market conditions, the following regional analyses provide insight into the regional demand for skilled workers and the availability of postsecondary programs to meet that demand on a regional basis.

Table 1 presents the top occupations that typically require some college by region. Where the projected openings for an occupation are not included, the occupation was not in the *top occupations for that region*, but it does not necessarily indicate a lack of demand in that region. There are only nineteen jobs on the list, which is an indication of the commonality between the regions. Seven of the occupations on the list were among the top jobs in at least five of the six regions. These included teachers (at various levels), nurses (including CNAs, LPNs, RNs, and NPs), and truck drivers. Northern Virginia, with its focus on IT jobs, had the largest number of top jobs that did not make the list in any other region.

Table 1. Jobs with the highest number of estimated annual openings from 2012 to 2022 that typically require at least some college education, by region

Title	Northern Virginia	Hampton Roads/ Eastern	Central Virginia	Valley	Southside	South-western Virginia	Total
Registered Nurses	603	619	686	404	163	133	2608
Management Analysts	1685	346	204				2235
Elementary School Teachers, Except Special Education	623	482	280	198	89	75	1747
Software Developers, Systems Software	1593						1593
Software Developers, Applications	1293						1293
Nursing Assistants		419	339	260	145	103	1266
Teachers and Instructors, All Other	767	118	90	117	51	95	1238
Computer Systems Analysts	1183						1183
Heavy and Tractor-Trailer Truck Drivers		293	254	332	153	133	1165
General and Operations Managers	731	159	186	47			1123
Accountants and Auditors	839		261				1100
Network and Computer Systems Administrators	738						738
Computer Support Specialists	732						732
Teacher Assistants		377	68	110	51	44	650
Licensed Practical and Licensed Vocational Nurses		81	265	32	91	95	564
Secondary School Teachers, Except Special and Career/Technical Education		178	66	74	42		360
Middle School Teachers, Except Special and Career/Technical Education		86			22		108
Physicians and Surgeons, All Other			64				64
Mental Health Counselors					29		29
Grand Total	10787	3158	2762	1574	836	678	19795

Source: JBLA analysis of employment data from the Virginia Employment Commission (www.virginialmi.com) and degree inventory data from SCHEV Research (www.research.schev.edu).

Tables 2 through 7 list the jobs with the greatest number of projected annual openings for the next ten year in each region. The occupations that typically require some college are followed by a list of the programs leading to employment in that occupation available from institutions in the region. The survey of programs included 2-year public institution and 4-year public and private, non-profit institutions.

Data on the estimated number of annual openings were obtained from the Virginia Employment Commission (VEC) through its labor market information portal, VirginiaLMI.com. These data included estimates of the number of annual openings (due to growth and replacement) between 2012 and 2022 within each Workforce Investment Board (WIB) region in the state. The 25 jobs or occupations with highest number of estimated annual openings in each WIB region were included in the analysis.

The WIB regions reflected in the VEC data are smaller than the regions used for analysis throughout the strategic planning process, so the estimated openings for the WIBs in each strategic planning region were aggregated to the strategic planning region level. As a result, some of the strategic planning regions included more than 25 jobs or occupations and the total number of openings in each region reflects the total of the openings in the WIBs within each region.

The tables also include the typical level of educational attainment for entry in each job or occupation. These levels are based on assessments performed and reported by the U.S. Bureaus of Labor Statistics. While there are know methodological issues with these assessments from the BLS, the other publicly available assessments also have known issues, so the comprehensiveness and consistency of the BLS assessments make them a reasonable choice for this analysis.

In order to assess whether institutions of higher education in the state are able to meet the demand for jobs and occupations on a regional basis, the degree inventories for the public two and four year and private, non-profit institutions located in each region were scanned for programs related to those jobs and occupations identified by the BLS assessments as typically requiring a postsecondary credential or degree. The degree inventories were obtained from the SCHEV Research website. For the Nurse Assistant occupation, the degree inventories were supplemented with program availability information obtained directly from the institutions' websites and course catalogs. The institutions and programs providing related credentials or degrees are reported immediately beneath the job or occupations to which they relate.

Central Virginia Region

Table 2. Jobs with the highest number of estimated annual openings from 2012 to 2022 and degree programs related to jobs that typically require postsecondary education in the Central Virginia Region

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Retail Salespersons	Less than high school	1070
Cashiers	Less than high school	816
Office Clerks, General	High school diploma or equivalent	733
Waiters and Waitresses	Less than high school	718
Registered Nurses	Associate's degree	686
Germanna Community College, Nursing, AAS		
J Sargeant Reynolds Community College, Nursing, AAS		
John Tyler Community College, Nursing, AAS		
Piedmont Virginia Community College, Nursing, AAS		
University of Mary Washington, Nursing, BSN		
University of Virginia, Nursing, BSN		
Virginia Commonwealth University, Nursing, BS		
Combined Food Preparation and Serving Workers, Including Fast Food	Less than high school	671
Customer Service Representatives	High school diploma or equivalent	425
Receptionists and Information Clerks	High school diploma or equivalent	400
Laborers and Freight, Stock, and Material Movers, Hand	Less than high school	394
Nursing Assistants	Postsecondary non-degree award	339
Germanna Community College, Nurse Aide, CSC		
J Sargeant Reynolds Community College, Health Care Technician, CSC		
Piedmont Virginia Community College, Nursing Assistant, CSC		
First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	335
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	Less than high school	286
Childcare Workers	High school diploma or equivalent	285
Personal Care Aides	Less than high school	283
Elementary School Teachers, Except Special Education*	Bachelor's degree	280
Bookkeeping, Accounting, and Auditing Clerks	High school diploma or equivalent	279
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	High school diploma or equivalent	265
Licensed Practical and Licensed Vocational Nurses	Postsecondary non-degree award	265
Central Virginia Community College, Nursing, CSC		
Germanna Community College, Licensed Practical Nursing, CERT		
Germanna Community College, Nursing, CSC		
Germanna Community College, Practical Nursing, CSC		
J Sargeant Reynolds Community College, Licensed Practical Nursing, CERT		
J Sargeant Reynolds Community College, Nursing, CSC		
J Sargeant Reynolds Community College, Practical Nursing, CSC		
John Tyler Community College, Nursing, CSC		
Piedmont Virginia Community College, Licensed Practical Nursing, CERT		
Virginia Commonwealth University, Nursing, CERT		
Accountants and Auditors	Bachelor's degree	261
University of Richmond, Accounting, BSBA		
Virginia Commonwealth University, Accounting, BS		
Virginia Union University, Accounting, BS		
Heavy and Tractor-Trailer Truck Drivers	Postsecondary non-degree award	254
NA		

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Landscaping and Groundskeeping Workers	Less than high school	244
Management Analysts	Bachelor's degree	204
Randolph College, Business, BA		
University of Mary Washington, Business Administration, BS		
University of Richmond, Accounting, BSBA		
University of Richmond, Business Administration, BSBA		
University of Richmond, Leadership Studies, BA		
University of Virginia, Commerce, BSC		
Virginia Commonwealth University, Accounting, BS		
Virginia Commonwealth University, Business , BS		
Virginia Commonwealth University, Financial Technology, BS		
Virginia Commonwealth University, Marketing, BS		
Virginia Union University, Accounting, BS		
Virginia Union University, Finance, BS		
Virginia Union University, Management Information Systems, BA		
Virginia Union University, Management, BS		
Virginia Union University, Marketing, BS		
First-Line Supervisors of Retail Sales Workers	High school diploma or equivalent	196
Security Guards	High school diploma or equivalent	190
General and Operations Managers	Bachelor's degree	186
Randolph College, Business, BA		
University of Mary Washington, Business Administration, BS		
University of Richmond, Business Administration, BSBA		
University of Richmond, Human Resources Management, BAS		
Virginia Commonwealth University, Business , BS		
Virginia Union University, Human Resource Management, BS		
Virginia Union University, Management, BS		
Carpenters	High school diploma or equivalent	93
Teachers and Instructors, All Other*	Bachelor's degree	90
Maids and Housekeeping Cleaners	Less than high school	75
Electricians	High school diploma or equivalent	73
Teacher Assistants	Some college, no degree	68
Operating Engineers and Other Construction Equipment Operators	High school diploma or equivalent	67
Secondary School Teachers, Except Special and Career/Technical Education*	Bachelor's degree	66
Physicians and Surgeons, All Other	Doctoral or professional degree	64
University of Virginia, Medicine, MD		
Virginia Commonwealth University, Medicine, MD		

NA No related degree or credential programs were found.

* K-12 teachers are required to have a bachelor's degree in an approved program, but not in a specific major.

Source: JBLA analysis of employment data from the Virginia Employment Commission (www.virginialmi.com) and degree inventory data from SCHEV Research (www.research.schev.edu).

Hampton Roads/Eastern

Table 3. Jobs with the highest number of estimated annual openings from 2012 to 2022 and degree programs related to jobs that typically require postsecondary education in the Hampton Roads/Eastern Virginia Region

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Retail Salespersons	Less than high school	1579
Cashiers	Less than high school	1316
Combined Food Preparation and Serving Workers, Including Fast Food	Less than high school	1279
Waiters and Waitresses	Less than high school	1078
Office Clerks, General	High school diploma or equivalent	931
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	Less than high school	718
Registered Nurses	Associate's degree	619
Hampton University, Nursing, BS		
Hampton University, Pre Professional Nursing, BS		
Norfolk State University, Nursing, BS		
Old Dominion University, Nursing, BSN		
Paul D Camp Community College, Nursing, AAS		
Rappahannock Community College, Nursing, AAS		
Thomas Nelson Community College, Nursing, AAS		
Tidewater Community College, Nursing, AAS		
Laborers and Freight, Stock, and Material Movers, Hand	Less than high school	501
Elementary School Teachers, Except Special Education*	Bachelor's degree	482
Receptionists and Information Clerks	High school diploma or equivalent	451
Customer Service Representatives	High school diploma or equivalent	421
Nursing Assistants	Postsecondary non-degree award	419
Paul D. Camp Community College, Nurse Aide, CSC		
Rappahannock Community College, Nurse Aide, CSC		
Thomas nelson Community College, Nurse Aide Education Program		
Tidewater Community College, Nurse Aide, CSC		
Personal Care Aides	Less than high school	416
First-Line Supervisors of Retail Sales Workers	High school diploma or equivalent	412
First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	393
Teacher Assistants	Some college, no degree	377
Management Analysts	Bachelor's degree	346
Christopher Newport University, General Business, BSBA		
College of William and Mary, Business Administration, BBA		
Hampden-Sydney College, Economics (Business), BA		
Hampton University, Accounting, BS		
Hampton University, Business Administration, BS		
Hampton University, Business Economics, BS		
Hampton University, Business Management, BS		
Hampton University, Finance, BS		
Hampton University, Marketing, BS		
Hampton University, Systems Organization and Management, BS		
Norfolk State University, Accountancy, BS		
Norfolk State University, Business, BS		
Old Dominion University, Accounting, BSBA		
Old Dominion University, E-Commerce Systems, BS		
Old Dominion University, Financial Management, BSBA		
Old Dominion University, Information Systems and Technology, BSBA		

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Old Dominion University, Management, BSBA		
Old Dominion University, Marketing Management, BSBA		
Regent University, Business Admin & Mgmt, General, MA/MBA		
Regent University, Business, BS		
Regent University, Global Business, BS		
Regent University, Organizational Behavior Studies/Org. Leadership, BS		
Virginia Wesleyan College, Liberal Arts Management Program, BA		
Landscaping and Groundskeeping Workers	Less than high school	336
Heavy and Tractor-Trailer Truck Drivers	Postsecondary non-degree award	293
Tidewater Community College, Ground Transportation Operation, CERT		
Tidewater Community College, Truck Driving, CSC		
Childcare Workers	High school diploma or equivalent	291
Stock Clerks and Order Fillers	Less than high school	277
Business Operations Specialists, All Other	High school diploma or equivalent	265
Bookkeeping, Accounting, and Auditing Clerks	High school diploma or equivalent	183
Secondary School Teachers, Except Special and Career/Technical Education*	Bachelor's degree	178
General and Operations Managers	Bachelor's degree	159
Christopher Newport University, General Business, BSBA		
College of William and Mary, Business Administration, BBA		
Hampton University, Business Administration, BS		
Hampton University, Business Management, BS		
Hampton University, Hotel and Restaurant Management, BS		
Hampton University, Hotel/Resort Management, BS		
Hampton University, Human Resources Management, BS		
Hampton University, Systems Organization and Management, BS		
Norfolk State University, Business, BS		
Old Dominion University, Financial Management, BSBA		
Old Dominion University, Management, BSBA		
Old Dominion University, Marketing Management, BSBA		
Regent University, Business Admin & Mgmt, General, MA/MBA		
Regent University, Business, BS		
Teachers and Instructors, All Other*	Bachelor's degree	118
Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent	106
Cooks, Restaurant	Less than high school	92
Middle School Teachers, Except Special and Career/Technical Education*	Bachelor's degree	86
Security Guards	High school diploma or equivalent	82
Real Estate Sales Agents	High school diploma or equivalent	81
Licensed Practical and Licensed Vocational Nurses	Postsecondary non-degree award	81
Eastern Shore Community College, Practical Nursing, CERT		
Eastern Shore Community College, Practical Nursing, CSC		
Hampton University, Nurse Practitioner, CERT		
Paul D Camp Community College, Nursing, CSC		
Paul D Camp Community College, Practical Nursing, CSC		
Rappahannock Community College, Licensed Practical Nursing, CERT		
Rappahannock Community College, Practical Nursing, CSC		
Thomas Nelson Community College, Nursing, CSC		

* K-12 teachers are required to have a bachelor's degree in an approved program, but not in a specific major.

Source: JBLA analysis of employment data from the Virginia Employment Commission (www.virginialmi.com) and degree inventory data from SCHEV Research (www.research.schev.edu).

Northern Virginia

Table 4. Jobs with the highest number of estimated annual openings from 2012 to 2022 and degree programs related to jobs that typically require postsecondary education in the Northern Virginia Region

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Retail Salespersons	Less than high school	1887
Management Analysts	Bachelor's degree	1685
George Mason University, Accounting, BS		
George Mason University, Business Administration, BS		
George Mason University, Finance, BS		
George Mason University, Information Systems & Operations Mgmt, BS		
George Mason University, Management, BS		
George Mason University, Marketing, BS		
George Washington University, Integrated Info, Science & Tech, BPS		
Marymount University, Business Administration, BBA		
Software Developers, Systems Software	Bachelor's degree	1593
George Mason University, Applied Computer Science, BS		
George Mason University, Applied Information Technology, BS		
George Mason University, Computer Science, BS		
Software Developers, Applications	Bachelor's degree	1293
George Mason University, Applied Computer Science, BS		
George Mason University, Applied Information Technology, BS		
George Mason University, Computer Science, BS		
Waiters and Waitresses	Less than high school	1209
Cashiers	Less than high school	1187
Computer Systems Analysts	Bachelor's degree	1183
George Mason University, Applied Computer Science, BS		
George Mason University, Applied Information Technology, BS		
George Mason University, Computer Science, BS		
Marymount University, Information Technology, BS		
Combined Food Preparation and Serving Workers, Including Fast Food	Less than high school	1113
Office Clerks, General	High school diploma or equivalent	1027
Accountants and Auditors	Bachelor's degree	839
George Mason University, Accounting, BS		
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	Less than high school	836
Teachers and Instructors, All Other*	Bachelor's degree	767
Business Operations Specialists, All Other	High school diploma or equivalent	746
Network and Computer Systems Administrators	Bachelor's degree	738
George Mason University, Applied Computer Science, BS		
George Mason University, Applied Information Technology, BS		
George Mason University, Computer Science, BS		
Marymount University, Information Technology, BS		
Computer Support Specialists	Some college, no degree	732
George Mason University, Command Control Comm & Intell Systems, CERT		
George Mason University, Computer Science, Cert		
George Mason University, Information Sciences, CERT		
George Mason University, Information Technology, CERT		
George Washington University, Computer Security and Info Assurance, CERT		

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Marymount University, Computer Science, UGC		
Marymount University, Information Technology, UGC		
Northern Virginia Community College, Computer and Information Science, AAS		
Northern Virginia Community College, Computer Science, AS		
Northern Virginia Community College, Information Systems Techno, CSC		
Northern Virginia Community College, Information Technology, AS		
General and Operations Managers	Bachelor's degree	731
George Mason University, Business Administration, BS		
George Mason University, Information Systems & Operations Mgmt, BS		
George Mason University, Management, BS		
George Mason University, Tourism and Events Management, BS		
Marymount University, Business Administration, BBA		
Customer Service Representatives	High school diploma or equivalent	717
Managers, All Other	High school diploma or equivalent	684
Elementary School Teachers, Except Special Education*	Bachelor's degree	623
Registered Nurses	Associate's degree	603
George Mason University, Nursing, BSN		
George Washington University, Nursing, BSN		
Marymount University, Nursing, BSN		
Northern Virginia Community College, Nursing, AAS		
Childcare Workers	High school diploma or equivalent	576
First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	557
Security Guards	High school diploma or equivalent	553
Sales Representatives, Services, All Other	High school diploma or equivalent	550
Receptionists and Information Clerks	High school diploma or equivalent	544

* K-12 teachers are required to have a bachelor's degree in an approved program, but not in a specific major.

Source: JBLA analysis of employment data from the Virginia Employment Commission (www.virginialmi.com) and degree inventory data from SCHEV Research (www.research.schev.edu).

Southside

Table 5. Jobs with the highest number of estimated annual openings from 2012 to 2022 and degree programs related to jobs that typically require postsecondary education in the Southside Region

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Cashiers	Less than high school	344
Retail Salespersons	Less than high school	294
Combined Food Preparation and Serving Workers, Including Fast Food	Less than high school	275
Personal Care Aides	Less than high school	223
Laborers and Freight, Stock, and Material Movers, Hand	Less than high school	216
Office Clerks, General	High school diploma or equivalent	177
Waiters and Waitresses	Less than high school	171
Registered Nurses	Associate's degree	163
Averett University, Nursing, BS		
Averett University, Nursing: Entry into Practice, BSN		
Averett University, RN to BSN, BSN		
Danville Community College, Nursing, AAS		
Liberty University, Nursing, BSN		
Longwood University, Bachelor of Science in Nursing, BSN		
Lynchburg College, Nursing, BS		
Patrick Henry Community College, Nursing, AAS		
Virginia State University, Nursing, AS		
Heavy and Tractor-Trailer Truck Drivers	Postsecondary non-degree award	153
Southside Virginia Community College, Ground Transportation Operation, CERT		
Southside Virginia Community College, Truck Driving, CSC		
Nursing Assistants	Postsecondary non-degree award	145
Danville Community College, Nurse Aide, CSC		
Patrick Henry Community College, Nurse Aide, CSC		
Southside Virginia Community College, Nurse Aide, CSC		
First-Line Supervisors of Retail Sales Workers	High school diploma or equivalent	98
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	Less than high school	98
Licensed Practical and Licensed Vocational Nurses	Postsecondary non-degree award	91
Danville Community College, Licensed Practical Nursing, CERT		
Danville Community College, Nursing, CSC		
Danville Community College, Practical Nursing, CSC		
Patrick Henry Community College, Licensed Practical Nursing, CERT		
Patrick Henry Community College, Practical Nursing, CSC		
Southside Virginia Community College, Licensed Practical Nursing, CERT		
Southside Virginia Community College, Practical Nursing, CSC		
Elementary School Teachers, Except Special Education*	Bachelor's degree	89
Automotive Service Technicians and Mechanics	High school diploma or equivalent	77
First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	73
Customer Service Representatives	High school diploma or equivalent	69
Teacher Assistants	Some college, no degree	51
Teachers and Instructors, All Other*	Bachelor's degree	51
Home Health Aides	Less than high school	49
Receptionists and Information Clerks	High school diploma or equivalent	44
Childcare Workers	High school diploma or equivalent	42
Secondary School Teachers, Except Special and Career/Technical	Bachelor's degree	42

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Education*		
Correctional Officers and Jailers	High school diploma or equivalent	42
Bookkeeping, Accounting, and Auditing Clerks	High school diploma or equivalent	42
Stock Clerks and Order Fillers	Less than high school	36
Mental Health Counselors	Master's degree	29
Liberty University, Counseling, MA		
Lynchburg College, Community Counseling, MED		
Virginia State University, Psychology, MS		
Packers and Packagers, Hand	Less than high school	27
Business Operations Specialists, All Other	High school diploma or equivalent	24
Light Truck or Delivery Services Drivers	High school diploma or equivalent	24
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	High school diploma or equivalent	23
Middle School Teachers, Except Special and Career/Technical Education*	Bachelor's degree	22
Maintenance and Repair Workers, General	High school diploma or equivalent	21

* K-12 teachers are required to have a bachelor's degree in an approved program, but not in a specific major.

Source: JBLA analysis of employment data from the Virginia Employment Commission (www.virginialmi.com) and degree inventory data from SCHEV Research (www.research.schev.edu).

Southwestern Virginia

Table 6. Jobs with the highest number of estimated annual openings from 2012 to 2022 and degree programs related to jobs that typically require postsecondary education in the Southwestern Virginia Region

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Cashiers	Less than high school	433
Retail Salespersons	Less than high school	295
Combined Food Preparation and Serving Workers, Including Fast Food	Less than high school	292
Customer Service Representatives	High school diploma or equivalent	220
Waiters and Waitresses	Less than high school	202
Office Clerks, General	High school diploma or equivalent	195
Personal Care Aides	Less than high school	157
Registered Nurses	Associate's degree	133
Bluefield College, Nursing, BS		
Jefferson College of Health Sciences, Nursing (RN-BSN Completion track), BS		
Jefferson College of Health Sciences, Nursing, RN, BS		
New River Community College, Nursing, AAS		
Radford University, Nursing, BSN		
University of Virginia's College at Wise, Nursing, BSN		
Virginia Highlands Community College, Nursing, AAS		
Virginia Western Community College, Nursing, AAS		
Wytheville Community College, Nursing, AAS		
Heavy and Tractor-Trailer Truck Drivers	Postsecondary non-degree award	133
Mountain Empire Community College, Truck Driving, CSC		
Southwest Virginia Community College, Truck Driving, CSC		
Virginia Western Community College, Truck Driving, CSC		
Wytheville Community College, Truck Driving, CSC		
First-Line Supervisors of Retail Sales Workers	High school diploma or equivalent	109
Nursing Assistants	Postsecondary non-degree award	103
Mountain Empire Community College, Nursing Assistant, CSC		
New River Community College, Nurse Aide, CSC		
Southwest Virginia Community College, Health Care Technician, CSC		
Virginia Highlands Community College, Nurse Aide, CEU		
Virginia Western Community College, Nurse Aide, CSC		
Wytheville Community College, Nurse Aide Program, Workforce training		
Laborers and Freight, Stock, and Material Movers, Hand	Less than high school	99
Licensed Practical and Licensed Vocational Nurses	Postsecondary non-degree award	95
Mountain Empire Community College, Practical Nursing, CSC		
New River Community College, Licensed Practical Nursing, CERT		
New River Community College, Practical Nursing, CSC		
Southwest Virginia Community College, Licensed Practical Nursing, CERT		
Southwest Virginia Community College, Nursing, CERT		
Virginia Western Community College, Licensed Practical Nursing, CERT		
Virginia Western Community College, Nursing, CSC		
Virginia Western Community College, Practical Nursing, CSC		
Wytheville Community College, Licensed Practical Nursing, CERT		

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Teachers and Instructors, All Other*	Bachelor's degree	95
Stock Clerks and Order Fillers	Less than high school	90
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	Less than high school	88
Bookkeeping, Accounting, and Auditing Clerks	High school diploma or equivalent	82
First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	77
Elementary School Teachers, Except Special Education*	Bachelor's degree	75
Home Health Aides	Less than high school	51
Cooks, Restaurant	Less than high school	51
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	Less than high school	50
Receptionists and Information Clerks	High school diploma or equivalent	49
Teacher Assistants	Some college, no degree	44
Carpenters	High school diploma or equivalent	43
Construction Laborers	Less than high school	42
Operating Engineers and Other Construction Equipment Operators	High school diploma or equivalent	35
Industrial Machinery Mechanics	High school diploma or equivalent	30
Supervisors of Construction and Extraction Workers	High school diploma or equivalent	28
Virginia Western Community College, Construction Trades, AAS		
Wytheville Community College, Construction Technology, CERT		

* K-12 teachers are required to have a bachelor's degree in an approved program, but not in a specific major.

Source: JBLA analysis of employment data from the Virginia Employment Commission (www.virginialmi.com) and degree inventory data from SCHEV Research (www.research.schev.edu).

Valley

Table 7. Jobs with the highest number of estimated annual openings from 2012 to 2022 and degree programs related to jobs that typically require postsecondary education in the Valley Region

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Retail Salespersons	Less than high school	761
Cashiers	Less than high school	732
Combined Food Preparation and Serving Workers, Including Fast Food	Less than high school	599
Waiters and Waitresses	Less than high school	511
Office Clerks, General	High school diploma or equivalent	437
Laborers and Freight, Stock, and Material Movers, Hand	Less than high school	434
Registered Nurses	Associate's degree	404
Blue Ridge Community College, Nursing, AAS		
Dabney S. Lancaster Community College, Nursing, AAS		
Eastern Mennonite University, Nursing, BA/BS		
James Madison University, Nursing, BSN		
Lord Fairfax Community College, Nursing, AAS		
Shenandoah University, Nursing, BS		
Heavy and Tractor-Trailer Truck Drivers	Postsecondary non-degree award	332
Blue Ridge Community College, Truck Driving, CSC		
Dabney S. Lancaster Community College, Truck Driving, CSC		
Customer Service Representatives	High school diploma or equivalent	289
Personal Care Aides	Less than high school	271
Nursing Assistants	Postsecondary non-degree award	260
Blue Ridge Community College, Allied Health, Workforce training		
Lord Fairfax Community College, Nurse Assistant, Workforce training		
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	Less than high school	258
First-Line Supervisors of Retail Sales Workers	High school diploma or equivalent	213
Elementary School Teachers, Except Special Education*	Bachelor's degree	198
Receptionists and Information Clerks	High school diploma or equivalent	198
First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	195
Bookkeeping, Accounting, and Auditing Clerks	High school diploma or equivalent	178
Teachers and Instructors, All Other*	Bachelor's degree	117
Teacher Assistants	Some college, no degree	110
Food Preparation Workers	Less than high school	86
Meat, Poultry, and Fish Cutters and Trimmers	Less than high school	85
Automotive Service Technicians and Mechanics	High school diploma or equivalent	85
Childcare Workers	High school diploma or equivalent	84
Carpenters	High school diploma or equivalent	82
Stock Clerks and Order Fillers	Less than high school	82
Secondary School Teachers, Except Special and Career/Technical Education*	Bachelor's degree	74
Maintenance and Repair Workers, General	High school diploma or equivalent	72
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	High school diploma or equivalent	70
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	Less than high school	69
Security Guards	High school diploma or equivalent	54
Light Truck or Delivery Services Drivers	High school diploma or equivalent	52
General and Operations Managers	Bachelor's degree	47
Bridgewater College, Business Administration, BA/BS		
Bridgewater College, Information Systems Management, BA/BS		

Job Title Program Title	Typical Degree for Entry	Estimated Annual Openings
Eastern Mennonite University, Business Administration, BA/BS		
Eastern Mennonite University, International Business, BA/BS		
James Madison University, Business Management, BBA		
James Madison University, Hospitality Management, BS		
James Madison University, International Business, BBA		
Mary Baldwin College, Business Administration, BA		
Mary Baldwin College, Business Administration/Economics, BA		
Shenandoah University, Business Administration, BBA		
Shenandoah University, Healthcare Management, BBA		
Southern Virginia University, Business Management & Leadership, BA		
Washington and Lee University, Business Admin, BSC		
Construction Laborers	Less than high school	38
Supervisors of Construction and Extraction Workers	High school diploma or equivalent	32
Licensed Practical and Licensed Vocational Nurses	Postsecondary non-degree award	32
Dabney S. Lancaster Community College, Licensed Practical Nursing, CERT		
Lord Fairfax Community College, Licensed Practical Nursing, CERT		
Shenandoah University, Family Nurse Practitioner, CRT		
Shenandoah University, Nurse Midwifery Endorsement, CRTG		
Shenandoah University, Nurse-Midwifery, CERT		

* K-12 teachers are required to have a bachelor's degree in an approved program, but not in a specific major.

Source: JBLA analysis of employment data from the Virginia Employment Commission (www.virginialmi.com) and degree inventory data from SCHEV Research (www.research.schev.edu).

Table 8. List of institutions by region used for regional analyses

Central Virginia

Central Virginia Community College

Germanna Community College

J Sargeant Reynolds Community College

John Tyler Community College

Piedmont Virginia Community College

Randolph College

University of Mary Washington

University of Richmond

University of Virginia

Virginia Commonwealth University

Virginia Union University

Hampton Roads/Eastern

Christopher Newport University

College of William and Mary

Eastern Shore Community College

Eastern Virginia Medical School

Hampden-Sydney College

Hampton University

Norfolk State University

Old Dominion University

Paul D Camp Community College

Rappahannock Community College

Regent University

Thomas Nelson Community College

Tidewater Community College

Virginia Wesleyan College

Northern Virginia

George Mason University

George Washington University

Marymount University

Northern Virginia Community College

Southside

Averett University

Danville Community College

Liberty University

Longwood University

Lynchburg College

Patrick Henry Community College

Randolph-Macon College

Richard Bland College

Southside Virginia Community College

Sweet Briar College

Virginia State University

Southwestern Virginia

Bluefield College

Edward Via College of Osteopathic Medicine

Emory and Henry College

Ferrum College

Hollins University

Jefferson College of Health Sciences

Mountain Empire Community College

New River Community College

Radford University

Roanoke College

Southwest Virginia Community College

University of Virginia's College at Wise

Virginia Highlands Community College

Virginia Intermont College

Virginia Tech

Virginia Tech Carilion School of Medicine

Virginia Western Community College

Wytheville Community College

Valley

Appalachian College of Pharmacy

Blue Ridge Community College

Bridgewater College

Christendom College

Dabney S. Lancaster Community College

Eastern Mennonite University

James Madison University

Lord Fairfax Community College

Mary Baldwin College

Shenandoah University

Southern Virginia University

Virginia Military Institute

Washington and Lee University

6. Suggestions for new credential programs to meet workforce needs

The regional analyses conducted in Section 5 do not indicate any major gaps in the ability of Virginia's colleges and universities to provide programs in the fields where workforce demand is expected to be highest over the next ten years on a region-by-region basis. The only high-demand occupation for which a program was not available at a public institution in the same region was that of Heavy and Tractor-Trailer Truck Drivers in Central Virginia. VirginiaLMI.com reports that Heavy and Tractor-Trailer Truck Drivers earned and estimated median annual wage of anywhere from $30,000 to $37,000 in the Central Region, so offering local access to a training program might give some students an opportunity to boost their earnings. However, it should also be noted that a cursory search revealed a number of private institutions in Central Virginia that offer this training, so introducing a program at a community college might not be necessary in this case.

The analyses conducted in the Gap Analysis Memo, and in Section 5 above, do reveal several areas where expanding existing programs, or adding new ones, might help Virginia's institutions better meet current and projected workforce demands. The analysis conducted in the Gap Analysis Memo revealed that projected annual openings in the area of Computer Technologies exceeded the current production of degrees and certificates by more than 3,100 annually. Within this program area, the largest gaps were found at the levels of: one to two year certificates (922 openings annually), bachelor's degrees (1,350 openings annually), and master's degrees (1,204 openings annually). The review of degree inventories conducted as part of the analysis in Section 4 indicates that programs in the Computer Technologies program area are available in all regions of the state.

This, however, is not to say that there are not opportunities to take further advantage of the booming growth of the information technology sector in Virginia with innovative new academic programs. One suggestion is the program field of Biometrics. Biometrics focuses on the skills needed to build automated identification devices. Currently, there are only two programs in the country offering bachelors degrees in Biometrics, one of which is located at West Virginia University (http://www.lcsee.statler.wvu.edu/ugrad/degree-info.php?degree=bsbs). This is a quickly growing field and is closely related to cyber security, a field in which Virginia institutions, including George Mason University, are already active. Adding a Biometrics program would integrate well with a strategy to establish a Research Center and Talent Hub around Cyber Security in Northern Virginia.

Additional information about programs currently being considered for introduction by institutions is also available in a separate memo describing the results of a survey of institutions about their plans, which was conducted as part of the strategic planning process.

Endnotes

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