Strategies for Improving Virginia Community College Graduation Rates

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Disclaimer

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On my honor as a student, I have neither given nor received any unauthorized aid on this assignment.

-Dylan Christopher Kolb
May 3, 2018

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Executive Summary

Community college graduation rates in Virginia are too low. Low graduation rates are associated with lower lifetime earnings and worse health outcomes for dropouts. The Virginia Community College System oversees 23 different community colleges across 40 campuses and served 252,728 students in the 2015-2016 academic year. VCCS faces challenges that affect all community colleges. VCCS tuition is increasing as a percent of disposable per capita income. Between 2007 and 2016 it increased from six to eleven percent. This is 26 percent more than other two-year institutions in the United States and was the second highest growth rate during this period.

Virginia's community colleges rely on part-time faculty for classroom instruction. As of Fall 2017, 74 percent of VCCS faculty were part-time adjuncts. Part-time faculty tend to be less available to students for assistance and are less likely to institute more rigorous instructional practices. Students at community colleges are also different than those at four-year institutions. Thirteen percent of community college students nationally are single parents and 42 percent are the first to attend college. In Virginia, 15 percent are over the age of 21, while at four-year institutions this is less than one percent. The following options apply best practices from other states and seek to improve Virginia community college graduation rates:

- Let present trends continue
- Mandatory summer internship programs
- Increase VSFAP funding
- Big data intervention program to catch failing students
- Performance measures

These options are judged using the following criteria: cost effectiveness analysis, political feasibility, implementation, equity, and quality.

I recommend letting present trends continue. Based on the cost effectiveness analysis it leads to the highest graduation rate over ten years at the lowest cost per one percent increase in graduation rates. VCCS is on the right track to improve community college graduation rates using the Guided Pathways framework, but needs to take note of the quality of community college education. This can be addressed by implementing performance measures proposed in the Virginia Higher Education Opportunity Act of 2011. These measures should distribute funding to colleges with the lowest percent change in tuition and highest post graduation salaries. Funding levels should not change for the next five years to give community colleges in Virginia a chance to adopt new budget projections and test new programs.

Problem Definition

Community college graduation rates in Virginia are too low. Virginia's community college graduation rate in 2013 was just 26.3 percent (VCCS Cohort Graduation and Transfer Rates). The 23 colleges ranged from the lowest rate of 16.4 percent to the highest of 50.1 percent. Community colleges are an excellent option for low-income students who want an Associate's degree, certificate, or have plans to transfer to a four-year program. However, community colleges fall short in the programs and services offered to help students transition to the workplace and graduate from two-year postsecondary institutions.

Costs to Society

Income

Earning a degree from a higher education institution in the United States is associated with a far higher income than those who drop out. According to the US Census Bureau, young adults between 25 and 34 with a college degree earn 40 percent more than someone who has not completed one, and 66 percent more than someone with only a high school degree ("U.S. Census Bureau QuickFacts," n.d.). An American Institute for Research study showed that students seeking a Bachelor's degree in 2002 who dropped out cost the nation approximately $3.8 billion in lost income, $566 million in federal income taxes, and $164 million in state income taxes (AIR, 2013). For Virginia, this demographic lost the state $128 million in personal income, $19 million in federal, and $7 million state income taxes.

In order to determine just how important a degree is to jobs and future earnings, researchers Mark Schneider and Lu Michelle Yin demonstrated what the cost was of low community college graduation rates. The authors estimated income growth over time using data from the 2010 Census and converting everything to present values. The researchers then compared the expected earnings over 40 years of a dropout versus a graduate. The researchers then predicted the economic gains states would have as a result of improving graduation rates by certain percentages. They found that if half of the community college dropouts earned their degrees it would generate an additional $30 billion in revenue during their working lives. This would let states gain $1.3 billion more in income taxes, which could even be used to reinvest in community colleges (Schneider & Yin, 2014).

Crime and Health

Education also has significant effects on crime and health outcomes. Students who graduate from community colleges tend to live healthier lifestyles and cost public health systems around $5,000 less in a lifetime compared to someone with only a high school degree. Most of the gains come from reduced Medicaid spending (Levin & Garcia, 2017). Graduating from college also reduces the likelihood of being involved in crime. Higher incomes of the more educated raises the opportunity cost of criminal activity (Levin & Garcia, 2017). Thus, graduating with an associates degree reduces criminal activity, saving taxpayers an additional $6,000 dollars in present value dollars per graduate.

Dropping out of community college also affects the state of Virginia. According to JLARC, in fiscal year 2016 a single community college credit cost the state $106.85 in general fund appropriations. Thus, 42 credits cost a student approximately $5,985 either out of pocket, or through state, federal, or institutional aid. Using these rates, the total cost for a student is approximately a total state investment of $10,470. Dropping out community college then costs the state money as a failed investment.

Virginia

Virginia is home to an estimated 8.7 million people that is 70 percent white. Virginia's per capita income is currently ranked 11 in the nation at $53,723 in 2016 dollars (VAPerforms). Between 2005 and 2016, Virginia's per capita income grew by .37 percent compared to the national average of .70 percent (VAPerforms). Virginia's eastern region grew by the most at .80 percent over this time period. As discussed above, education is a major factor in determining per capita income. According to a 2015 American Community Survey, median income over 12 months for a bachelor degree was $55,799, while with a high school degree or equivalent it was only $29, 674.

The Virginia Community College System

Virginia's community colleges were created in 1966 for increased higher education and workforce training (VCCS). The mission statement at the time was to "give everyone the opportunity to develop the right skills so lives and communities are strengthened." There are 23 community schools across 40 campuses in the Virginia system that served 252,728 students in the 2015-2016 academic year (SCHEV). These colleges provide two-year and other specialty trainings and certifications, and nationally 50 percent of students enrolled in higher education attend these institutions (Ma & Baum, 2016).

VCCS can save students money by offering transfer programs to four-year Virginia public universities. Students at community colleges obtain credits that count toward a Bachelor's degree at other higher education institutions. In the 2014-15 academic year, more than 11,600 students transferred from VCCS to one of Virginia's public four-year institutions, up 35 percent from the 2007-08 academic year (JLARC). Despite this, only 15 percent of those that transferred to a four-year university and earned a degree within seven years (JLARC). This varied between 19 percent at Northern Virginia Community College to just four percent at Mountain Empire Community College.

VCCS is in the process of implementing new initiatives to streamline program choices and improve scheduling (JLARC). Students often struggle to plan out courses in their first semester and can take more credits than needed. To tackle this, VCCS is reducing the number of course offerings through a "meta-majors" program. These meta-majors group together standardized course offerings to create smoother tracks for completion. Another program, iPASS, will, begin Spring 2018. This navigation software makes use of technology to support academic planning and student needs. It matches student interests with fields of study and places students in courses that best match their schedule. Finally, the system will replace a previous, unsuccessful early warning intervention program that placed students in danger of failing with assistants.

Proponents of community colleges insist that they provide the best access to higher education. Faculty understands that students at these institutions are generally excluded from other higher education opportunities. They are praised for humanizing the student and shaping a less academically challenging curriculum. Before exploring more about community colleges it is important to understand the laws and funding structures associated with VCCS.

Laws and Regulations

State Code § 23.1-2901 was signed into law 1966 by Governor Mills Godwin alongside the states first sales tax to fund it. The law combined Virginia's other technical and two year universities into a unified community college system.

There are no specific federal laws targeting community colleges as they are lumped into higher education institutions. The primary regulations for community colleges in Virginia stem from **8VAC95** and the State Board for Community Colleges. This is the governing body for Virginia's community college system. The Board's responsibilities are as follows:

- Prepare and administer plan of standards and policies for community colleges to establish. This requires appropriate educational opportunities and curricula to be available.
- Control and spend all state and privately appropriated funds and establish tuition fees.
- Confer diplomas and certificate degrees.
- Establish policies to create local community college boards suited for that locality's needs.
- Communicating with the Governor, General Assembly, Secretary of Education, and other higher education agencies and organizations relating to community colleges.
- Promulgating necessary rules and regulations relating to carrying out the purpose of Chapter 16 Title 23 of the Code of Virginia.

Chapter 16 Title 13 gives VCCS primary responsibility for coordinating workforce training to the associate level. This regulation also emphasizes providing employers with cost effective and relevant courses to meet "real, current, and projected" workforce training needs. Finally, Chapter 16 Title 13 requires VCCS to "maximize the availability and use" of distance learning courses.

These two regulations give the VCCS a wide range of power to implement policy and direct funding to improve community colleges across the state. In order to determine how much financial power VCCS has, I will examine historical and current spending levels in Virginia's community college system in addition to any financial incentives available.

Funding

Federal

Community colleges rely on a combination of federal and state funding to both aid students and run their campuses. Federal funding goes directly to students in the form of Pell Grants and loans. Some state funding goes to students as aid, but most goes directly to institutions, which is then

distributed by staff. This funding is critical for community college students both due to the lower income demographic and rising costs.

In order to assist students and higher education institutions, the federal government started supplying more funds. At the same time state funding decreased by 37 percent, federal funding increased by 32 percent between 2000 and 2012 (Anne Stauffer & Phillip Oliff, 2015). The area that saw the largest federal increase was Pell Grants and veterans' education benefits, which rose by $13.2 billion (72 percent) and $8.4 billion (225 percent) in real terms respectively between 2008 and 2013. So just what are Pell Grants and other state and federal programs that contribute to postsecondary education, particularly community colleges.

Table 1: Pell Grant Data for Virginia Public Two-Year Colleges

Academic Year	Number of Unique Students	Total Amount Awarded	Average Amount Awarded	Percentage of students with Pell Grants
2016-17	60,659	$182,839,940	$3,014	35.0%
2015-16	66,982	$206,403,350	$3,081	37.4%
2014-15	76,344	$233,127,817	$3,054	41.3%
2013-14	79,208	$238,749,366	$3,014	41.6%
2012-13	79,919	$236,587,844	$2,960	41.1%

Source: SCHEV

Pell Grants serve as a voucher for low to middle income students who do not yet have a Bachelor's degree. The program grew quickly from its beginning in 1974. The maximum reward is now $5,920 each semester in the 2017-2018 academic year, up from $4,731 per semester in 2007-2008. Community college students are the majority of Pell Grant recipients, with 36 percent going to public two-year institutions, or $3.2 million in 2012-2013. As seen in Table 1, 60,650 community college students received Pell Grants in the 2016-2017 school year for a total reward amount of $183 million and an average of around $3,000 per student. This made up 35 percent of all students attending community colleges in Virginia. This is down from the previous years where Pell Grants were around 41 percent of all community college students

Commonwealth of Virginia

Between 2008 and 2013, full time equivalent students (FTE) grew by 1.2 million or 8 percent. According to the JLARC's Operations and Performance of the Virginia Community College System, Virginia's postsecondary tuition increased by $4,771 per student between FY 1998 and 2012. Community colleges in particular were hit hard. Between 2007-08 and 2010-11 academic years, state funding for community colleges fell on average from $4,578 to $3,430 FTE or by 25 percent (McKibben, Bryce, 2013). Virginia community college funding fell from $4,275 to $2,583 FTE (SCHEV). This was in part due to state revenue falling by nine percent on average over the same 12-year period. In order to stay afloat, postsecondary institutions increased enrollment and raised tuition Despite this, community colleges tried to keep tuition in reason. Tuition for these institutions averaged $3,264 compared to $8,893 FTE at a four-year institution, both in Fall 2013. Virginia's community colleges do also keep tuition manageable. VCCS

continues to pledge to not let tuition exceed half of the average cost of a public four-year institution in Virginia.

Table 2: VSFAP Data for Virginia Public Two-Year Colleges

Academic Year	Number of Students	Total Amount Awarded	Average Amount Awarded
2012-13	38,386	$35,771,924	$932
2013-14	39,102	$37,405,120	$957
2014-15	42,117	$38,230,892	$908
2015-16	38,608	$38,824,608	$1,006
2016-17	36,161	$41,473,146	$1,147

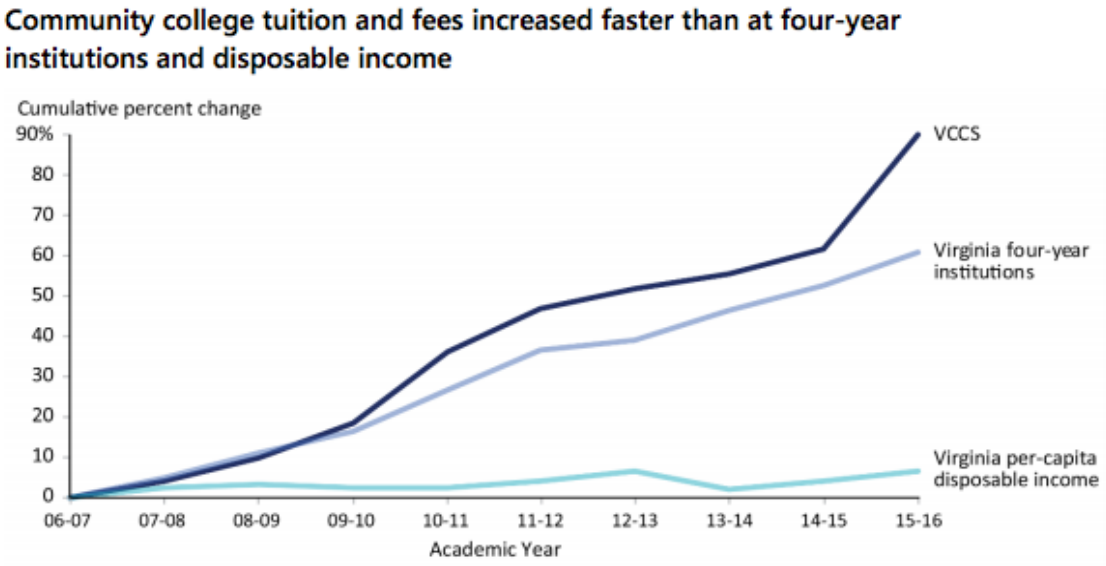
Source: SCHEV

Virginia allocates need-based financial support for students under the Virginia Student Financial Assistance Program (VSFAP). As seen in Table 2, VSFAP served 36,161 students for an average of $1,147 during the 2016-17 academic year. The average amount per student increased by $215, or 23 percent between 2012 and 2016. Virginia also offers a direct scholarship programs in the form of the Virginia Commonwealth Award (VCAP) and Virginia Guaranteed Assistance (VGAP) Program. VCAP provides aid depending on a student's need, with awards ranging from $500 to $3,500. VGAP provides both need-based and merit-based aid to students ranging from $400 to $5,000. VGAP can be renewed for an additional three years.

Funding Formulas

Another important aspect of state funding for community colleges is how they distribute funds. Virginia is one of 32 states that has a funding formula to give aid to their public two and four-year higher education institutions. The Virginia Higher Education Opportunity Act (VHEOA) was amended in 2011 to establish incentives for schools to receive aid. The general formula asserts that 67 percent of an institution's cost for Virginia students should be covered from the Virginia general fund. This amount is calculated by taking the cost of enrollment for the students and the makeup of degrees and physical space that the institution provides. Further funding is also tied to how well each institution follows the VHEOA's targeted economic and innovation incentives. These include: increased Virginia student enrollment, degree completion, retention and graduation rates, STEM degree production, public/private collaboration, technology-enhanced instruction, and enhanced transfer programs. We see that Virginia is investing in funding formulas and other performance metrics, but there is still room for improvement using performance measures. A more detailed funding performance measures discussion will be in the Best Practices section.

Rising College Tuition



SOURCES: JLARC staff analysis of published in-state tuition data from the Integrated Postsecondary Education Data System; St. Louis Federal Reserve GDP Deflator; statewide per-capita disposable income data from the U.S. Bureau of Economic Analysis. Excludes Eastern Virginia Medical School and Richard Bland College.

Before discussing tuition it is important to clarify that total cost of college is different than tuition prices. College cost includes how much colleges are spending and the price is what the college is charging students in tuition. Despite efforts by the federal and state governments, community college costs and tuition are still growing. According to the Urban Institute, in the ten years ending in 2012–13, the percentage of education and related expenditures covered by net tuition revenue rose from 26 to 39 percent nation wide ("Community Colleges: Multiple Missions, 2016). Virginia is ranked 8th in 2015/2016 annual tuition and fees for public two-year universities in the nation.

State spending per student fell 22.5 percent inflation adjusted between 2008 and 2016. Virginia did increase spending by 2.7 percent from 2015 to 2016, but tuition is still growing at public universities ("Funding Down, Tuition Up," 2016). This trend serves to shift the cost of higher education from the state to the student, something that hits low-income students particularly hard. College tuition and fees have increased 63 percent since January 2006, from 100 to 162.7 in July 2016 according to a BLS index ("College tuition and fees increase", n.d.). Tuition and fees are outpacing inflation and even medical care costs as a function of CPI as seen in figure above. At the same time, labor productivity has been relatively stagnant. This shows that even though institutions are demanding more from their students for higher education, productivity as measured by the number of graduates per dollar of spending is flat. A JLARC study found that Virginia colleges are spending more on nonacademic functions such as intercollegiate athletics while having difficulty funding academics.

VCCS tuition and fees increased from six percent of statewide disposable per capita income in 2006-2007 to nearly 11 percent in 2015-2016 (JLARC). As see in the above figure, tuition for VCCS is increasing faster than Virginia's four-year institutions and far outpacing disposable

income. These fees are increasing 26 percent more than two-year institutions across the country at the second highest growth rate. To make matters worse, 37 percent of community college students simply do not apply for federal student aid. Fifteen and twenty nine percent of students from the lower two family income quartiles respectively did not apply for aid because they assumed they were ineligible or that they had no need. Below are ways that community colleges use technology to try and address some of these issues.

Technological Changes

The US Department of Education continues to identify and respond to trends in the higher education field. The 2016 and 2017 National Education Technology Plan (NETP) found that that the types of students enrolling in postsecondary education was changing, and thus the technology needed to adapt as well. Forty three percent of students attended part-time, and 62 percent worked either full or part-time. These challenges required a "student-centered" approach focused on flexible locations and schedules ,along with work-centered pathways and classes.

In order to meet this demand, VCCS created the Virginia Education Wizard to "help students identify their personal goals, needs, and interests and connect to VCCS offerings" (King & South, 2016). This site allows students to plan a career, plan for payment and prepare for college all online and free. The report also details how technology can enhance learning. Technology allows for students to access learning opportunities that could be traditionally bound by timing and place. Technology also gives students access to high quality resources that are not geographically bounded. Importantly for community colleges, technology can give students and institutions access to high-quality resources at reduced costs. Several universities offer "open textbooks" that are free for students and a federal DREAM initiative gave competitive grants to community colleges to build curricula around these open textbooks.

Online classes have increasingly become a staple of community colleges. Compared to four-year liberal arts instructions where 61 percent report online classes that are taught exclusively online, 82 percent of community colleges have exclusively online classes (Parker, Moore, & Lenhart, Amanda, 2011). According to the National Center for Education Statistics, two million undergraduate students in 2014 reported only taking distance education courses, making up 12.1 percent of all undergraduate students (NCES). Online classes do face scrutiny over student persistence. Community colleges report drop rates around 20 percent higher than in person classes (Aragon, Johnson, 2008). A report by Aragon and Johnson observed what causes these students to leave the class.

Interestingly, age, ethnicity, and financial aid eligibility did not have significant impacts on dropout rates. 52 percent of males completed the online course compared to 66 percent of females. The researchers attributed this to the ease of scheduling and familial concerns that women rated as more important compared to males. Completers tended to be enrolled in more credit hours and also had higher GPA's on average than noncompleters. Twenty eight percent of students cited lack of communication and course design as a reason for dropping out compared to 34 percent reporting personal reasons. Some 18 percent of students also cited Web tutorial issues as reasons for dropping the class. This suggests that some students simply faced difficulty with the technology and communication structure of online classes. As such, community colleges need

to be careful of adopting online classes without properly instituting support for students unable to navigate online classes effectively.

Although online classes may be relatively easy to adopt, other technological innovations may be out of reach for community colleges. Funding levels from the state and federal government can be unreliable and thus lead to insecurity in future investments.

Critical Issues in Community Colleges

Rigor

Literature suggests that community college education lacks the rigors of four-year institutions. Authors McGrath and Spear detail in their *Academic crisis of the community college* that faculty lower requirements as the average academic level and interest of the student declines. Other researchers such as Brint and Karabel even assert that community colleges divert students from four-year institutions rather than persuade students to continue on an academic path. In order to test whether or not students are better off going to community colleges as primers for four-year institutions, researchers Carlan and Byxbe tested student's performances.

The two researchers looked at students that either began at a four-year institution or who spent their first two years at a community college and transferred (Carlan & Byxbe, 2000). They examined the grade differences between the groups and explained them using aptitude and environmental differences. Students who transferred and the original students showed similar standardized test scores initially. After two years, the data showed only one third, compared to one half of original students placed in the top quartile of standardized tests. Carlan and Byxbe asserted that it was not the aptitude difference, but the nurturing practices present in community colleges and not other higher education institutions. Community colleges were found to inflate GPA's and soften requirements. The researchers did admit that some students might not have gained the confidence to apply to four-year institutions in the first place without community colleges. They also noted that it was a "predictor of lower GPA for students who began their career at the four-year institution than for those who transferred from a community college." Therefore, it is important to understand the factors at community colleges that hurt student success.

As discussed previously, after the economic downturn in 2007 and 2008, more students joined community colleges. Even though these colleges raised tuition, there was a significant overcrowding effect. Research shows that as enrollment increases and more students vie for scarce college resources, graduation rates tend to decline (Goldrick-Rab, 2010). Importantly, need-based financing and state higher education appropriations were positively linked with increased BA production within states. This also extends to Pell Grants, which were shown to decrease the probability of withdrawal among students in their first two years of college (Goldrick-Rab, 2010).

Quality of Faculty

Quality of community college education could also contribute to low graduation rates. Virginia's community colleges rely primarily on part-time faculty for classroom instruction. As of Fall 2017, 74 percent of VCCS faculty were part-time adjuncts (JLARC). The remaining 26 percent full-time faculty have remained steady over the last ten years, increasing only one percentage point. In general, more part-time faculty is associated with poorer student performance. Part-time faculty tend to be less available to students for assistance and are less likely to institute more rigorous instructional practices. VCCS has taken steps to meet this with two programs. The first is a temporary program that compensates full-time faculty to mentor part-time faculty. The second provides an orientation and the "First year and Adjunct Institute" to advise faculty. VCCS has also taken steps to attract full-time staff by creating a new position, the Associate Instructor that requires fewer credentials than a typical full-time staff, but is not tenured. These programs are good starts, but are limited by funding, which would need to come from either the state or by an increase in already rising tuition and fees.

Community College Students are Different

Students at community colleges are far different than students at four-year institutions. Half of the students enrolled work full time (CFAP). Students cite lack of time, or need to care for families for dropping out of community colleges. Thirteen percent of community college students are single parents further reducing time available. Students also tend to be low-income and minorities. Forty two percent of community college students are also the first generation to attend college (AACC). They may not have the social or behavioral tools necessary to flourish in higher education, or be less aware of post graduation pathways. These behaviors show in community college engagement. Although student engagement is challenging for many higher education institutions, 30 percent of community college students do not attend orientation. Ninety percent note that academic planning is important to them, but less than one third report that an advisor helped them set academic goals and plan for the future.

Virginia community college students are similar to the results above. Fifteen percent of community college students in 2015 were over the age of 21, compared to less than one percent in public four-year institutions (JLARC). Older students are more likely to have poor study habits, and tend to have jobs or family responsibilities, leading to lower completion rates. Part-time students made up 38 percent of first-time students in VCCS, compared to one percent of public four-year in Fall 2016 (JLARC). Just 28 percent of part time students completed their credentials within seven years compared to 40 percent of full-time student at VCCS institutions.

Community colleges often lack the structure for proper academic planning, advising, career counseling, and financial aid. These issues are compounded by a lack of funding from federal and state governments. These institutions receive only 55 percent of their revenue from these sources. In order to make up for this shortfall, schools improve enrollment while not creating the supporting structures for a burgeoning population. According to data from 2009, community colleges spend around $13,000 annually per full-time student. By comparison the average for a private bachelors program was $27,439 a year.

Graduation Rates

All of the above problems lead to low graduation rates. Only 46 percent of students that start at a community college earn a degree or certificate, transfer to baccalaureate institution, or are still enrolled six years later (Juszkiewicz, 2017). More than half of Hispanic and 40 percent of Black students are enrolled in community colleges. These groups also graduate at lower rates. Six years after college entry only 30 percent of low-income, 26 percent of Black, and 26 percent of Hispanic students graduated compared with 36 and 39 percent of white and high-income students respectively (AACC). Degree attainment is incredibly important in the current service-based economy. According to the Georgetown Center on Education and the Workforce 65 percent jobs by 2020 will require postsecondary education (Job Growth and Education, 2014).

Although graduation rates and Associate's degrees are important, community colleges can offer more to students. The typical definition of completers under the Postsecondary Education Data System that is used in graduation rates does not include students that only take certain classes or transfer to other institutions. Evidence from a California report shows that even "skill builders" who drop in for a few courses show significant wage gains. The issue with the mix of students who go into community colleges is that they often do not have clear goals for completion. The "skill builders" may be on track, but other students may veer between a full Associate's degree, certificate, and transfer plans with not enough accumulated credits to complete any one. This "shapeless river", as described in Scott-Clayton's article, can derail students form completing on time ("Community Colleges: Multiple Missions, 2016).

Even for transferring students, evidence shows that it requires "vigorous monitoring of institutional practices" (Urban Institute). Only 15 percent of students who transferred earned a Bachelor's degree in seven years. Virginia community colleges constantly make new transfer agreements with four-year institutions, but they are often not kept up to date and are generally not accessible to students (JLARC).

For relevant analysis and policy option projections I will use graduation rates as an outcome measure. This is defined as graduating from a two-year Associate's degree program at a community college within three years. Transfers will not be included in this analysis as evidence shows that community college students who transfer face similar problems detailed above. Policies that improve community college graduation rates will most likely set up transfer students for success at other institutions. Graduation rates differ from dropout and completion rates as dropout rates only determine if a student is no longer in the program and neglect any time frame for completion. Completion rate definitions differ depending on the institution, but are similar to graduation rates. Completers in this case are those who do graduate within three years with an associate degree.

Best Practices

Virginia's community college system can learn some best practices from both within the state, and across the country.

Student Centered

Reports from the Center from American Progress and the American Association of Community Colleges push for the student to be at the center of reforms (Executive Office of the President, 2015). This involves creating a narrative around vulnerable student populations who are at risk of failure due to lack of support. The report cites Michigan's No Worker Left Behind program, which provides up to two years of free tuition for targeted programs of study. The authors assert that this student-centered approach also should be used to assess and guide college readiness through basic education requirements. This involves exchanging semester-based, classroom-centered skill development courses for learning modules, self-paced programs, and learning communities. These programs need to be simultaneously customized for the different students community colleges have, including working adults and non-traditional learners.

The AACC pushes for colleges to create coherent and structured pathways for student degree attainment. The proposed reforms also involve targeting student who have earned 30 or fewer credit hours, and assisting them earn credentials. In order to fund these initiatives the AACC wants colleges to advocate for investment in public goods from the local, state, and federal government. These efforts are to be paired with incorporating incentives for student performance into financial aid while still prioritizing need-based aid. While these programs seem immense and the issues facing community colleges are daunting, reform is necessary to improve Virginian access to higher education institutions and give them the tools for a more productive career.

Free and Reduced Tuition

One of President Obama's initiatives in 2015 was the America's College Promise plan to make community colleges free for "responsible students" (EOP, 2015). Since this initiative, states like Oregon and Mississippi passed legislation to make this a reality. One program, Oregon Promise, provides "last dollar" funding that is not covered by federal or state aid. Passed on July 2015, if high school students have a minimum 2.5 GPA and apply for existing aid, they can qualify for this program. Although there is not yet data on graduation rates, the program did increase community college enrollment from 16.3 percent of high school graduating classes in 2014, to 18.5 percent in 2016.

Applied Work

Community colleges with over 90 percent graduation rates often include long distance learning options and a career focus. East San Gabriel Valley Regional Occupational Program boasts a 93.4 percent graduation rate and pairs its students with businesses and job sites that requires them to split their time between their curriculum and field work (Heather Fishel, 2017). Another California college, the Lake Tahoe Community College, allows students to choose how many

days they want to attend and build their curriculum with a student focus. This college also has an above 90 percent graduation rate at 92.6 in 2016.

The Aspen Institute awarded Florida's Valencia Community College the top community college spot in the United States in 2011. Nearly half of Valencia's students are underrepresented minorities, African American, Hispanic, Native American, and many are low-income, yet the college boasts a more than 50 percent graduation and transfer rate (Aspen, 2011). What sets Valencia apart is its high employment rate. The school links its students with Northrop Grumman's needs for local laser technicians and also has a close transfer relationship with the University of Central Florida. These motivate students to graduate as the goals are tangible to their personal success.

Big Data Programs

One of the most innovative ways to improve college graduation is from Georgia State. Sixty percent of the university is nonwhite and 40 percent are the first to go to college in their families ("Big Dreams, Big Data," 2016). This is similar to community college statistics discussed previously, where 42 percent were first generation attendees (AACC). In 2003, the graduation rate was just 32 percent at Georgia State. The university decided to institute a "big data" policy and studied their previous graduation statistics. One hundred and forty thousand students were analyzed over a ten-year period. They learned that if students scored poorly in certain classes, they were more likely to fail out. In 2012, administrators instituted a policy that raised flags if a student did poorly in specific classes and within 48 hours that student met with an administrator. This administrator is in charge of finding students particular challenges, advising them, and even sometimes recommending a switch in majors.

The program saw immediate success; in 2014 the six-year graduation rate was 54 percent. Black and Latino students saw even greater increases, 36 and 34 percent respectively. At the same time, the university made efforts to include low income students. From 2003 to 2013, Georgia State increased enrollment of students receiving Pell Grants from 31 to 58 percent. Virginia can choose to look selectively at some of these programs and adopt practices that fit within VCCS's existing programs and limits.

New Performance Measures

As of March 2014, 21 states have established performance measures tied to funding formulas. States, including Virginia, historically funded colleges through enrollment numbers and are now shifting toward outcomes, like graduation and retention rates. One of the best examples of this is Texas State Technical College System's (TSTC) Returned Value Funding Model. State appropriations for TSTC are based on a proportion of the increased wages of the state's students over five years who remain and work in Texas (National Commission on Financing 21st Century Higher Education, 2016). The formula adjusts for inflation and tax rates and distributes funding based on the "value added" by students as a result of their degrees (Texas Higher Education Coordinating Board, 2013).

Short-term effects of these performance measures vary, but evidence is positive (JLARC). Louisiana reported increased retention rates at universities within one year of instituting performance measures using retention rates. Tennessee also saw positive results after passing performance measures targeting education productivity, advising, and early detection and intervention. It is too early to say what the long-term effects of performance based funding models on higher education outcomes, as most of these proposals are relatively new. Short-term results show graduation rate increases of between one and two percent. SCHEV insists that if Virginia were to fully implement this kind of formula, the financial incentives must be high. They want $65 million, or five percent of total higher education spending, to be included in general funds for this measure.

Streamlined Systems

City University of New York (CUNY) launched the Accelerated Study in Associate Programs (ASAP) in 2007 that sought to accelerate graduation for associate degree students in six CUNY community colleges. ASAP required full-time enrollment, block scheduled first-year courses, cohort course taking, intrusive and mandatory advisement, career services, and tutoring to name some of the program components ("Accelerated Study in Associate Programs," n.d.). Before ASAP, fewer than 25 percent of CUNY community college students graduated within three years. Fifty percent of students enrolled in the ASAP program graduated compared to 21.6 percent of non-ASAP students, even benefiting students from underrepresented groups at higher rates. ASAP also increased student retention rates, movement through developmental course work, and reduced credit accumulation.

VCCS has begun to implement its own version of ASAP that is focused on counseling services and "meta-majors". These are designed to help a student choose a degree path that is both structured to minimize number of credit hours required and completion focused (Waugh, n.d.). VCCS's 2021 goal is to triple the number of credentials awarded using the Guided Pathways model. Guided Pathways was rolled out beginning in 2016-2017 and while it is too early to tell how it will impact graduation rates, it is designed around a student-centered perspective. The program "is a framework by which an institution applies strategic coherence to its policies, program pathways, technology, advising, and business processes" (VCCS). The three main components are meta majors, onboarding, and structured programming.

Meta-Majors cluster academic programs by related courses or occupations, reducing lists of more than 100 majors to between five and ten. Onboarding is the time before a student attends his or her first day of class. VCCS notes a recent study that about half of students who apply to VCCS drop out before they even attend their first class ("Guided Pathways", n.d.). Onboarding with Guided Pathways seeks to halt this by streamlining admissions, financial aid, orientation, and registration processes. The final piece, structured programs, limit electives while emphasizing relevant coursework to provide a clear roadmap to graduation and careers. Colleges are in charge of sequencing courses and credentials to build on one another using "stackable credentials". These allow student who drop out to not have to repeat coursework in order to reach the next milestone. These programs are promising for VCCS as they can potentially both reduce spending per student while making it easier for students to graduate on time.

Options

The following are options to improve Virginia community college graduation rates. There will be discussion of the details of the options, but not cost estimates or outcome projections. This will be available in the Criterion Evaluation section and more details will be provided in the appendices.

Let present trends continue (Status quo)

This option does not increase funding or implement any new programs in Virginia's community college system. This option involves the current move to concentrate majors into "meta majors" and streamline graduation into what is called the "Guided Pathways Program." The program models New York's Accelerated Study in Associate Degree (ASAP) program. There are three major components to Guided Pathways.

The first is the meta major program mentioned above. This takes what were up to 50 to 100 different majors at VCCS institutions to five to ten. This is meant to provide clear choices for incoming associate degree students as to not overwhelm them before classes begin. The second part involves commitment to onboarding. Onboarding is the time between when a student applies to a VCCS institutions and when they first start classes. Onboarding seeks to make it easier to apply for aid, register for classes, and attend orientation. The final provision of Guided Pathways lays out a "structured program" for students to follow until graduation. It seeks to cut down on wasted credits and order classes for students to take in any given meta major. Students who drop out will have an easier time picking up where they left off.

Mandatory summer internship programs

Students at community colleges would be required to find a private company or other office to work at as part of a semester of learning. This job experience would count toward graduation credits and also provide valuable connections a student can use to secure a job upon graduation. This option will be difficult to establish in more rural areas of the state where there are fewer employers. Transportation may also be an issue for students to participate in their new work-study jobs. This option stems from best practices from the applied work best practices section. Students who have potential jobs lined up after their associate degrees will be incentivized to graduate on time. Students involved in previous work can continue, but will be encouraged to seek a job relevant with their coursework.

While Virginia community colleges are dispersed across the state, research shows that students who have an internship during the summer are more likely to graduate (Walker, 2011). This option will require students to have an internship that allows remote work, but will have the student meet in person with the employer at least once every two weeks. The option will be phased in with 20 percent of first year students being required in the first year with an additional 20 percent added in every two years.

Increase VSFAP funding per student by $200

This option increases the amount of financial aid available through Virginia to students who attend community colleges. Although Pell grants have taken up much of financial aid funding since the economic recession, Virginia funding can be used to aid community college attendees who need it the most. The current average amount of funding per student is $1,147. The state is increasing the amount they provide; the average amount per student increased between 2012 and 2016, by $215 or 23 percent. This funding should be increased by an additional $200 per student and directed toward community college students. This option targets students who are most in need of assistance to combat rising tuition.

Invest in and implement big data program to catch failing students

Similar to what Georgia State' initiative, this would create a program to find at risk students before they drop out. The first step would be to create database and have experts go through it to identify classes and other personal markers that make students more likely to drop out. This program would need to be instituted at every community college and also have the necessary staff to intervene with students. The staff should examine what the drivers are of the student poor performance and seek to rectify it with the appropriate solution.

Implement effective productivity measures using five percent of Higher Education Spending

Virginia is already implementing performance measures into its spending formulas; this option seeks to set dedicated SCHEV recommended five percent of funding for the measures and define the outcome metrics. Metrics should include graduation rates, tuition price percent change, starting salary, and student employment rate. Schools that are performing well in these measures should be rewarded in increased funding and serve as an incentive to other schools to improve their own outcome metrics.

Criteria

Cost Effectiveness Analysis (50% weight)

The first criterion will include a cost effectiveness analysis of alternatives to improve graduation rates; what options improve graduation rates the most at the lowest cost. Below is a breakdown of the major components of the CEA. Detailed assumptions and data will be provided in the appendices. This criterion is the primary one for a recommendation. The following criteria will be taken in context of the option itself.

This cost effectiveness analysis will project out 10 years and be contained to the Virginia Community College System and the Commonwealth of Virginia. I will use a discount rate of four percent. Costs and benefits should be limited to those who graduate and participate in the Virginia Community College System. Some of those that it will involve are students in community college, professors, associate professors, administrative assistants, and the Virginia state government.

Cost Categories

Cost to Program Participants

Students will spend extra time meeting with professors or administrative assistants. Students will also spend time in community college while they could work elsewhere. Some faculty will participate in meetings as a result of programs and their opportunity cost needs to be considered.

Cost to Society

Certain programs like the big data program will require upfront capital costs such as computers and software. Some projects will require consulting costs to ensure that the program starts off smoothly across the 23 different community colleges.

Recurring costs

Salaries and benefits for additional professors will continue to cost the state funds and are therefore categorized as recurring costs. Other costs included in this category are: materials and supplies used during processes, computer software replacement and hardware updates, travel, and any additional overhead costs.

Key Assumptions

General

To calculate hourly rates for students and professors when there is not data I assumed average 40-hour workweeks and then divided by 2080 to find the hourly rate

Baseline

Student populations in VCCS were projected by SCHEV until 2024. For the remaining years I averaged the percent change between each year and applied it to the remaining years. Spending per FTE student was calculated by taking JLARC data between 2006 and 2015 and determining the average percent change year to year. This was then applied to the following ten years for a baseline projection. Yearly spending was then calculated by multiplying the projected number of students by the projected amount of spending per student. Some students who are enrolled in community college are sacrificing earning wages. This population was defined as students who are over the age of 20 as they did not go straight into community college after high school. The national percentage for community colleges was 79 percent over the age of 20 in community colleges and will be used for this calculation.

Political Feasibility (20% weight)

The second criterion will involve investigating how politically feasible any given alternative is. In essence, does this option have a chance to be approved by the given political representatives and have a chance to be implemented. The governor's position on the issue should be known in addition to other state representatives. This will also include the positions of the attorney general and secretary of education when applicable. For community colleges, I will need to determine the leadership on the State Senate Education and Health committee and the House Education committee. It will also be important to know what the different leadership positions in the State House and Senate are on the issue. Another factor of this criterion is how the VCCS Board would accept different alternatives. If an option goes against another option that they supported, then I would expect it to be difficult to get buy-in from representatives.

Even if the option does not require legislation, another set of political actors will be involved. The State Council on Education's (SCHEV) stance on an issue should be taken into account as well as Board of Visitors and State Board for Community Colleges. Will these options fit within these organizations policies and will they support it.

Implementation (10% weight)

The third criterion will investigate how effectively a given alternative will be put into action. It will cover if one agency is able to have ownership of the alternative and if it is in accordance with the culture and previous policies of the agency. It will also cover how complex the program will be and whether or not it can be phased in with a pilot program. The primary agency implanting the alternatives will be VCCS, so I need to ensure that any alternative should be supported within the existing framework. This criterion will also take into account how much control a given community college has over a program and how much they can fit it to match their own institutions.

Fairness/Equity (10% weight)

The fourth criterion will focus on how well a given alternative targets the least advantaged population. In this case it will investigate if the students who will graduate are low-income or historically disadvantaged. This criterion will also look at how it impacts students with families or who also work part-time or full-time outside of classes. Essentially, will the option level the playing field for disadvantaged students and by removing barriers that traditionally hold back these students.

Quality (10% weight)

This criterion will measure whether an option not only improves graduation rates, but increases the quality of the education. There is a real scenario where community colleges change their programs to incentivize graduation rates to increase funding, but the substance of the degree is lacking. This criterion will look at this by taking into account entry-level wages graduates as well as productivity measures like cost per credit. Community colleges should include a five-year salary survey option to ensure that their student's degrees are valued in the workplace.

Criterion Evaluation

Let present trends continue

Cost Effectiveness Analysis

Projected Graduation Rate Increase	Cost Effectiveness Ratio	Comparison to Status Quo
25	$1.3 Billion	N/A

The status quo affected initial baseline spending. Data from Levin and Garcia's Cost Benefit Analysis showed that New York's ASAP program saved the state 10% per student in a year. This baseline will be applied to all other options. Once this was taken into account and applied to all other options I added in a one time consulting fee to get the system running across all community colleges. All other costs are incorporated into the overall reduction in baseline spending per student. This is because, while there may be more administrators hired, students are projected to take fewer credits thereby reducing the need for additional teaching staff. Students will also save time if the system is streamlined. This leads to the reduced baseline spending. Consultant costs were added as the implementation process will differ between New York and Virginia.

This option will lead to a projected 25 percent increase taken from ASAP estimates. This means a cost of $1.3 billion dollars per one percent increase in Virginia community college graduation rates over ten years. This may seem like a large amount of money, but it is important to remember for this option and others that this includes baseline spending. In other words, this is funding that is projected to be spent by the state on Virginia Community Colleges and the cost effectiveness ratio takes this into account over the next ten years.

Political Feasibility-High

This option was approved and is currently being implemented. Letting present trends continue is highly politically feasible. VCCS recently adopted the Guided Pathways program and it is unlikely it will be challenged by another major program that could replace it in the short term.

Implementation-Low

This option will be complex to implement, even if VCCS is at the head of the process. This option overhauls much of the existing frameworks at the 40 campuses into one. The meta major aspect itself will take immense coordination. Taking a school that has hundreds of majors and reducing it to ten in an organized manner will be difficult. Additionally, organizing professors and administrative staff for the structured programs will create immense strain. Readmitting students who drop out where they left off will create more administrative challenges as well.

Equity-High

Guided Pathways onboarding process and structured programs aid disadvantaged students. Students will have an easier time applying for financial aid and structured pathways helps students who drop out. Even the meta-major aspect of the program simplifies associate degree attainment. Therefore, the status quo is beneficial to disadvantaged students.

Quality-Low

This option does not address the quality of community college education. Meta majors do not seem to add to academic rigor and structured pathways makes the path to graduation easier. The status quo's goals in Guided Pathways is primarily to improve graduation rates, which could lead to easier classes at the cost of academic rigor. This scenario was discussed in the Critical Issues section and it is a distinct possibility that letting present trends continue will not address the quality of higher education at Virginia community colleges.

Mandatory internship program

Cost Effectiveness Analysis

Projected Graduation Rate Increase	Cost Effectiveness Ratio	Comparison to Status Quo
21.6	$1.5 Billion	+$214 Million

This program targets the first year associate degree students, and phases in over the ten years. The costs include the opportunity costs of the time spent by students searching for jobs and traveling when required. There will be recurring costs with salaries and benefits of 40 administrative staff (one per school) and from the employer who will pay a set salary. There will also be a stipend provided by the school for each student.

This option will lead to a projected 21.6 percent increase in graduation rates over ten years and cost $1.5 billion dollars per one percent increase in graduation rates. This is $214 million dollars more expensive than the status quo. The projected graduation rate increases are taken from best practices instituted by other community colleges and a study done at Ohio State that compared graduation rates of Bachelors students of those who had a summer internship and those who did not. Researcher Robert Walker found that students who took internships were 54 percent more likely to graduate than those who did not (Walker, 2011).

Political Feasibility-High

Governor Northam is in a position to support this option. In his "G3-Get Skilled-Get a Job-Give Back", Northam pushes for a mentor to train community college students for the workplace and obtain an apprenticeship if needed to secure a high-skilled job after college (G3—Get Skilled—Get a Job—Give Back, 2017). Secretary of Health Qarni is visiting underrepresented areas of Virginia schools on a "listening tour" and can provide resources to connect these schools to employers. This option will appeal to Republican members of the House and Senate, who still chair the Education Boards in both houses. Republicans were for bringing jobs to the Virginia under Governor McAuliffe's tenure. They will need to approve the stipends for the associate degree students and new career advisors, but costs will also be toward employers to hire new summer workers.

Implementation-Low

This option will be difficult to implement effectively. There needs to be coordination among the 40 different career counselors and across all of the employers. Even though the program is being phased in, it will take time before a full class will be able to participate. VCCS should have the ability to coordinate the program itself, but once again it will take time to make sure the connections are there between schools and potential employers. It will also be difficult to find employers that are willing to have a community college student work from home and only meet once every two weeks.

Equity-Medium

This option does attempt to level the playing field for all students and makes it mandatory to find high skill jobs. Students will be forced to find jobs that match the skills of associate degree holders. The problem with this is students who are not used to searching for these jobs will need to devote more time with career counselors to match with the right job. This could mean less time spent on studies compared to those who have already had experience with high skill job searches.

Quality-High

This option means that students will not only be incentivized to graduate to obtain high skill jobs as a result of their experience. It should also mean that students will take up high paying jobs and increase average salary upon graduation with an associate degree. This option is designed primarily to affect quality of higher education in community colleges. Best practices and research discussed above show that this has the potential to improve graduation rates as well. Students who see a high paying job available to them upon graduation are incentivized to work toward that goal.

Increase VSFAP Funding

Cost Effectiveness Analysis

Projected Graduation Rate Increase	Cost Effectiveness Ratio	Comparison to Status Quo
3.2	$10.35 billion	+$9 billion

This option contains few additional costs. The primary costs include a new administrative assistant to handle additional funding allocation and the health benefits associated with the new hire. The other cost category is the increased aid. This is $200 given to students already receiving VSFAP aid. It is projected that this will lead to a 3.2 percent increase in graduation rates over ten years at a cost of $10.35 billion per 1% increase in graduation rates. This option's cost effectiveness ratio is $9 billion more expensive than the status quo.

Political Feasibility-Medium

Governor Northam wants to increase last dollar funding for community college students in Virginia. His G3 plan pushed for free community college and asking for an average 20 percent increase in VSFAP funding per aid recipient will not be an issue. The issue will lie in the Republican controlled House of Delegates. Flat funding increases directed toward aid recipients will be a harder sell than an internship program geared toward setting students toward Virginian jobs. Virginia still relies on Pell Grant funding and delegates may question why they need to invest in financial aid if the government has already stepped in after the 2008 financial crisis. It will be up to the Governor and his Education office to support funding toward VSFAP.

Implementation-High

The framework for VSFAP already exists making implementation a nonissue. An additional administrative assistant is included in the option to handle additional applications that will arise as a result of funding increase.

Equity-High

This option is highly rated for equity. Providing funding to the already low-income students who receive Virginia need based financial aid will help provide for travel expenses or day-care costs for parents attending classes. Efforts will need to be made to let students who qualify for this program to receive their funding, but this option is designed to benefit the most disadvantaged students.

Quality-Low

Though this option aids students attending community colleges and will help graduation, it does not target quality. Graduation salary and costs per credit are expected to remain the same.

Invest and implement big data program to catch failing students

Cost Effectiveness Analysis

Projected Graduation Rate Increase	Cost Effectiveness Ratio	Comparison to Status Quo
22	$1.5 billion	+$183 million

This option contains multiple cost categories. Costs to program participants involves the time spent by students and professors using the new program. Students will be brought in for advisement sessions and professors need to take the time to flag students and provide comments. The recurring costs will be the salary and health benefits of the new administrator in charge of meeting with students as well as materials and supplies along with overhead administrative costs. Schools will need to replace computers on average once every five years. There will be upfront costs associated with consultants to teach administrators the new software and implement it across the 40 different campuses. This category also includes the cost of the software download across the different campuses.

The projected graduation rate increase is 22 percent at a cost of $1.5 billion per one percent increase in graduation rates. This is an additional $183 million dollars compared to the status quo. The 22 percent increase is taken from the Georgia State program that saw similar increases over ten years.

Political Feasibility-High

This option was tried before with the Student Assistance and Intervention for Learning Success program (SAILS). It was implemented in 2013 and has since fallen out of service. Research into this does not provide reasoning for the cancellation, but a new program is included in the Vision 2021 plan called iPASS will replace it in 2018. Therefore, legislators will need to understand why SAILS was not successful and whether or not a new data intervention program such as this option will succeed. It is likely that Governor Northam will support this program as it fits within the G3 plan's scope of bringing students into high paying, high skill jobs. The two education committees in the House and Senate will need to be convinced that a new data intervention program will learn from the failings of SAILS. If the cost can be justified, then it is likely they will support a program that increases graduation rates and leads to high paying Virginian jobs.

Implementation-Low

Similar to the intern study option, this option includes a number of moving parts and coordination among all community colleges. VCCS cannot do this alone and will need to contract out services to ensure the program runs as intended. Consultants need to be hired to train new administrators to learn the necessary software and also professors need to be briefed on how to use the program effectively. There will be institutional memory derived from the SAILS program, but if significant changes are made it will be a burden on VCCS staff to learn new software programs.

Equity-High

This program is meant to aid students who drop out and tend to be disadvantaged. Therefore this program is targeted at students failing important classes needed to graduate on time. As discussed in the graduation rate section, low-income students graduate at rates nine percentage points lower than high-income students. Intervention programs will need to discuss drivers of dropping out in addition to strategies to work toward graduation. This data will be useful for future interventions and create options to approach disadvantaged students.

Quality-Medium

The option is designed around student graduation, not necessarily the quality of the degree. Students at Georgia State could be considered to drop their intended major and pursue others to ensure on-time graduation. This does not make the quality of the education better inherently. There is room for this program to improve quality. Data collected on what classes cause the most flags to be raised can be used to determine why students are failing. This can then be used to improve class quality and reduce time spent in advising sessions. If class quality improves then it could also raise post graduation salaries for Virginia community college students, further improving the quality measure.

Performance Measures

Cost Effectiveness Analysis

Projected Graduation Rate Increase	Cost Effectiveness Ratio	Comparison to Status Quo
1.5	$22 billion	+$20.7 billion

The only cost associated with this option is the salary and health benefits of an administrator to oversee the implementation process and record the measures across the different community colleges. Staff already working at community colleges will report the required performance metrics. The expected increase in graduation rates is 1.5 percent over ten years and at a cost of $22 billion per one percent increase in graduation rates. This is an additional $20.7 billion compared to the status quo. The graduation rate increase is taken from analyzing other states that instituted performance measures such as Texas and Louisiana. These states showed an average of between one and two percent increase in graduation rates so I decided on 1.5 percent for the purpose of this CEA.

Political Feasibility-High

Political feasibility for this option is high because Virginia is already transitioning to using funding formulas in higher education to allocate higher education spending. Legislators realized that allocating funding based on the number of full-time equivalent students did not incentivize institutions to adopt best practices or improve graduation rates. It did lead to community colleges increasing enrollment, which strained faculty who were unable to keep up with the rising

demands of students. Legislation passed in Virginia Higher Education Opportunity Act in 2011 advocated for reform based investment in higher education. Passing funding formulas will appeal to the Republican chairs of the Senate and House education subcommittees to ensure money is being spent efficiently. It is unclear if Governor Northam will support this measure. Performance measures discriminate between schools by denying funding from low performing schools to the benefit of high performing schools. There is a risk of a "rich get richer" phenomena in this option that goes against Northam's G3, flat funding increase plan.

Implementation-Low

This option will be difficult to implement and VCCS will not have ownership over specifics of the productivity measures. VCCS do have the legal authority to distribute funding to community colleges, which will give them some control over the process once it is approved. Schools will need to collect data on post employment salaries, but should already have graduation rate and tuition information. The primary issue with implementation is the consternation it may cause among community colleges vying for funding. Although it is only five percent of allocated funding it will not be adopted easily in community colleges that face tuition or employment difficulties for their students.

Equity-Medium

The program does not address equity directly, but it does provide incentives for colleges to lower increases in tuition. This increases the amount of money each student can devote to other expenses associated with community college.

Quality-High

This option is designed to improve community college quality by providing financial incentives. It should lead to colleges adopting cost saving measures and prioritizing graduating students with high paying salaries.

Outcomes Matrix

	CEA* (Compared to status quo in millions of dollars)	**Political Feasibility**	**Implementation**	**Equity**	**Quality**
Status Quo	0	High	Low	High	Low
Big Data Program	+183	High	Low	High	Medium
Intern Study	+214	High	Low	Medium	High
VSFAP Funding	+9,000	Medium	High	High	Low
Performance Measures	+20,700	High	Low	Medium	High

Recommendation: Let present trends continue

I recommend letting present trends continue. VCCS is adopting measures that target weaknesses in the community college system. Guided Pathways and the Vision 2021 initiatives show that VCCS is on the right track to improve community college graduation rates. It is the most cost effective option and will lead to the highest projected percentage increase in graduation rates over the next ten years. This paper is structured around improving community college graduation rates, which was the focus of the Commonwealth Institute and associated with increased lifetime earnings and healthier lifestyles. It may be difficult to implement the ambitious scope of Guided Pathways effectively and it will require the VCCS to reform itself to meet the demands of a higher educated workplace. Other options tend to either not target graduation rates, or are too difficult to implement across VCCS. These options also do not have comparable cost effectiveness measures compared to the status quo.

This option does not address the quality of Virginia community colleges. My reservation in recommending this option is that if the goal is to triple graduation rates by 2021, it could sacrifice requirements to maximize graduation. Lower standards could warn future employers that hiring VCCS Associate degree students is not worth the investment. In order to meet the quality component my secondary recommendation is to institute performance measures based on percentage change in tuition and post graduation salary. Five percent of VCCS funding will be taken for this and will not require any additional funding.

Implementation

Before passing language on performance measures, the Virginia Department of Education along with the majority and minority leaders on the House and Senate Education committees need to interview VCCS officials. This should begin with a meeting with the Board of Visitors of VCCS to understand how performance measures will affect these institutions. Meetings should follow with representatives from each community college to understand how already underfunded and underperforming institutions can receive funding. Another important consultation point will be with representatives from Texas state government who oversee the Returned Value Funding Model. They will help with the surveying process and with questions toward funding formulas.

In order to allay fears of funding cuts for underperforming schools it is recommended that the measures do not take effect for at least five years. Performance measures should be tracked regardless to give these schools an idea of how they would have received funding for that year had the measures been in place. This will allow schools to become comfortable with the measures and let them project potential budgets. In order to avoid a “rich-get-richer” scenario, money should be allocated for top performers that does not come out of the five percent taken out of the VCCS budget. It will mean more funding in the future for the community college system, but given Governor Northam’s position and the job opportunities associated with community college degrees, representatives can be persuaded to set aside funds. The status quo paired with performance measures gives Virginia Community Colleges a path toward higher graduation rates with a high quality degree.

Appendices

Important Figures

Table 1: Community College Enrollment Projections for Virginia

Year	VCCS (FTIC)	VCCS (Undergrad)
2017	26,735	107,308
2018	27,419	104,133
2019	27,518	101,998
2020	27,790	100,795
2021	28,116	100,854
2022	28,237	101,843
2023	28,287	103,868
2024	-	105,862
2025	-	105,639
2026	-	105,416
2027	-	105,195

Source: SCHEV, Weldon Center

The above table uses SCHEV and Weldon Center data to predict how many students will be enrolled in the Virginia Community College System in the upcoming ten years. Predictive data ends in 2024 so subsequent data is projected using the average rate of change for the previous eight years and applying it to 2025-2027. This data is important for policymakers to create a baseline for spending in the next years.

Table 2: Virginia Community College System by Year---project

Fiscal Year	Total VCCS Spending (in thousands of dollars)
2012	$1,163,033
2013	$1,199,318
2014	$1,208,202
2015	$1,220,949
2016	$1,209,058
2017	$1,189,216

Source: JLARC, VCCS

Table 4: Projected VCCS Spending (2017-2027)

Fiscal Year	Projected Spending per FTE Student
2017	10310
2018	10499
2019	10692
2020	10888
2021	11088
2022	11291
2023	11498
2024	11709
2025	11924
2026	12143
2027	12365

JLARC

Cost Effectiveness Analysis Technical Appendix

This section will go over the calculations that went into the cost effectiveness analysis and how I arrived at the numbers I did for my cost effectiveness measures.

Baseline

- Student enrollment in Virginia community college system undergraduate programs was taken from SCHEV projections. These ended in 2024 so I took the average percent change between 2017 and 2024 and then projected this for the next three years.
- Spending per full time equivalent students was available between fiscal years 2006 and 2015 from JLARC. I took the average percent change between each year and projected this into 2027.
- Total spending for each baseline year was then just projected student enrollment multiplied by projected spending per full time equivalent student.

Opportunity Costs

- In order to determine the opportunity cost of participants time in the programs I used the hourly salaries.
- Seventy nine percent of students enrolled in community colleges are over the age of 21 (Ma, Baum, 2016). These students are forgoing a high school wage to attend community colleges. The average high school wage rate was taken from the Economic Policy Institutes report at $17.83 per hour in 2017 (Gould, 2017). Each year I multiplied 17.83 by 2080, which is the assumed number of hours for a 40 hour work week for 52 weeks. This number is then multiplied by the number of students over the age of 21 attending Virginia community colleges.
- Community college student hourly wage rates were taken from the same report, using 2017 wage rates for workers with some college (Gould, 2017).
- Professor's hourly wage rates were taken from the VCCS 2017-2018 Salary Schedule. I took the midpoint yearly salary and assumed 40 hour work weeks for the year.

Status Quo

- I assume that there would be 24 hours of consulting per school at a rate of 200 an hour. 200 dollars per hour was taken from optimalnetworks, an IT consulting firm in Virginia. They tend to charge around 200 dollars an hour for strategic consulting projects.
- There is an assumed ten percent decrease in spending per FTE student. This was taken from a previous cost effectiveness analysis undertaken by Levin and Garcia on the ASAP program (Levin, Garcia, 2017).
- The increase in graduation rates was taken from the ASAP program in New York community colleges. Graduation rates were at least 25 percent across the 2006-2007 academic cohorts (Accelerated Study in Associate Programs, 2018).

- The cost effectiveness measure was taken from the total discounted of $40,869,878,932 and then divided by the projected 25 percent increase to give $1,323,499,101 per one percent increase in graduation rates.

Big Data initiative

- The opportunity cost of students in programs is limited to the percent of students who drop out on average taken from the VCCS 2013 graduation rate within three years. I assumed that the 73.37 percent of students who dropped out would have been brought in for a consulting session at least once per year. I limited this to a one-hour session per student that would have dropped out per year equal to the $19.41 hourly wage rate for a student with some college education.
- In 2013, 45 percent of classes were taught by a full-time professors (VCCS 2014 Six Year Plan Narrative). I assumed that they spend two extra hours each year using this program. This is then multiplied by the hourly wage rate for a full-time faculty with the remaining 55 percent of faculty equal to the assistant professor hourly wage rate also from the Salary Schedule.
- I assumed that consultants spend five hours at each college to set up and brief administrators at a rate of $150 an hour. This is taken from the costs optimalnetworks lists for engineering consulting projects.
- I assume that the each college will use Stata MP 2 Core educational network program at a cost of $340 per download taken from the Stata website.
- I assume that each community college will purchase two Dell computers per college to be replaced every five years at 480 per computer (Dell 19 Monitor | E1916H | Dell United States).
- I assume that each community college will require an additional administrative assistant per community college at $14.67 an hour. VCCS employees receive benefits in addition to salary. This was applied by taking the $229.64 non-postal monthly standard 2017 Blue Cross Blue Shield Service Benefit plans rate.
- Assume office supplies cost $200 per school to be replaced every year.
- The 22 percent increase in graduation rates is taken from the change reported by Georgia State University's data from their big data initiative (Georgia State University Magazine, Winter 2016).
- The cost effectiveness measure was taken from the total discounted costs of $33,151,937,352 then divided by the projected 22 percent increase to give $1,506,906,243 per one percent increase in graduation rates.

Intern Program

- To ease implementation I assume tis program phases in starting at 20% adoption in the first two years and adding 20% every two years.
- Only half of FTE students participate in the program. This is meant to target students between the first and second year of their associate degree program, which does not apply to students in their second year of community college.
- I assume that this program will require 400 hours of work per student for a ten week, 40 hour workweek summer time period.

- I assume students meet with sponsor/employer once every two weeks with the rest of work to be done remotely.
- I assume two hours of travel per meeting for a total of ten hours during the work period. The opportunity cost of this travel is the wage rate for workers with some college.
- I assume that students spend five hours per year finding internships. This is applied using the wage rate for students with some college
- Employers will pay minimum wage of Virginia at $7.50 an hour.
- I assume each college will hire one career services administrator per school at a yearly salary of $44,792 dollars. This is taken from the average salary reported from a Career Services Specialist on glassdoor.
- The outcome measure is taken from a University of Ohio paper does study showing a 54 percent graduation difference at a four-year undergraduate program between those who did an internship and those who did not.
- The average graduation rate for study due to phase in is 21.6%. This is found by multiplying the phase in rate by the full 54 percent and then averaging this across the ten-year scope.
- The cost effectiveness measure was taken from the total discounted costs of $33,215,846,092 then divided by the projected 21.6 percent in graduation rates to give $1,537,770,652 per one percent increase in graduation rates.

VSFAP Aid

- The percent of students using VSFAP is estimated at 33.75% using average of the 2012-2017 academic years from SCHEV data.
- Assume that one additional administrative assistant will be hired at same salary as before to handle increased aid load.
- Assume 3.2% increase in graduation. This is taken from a research paper from Susan Dynarski that reports between three to five percentage point increase in graduation rates as a result of aid increases.
- The cost effectiveness measure was taken from the total discounted costs of $33,144,349,554 then divided by the projected 3.2 percent increase in graduation rates to give $10,357,609,236 per once percent increase in graduation rates.

Performance Measures

- Assume that one additional administrative assistant will be hired at same salary as before to handle implementing the measures across VCCS.
- Assume 1.5% increase in graduation rates. This is taken from performance measures reported from the National Conference of State Legislatures. Rates ranged from one to two percent so I averaged it to 1.5 percent.
- The cost effectiveness measure was taken from the total discounted costs of $33,087,555,367 then divided by the projected 3.2 percent increase in graduation rates to give $22,058,370,245 per once percent increase in graduation rates.

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