

Appendix B: Methods

Methods

The *Virginia Educated* study has traveled many paths to one destination. Across a two-year span, the effort has involved strategic discussions, literature reviews, expert consultations, focus groups, cognitive interviews, pilot content/methods testing, and production instrument fielding. Each of these activities has converged around a singular goal: to assess the value and multi-faceted impact of undergraduate education among recent graduates of the Commonwealth's publicly-supported institutions of higher learning.

The *Virginia Educated* production survey is both the centerpiece and the culmination of this study. It has several special qualities. Importantly, it asks respondents about an array of life domains: economic, personal, and social. Not only does it inquire about issues like job tenure and satisfaction, but it considers subjects like community involvement, health, and overall life satisfaction in parallel.

Additionally, the survey captures copious amounts of closed-ended data, while simultaneously inviting open-ended comments about participants' undergraduate experiences. Consequently, *Virginia Educated's* multi-dimensional approach allows respondents' perspectives and circumstances – indeed their voices – to be woven together with substantial quantitative information. This combination facilitates development of a contextualized, holistic portrait of the role higher education plays in the lives of thousands of people.

***Virginia Educated* sought to answer the key question:**

Considering traditional and non-traditional measures, what is the ***overall value proposition*** of certificates, associate degrees, and baccalaureate degrees, ***according to Virginia's recent graduates?***

Value, for the purpose of this project, was not limited to economic terms like employment and earnings. It also incorporated social and emotional factors – for instance, satisfaction with life, health, and community engagement.

Other elements of the *Virginia Educated* survey stand out. It is large in scale – with 15,348 completions – and it involves 39 public Virginia community colleges, colleges, and universities. Next, it considers several types of graduates – those who completed occupational/technical certificates, associate degrees, and bachelor's degrees. Moreover, it cuts across fields of study; it includes the input of graduates who were non-traditional, underrepresented and first-generation students; it collects data from in-state and out-of-state students; and it has a lengthy time horizon of approximately 10 years (i.e., persons who graduated between 2007-18). Significantly as well, where participant consent occurs, *Virginia Educated* allows survey data to be paired with secondary administrative data typically collected and held by SCHEV. Finally, it provides an early look at how graduates have fared during the COVID-19 public health emergency.

Virginia Educated was developed in several stages including focus groups, cognitive interviews, a pilot survey and a full production survey. Below is a detailed description of the project's implementation and methods, focusing on the production survey. Earlier stages of the study were described in more detail separately in reports submitted to SCHEV in September 2019 (focus groups), January 2020 (cognitive interviews) and June 2020 (pilot survey).

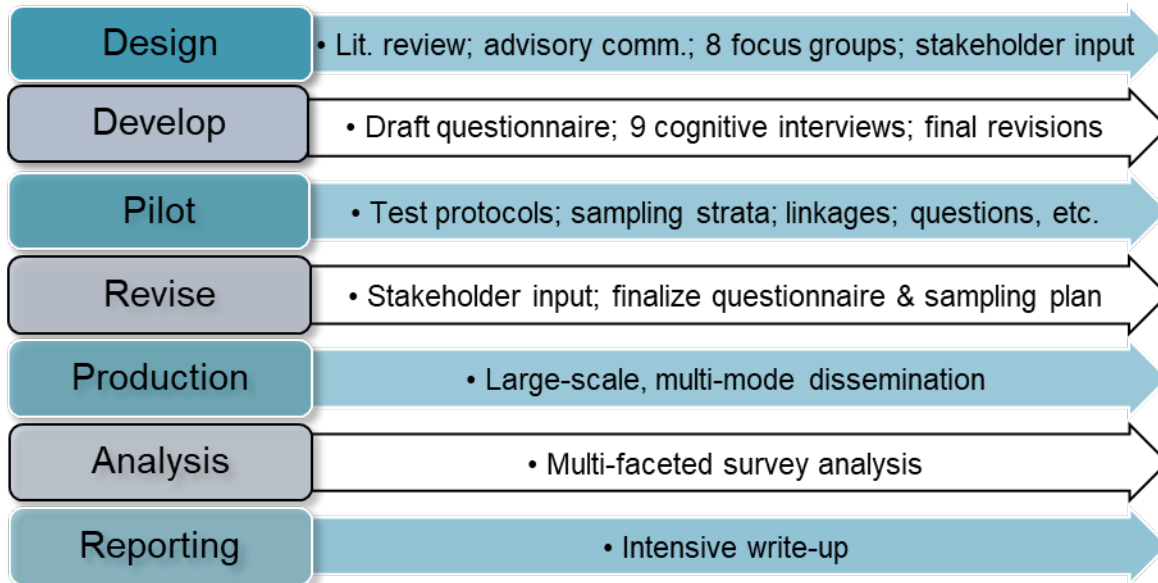
Study conceptualization and instrument development

Framing discussions, advisory groups and IRB

The *Virginia Educated* study – in both its pilot and production forms – reflected input from many sources. In particular, members of SCHEV's Post-College Outcomes Taskforce and subsequent Data Project Advisory Committee weighed in on survey design and administration. These individuals represented several institutions of higher education in the Commonwealth, such as the W&M; George Mason University; James Madison University; the University of Mary Washington; the University of Virginia; the Virginia Community College System (VCCS); VCU; Virginia State University; and Virginia Tech. The Data Project Advisory Committee also included representation from the Federal Reserve Bank of Richmond and VEDP. Members of SCHEV's full Council, as well as its Instructional Programs Advisory Committee (IPAC) and its General Professional Advisory Committee (GPAC) were also periodically apprised of survey development, deployment, and other project milestones. VCU's IRB was brought in early on to review the study for human subjects research protections and they provided excellent and timely support throughout the project. The entire project proceeded under VCU IRB protocol HM20017308 – inclusive of the August 2019 initial submission and later modifications.

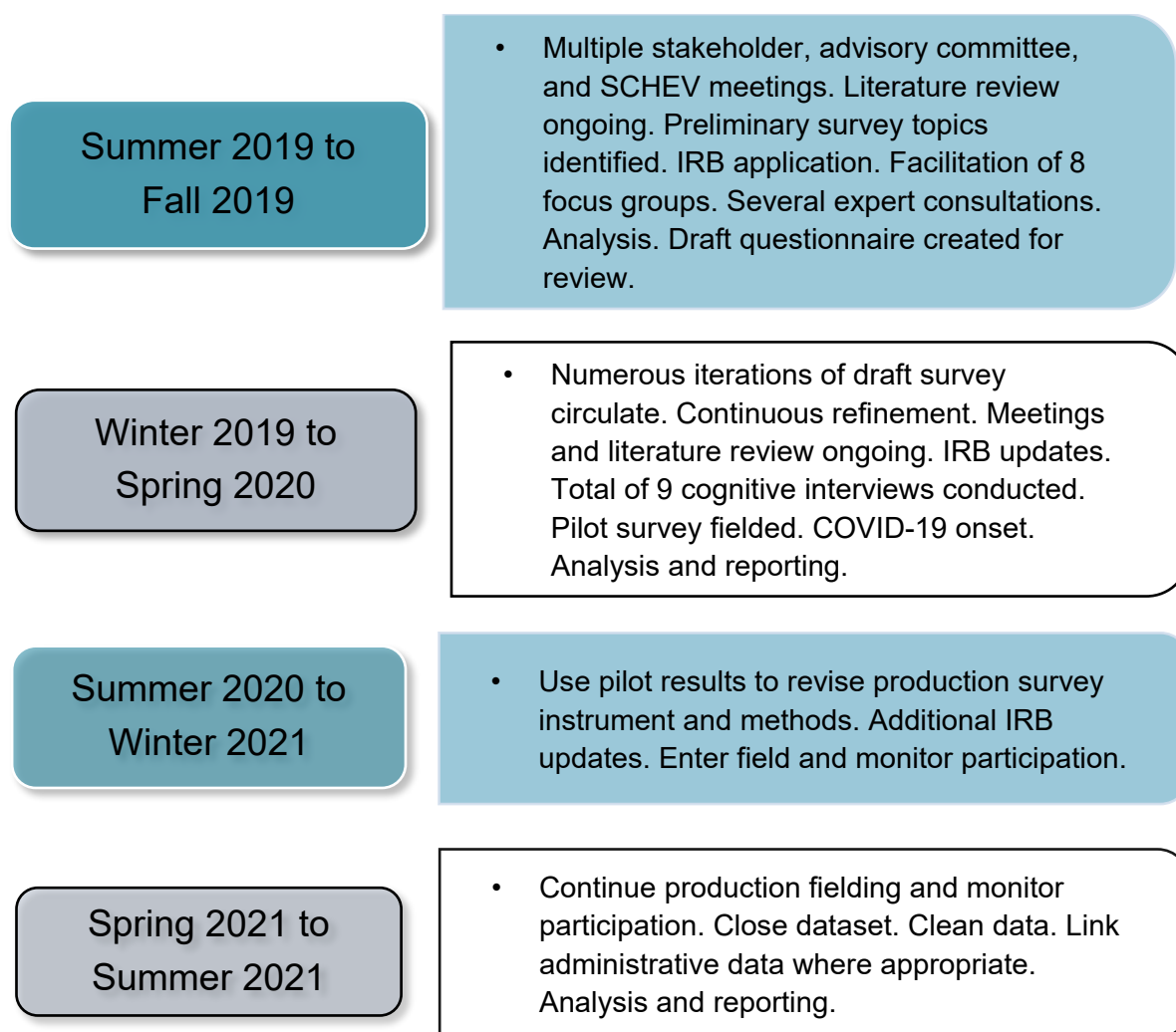
Due to its complexity and scope, the project followed a multistage process (see Figure B-1 below).

Figure B-1: Virginia Educated Project Stages



See Figure B-2 and the following text for details of the project’s development process.

Figure B-2: Virginia Educated Project Development Timeline



Funding

After working with the Post-College Outcomes Taskforce formed in spring 2018, SCHEV requested and received an appropriation from the Virginia General Assembly for a research study. SCHEV contracted with SERL in the Wilder School of Government and Public Affairs at VCU to carry out the study, and formed the Data Project Advisory Committee (membership described above). The contract began on July 1, 2019. Funding was later supplemented by Virginia public institutions of higher education, VEDP and SCHEV.

Literature reviews

The SERL project team completed extensive literature reviews. They closely examined studies, surveys, articles, expository papers, and blogs on higher education – covering topics such as the

college “value proposition” and “earnings premium,” as well as outcomes such as employment, general education, wages, and civic engagement. They investigated methodological recommendations, too, such as question wording and question layout. References spanned (this list is not exhaustive):

1. BRFSS (National Center for Chronic Disease Prevention and Health Promotion, 2018)
2. H.L. Chen et al.’s *Designing the Pathways of Engineering Alumni Research Study* (PEARS; 2012)
3. The Corporate Finance Institution’s (n.d.) conceptualizations of underemployment, among several others
4. Gallup Blogs (Busteed, 2016; Busteed & Auter, 2018; Gallup, Inc., 2015; Pulsipher, 2019; T. Tran, 2018)
5. The Gallup, Inc. and Purdue University Index (2014)
6. Harvard Magazine’s commentary on general education – *General Education, Finally Defined* (2007)
7. NSSE (see general description, Indiana University Center for Postsecondary Research, 2019)
8. Strada Education Network and Gallup, Inc.’s *From College to Life: Relevance and the Value of Higher Education* (2018)
9. The U.S. BLS Employment Projections program (see updated estimates for 2019/2029)
10. The U.S. BLS’ *Industries by Supersector and North American Industry Classification System* (NAICS; 2021)
11. The U.S. Census Bureau’s *CPS Volunteering and Civic Life Supplement* (2017)
12. The U.S. Federal Reserve’s 2018 *Survey of Household Economics and Decision-Making* (SHED; 2019)
13. The *Satisfaction with Life Scale* developed by Diener et al. (SWLS; 1985)
14. A predictive underemployment pilot study conducted among tens of thousands of VCU undergraduate alumni (Kiefer et al., 2019)
15. A special model of underemployment and earnings predictors generated by VEDP (personal communication, April 29, 2019)
16. Modified, abbreviated alcohol and tobacco use questions inspired by the BRFSS, the *National Survey on Drug Use and Health* (NSDUH), and the National Institute on Alcohol Abuse and Alcoholism (see NIAAA’s *National Epidemiologic Survey on Alcohol and Related Conditions-III*; NESARC-III; n.d.)
17. Multiple institution-specific surveys (e.g., Norfolk State University, Old Dominion University, University of Massachusetts-Amherst, University of Pennsylvania, University of Wisconsin-Madison, West Virginia Higher Education Policy Commission)

Focus groups

While high-level conversations and literature reviews continued, in September 2019 SERL convened eight focus groups and two one-on-one interviews across the nine GO Virginia regions in the state. The purpose was to understand higher education issues from graduates' perspectives and learn how graduates think and talk about these issues, so that a good questionnaire could be developed. A total of 44 people participated, and their input influenced the content and operationalization strategy for *Virginia Educated* pilot and production surveys. More than two dozen colleges and universities were represented by focus group attendees and interviewees. Eighty-two percent of the participants were female, roughly 66 percent were White/Caucasian, and 74 percent had taken out student loans at one point or another. The focus groups covered a great deal of ground, but during analysis, themes coalesced around:

1. The utility of hands-on opportunities like internships
2. General education courses – both good and bad experiences
3. College as being much more than the classroom experience
4. Approaching higher education as an investment
5. How the higher education experience varies from one person to another
6. Acknowledging that higher education influences not only employment, but other life domains as well

Details about the focus groups can be found in a report previously furnished to SCHEV in September 2019.

Consultations

Virginia Educated also benefited from numerous consultations with subject matter and technical experts. Potential survey domains, survey questions, and broad issues such as higher education's impact on employment outcomes were discussed with researchers located within VCU, Drexel University, Georgetown University, Harvard University, Northwestern University, the University of California-Berkeley, the University of Michigan, and the University of Pennsylvania. These conversations were frequently arranged by Dr. Stephen Moret of VEDP. Beyond this, SERL reached out to colleagues at AASRO and AAPOR for guidance on methodological concerns like incentives.

Cognitive interviews

With a draft survey taking shape, SERL contracted with Well World Solutions to conduct and analyze cognitive interviews. These were intended to evaluate the overall design, phrasing, flow, comprehension and “cognitive burden” of the instrument among likely respondents. SERL recruited nine individuals who did interviews in mid-December 2019 at locations in Northern Virginia and Richmond. Five of the participants were male (56 percent), and five were White/Caucasian (56 percent); seven (78 percent) had used student loans, and two (22 percent)

had more than one degree. Feedback from the cognitive interviews led to refinement of survey questions about family, employment and underemployment as well as some additional minor changes. After some final conversations with SCHEV and Data Project Advisory Committee members, the pilot phase of the project officially began.

Pilot survey

The *Virginia Educated* pilot survey was an important milestone. It went into the field in March 2020 to a probability-based sample of 3,648 graduates. It had both web-based and mail-based components, and it featured methodological experiments concerning stationery type, envelope type, logo type, letter versus postcard reminders, incentive amounts and cash gift amounts. Pilot data collection continued into May 2020, and analysis concluded by June of 2020. At the end of data collection, there were 1,019 completions, for a response rate of 28 percent. Details about the pilot can be found in a report previously furnished to SCHEV in June 2020.

Instrument updates

Based on pilot findings, SERL modified certain survey questions and answer choices ahead of production. They added a few new items like a COVID-19 impact matrix, and they converted some of the pilot's open-ended questions to close-ended questions, after looking closely at pilot data. For instance:

Pilot question: Why did you come to Virginia for your undergraduate education? (Write-in)

Intervening steps: code pilot answers, assess frequencies of pilot answers to generate a closed-ended list of responses for the production survey

Production question: Why did you come to Virginia for your undergraduate education? Select all that apply.

Answer choices, based on pilot analysis:

- Academic reputation: specific school
- Academic reputation: Virginia overall
- Athletic opportunity/Athletic scholarship
- Best fit for me
- Best overall value or choice
- Campus tour
- Change of scenery
- Distance to/from home
- Familiar with/Just liked the area or town
- Financial aid package/Grants/Scholarships
- Out of pocket cost of attending
- Specific major or field of study available
- Other, Write in:

Further revisions to the instrument, procedural modifications per the pilot's experimental conditions outcomes, and numerous rounds of beta testing within SERL occurred before the survey went live, as described below.

Production survey

Project timeline

Due to the amount of time required to develop the pilot instrument, as well as delays associated with COVID-19, SCHEV and VCU agreed to move the project's deadline to June 30, 2021. This extension meant that the production survey launched in early December 2020. Data collection and coding occurred throughout the early months of 2021. Data collection closed on April 28, 2021 for the email-only census (see below) and May 17, 2021 for the probability sample (see below). Analysis, secondary data linkage, and report-writing activities took place in the spring and summer of 2021, with project administrative closeout tasks winding down in October 2021.

Dimensions covered by Virginia Educated

The *Virginia Educated* survey collected data in seven main dimensions directly from graduates:

1. Demographics – including status while an undergraduate student (full-time or part-time, transfer student); additional degrees and credentials obtained; most selective institution applied to; gender; age; race/ethnicity; relationship status; caretaking status currently and during undergraduate education; number of friends from undergraduate education still in direct contact with; first-generation college student status; current residence; rent or own housing; personal and household income; household size.
2. Undergraduate experience and impacts – including satisfaction with various aspects and outcomes of the undergraduate experience; primary reason for starting their undergraduate education; opinions and experiences regarding general education, internships, mentoring, extracurricular activities, job preparation; ways in which they feel successful (or not); employment during undergraduate education; overall impacts of their undergraduate education on their lives; advice they would give undergraduates today.
3. Student debt – including whether they had any debt after their undergraduate education; any debt for any other education; types of debt; how much of a problem paying the debt has been; impacts of student debt on aspects of life; current debt status; level of worry about current undergraduate debt; whether the undergraduate education was worth the cost.
4. Employment – including current employment status; hours worked per week; actively seeking a new job; level of education required to do their job; how closely current job relates to undergraduate field of study; type, industry, number of employees and ZIP code of current primary employer; type of occupation and job title; benefits offered in the primary job; opinions about the primary job; underemployment (malemployment); years of full-time work experience; satisfaction with career progress; and entrepreneurship.
5. Residence and mobility – including residence prior to starting undergraduate education; change in residence after graduating; reasons for relocating; willingness at time of graduation to relocate for a job.
6. Community engagement – including volunteering; donating time or money; voting; interacting with elected officials; attending public meetings or demonstrations, or supporting or avoiding businesses for political or social reasons; and impacts of undergraduate education on engaging with other people.
7. Health and well-being – including overall ratings of physical and mental health; use of alcohol and tobacco in the past 30 days; impacts of COVID-19 on various life aspects; ratings of satisfaction with several aspects of life.

Study population

The study population was 499,665 graduates who earned an undergraduate credential (certificate, associate degree, bachelor's degree) from a Virginia state-supported institution of higher education between 2007 and 2018.

SCHEV maintains the authoritative list of graduates from Virginia institutions of higher education, but contact information had to be obtained using a commercial address matching service. Mailing addresses were obtained for about 60 percent of the graduates. Email addresses were obtained for about 20 percent of the entire list (this was about 30 percent of those with mailing addresses). Graduates with contact information formed the core of the sample for the production survey. A sample of 4,021 graduates with no contact information was included in the production survey sample after their mailing addresses were manually looked up online. This allows the survey findings to be projected to the full population of nearly one-half million recent undergraduates.

Production survey design

The main focus of the production survey was a probability-based sample of 50,495 graduates. The probability-based sample was supplemented by a full "census" of all 52,173 graduates with email addresses on file who were not selected into the probability-based sample.

The production survey was conducted from December 15, 2020 to May 17, 2021. The survey was primarily a web-based survey. Paper questionnaires were proactively offered to a small subsample of cases in the probability-based sample, and any graduate in the probability-based sample could return a postage-paid postcard to SERL to request a paper questionnaire.

Paper questionnaires were not offered to graduates in the email-only census.

For cost reasons, graduates in the email-only supplement were contacted only by email. Up to five emails were sent to these persons. Those who completed the survey were given a \$10 electronic gift card (unless they opted out) and entered into the same 32 drawings for gift cards ranging from \$50 to \$250 (unless they opted out).

Production survey special preparations

SERL employed several strategies to prepare the *Virginia Educated* production probability sample. Ahead of the sample draw, project team members drew a random sample of 6,000 graduates without any contact information (3,000 graduates who were in-state students, and 3,000 who were out-of-state students). The SERL Data Entry Team conducted manual AlumniFinder online searches on 5,350 these cases, finding mailing information for 4,021 of them. The purpose of this effort was to test for sampling bias (i.e., did responses from cases without contact information systematically differ – or not – from cases with contact information).

There were 801 respondents from within this subsample, and they did not appear to differ meaningfully from those with contact information.

It is helpful to point out that AlumniFinder is a paid service that aggregates information from public records and commercially available information. No data subject to the Gramm-Leach-Bliley Act or the Federal Drivers' Privacy Protection Act is made available by AlumniFinder.

Importantly as well, use of AlumniFinder was approved through multiple VCU administrative channels in the months prior to production launch. Moreover, anyone at SERL executing searches signed the project's Restricted Use Data Agreement (RUDA) and Non-Disclosure Agreement (NDA) prior to logging in; the Principal Investigator also regularly reviewed AlumniFinder usage and imposed search fee spending limits before use began.

Other sample preparation steps involved de-duplicating cases in SCHEV's master list (completed before the pilot) and also refreshing mailing addresses for cases with postal addresses. As in the pilot, SERL collaborated with its production printing/mailing vendor to update addresses via the National Change of Address (NCOA) module and the Coding Accuracy Support System (CASS). Using NCOA and CASS beforehand limited the likelihood of undeliverable mail and wasted postage costs throughout the probability sample contact protocol (see more information below). NCOA-CASS updates prior to production survey launch revealed:

- 20,445 address revisions
- 1,023 undeliverable records
- 755 deceased records

Although the team would have preferred to cross-reference sampling frame data to the National Death Index as well – as recommended in the pilot survey report – this would have involved significant time and financial outlays. Also, staff did not batch-refresh email addresses prior to production distribution due to projected budget impacts. However, the print and mail vendor for the production survey used their mailing software to review and update postal mailing addresses before sending the survey letters.

Probability-based sampling

Having completed these preparations, SERL refined Statistical Package for the Social Sciences (SPSS) syntax from the pilot to pull a disproportionately stratified sample of 50,495 cases (not including five quality control cases “seeded” later into the mailing list). The probability-based sample was designed to represent the study population of 499,665 people who received an undergraduate credential from a Virginia state-supported institution between 2007 and 2018, while ensuring enough completed survey cases in key subgroups to support some comparative analyses.

To enhance representation among four-year institutions, SERL condensed 23 community colleges into six groups using principles established by the VCCS. These community college

groups were to be treated like individual institutions for sampling and analysis. SERL excluded from the production sample sampling frame anyone who had been invited to participate in earlier stages of the *Virginia Educated* research process – meaning focus groups, cognitive interviews, or the pilot survey.

The population for the production survey was reduced to 476,122 individuals by excluding those who had been invited to participate in earlier stages of the project. Graduates who were known to be deceased from automated checks of the mailing addresses were also excluded from the population for the production survey.

The main sampling frame for the production survey was 254,585 graduates with a mailing address. From this frame, 46,474 graduates were selected. A secondary sampling frame was 221,537 graduates without a mailing address. From this frame – as noted above – the 3,000 in-state graduates and 3,000 out-of-state graduates were randomly selected for individual online lookups to try to find mailing addresses using AlumniFinder. Ultimately 4,021 graduates for whom contact information could be obtained were added to the probability-based sample (see above). Thus, the total sample size for the probability-based sample was 50,495.

The sample of 46,474 cases with contact information was disproportionately stratified – that is, some groups were intentionally oversampled to ensure adequate representation of those participants’ experiences in the results. The following strata were used:

1. Institutions (community colleges were grouped by enrollment into six institution-equivalent strata to facilitate sampling and analysis)
2. Discipline groups (areas of study)
3. Race/ethnicity (non-Hispanic Black/African-American or not)
4. In-state/out-of-state at time of enrollment
5. Email/no email address present on the graduate’s case

The sample of 46,474 graduates was allocated in four steps:

1. Census of Trades graduates: All graduates with a credential in the trades were selected to ensure as much representation as possible for this small subgroup.
2. Census of small institutions: All graduates were selected at the three smallest institutions – Richard Bland College, Virginia Military Institution, and the University of Virginia at Wise – to ensure as much representation as possible for them.
3. non-Hispanic Black/African-American oversample: After setting targets for the total remaining sample size for each institution or community college grouping, non-Hispanic Black/African-American students were oversampled within institutions or community college groupings, resulting in representation overall that was increased from 14 percent in the sampling frame to 21 percent in the sample. At the institution level, if the number of non-Hispanic Black/African-American graduates was 460 or less, all non-Hispanic Black/African-American graduates were selected. If it was greater than 460, non-

Hispanic Black/African-American graduates were sampled normally within that institution. This sampling step included oversamples of out-of-state students; those with emails; and slight oversamples of those in business and communication, education, health professions, and STEM disciplines (with slight undersampling in the two largest categories: liberal arts, and psychology and social sciences).

4. Remaining sample: After revising the targets for the total remaining sample size for each institution or community college grouping, the students who were not non-Hispanic Black/African-American were sampled within each institution. As in the non-Hispanic Black/African-American oversample, this sampling step included oversamples of out-of-state students; those with emails; and slight oversamples of those in business and communication, education, health professions, and STEM disciplines (with slight undersampling in the two largest categories: liberal arts, and psychology and social sciences).

Email-only census list

Beyond this probability sample, the production stage of *Virginia Educated* also included a census of graduates with email addresses who were not selected into the probability sample. Reaching out to this email-only group not only was a convenient and inexpensive way to supplement completions in the probability sample, it also provided an opportunity to “soft launch” the web-based survey to a small subsample of the email-only list prior to launching the larger-scale probability sample.

The total number of cases in the email census was 52,173 after removing 713 duplicate emails and two invalidly formed email addresses from the original list. The cases were divided into 105 replicates – small equivalent subsamples – of about 500 emails each. Each replicate went through an email-only contact sequence documented below.

See Figure B-3 through Figure B-5 for maps showing where the cases for the probability-based sample and the email-only census were geographically located.

Figure B-3: Virginia Educated Geographic Concentration, Probability-Based Sample and Email-Only Census, by State

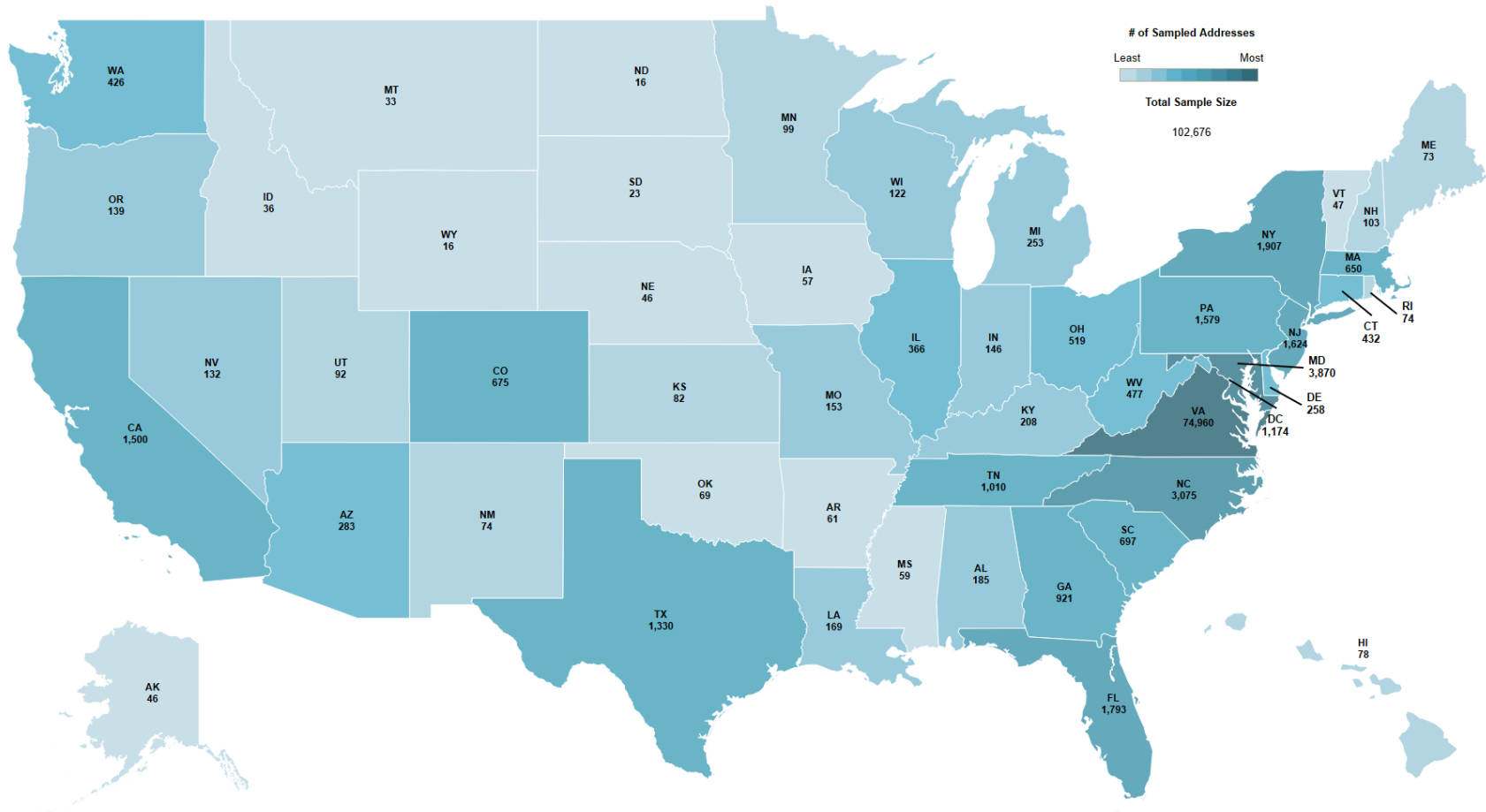


Figure B-4: Virginia Educated Geographic Concentration, Probability-Based Sample and Email-Only Census, Virginia Only

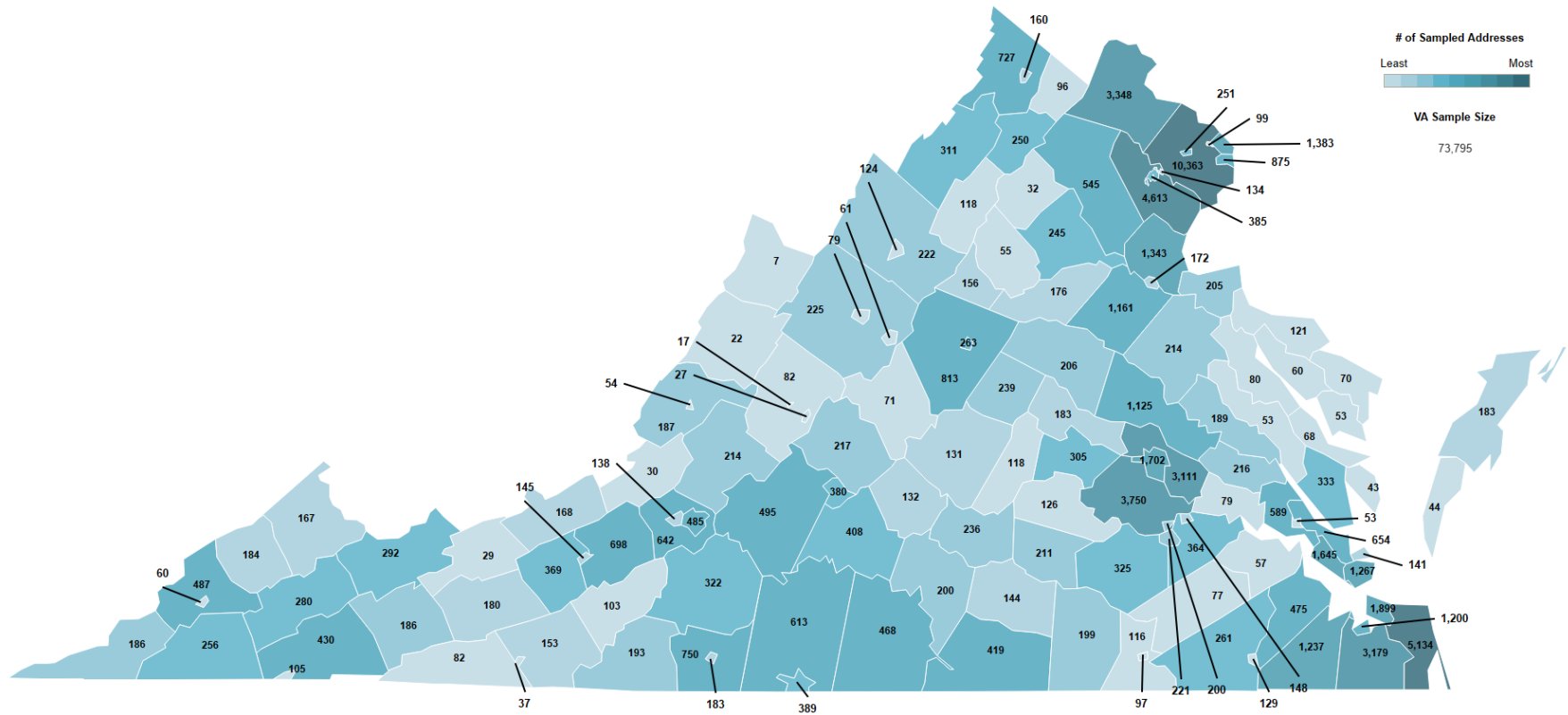
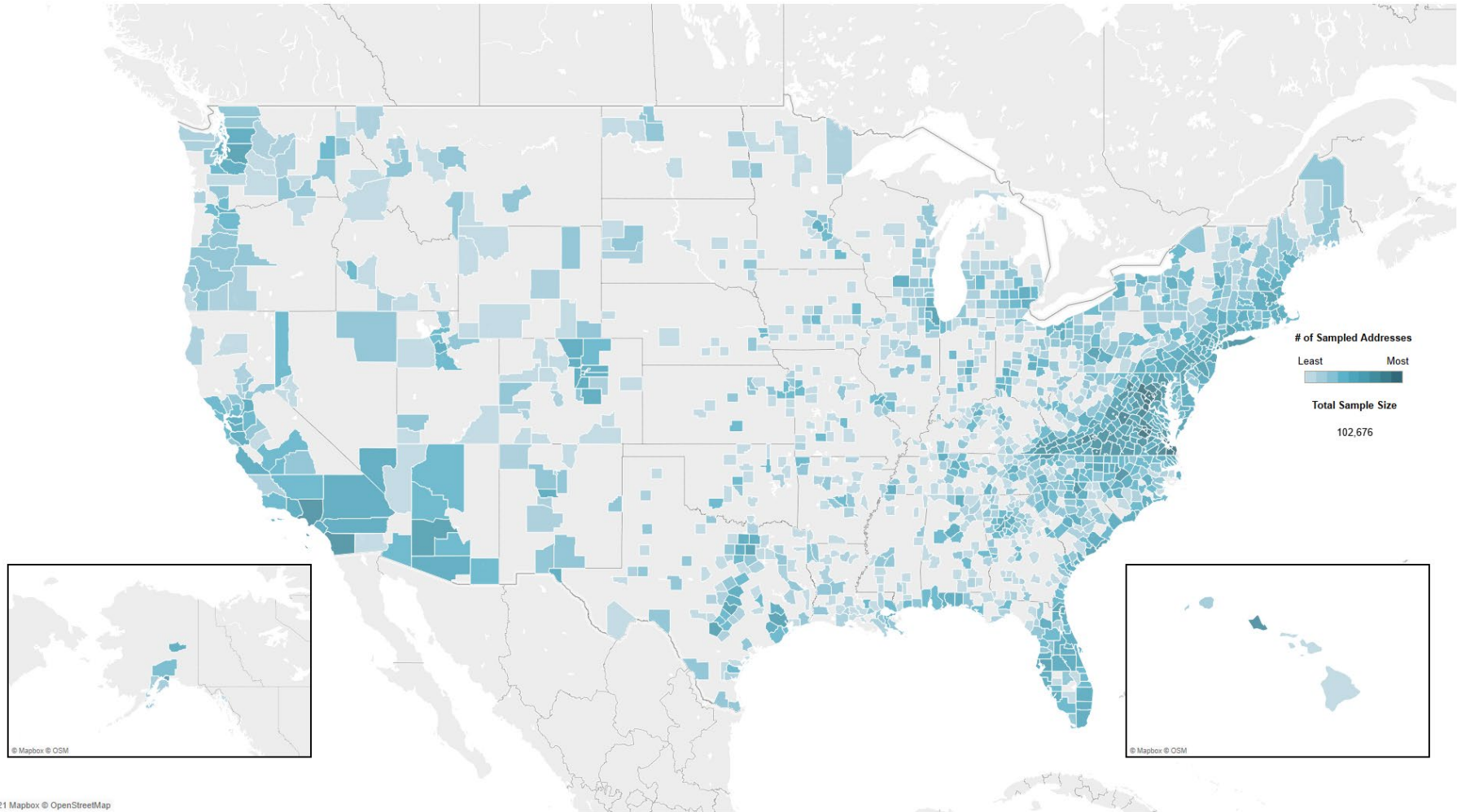


Figure B-5: Virginia Educated Geographic Concentration, Probability-Based Sample and Email-Only Census, by FIPS Code (Locality)



Probability sample contact sequence

Graduates in the probability-based sample were contacted by postal mail up to three times and, where possible, up to five times by email. Due to the large size of the probability sample – and also COVID-19 conditions – the production survey’s three mailings were printed off-site and mailed by a third-party vendor. All three mailings traveled with first-class postage and Richmond postmarks (see Table B-1).

Examples of all contact materials can be found at the end of this appendix.

The first mailing to the probability sample, an advance letter, contained a \$1 bill to raise interest in the survey.

The second mailing to the probability sample invited participants to return an enclosed business-reply postage-paid postcard if they wanted to complete the survey by paper, change their contact information, or be removed from the distribution list.

The third mailing to the probability sample served as either a paper survey booklet mailing with a cover letter, or just a final reminder letter. A planned fourth mailing was cancelled because the project was on pace with completions projections, time was running short, and the budget did not support collecting many completions beyond the targeted number due to the promised incentives.

Paper survey booklets were proactively sent in this third mailing to 4,387 sampled graduates who had not already responded by web. In addition, 84 graduates who were not already in the paper booklet sample requested paper booklets.

Each mailing to the probability sample offered access to the web-based version of the survey via internet URL, QR code, or text-back code.

In addition to these three postal contacts, SERL sent as many as five emails to probability sample cases that had email addresses (even though these cases were about 20 percent of the full master list and about 30 percent of those with contact information, they were about 35 percent of the probability sample because they were oversampled somewhat). These emails contained individualized clickable Qualtrics survey links. The timing of the emails varied across weekdays, weekends, and times of day. Each email included an unsubscribe link.

Those who completed the survey were given either an electronic or a physical \$10 gift card (unless they opted out). They were also entered into 32 drawings for gift cards ranging from \$50 to \$250 (unless they opted out).

The survey opened on December 15, 2020 with a “soft launch” of a sample of 1,976 email-only cases (described in more detail below). The advance letters for the probability sample were mailed on December 23, 2020.

Most of the graduates who completed the probability sample used the Qualtrics web-based survey. Although graduates were told that data collection would end in mid-April 2021, paper

survey booklets continued to arrive for several weeks afterward. SERL's Data Entry Team added these into Qualtrics through the first two weeks of May.

Data collection closed on May 17, 2021 for the probability sample.

Table B-1: Summary of Virginia Educated Probability Sample Contact Sequence

Mail Contacts	Email Contacts
<p><u>Advance Letter</u>: with a \$1 bill to cultivate interest in survey</p> <p>n = 50,495; includes 5 quality control cases; sent December 23, 2020</p>	<p>Email sent to probability sample cases with available email addresses</p>
<p><u>Reminder Letter #1</u>: with a postcard to request a paper survey, to change contact information, or to be removed from the distribution list</p> <p>n = 43,402; sent January 29, 2021</p> <p>smaller contact wave reflects survey completions, opt-outs, and undeliverables</p>	<p>n = 26,015 to start; this number declined with each contact wave, due to bouncebacks, opt-outs, and survey completions; includes 5 quality control cases</p> <p>Up to five email contacts possible</p>
<p><u>Paper Survey Packet with Cover Letter</u>: sent to a special group of probability sample cases and to those who specifically requested paper surveys</p> <p>n = 4,387 in special group; sent March 15, 2021</p> <p>n = 84 by request; sent April 1, 2021</p> <p><u>or Reminder Letter #2</u>: the final mailing</p> <p>n = 31,637; sent March 26, 2021</p> <p>smaller contact wave reflects survey completions, opt-outs, and undeliverables</p>	<p><u>Scheduled in-between mailings at varying times of day</u>:</p> <p>December 30, 2020 (14,650 working emails)</p> <p>January 2, 2021 (13,793 working emails)</p> <p>February 10, 2021 (11,803 working emails)</p> <p>April 7, 2021 (11,033 working emails)</p> <p>April 11, 2021 (10,883 working emails)</p>
<p>Advertised survey close date: April 16, 2021</p> <p>Paper survey data entry completed: May 14, 2021</p> <p>Final survey close date: May 17, 2021</p> <p>Total Completions: 13,294 Response Rate: 26.3 percent</p> <p>Persistence rate (those who started the survey went on to complete it): 91 percent</p> <p>Median time to completion: 32.4 minutes</p> <p>Secondary data linkage consent: 68.6 percent</p>	

Table B-2: Contacts at a Glance, Virginia Educated Probability Sample

Virginia Educated contacts at-a-glance, **probability sample:**

in the field December 23, 2020 to May 17, 2021

130,005 pieces of mail were sent across 3 major mailings and 1 small adjunct mailing
up to 5 email reminders were sent to persons in the probability sample with email addresses
a total of **62,162** emails were sent to working email addresses:
this is a duplicated number; average email distribution size was 12,432 working addresses

Gift card fulfillment (as of September 30, 2021)

8,660 \$10 *electronic* gift cards were requested

7,636 \$10 *electronic* gift cards were delivered *and* claimed

of those, 246 *electronic* gift cards were donated to charitable causes

4,249 \$10 Target gift cards were requested

4,219 \$10 Target gift cards were mailed

there were 348 gift card opt-outs

Result: 13,294 total completions, for a response rate of 26.3 percent

Email-only census contact sequence

As mentioned previously, SERL also prepared *Virginia Educated* survey invitations by email only for cases in the SCHEV master file with email addresses who were not included in the probability-based sample. Five important differences distinguished these email-only cases, most of which are alluded to elsewhere. First, they were handled via replicates – meaning that only small groups of email cases were asked to take the survey before other small groups of email cases were contacted. Second, for cost reasons these cases received solely email communications about the survey; they did not also get advance/reminder letters or postcards (they also had unsubscribe links in all messages). Third, these individuals were offered only the web-based version of survey; SERL did not present them with the paper questionnaire unless they specifically requested it (none did). Fourth, these individuals did not get the \$1 upfront incentive that accompanied the original protocol’s advance letter. Fifth, they could claim their \$10 gift card in electronic form only.

Replicate arrangements for the email-only group allowed the project team to conduct a “soft launch” of the web survey, beginning in mid-December 2020 (n = 1,976 persons in the email-only group plus three quality control cases), ahead of the probability sample. Replicates also helped staff manage email traffic and maintain security and quality control.

Replicates were released for contact in groups, in succession, to assess the email-only response rate and ensure that the project would stay within the budget for incentive fulfillment.

Ultimately, however, all of the replicates were invited to do the survey.

Each replicate went through an email-only contact sequence (documented below) and completed a version of the Qualtrics survey at a URL that was separate from the probability-based sample's Qualtrics survey URL. Up to five emails were sent to these persons at different days and times. Those who completed the survey were given a \$10 electronic gift card (unless they opted out) and entered into the same 32 drawings for gift cards ranging from \$50 to \$250 (unless they opted out).

See Table B-3 for additional details.

Table B-3: Summary of Virginia Educated Email-Only Contact Sequence

Email Contacts	Replicate Size and Succession
<p>Sent to all cases with email addresses not already in the probability sample</p> <p>n = 52,173, plus 3 quality control cases</p> <p>Issued in replicates – meaning small groups</p> <p>Each replicate received five email contacts; times of day varied</p> <p>Contact waves diminished within replicates, due to bouncebacks, opt-outs, and completions</p> <p>Email-only group ran concurrent with probability sample</p>	<p><u>Replicates 1-4:</u> n = 1,976; launched December 15, 2020 “Soft launch” Last contact sent: January 11, 2021</p> <p><u>Replicates 5-14 & 201:</u> n = 5,888; launched January 15, 2021 Last contact sent: February 6, 2021</p> <p><u>Replicates 15-65:</u> n = 25,127; launched February 24, 2021 Last contact sent: March 16, 2021</p> <p><u>Replicates 66-104:</u> n = 19,182; launched March 22, 2021 Last contact sent: April 11, 2021</p>
<p style="text-align: center;">Email-only survey deactivation date: April 28, 2021</p> <p style="text-align: center;">Total Completions: 2,054 Response Rate: 3.94 percent</p> <p style="text-align: center;">Persistence rate (those who started the survey went on to complete it): 74.1 percent Median time to completion: 32.1 minutes Secondary data linkage consent: 68.6 percent</p>	

Table B-4: Contacts at a Glance, Virginia Educated Probability Sample*Virginia Educated* contacts at-a-glance, **email-only group:**

in the field December 15, 2020 to April 28, 2021

for persons *not* already in the probability sample

email census was divided into 105 replicates, or small batches

105 replicates were allocated across 4 waves

each wave received up to 5 email contacts

a total of **220,448** emails were sent to working email addresses:

this is a duplicated number; average email distribution size was 11,022 working addresses

Gift card fulfillment (as of September 30, 2021)

1,965 \$10 *electronic* gift cards were requested

1,752 \$10 *electronic* gift cards were delivered *and* claimed

of those, **27** *electronic* gift cards were donated to charitable causes

5 \$10 Target gift cards were requested

5 \$10 Target gift cards were mailed

there were 73 gift card opt-outs

Result: 2,054 total completions, for a response rate of 3.9 percent

Response rates

After the dataset closed and final quality control reviews were implemented, there were 13,294 completed surveys out of 50,495 cases in the probability-based survey, and 2,054 completed surveys out of 52,173 cases in the email-only supplement. AAPOR provides standard definitions and calculations for survey response rates. For surveys of known persons, such as *Virginia Educated*, undeliverable mail or email addresses still count in the survey response rate calculation. Only individuals known to be deceased before the start of the data collection period are excluded from the response rate calculation. Although, sadly, SERL did learn of some recent graduates who had passed away, we have chosen to include all cases in the original sample in the denomination of the response rate calculations for the sake of simplicity and clarity.

Using this approach, the response rate for the probability sample was 26.3 percent (the analysis from the pilot survey methods experiments had predicted a yield of 13,061 completions with a response rate of 25.9 percent). The response rate for the email-only supplement was 3.9 percent.

On the web, the median time to complete the survey was 32.4 minutes in the probability-based sample and 32.1 minutes in the email-only census. Ninety-one percent of those in the probability-based sample who started the survey on the web completed it and 74 percent of those in the email-only census did so. In addition, 68.4 percent of those who completed the survey in

the probability sample agreed to have their survey responses linked to their secondary data, and 68.6 percent of those in the email-only census did so.

For a survey of this length, the rates of abandonment were low and the rates of agreement to data linkage were favorable. This most likely reflects the time invested by the research team and Data Project Advisory Committee in developing the questionnaire and administrative protocol, as well as the incentives that were offered.

Response rates varied by institution, from a high of 34.8 percent (W&M) to a low of 19.1 percent (Virginia State University). The numbers of completed surveys varied by institution, partly as a result of different response rates, but mainly due to smaller institutions not having a lot of graduates to invite into the survey. Richard Bland College, the University of Virginia's College at Wise and Virginia Military Institute were significantly smaller than the other institutions in the survey. All of their graduates were included in the probability sample.

Table B-5 shows information about survey response and response rates.

Table B-5: Response Rates Overall and by Institution

Institutions	Population N	Sampling frame size (excludes no-contact lookup cases)	Probability sample size (incl. non-contact lookups) ^a	Probability sample respondents	Probability sample response rate	Email-only supplement size ^b	Email-only supplement respondents	Email-only supplement response rate	Total Respondents
Total	499,665	254,585	50,495	13,294	26.33%	52,175	2,054	3.94%	15,348
1 Group I (Smallest 4 CCs)	7,290	3,412	2,198	496	22.6%	126	4	3.2%	500
2 Group II (Small 9 CCs)	43,806	22,468	2,583	577	22.3%	6,482	199	3.1%	776
3 Group III (Medium 6 CCs)	36,770	19,629	2,504	623	24.9%	5,219	210	4.0%	833
4 Group IV (Large 2 CCs)	16,924	9,927	2,287	583	25.5%	2,573	96	3.7%	679
5 Group V (Tidewater CC)	27,236	15,762	2,452	604	24.6%	5,392	164	3.0%	768
7 Group VII (Northern Va CC)	38,858	20,311	2,527	675	26.7%	6,244	208	3.3%	883
231712 Christopher Newport University	9,530	4,561	2,224	696	31.3%	104	6	5.8%	702
232186 George Mason University	45,377	23,761	2,709	688	25.4%	6,049	241	4.0%	929
232423 James Madison University	36,754	18,885	2,753	764	27.75%	3,587	159	4.43%	923
232566 Longwood University	7,951	4,340	2,210	669	30.27%	273	9	3.30%	678
232681 University of Mary Washington	9,300	4,834	2,243	740	32.99%	516	26	5.04%	766
232937 Norfolk State University	8,326	4,230	2,234	452	20.23%	993	33	3.32%	485
232982 Old Dominion University	33,853	18,873	2,572	676	26.28%	4,819	245	5.08%	921
233277 Radford University	17,584	9,281	2,324	601	25.86%	1,500	70	4.67%	671
233338 Richard Bland College ^{a,b}	1,431	777	784	162	20.66%	3	0	0.00%	162
233897 UVa College at Wise ^{a,b}	2,756	1,415	1,426	379	26.58%	6	1	16.67%	380
233921 Virginia Tech	51,248	23,324	2,898	833	28.74%	1,868	71	3.80%	904
234030 Virginia Commonwealth University	43,056	19,629	2,618	649	24.79%	3,631	156	4.30%	805
234076 University of Virginia	36,153	17,996	2,781	811	29.16%	2,379	132	5.55%	943
234085 Virginia Military Institute ^b	3,603	1,452	1,518	351	23.12%	0	0	--	351
234155 Virginia State University	7,523	2,884	2,258	432	19.13%	36	1	2.78%	433
231624 William & Mary	14,336	6,834	2,392	833	34.8%	375	23	6.1%	856

^a - For schools where 100% of available cases with contact information were sampled, sample sizes can be larger than frame size because no-contact cases that were successfully looked up were added to the sample.

^b - A small number of cases that started out in the probability survey sampling frame -- because they had mailing addresses -- had their mailing information invalidated after the mailing list was updated. If they had email addresses, they were included in the email-only supplement. That is why two of the three institutions that were censused in the probability sample have small numbers of cases in the email-only supplement. The email-only supplement ordinarily included only cases left over from the probability sampling -- and there should be no such cases for institutions that were censused

Combining data

A review of the survey data and demographics among the different sampling strata and across the probability-based sample and the email-only census supported the decision to combine all of the completed surveys and treat them as one sample from the full study population for weighting and analysis purposes.

Weighting

As is often done in surveys, the final *Virginia Educated* dataset was weighted to account for differential response by subgroups as well as disproportionate stratified sampling. These adjustments reduce biases in overall survey statistics to the extent that survey responses differ systematically by the criterion variables used in the weighting. The weighting also provides confidence that the survey estimates are based on a weighted dataset that looks like the whole population of interest.

The weight for each case is a number that is used in statistical calculations in place of the implied weighting value of one for every case in an unweighted dataset. Weights that are greater than a value of one indicate cases that are underrepresented in the unweighted dataset. Weights that are less than a value of one indicate cases that are overrepresented in the unweighted dataset. The weighted count of cases in any category in the analysis is the sum of the weights for the cases in that category.

As described earlier, the population for the production survey was a subset of the total study population – about 4.6 percent of the total study population was excluded the production survey sampling frame because they had already been invited to focus groups, cognitive interviews or the pilot survey, or were known to be deceased. Also, the sampling frame for the production survey was sampled more heavily among some groups than others. For example, graduates with email addresses had a 100 percent chance of being included in the survey, either because they were sampled into the probability-based survey or they were subsequently assigned to the email-only survey with certainty. More than 18 percent of graduates with postal addresses were included in the production survey sample, compared to about 1.8 percent of those without postal addresses. In addition, oversamples were created for non-Hispanic Black/African-American, out-of-state, and emailable graduates.

Ordinarily, a weighting scheme would include steps to address different rates of sampling among groups and among different frames. However, a comparison of substantive survey responses across these different sampling groups did not identify meaningful differences. Furthermore, the demographics of those excluded from the sampling frame for the production survey were not markedly different from those who were included. Therefore, in the weighting process, the demographics of the completed surveys were compared directly to the demographics of the criterion population without regard to the different sampling proportions used among the

different sampling frames. In addition, the criterion population was defined to be the total study population of 499,665 graduates.

The dataset was weighted in several steps using a technique called raking (or iterative proportional fitting). The criterion variables used in the weighting were:

1. Institution/Community college grouping
2. Race (non-Hispanic Black/African-American or not)
3. Gender
4. Email status (had address/no address)
5. Domicile (in-state/out-of-state student at time of enrollment)
6. Discipline group (field of study)

First, within each institution or community college grouping, the responses were adjusted for race. These weights were modified proportionately so that they added to the total unweighted number of cases within each institution or community college grouping. Then these weights were applied to the dataset.

The weighted file was then adjusted for gender within each institution or community college grouping. These weights were varied proportionately so that they added to the total unweighted number of cases within each institution or community college grouping. These new weights now combined the adjustments for race and gender. Then the new weights were applied to the dataset.

The same steps were executed for status, domicile and discipline group. At each stage, the prior weighting was combined with the new adjustments.

This cycle was repeated seven times, with each iteration bringing the weighted cases closer and closer to the criterion values of the five weighting variables within institution.

After seven iterations, extreme outlying weighting values (below 0.10 and above 3.0) were trimmed to be no less than 0.10 and no greater than 3.0. The trimmed weights were adjusted to sum to the unweighted number of cases within each institution or community college grouping.

Then a constant factor within each institution was applied to the weights to create a separate weight that summed to the full population found within each institution or community college grouping.

These weights adjusted the survey completions within each institution or community college grouping to match the population proportions and numbers for the five criterion variables. They also preserved the oversampling of smaller schools, so that statistical tests could be based on the full oversample numbers.

The institution-based weights can contain biases in the overall totals if respondents from different institutions answered survey questions differently from one another and they are not represented in the weighted data in the same proportions they account for in the population.

Therefore, one more pair of weights was created to adjust the weighted number of responses by institution.

The four weighting variables were added to the survey dataset for use in analysis.

Table B-6 shows the impact of weighting by institution.

Table B-6: Population, Frame, Sample, Unweighted Responses and Weighted Responses for Criterion Demographic Variables by Institution

Table shows percentages within institution		Total	Comm Coll Group 1 (Smallest 4 CCs)	Comm Coll Group 2 (Small 9 CCs)	Comm Coll Group 3 (Medium 6 CCs)	Comm Coll Group 4 (Large 2 CCs)	Comm Coll Group 5 (Tidewater CC)	Comm Coll Group 7 (Northern Va CC)	Christopher Newport University	George Mason University	James Madison University	Longwood University	University of Mary Washington	Norfolk State University	Old Dominion University	Radford University	Richard Bland College	University of Virginia's College at Wise	Virginia Tech	Virginia Commonwealth University	University of Virginia	Virginia Military Institute	Virginia State University	William & Mary
Race																								
Black	Pop.	14.6	16.3	17.8	13.2	27.0	29.6	14.3	7.4	8.5	3.6	5.8	5.0	77.6	20.1	7.3	25.5	7.6	3.5	17.0	7.0	4.4	81.4	6.3
	Frame	14.4	15.4	16.6	13.0	27.0	29.2	14.2	7.1	8.3	3.4	5.1	4.8	76.9	18.7	6.5	24.7	6.2	3.3	17.2	6.9	4.7	81.2	6.1
	Sample	21.3	22.5	22.9	18.5	32.0	33.1	17.5	13.2	11.8	8.4	9.1	8.4	77.0	23.4	13.7	24.1	6.0	10.2	21.9	13.4	4.8	78.6	14.6
	Unwtd.	18.4	19.4	19.3	16.8	24.9	25.3	14.9	12.0	15.0	11.7	9.7	8.4	73.0	18.3	16.1	20.4	4.2	11.0	16.8	10.9	4.3	76.9	13.8
	Wtd.	15.9	16.3	17.8	13.2	27.0	29.6	14.3	7.4	8.5	3.6	5.8	5.0	77.6	20.1	7.3	25.5	7.6	3.5	17.0	7.0	4.4	81.4	6.3
Non-Black	Pop.	85.4	83.7	82.2	86.8	73.0	70.4	85.7	92.6	91.5	96.4	94.2	95.0	22.4	79.9	92.7	74.5	92.4	96.5	83.0	93.0	95.6	18.6	93.7
	Frame	85.6	84.6	83.4	87.0	73.0	70.8	85.8	92.9	91.7	96.6	94.9	95.2	23.1	81.3	93.5	75.3	93.8	96.7	82.8	93.1	95.3	18.8	93.9
	Sample	78.7	77.5	77.1	81.5	68.0	66.9	82.5	86.8	88.2	91.6	90.9	91.6	23.0	76.6	86.3	75.9	94.0	89.8	78.1	86.6	95.2	21.4	85.4
	Unwtd.	81.6	80.6	80.7	83.2	75.1	74.7	85.1	88.0	85.0	88.3	90.3	91.6	27.0	81.7	83.9	79.6	95.8	89.0	83.2	89.1	95.7	23.1	86.2
	Wtd.	84.1	83.7	82.2	86.8	73.0	70.4	85.7	92.6	91.5	96.4	94.2	95.0	22.4	79.9	92.7	74.5	92.4	96.5	83.0	93.0	95.6	18.6	93.7
Email																								
No email	Pop.	83.1	78.1	77.8	79.1	77.2	75.7	80.7	85.8	82.6	86.5	84.6	84.7	76.0	81.7	85.4	75.8	84.7	89.4	85.0	90.1	90.5	76.8	89.0
	Frame	69.4	63.5	62.1	64.7	63.5	59.6	64.2	73.7	68.4	74.9	72.9	72.3	55.3	68.4	73.7	58.8	72.3	79.8	70.8	80.8	79.1	54.0	78.7
	Sample	32.0	61.4	17.9	21.0	29.0	19.9	18.7	62.4	19.4	29.3	54.9	54.6	41.8	21.7	39.9	60.1	73.5	41.0	27.9	35.0	85.6	59.5	55.9
	Unwtd.	55.0	62.8	47.0	45.6	51.5	48.3	45.5	65.1	45.7	55.4	59.1	64.0	52.8	43.2	56.9	59.9	72.4	60.1	52.2	56.8	88.0	57.5	60.5
	Wtd.	83.1	78.1	77.8	79.1	77.2	75.7	80.7	85.8	82.6	86.5	84.6	84.7	76.0	81.7	85.4	75.8	84.7	89.4	85.0	90.1	90.5	76.8	89.0
Have email	Pop.	16.9	21.9	22.2	20.9	22.8	24.3	19.3	14.2	17.4	13.5	15.4	15.3	24.0	18.3	14.6	24.2	15.3	10.6	15.0	9.9	9.5	23.2	11.0
	Frame	30.6	36.5	37.9	35.3	36.5	40.4	35.8	26.3	31.6	25.1	27.1	27.7	44.7	31.6	26.3	41.2	27.7	20.2	29.2	19.2	20.9	46.0	21.3
	Sample	68.0	38.6	82.1	79.0	71.0	80.1	81.3	37.6	80.6	70.7	45.1	45.4	58.2	78.3	60.1	39.9	26.5	59.0	72.1	65.0	14.4	40.5	44.1
	Unwtd.	45.0	37.2	53.0	54.4	48.5	51.7	54.5	34.9	54.3	44.6	40.9	36.0	47.2	56.8	43.1	40.1	27.6	39.9	47.8	43.2	12.0	42.5	39.5
	Wtd.	16.9	21.9	22.2	20.9	22.8	24.3	19.3	14.2	17.4	13.5	15.4	15.3	24.0	18.3	14.6	24.2	15.3	10.6	15.0	9.9	9.5	23.2	11.0

Table shows percentages within institution		Total	Comm Coll Group 1 (Smallest 4 CCs)	Comm Coll Group 2 (Small 9 CCs)	Comm Coll Group 3 (Medium 6 CCs)	Comm Coll Group 4 (Large 2 CCs)	Comm Coll Group 5 (Tidewater CC)	Comm Coll Group 7 (Northern Va CC)	Christopher Newport University	George Mason University	James Madison University	Longwood University	University of Mary Washington	Norfolk State University	Old Dominion University	Radford University	Richard Bland College	University of Virginia's College at Wise	Virginia Tech	Virginia Commonwealth University	University of Virginia	Virginia Military Institute	Virginia State University	William & Mary
Domicile																								
In-state	Pop.	86.5	92.6	98.0	98.4	98.9	96.2	96.8	93.5	86.6	70.9	95.4	84.6	84.0	89.0	93.7	95.9	96.0	73.7	91.2	68.6	57.8	70.2	65.7
	Frame	88.1	92.2	97.9	98.5	99.0	96.7	97.4	93.6	89.6	70.0	96.3	85.2	85.5	90.0	93.9	97.5	96.3	74.9	93.9	72.5	60.4	69.7	67.5
	Sample	82.9	87.4	94.3	95.8	98.0	93.2	94.0	87.5	83.3	65.5	93.9	75.0	80.0	83.1	86.1	97.5	96.1	55.5	82.5	64.3	55.6	49.2	61.5
	Unwtd.	76.4	88.2	83.9	91.7	96.9	83.5	83.4	88.3	66.4	65.3	94.2	72.5	78.1	71.3	83.0	98.8	95.5	61.6	69.9	61.2	60.7	56.1	62.7
	Wtd.	86.1	92.6	98.0	98.4	98.9	96.2	96.8	93.5	86.6	70.9	95.4	84.6	84.0	89.0	93.7	95.9	96.0	73.7	91.2	68.6	57.8	70.2	65.7
Out of state	Pop.	13.5	7.4	2.0	1.6	1.1	3.8	3.2	6.5	13.4	29.1	4.6	15.4	16.0	11.0	6.3	4.1	4.0	26.3	8.8	31.4	42.2	29.8	34.3
	Frame	11.9	7.8	2.1	1.5	1.0	3.3	2.6	6.4	10.4	30.0	3.7	14.8	14.5	10.0	6.1	2.5	3.7	25.1	6.1	27.5	39.6	30.3	32.5
	Sample	17.1	12.6	5.7	4.2	2.0	6.8	6.0	12.5	16.7	34.5	6.1	25.0	20.0	16.9	13.9	2.5	3.9	44.5	17.5	35.7	44.4	50.8	38.5
	Unwtd.	23.6	11.8	16.1	8.3	3.1	16.5	16.6	11.7	33.6	34.7	5.8	27.5	21.9	28.7	17.0	1.2	4.5	38.4	30.1	38.8	39.3	43.9	37.3
	Wtd.	13.9	7.4	2.0	1.6	1.1	3.8	3.2	6.5	13.4	29.1	4.6	15.4	16.0	11.0	6.3	4.1	4.0	26.3	8.8	31.4	42.2	29.8	34.3
Gender																								
Male	Pop.	43.4	37.4	40.1	38.3	35.2	41.7	43.8	43.4	44.5	41.8	34.1	35.7	32.8	42.3	43.3	34.2	46.7	58.2	40.4	44.6	90.7	37.3	44.3
	Frame	41.9	35.3	38.9	36.9	33.9	41.0	41.7	42.3	43.7	39.9	33.3	34.7	29.5	41.0	42.7	31.0	45.5	57.6	39.2	42.8	91.8	36.5	43.1
	Sample	39.4	32.1	36.4	34.6	32.1	39.6	39.9	40.0	41.3	38.1	33.8	32.9	29.8	38.0	39.6	30.7	46.0	57.8	36.7	42.9	92.4	36.1	42.2
	Unwtd.	35.4	29.2	28.9	30.0	26.4	32.9	33.6	34.3	36.3	33.9	28.9	29.5	19.8	35.8	31.9	30.9	41.3	55.8	29.4	42.8	91.7	26.6	39.1
	Wtd.	42.9	37.4	40.1	38.3	35.2	41.7	43.9	43.4	44.6	41.8	34.1	35.7	32.8	42.3	43.3	34.3	46.7	58.2	40.4	44.6	90.7	37.3	44.3
Female	Pop.	56.6	62.6	59.8	61.6	64.7	58.3	56.1	56.6	55.4	58.2	65.9	64.3	67.2	57.7	56.7	65.5	53.3	41.8	59.5	55.4	9.3	62.6	55.7
	Frame	58.1	64.6	61.1	63.1	66.1	59.0	58.2	57.7	56.2	60.1	66.7	65.3	70.5	59.0	57.3	68.5	54.5	42.4	60.8	57.2	8.2	63.3	56.9
	Sample	60.6	67.9	63.6	65.4	67.9	60.4	60.1	60.0	58.6	61.9	66.2	67.1	70.2	62.0	60.4	68.7	54.0	42.2	63.2	57.1	7.6	63.7	57.8
	Unwtd.	64.6	70.8	71.0	69.9	73.6	67.1	66.4	65.7	63.7	66.1	71.1	70.5	80.2	64.2	68.1	69.1	58.7	44.2	70.6	57.2	8.3	73.2	60.9
	Wtd.	57.1	62.6	59.8	61.6	64.8	58.3	56.1	56.6	55.4	58.2	65.9	64.3	67.2	57.7	56.7	65.7	53.3	41.8	59.6	55.4	9.3	62.6	55.7
Unk/Not reported	Pop.	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.2	0.0
	Frame	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0
	Sample	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0
	Unwtd.	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
	Wtd.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0

Table shows percentages within institution		Total	Comm Coll Group 1 (Smallest 4 CCs)	Comm Coll Group 2 (Small 9 CCs)	Comm Coll Group 3 (Medium 6 CCs)	Comm Coll Group 4 (Large 2 CCs)	Comm Coll Group 5 (Tidewater CC)	Comm Coll Group 7 (Northern Va CC)	Christopher Newport University	George Mason University	James Madison University	Longwood University	University of Mary Washington	Norfolk State University	Old Dominion University	Radford University	Richard Bland College	University of Virginia's College at Wise	Virginia Tech	Virginia Commonwealth University	University of Virginia	Virginia Military Institute	Virginia State University	William & Mary	
Discipline Group																									
Business and Communication	Pop.	18.0	7.9	7.4	12.4	12.8	15.6	19.7	27.7	20.4	28.2	22.8	15.5	21.8	17.1	27.8	1.5	18.1	24.3	20.2	9.7	0.0	29.7	13.4	
	Frame	17.7	8.3	8.2	13.0	12.4	16.2	18.4	27.2	20.4	27.7	22.4	15.3	20.7	17.3	27.4	1.1	19.1	24.4	20.4	8.5	0.0	28.5	12.6	
	Sample	17.2	8.0	7.7	14.0	12.0	16.1	17.9	27.6	19.7	26.5	24.0	16.1	21.5	16.8	27.9	1.1	18.6	23.0	21.4	8.7	0.0	29.8	12.5	
	Unwtd.	16.6	8.4	7.2	13.8	12.2	15.8	16.0	29.2	17.2	24.1	22.3	15.1	19.6	15.6	24.1	1.9	16.8	21.8	17.6	9.8	0.0	28.2	13.1	
	Wtd.	17.8	7.9	7.4	12.4	12.8	15.6	19.7	27.7	20.4	28.2	22.8	15.5	21.8	17.1	27.8	1.5	18.1	24.3	20.2	9.7	0.0	29.9	13.4	
Health Professions	Pop.	13.6	39.5	38.1	26.6	35.1	15.9	12.7	0.0	8.6	14.9	6.3	0.7	15.1	17.2	7.5	0.0	6.3	0.0	7.7	3.5	0.0	0.8	0.0	
	Frame	16.3	44.2	41.5	30.7	38.9	18.1	16.9	0.0	9.9	17.1	7.0	1.1	18.0	19.3	9.0	0.0	7.2	0.0	10.4	4.3	0.0	1.0	0.0	
	Sample	17.5	49.7	44.7	30.7	39.9	17.1	15.9	0.0	10.8	17.1	7.5	0.9	18.3	20.5	8.7	0.0	7.1	0.0	10.3	4.1	0.0	0.9	0.0	
	Unwtd.	14.4	52.8	41.8	29.9	34.3	16.9	16.1	0.0	12.3	16.1	8.4	1.0	18.1	23.2	10.3	0.0	6.6	0.0	12.0	4.2	0.0	0.0	0.0	
	Wtd.	12.1	39.5	38.2	26.6	35.1	15.9	12.7	0.0	8.6	14.9	6.3	0.7	15.1	17.2	7.5	0.0	6.3	0.0	7.7	3.5	0.0	0.0	0.0	
Liberal Arts	Pop.	24.9	30.1	30.9	39.3	26.6	22.9	41.4	16.4	20.7	17.6	27.5	35.0	17.4	17.8	20.9	5.1	39.8	14.0	25.3	26.2	6.4	14.2	22.0	
	Frame	23.7	26.3	26.9	34.6	23.1	21.2	39.5	15.6	20.8	17.4	28.4	36.9	17.8	17.2	20.9	4.6	39.3	14.2	23.0	26.6	6.6	15.8	22.4	
	Sample	23.2	22.1	23.5	31.4	19.8	20.5	40.5	15.4	20.9	15.9	26.2	37.3	17.6	17.4	20.9	4.7	39.8	14.7	22.2	26.5	6.5	13.5	21.0	
	Unwtd.	22.2	22.8	27.4	26.8	19.0	16.8	37.9	15.0	22.6	13.8	27.6	33.8	19.4	15.0	22.8	8.0	41.1	13.8	25.2	24.1	4.6	17.6	20.7	
	Wtd.	24.5	30.1	31.0	39.3	26.6	22.9	41.4	16.4	20.7	17.6	27.5	35.0	17.4	17.8	20.9	5.1	39.8	14.0	25.3	26.2	6.4	14.3	22.0	
Psychology and Social Sciences	Pop.	19.0	3.6	3.4	6.8	8.0	20.5	8.6	33.5	28.2	18.3	28.1	30.6	25.5	21.0	23.2	0.0	30.6	14.1	25.3	29.1	52.1	29.0	38.8	
	Frame	18.0	3.6	3.3	6.5	7.5	19.2	8.3	34.5	27.2	17.5	27.3	29.4	23.8	19.6	22.4	0.0	29.1	13.7	25.1	28.5	54.0	28.1	38.5	
	Sample	18.3	2.9	3.1	6.9	6.6	18.8	8.0	33.5	27.7	16.6	26.3	28.5	22.7	19.4	23.2	0.0	29.0	14.0	24.9	29.1	54.0	28.2	38.7	
	Unwtd.	19.6	3.2	2.6	6.4	5.6	15.8	6.5	33.5	27.0	14.6	26.1	31.2	23.1	18.2	20.3	0.0	28.7	12.5	21.9	26.6	49.3	30.5	35.0	
	Wtd.	21.6	3.6	3.4	6.8	8.0	20.5	8.6	33.5	28.2	18.3	28.1	30.6	25.5	21.0	23.2	0.0	30.6	14.1	25.3	29.1	52.1	29.2	38.8	
STEM Disciplines	Pop.	21.3	18.1	18.9	12.8	12.9	21.7	16.2	22.4	19.5	12.8	9.7	18.1	14.7	18.3	10.0	93.4	5.2	47.6	17.8	30.4	41.5	15.3	20.7	
	Frame	20.8	16.8	19.0	13.0	13.5	22.0	15.5	22.7	19.1	12.0	9.3	17.3	13.7	18.4	9.7	94.3	5.3	47.5	17.5	30.9	39.5	15.5	20.8	
	Sample	19.0	16.2	18.2	12.2	12.3	21.4	14.7	23.5	18.2	11.2	10.6	17.1	14.0	17.5	8.6	94.2	5.5	48.3	16.8	30.3	39.6	16.6	21.3	
	Unwtd.	20.3	12.2	14.6	10.9	8.2	16.7	14.6	22.4	18.5	13.2	9.4	18.8	13.4	20.2	11.0	90.1	6.8	51.8	19.0	33.6	46.2	16.6	25.1	
	Wtd.	20.4	18.1	19.0	12.8	12.9	21.7	16.2	22.4	19.5	12.8	9.7	18.1	14.8	18.3	10.0	93.4	5.2	47.6	17.8	30.4	41.5	15.4	20.7	

Table shows percentages within institution		Total	Comm Coll Group 1 (Smallest 4 CCs)	Comm Coll Group 2 (Small 9 CCs)	Comm Coll Group 3 (Medium 6 CCs)	Comm Coll Group 4 (Large 2 CCs)	Comm Coll Group 5 (Tidewater CC)	Comm Coll Group 7 (Northern Va CC)	Christopher Newport University	George Mason University	James Madison University	Longwood University	University of Mary Washington	Norfolk State University	Old Dominion University	Radford University	Richard Bland College	University of Virginia's College at Wise	Virginia Tech	Virginia Commonwealth University	University of Virginia	Virginia Military Institute	Virginia State University	William & Mary
Education	Pop.	2.6	0.0	0.2	0.3	0.0	0.6	0.3	0.0	2.7	5.8	5.7	0.0	5.6	8.6	10.5	0.0	0.0	0.0	3.7	1.0	0.0	11.1	5.2
	Frame	2.6	0.0	0.3	0.3	0.0	0.6	0.3	0.0	2.6	5.8	5.7	0.0	6.0	8.2	10.5	0.0	0.0	0.0	3.8	1.2	0.0	11.1	5.7
	Sample	2.8	0.0	0.3	0.3	0.0	0.5	0.3	0.0	2.7	5.8	5.5	0.0	5.7	8.3	10.7	0.0	0.0	0.0	4.4	1.3	0.0	11.1	6.6
	Unwtd.	2.8	0.0	0.0	0.4	0.1	0.5	0.2	0.0	2.4	4.4	6.2	0.0	6.4	7.7	11.5	0.0	0.0	0.1	4.2	1.7	0.0	7.2	6.1
	Wtd.	2.8	0.0	0.0	0.3	0.0	0.6	0.3	0.0	2.7	5.8	5.7	0.0	5.6	8.6	10.5	0.0	0.0	0.0	3.7	1.0	0.0	11.2	5.2
Trades - Construction and Vocational	Pop.	0.8	0.9	1.0	1.8	4.5	2.8	1.1	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Frame	0.8	0.8	0.9	1.9	4.6	2.7	1.2	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sample	2.1	1.0	2.4	4.5	9.3	5.5	2.7	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unwtd.	4.1	0.6	6.4	11.9	20.5	17.6	8.7	0.0	0.0	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Wtd.	0.7	0.9	1.0	1.8	4.5	2.8	1.1	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Margin of error (sampling error)

The survey was not completed by everyone in the population of interest. Rather, it was offered only to a sample of the full population, and completed by a portion of that sample (the “realized sample”). Therefore, the 15,348 people who responded to the survey could have answered the survey questions differently from any other realized sample of 15,348 people that could have been obtained. How different is the realized sample likely to be from all other possible samples of 15,348 people? That is what the margin of error calculation tells us.

The margin of error calculation depends most heavily on the number of cases containing valid data, and next on the variability of the responses to the survey item of interest. In cases where the realized sample contains a fairly large share of the population of interest – 20 percent or more – a “finite population correction” (fpc) is usually brought into the calculation. The fpc is ignored in this study because the realized sample is only about three percent of the population of interest. The final input to the calculation – a z-score associated with the “level of confidence” – is provided by a decision about what level of error is acceptable.

In the *Virginia Educated* survey, a Yes/No survey item answered by all 15,348 respondents with a 50-50 distribution of responses will have a sampling error of +/- 1.2 percentage points at the 95 percent level of confidence. This means that if this survey were administered in the same fashion 100 times with 100 different realized samples of size 15,348 drawn from the study population, 95 out of those 100 surveys would produce answers to a given survey item that are within +/- 1.2 percentage points of one another. Additionally, if survey sampling were the only source of error in the survey, we would expect that the true value in the population is within +/- 1.2 percentage points of the survey estimate 95 percent of the time. The sampling error is affected by the stratified sample design and the weighting of the dataset. The estimate of +/- 1.2 percent takes those factors into account.

Note that there are other sources of error in surveys besides sampling error that can be difficult or impossible to measure. While every effort was made to suppress or eliminate error in this survey, readers should be mindful of the limitations inherent in survey research.

The large numbers of cases overall and within important subgroups support provide good statistical precision for analyses.

Technically, each question or survey statistic has its own individual sampling error. Different distributions of survey responses will affect the margin of error. The margins of error are also larger for questions answered by smaller numbers of respondents, and for subgroups in the data.

Margins of error were calculated overall and by institution for nine key variables:

1. rand1: A randomly-generated Yes/No variable with an overall distribution of 50.04 percent/49.96 percent.

2. rand2: A randomly-generated Yes/No variable with an overall distribution of 50.05 percent /49.95 percent.
3. rand3: A randomly-generated Yes/No variable with an overall distribution of 49.56 percent /50.44 percent.
4. q6_cat: Percentage saying they were “extremely” or “very” appreciative of the general education classes they took, with a distribution of 38.07 percent appreciative/61.93 percent neutral or not appreciative.
5. q9_cat: Percentage saying that overall they were “very satisfied” or “satisfied” with their undergraduate education, with a distribution of 88.10 percent satisfied/11.90 percent neutral or dissatisfied.
6. q53_cat: Percentage saying they were “extremely satisfied” or “satisfied” with the progress they had made towards long-term career goals since completing undergraduate education, with a distribution of 69.21 percent satisfied/30.79 percent neutral or dissatisfied.
7. q91_cat: Percentage saying they “strongly agree” or “agree” that their undergraduate education was worth the cost, with a distribution of 56.35 percent agreeing/43.65 percent neutral or disagreeing.
8. q67_cat: Percentage saying they were “very satisfied” or “satisfied” with how their undergraduate experience prepared them for the workplace, with a distribution of 69.49 percent satisfied/30.51 percent neutral or dissatisfied.
9. q97_3_cat: Percentage saying they “strongly agree” or “agree” with the statement “I am satisfied with my life,” with a distribution of 69.00 percent agreeing/31.00 percent neutral or disagreeing.

Table B-7 below presents a summary of this information.

Table B-7: Margins of Error for Nine Key Variables by Institution

Institutions	rand1 sampling error: Randomly- generated Yes/No variable	rand2 sampling error: Randomly- generated Yes/No variable	rand3 sampling error: Randomly- generated Yes/No variable	q6_cat sampling error: Appreciative of the general education	q9_cat sampling error: Satisfaction with undergraduate education overall	q53_cat sampling error: Satisfaction with career progress	q91_cat sampling error: Agreeing undergraduate education was worth the cost	q67_cat sampling error: Satisfaction with preparation for the workplace	q97_3_cat sampling error: Agreeing "I am satisfied with my life"
Total	1.19%	1.20%	1.20%	1.21%	0.80%	1.10%	1.16%	1.10%	1.11%
Group I (Smallest 4 CCs)	4.83%	4.83%	4.76%	5.71%	2.41%	4.19%	4.32%	3.83%	4.48%
Group II (Small 9 CCs)	4.76%	4.83%	4.75%	5.64%	3.19%	4.41%	4.31%	4.22%	4.55%
Group III (Medium 6 CCs)	4.80%	4.74%	4.70%	5.40%	3.25%	4.63%	4.65%	4.51%	4.67%
Group IV (Large 2 CCs)	4.76%	4.57%	4.79%	5.26%	3.50%	4.62%	4.60%	4.53%	4.78%
Group V (Tidewater CC)	4.78%	4.79%	4.78%	5.89%	3.42%	4.92%	4.90%	4.90%	4.91%
Group VII (Northern Va CC)	4.64%	4.81%	4.83%	5.27%	3.50%	4.64%	4.66%	4.68%	4.79%
Christopher Newport University	4.26%	4.26%	4.30%	4.04%	2.73%	3.90%	4.25%	4.12%	3.97%
George Mason University	4.68%	4.68%	4.75%	4.40%	3.44%	4.37%	4.71%	4.51%	4.39%
James Madison University	4.50%	4.49%	4.47%	4.14%	2.36%	3.68%	4.35%	3.55%	3.60%
Longwood University	4.26%	4.33%	4.29%	3.87%	2.41%	3.91%	4.32%	3.86%	3.77%
University of Mary Washington	4.15%	4.15%	4.11%	4.22%	2.64%	3.83%	4.17%	4.09%	3.77%
Norfolk State University	5.08%	5.06%	5.02%	5.48%	3.50%	5.01%	4.94%	4.60%	4.89%
Old Dominion University	4.46%	4.62%	4.60%	4.67%	3.27%	4.35%	4.57%	4.40%	4.34%
Radford University	4.92%	4.91%	4.92%	4.88%	3.14%	4.70%	4.99%	4.51%	4.52%
Richard Bland College	7.98%	7.85%	8.19%	8.24%	6.09%	8.04%	7.71%	7.84%	8.18%
UVa College at Wise	5.20%	5.00%	5.17%	5.06%	2.89%	4.46%	4.91%	4.34%	4.29%
Virginia Tech	4.04%	4.14%	4.13%	3.89%	2.08%	3.42%	3.89%	3.28%	3.50%
Virginia Commonwealth University	4.77%	4.94%	4.78%	4.25%	3.85%	4.60%	4.72%	4.86%	4.59%
University of Virginia	3.98%	3.99%	3.96%	4.12%	2.14%	3.36%	3.73%	3.45%	3.36%
Virginia Military Institute	5.17%	5.17%	5.27%	5.23%	2.98%	4.28%	4.91%	3.79%	4.48%
Virginia State University	5.56%	5.37%	5.38%	5.57%	3.35%	5.38%	5.25%	4.56%	5.32%
William & Mary	4.10%	4.12%	4.10%	3.97%	2.34%	3.38%	3.78%	3.57%	3.61%

All percentages are +/-

Incentives approach: Overall

The pilot phase of *Virginia Educated* tested numerous experimental conditions to prepare for the production stage. These included variations in upfront incentive amounts, survey completion incentive amounts, and drawing prize amounts. Details are described in the pilot’s technical appendix. Analysis of these conditions – paired with exploration of several cost scenarios – suggested that the following combination of incentives would yield the best, most cost-effective response rate and numbers of completed surveys in production:

- \$1 in cash in each advance letter (“upfront”):
 - A token gift designed to pique recipient interest in -- and boost recipient inclination to complete – the survey
 - Based on social exchange theory
 - A long-standing, impactful approach documented in survey methods literature
 - Not available to email-only cases
- \$10 gift card (“contingent”):
 - This had a statistically-significant effect on pilot response rates, as compared to \$5 and \$0 experimental offerings (31 percent, 24 percent, and 22 percent, respectively)
 - This amount also fit within project budget specifications
 - Participants could opt-out of gift card receipt
 - Offered in electronic and physical formats, as discussed below
- Thirty-two additional gift card drawing prizes:
 - Ranging from \$50 to \$250 in value
 - Limit one prize per person
 - Participants could opt-out of the drawings

Donations

Those requesting the electronic gift cards through Rybbon (see below) had the option to donate the value of their card to a charitable group registered with Rybbon. As of September 30, 2021, survey respondents had donated \$2,750 to charitable causes of their choice rather than receiving the gift cards themselves.

Incentive contingent on survey completion: Electronic

Like in the pilot, the production phase of *Virginia Educated* involved use of electronic gift cards. The same vendor, Rybbon, assisted with this – to aid research project continuity and also after additional, pre-production vetting by VCU Procurement Services. By way of background, Rybbon helps disburse electronic rewards for survey and marketing purposes. They were initially recommended to SERL by colleagues within AASRO. SERL conducted a review of potential electronic gift card vending services and Rybbon appeared to be the best fit for the needs of the project.

Rybbon's functionality is described at length in the pilot survey's technical appendix, and many of the same processes were in place for *Virginia Educated* production. In particular, the SERL team linked their Qualtrics survey module to a Rybbon campaign of pre-selected \$10 gift cards, and they preserved the option for respondents to donate their rewards among several charitable causes (participants could also opt out of their electronic gift card if they wanted to). They also created a message at the end of the survey, letting participants know that they were about to visit a separate site to process their gift card requests. Additionally, SERL permitted the exchange of only one field between the Qualtrics survey and Rybbon – the SERL-generated survey code. Consequently, Rybbon was not able to receive or read any other data respondents entered into the Qualtrics module.

Like with the pilot, too, SERL did not set up auto-fulfillment of electronic gift cards, although Rybbon offered this capability. Instead, a SERL project staff member cross-referenced each survey completion and each pass-through survey code for validity prior to authorizing gift card distribution. The team also limited gift card redemption to 60 days, and they requested that Rybbon refund all unclaimed gift cards (available at 100 percent cost).

Incentive contingent on survey completion: Physical

As in the pilot, SERL offered physical gift cards in *Virginia Educated* production. One of the major reasons for this was that more than half of pilot web-survey respondents (55.4 percent) asked for their gift cards by mail. Similar eligibility conditions to the pilot survey were in place for tangible cards, except that the value did not vary (i.e., \$10), they were not issued to email-only cases, and there were more drawing prizes, due to the much larger production sample size. For simplicity, graduates who complete the survey by paper were offered only a physical gift card. More specifically, physical gift cards were provided to:

- All paper survey completers (no electronic option)
- Web survey completers who preferred to have a card mailed to them:
 - Probability sample cases only; email-only participants were not eligible
- Winners of thirty-two gift card drawing prizes:
 - Four \$250 gift card prizes
 - Twelve \$100 gift card prizes
 - Sixteen \$50 gift card prizes
 - Likelihood of winning distributed across *all* paper and web survey completers, including email-only cases
 - Limit one prize per person
- Completors could opt-out of their gift card and/or drawing, if they chose to do so
- Any returned/undeliverable gift cards had at least one mailing re-attempt

Because of COVID-19, project team members could only come to campus on a scaled-down/rotating basis while production proceeded. Thus, there was a lag time in gift card

fulfillment, coupled with gift card shipment delays on the part of the vendor. However, unlike with the pilot, SERL was able to notify participants of delays beforehand. Language to this effect appeared at the beginning and end of the survey, both on paper and in Qualtrics.

Study caveats

Virginia Educated offers insightful, multi-focal responses to questions about the value and impact of higher education. The data generated from the *Virginia Educated* study can stand alone, supplement SCHEV's robust in-house data analytics, or be brought alongside other types studies commissioned by – or otherwise affecting – SCHEV's work. These include the Organization for Economic Co-operation and Development's labor market examination, *Moving Virginia Forward* (University of Virginia et al., 2018) or *The Landscape of Postsecondary Access Resources in Virginia* (Corning et al., 2017).

Other studies

However, *Virginia Educated* does not provide authoritative, final answers about the value, impact, or “betterment” of the college-educated populace. It also does not take the place of – or diminish – related analyses. To be certain, there are many kinds of studies that triangulate subject matter data or otherwise contribute to this discussion. Thus, they remain vital to the topical canon. Such research includes, but is not limited to:

1. Introspective studies focused on economic impact, like those occurring under the auspices of the APLU IEP University credentialing process (n.d.)
2. Quantitative studies of the impact of specific institutions on their local and regional economies
3. Extensive inquiries about specific spheres – for instance, the ACHA's NCHA (2021) or the CASE's *Global Alumni Engagement Metrics Survey* (2021)
4. First-destination surveys, such as those conducted by NACE (2021; see also SCHEV, 2019a)
5. Long-term, multi-institution student activity and impact practice assessments like the NSSE, implemented by the Center for Postsecondary Research at Indiana University (2020)
6. National, recurring surveys with special field of study emphases, economic foci, and/or varying contact methods, such as the NCSES' and the U.S. Census Bureau's NSCG (2021), the NCSES' Baccalaureate and Beyond Longitudinal Study (2021), and occasional research funded by groups like the AACU (n.d.)
7. Surveys available for use at different educational milestones, or for gathering more information about campus dynamics, like those managed by HERI at the University of California Los Angeles (2021)

8. Surveys conducted by colleges and universities themselves, per the remit of alumni offices, career services offices, institutional effectiveness offices, individual departments, or other internal bodies
9. Wage and economic data that can be mined from public domain sources, like the U.S. BLS and the U.S. Census Bureau (for an example, see Abel & Dietz, 2014)
10. Enrollment and student debt data that can be mined from public domain sources, like SCHEV

Sampling frame conditions

The *Virginia Educated* study included people who earned an undergraduate credential – that is, a certificate, associate degree or bachelor’s degree – at a publicly-supported institution of higher education in Virginia in the years 2007 through 2018. The study may not apply to graduates of other institutions or graduates in different years.

The contact information obtained for the survey included only U.S. mailing addresses. Therefore, experiences of international students and graduates currently living abroad are not well represented in the study.

Contact information was obtained for about 60 percent of the study population. This means that about 40 percent of the study population was not covered in the sampling. However, as noted earlier in this report, a sample of 4,021 graduates with no contact information was included in the production survey sample after their mailing addresses were manually looked up online. There were 801 respondents from within this subsample, and they did not appear to differ meaningfully from those with contact information, but there was no formal follow-up to determine if there was non-ignorable non-coverage error in the sample.

It is possible that those who were sampled and responded to the survey were systematically different from those who did not respond. The good response rate, good alignment of demographics of the respondents to known demographics of the study population, and broad range of positive and negative responses to survey items provide confidence that the respondents are representative of the entire study population, but there was no formal follow-up to try to ascertain the extent of possible non-response error.

Mode effects

Survey responses can vary depending on what mode (web, paper, telephone, face-to-face, etc.) is used to interact with respondents. Other differences can occur depending on what technology respondents use (small screen devices such as cell phones, larger screens such as laptop or desktop computers, etc.). Almost all of the completed surveys were done online rather than on paper, so some mode differences are not likely to be found in the dataset. But there was no investigation of potential mode differences by type of technology used to complete the web-based surveys.

Protocol differences

It is possible that the recruitment protocols for the probability sample and email-only supplement could create systematic differences in the responses. The probability sample included up to three letters in the recruitment protocol with up to five emails sent to graduates with email addresses on file, while the email-only supplement did not include any letters. In addition, the probability sample included the option to request a paper questionnaire booklet while the email-only supplement did not. The response rate to the probability sample was 26.3 percent while the response rate to the email-only supplement was 3.9 percent. A review of survey responses across the two protocols did not reveal any large differences and the two groups were combined for analysis, but no formal investigation of systematic response differences was carried out.

Questionnaire validity and reliability

Guided in part by the literature on post-graduate surveys, the questionnaire was developed organically through a process that included exploratory focus groups, expert input on various topics, cognitive interviews and a pilot survey (also carried during the COVID-19 pandemic, in March to June of 2020). The questionnaire seemed to perform well, but there was no formal analysis of the data that was focused on questionnaire validity or reliability.

As indicated by some comments from respondents, the experiences of non-traditional students and those who attended programs that were entirely online may not have fit the assumptions of the questionnaire very well in some places.

COVID-19

Importantly, too, both pilot and production survey phases of *Virginia Educated* occurred during the COVID-19 pandemic. The public health crisis likely affected study participants, and by extension, their survey responses. Therefore, it may be appropriate to read and interpret results through this lens. The questionnaire contained questions specifically about COVID-19 impacts on graduates, but it is not possible to know what the results would have been like if there had been no pandemic.

Other caveats

Conclusions or assertions made in this report may evolve upon further analysis. Observations included here may or may not be causal. Additional examination may be warranted.

Surveys are subject to many kinds of errors. While every effort was made to suppress or eliminate error in this survey, readers should be mindful of the limitations inherent in survey research.

Operational details

The following information is an operational look “behind the scenes” at how the survey launched, how it generated 15,348 completions, and how data analysis unfolded. It also archives important supporting materials, like the production survey instrument.

Production survey staffing

SERL’s staffing configuration for *Virginia Educated’s* production phase was similar to that of the pilot: a Principal Investigator, a Project Manager, one full-time Research Support Specialist, and three part-time Research Assistants (focused on data analytics, coding, literature review, and report-writing). Research economists within VCU’s CURA assisted with linked survey-secondary data analysis (those analyses will be released separately from this report). A contractor, Well World Solutions, was brought in toward the end of the project to increase analysis and report-writing capacity.

In addition, several undergraduate Federal Work Study students on SERL’s Data Entry Team offered support through sample preparation, mail handling, paper survey data entry, open-ended response coding, and gift card fulfillment. Staff and Data Entry Team members worked mostly remotely throughout production because of COVID-19 conditions.

COVID-19 impacts on the project

The onset of COVID-19 affected *Virginia Educated*, during both pilot and production. Logistically, SERL adhered to VCU’s telework policy for the duration of the public health crisis. This meant doing most of the project’s work remotely, with virtual quality checks of mailings and regular team “office hours” convened online. Under phased restrictions, SERL staff were able to go to campus periodically in the Fall/Winter/Spring of 2020-21 for mail handling and gift card fulfillment activities.

Project research integrity and staffing information security

All core personnel involved in the project reviewed SCHEV’s RUDA and signed NDAs prior to engaging in work tasks, whether or not they joined at the pilot or production juncture. Staff also completed or updated human subjects training, as required by VCU’s IRB. Numerous undergraduate Data Entry Team members participated in a basic Responsible Conduct of Research webinar as part of their SERL on-boarding process; they also signed a general SERL Confidentiality Agreement.

As with the pilot, sensitive data related to *Virginia Educated* production was stored on a secure drive, accessible only to pre-approved, authorized users. Moreover, only the minimum necessary number of staff had access to a triple-secured, master file laptop containing the study’s sampling frame. Importantly, too, because COVID-19 necessitated a great deal of telework, project team

members used multi-factor virtual private network (VPN) credentialing processes to complete their work responsibilities.

Special services requests for proposals

Several months ahead of the production survey, SERL collaborated with VCU's Procurement Services office to issue two Requests for Proposals (RFPs) – the first for electronic gift card vendors and the second for specialized printing and mailing services. RFPs were required due to the scope, scale, and anticipated expense of *Virginia Educated* production.

The electronic gift card RFP started in March 2020 and involved three proposals. The printing and mailing services RFP got underway in May 2020 and generated seven proposals. The chosen vendor, Taylored Printing, was awarded a contract in October 2020.

Production survey modifications, COVID-19 content, and beta testing

As described in the pilot report furnished in June 2020, as well as the report that accompanies this document, the SERL project team adjusted the production instrument based on data – and other insights – drawn from the pilot survey. One example of this change was to include a new question:

Production Question: Do you have an industry-specific license, certification, or other credential? For example, a teaching license, a Project Management Professional credential, a Public Accountant certification, or a nursing license?

Response Format:

- 1 Yes
- 2 No → (GO to Q19)S
- 0 Choose not to answer → (GO to Q19)

Branch: What is this industry-specific license, certification, or other credential? Please do not abbreviate.
Write in: _____

Significantly, SERL converted several open-ended pilot questions to close-ended production questions via a two-step process: (a) coding more than 6,000 open-text responses to 10 open-ended questions using an emergent themes approach; (b) analyzing the distribution of these codes to develop close-ended answer arrays. In this way, pilot respondents helped craft production content, reflecting the spirit and practice of applied, participatory research.

A sample alteration appears below:

Pilot Question: There are many ways to define success. In what ways are you successful?

Response Format: Open text

Intervening Steps: Reviewed the responses

Developed codes based on the responses

Codeed the responses

Analyzed the coding frequencies; used the most frequent codes to create answer choices – balanced positive and negative directionality

Production Question: There are many ways to define success. In what ways are you successful?

Response Format: Select all that apply:

- I do not feel successful
- Career or job satisfaction; professional growth or status
- Community involvement, impact, or service (work-related)
- Community involvement, impact, or service (not work-related)
- Educational achievement or progress
- Family relationships
- Financial stability, security, self-sufficiency; control of debt
- Friendships or other social relationships
- Sense of personal growth, fulfillment, confidence, or perspective
- Other, Write in: _____

The SERL team – in consultation with SCHEV and members of the Data Project Advisory Committee – also determined that it was important to acknowledge, and measure the impacts of COVID-19 on survey respondents. This need was especially acute due to the timing, breadth, and depth of the study (e.g., the pilot survey deployed one week prior to widespread quarantine). Thus, SERL generated new production survey content to help develop a picture of the pandemic’s effects.

An example is as follows:

Production Question: See below (truncated)

Response Format: Matrix-Likert scale

Please indicate your best answer for each of the following statements (truncated):

Because of COVID-19/coronavirus...

	<i>Significantly changed for the worse</i>	<i>Somewhat changed for the worse</i>	<i>Did not change</i>	<i>Somewhat changed for the better</i>	<i>Significantl y changed for the better</i>
a. My worldview...					
b. My education situation...					
c. My employment situation...					
d. My family relationships...					
e. My financial situation...					
f. My overall sense of success...					

At the same time, SERL appreciated the need to preserve the “archival quality” of most survey questions – meaning that they could either be left alone *or*: (a) modified slightly to gauge COVID-19’s point in time impacts and (b) updated slightly again in future survey administrations when COVID-19 might not be as much of an issue as it was during the *Virginia Educated* project.

An example of a balanced modification, with COVID-19 components, is:

Pilot/Production Question: Which of the following describes why you are not currently employed?

Response Format: Select all that apply:

Answer choices altered for COVID-19 point in time; all other choices featured in the pilot phase. These choices could be updated again/removed – while other choices could be preserved – for future survey exercises.

- I have retired
- I have chosen not to work
- I have a disability that doesn't allow me to work
- I quit to seek other work
- I do seasonal work
- I was laid off, **NOT** due to COVID-19/coronavirus
- I was laid off or otherwise lost my job **BECAUSE OF** COVID-19/coronavirus
- I am not working in order to attend to family duties
- I am a student
- Other, Write in: _____

SERL staff made these adjustments and others to the production questionnaire, per input from SCHEV's Data Project Advisory Committee and also following consultation with SCHEV staff. After multiple rounds of revision, SERL finalized the production instrument and its companion Qualtrics web module in September 2020. Each version of the instrument – both paper and electronic – were subsequently beta-tested within SERL.

Production survey websites and other communication

The production survey had two websites hosted by SCHEV. These sites featured basic information about *Virginia Educated*. Of note, they did not contain links to the survey itself. This was an intentional decision, designed to preserve survey and sample integrity. The content remained essentially the same as the pilot website, although some details were different for the email-only group, as discussed below (<https://surveys.schev.edu/about> and <https://surveys.schev.edu/e-survey>).

In addition, as in the pilot, SERL drafted a memo, in consultation with SCHEV staff. This communication summarized key points about the production survey. Prior to launching the survey, SCHEV's Executive Director shared the communication with university presidents, chancellors, and superintendents (see attachments).

Production survey contact and access protocol: Probability sample

The probability sample for *Virginia Educated* followed a contact sequence much the same as that of the pilot, with three exceptions. First, paper survey booklets were proactively provided only to a small sample of graduates or to those who requested them using a postage-paid reply card,

instead of being furnished to all non-respondents. This strategy was an important cost-saving measure. Second, reminder letters were used in lieu of reminder postcards, as they had a higher response rate in the pilot (29 percent to 26 percent, respectively). Third, the time between mailings was longer than in the pilot, due to intervening holidays and also the larger scale of the mailings (i.e., increased printing time).

Table B-8 outlines the production survey's probability contact schedule, which included three major mailings, up to five emails for probability cases with email addresses, and a small-batch paper survey mailing (notes: not all cases in the probability sample had email addresses; the boutique mailing occurred because of rolling receipt of paper survey request postcards; all email contacts include unsubscribe links). The SERL team kept track of survey dispositions throughout each contact round – whether they were survey attempts, survey completions, or opt-outs. Staff removed these graduates from subsequent contact waves, reducing unnecessarily-duplicative communications. They also sent follow-up emails and letters to people whose requests for paper surveys were too late to honor (i.e., after the dataset closed). Notably, a planned fourth mailing was eliminated because survey completions appeared to be “early on target.” It was also cut to preserve the project's timeline and budget.

Once invitations were sent out via letters and emails, respondents could complete the survey in multiple ways (except the email replicates, which could only take it in electronic form). They could fill it out by paper, upon request. They could use an anonymous weblink. Other options involved clicking an individualized link provided via email, scanning a QR code, or sending a text to a toll-free number. This last choice was slightly different than in the *Virginia Educated* pilot. This is because the SERL team received notice from Qualtrics in September 2020 that Short Messaging Service (SMS) codes were no longer available in their service portfolio; hence, a longer 10-digit code was used instead.

Table B-8: Probability Sample Contact Sequence, *Virginia Educated* Production Survey

CONTACT TYPE		RECIPIENT STATUS AND DATE
CONTACT #1 Mailing #1 <i>Advance letter</i>		All cases in the probability sample (n = 50,495; includes 5 quality control cases); December 23, 2020 With a \$1 bill inside
CONTACT #2 Email #1 (Email invitation)		All cases in the probability sample <i>with email addresses</i> (n = 26,015), excluding completers and opt-outs; including five quality control cases (revised n = 22,931); 8,281 bouncebacks; 14,650 people receiving email December 30, 2020
CONTACT #3 Email #2 (Email reminder)		All cases in the probability sample <i>with email addresses</i> , excluding completers and opt-outs; including five quality control cases (revised n = 21,921); 8,128 bouncebacks; 13,793 people receiving email January 2, 2021
CONTACT #4 Mailing #2 <i>Reminder letter</i> #1	CONTACT #4a Mailing #2a <i>Paper survey</i> <i>request postcard</i>	All cases in the probability sample, excluding completers and opt-outs (revised n = 43,402); January 29, 2021
CONTACT #5 Email #3 (Email reminder)		All cases in the probability sample <i>with email addresses</i> , excluding completers and opt-outs; including five quality control cases (revised n = 19,390); 7,587 bouncebacks; 11,803 people receiving email February 10, 2021
CONTACT #6a Mailing #3a <i>Paper survey with cover letter</i>		Paper surveys to a specially-sampled segment and to early paper survey requestors (revised n = 4,387); March 15, 2021
CONTACT #6b Mailing #3b <i>Reminder letter #2</i> <i>Final mailing</i>		All cases in the probability sample, excluding completers, opt-outs, and paper survey recipients in Mailing #3a (revised n = 31,637) March 26, 2021
CONTACT #7 Email #4 (Email reminder)		All cases in the probability sample <i>with email addresses</i> , excluding completers and opt-outs; including five quality control cases (revised n = 37,535 – <u>Qualtrics methodology change</u>); 26,502 bouncebacks; 11,033 people receiving email; April 7, 2021
CONTACT #8 Email #5 (Email reminder)		All cases in the probability sample <i>with email addresses</i> , excluding completers and opt-outs; including five quality control cases (revised n = 37,318 – <u>Qualtrics methodology change</u>); 26,435 bouncebacks; 10,883 people receiving email; April 11, 2021
CONTACT #9 (supplemental) <i>On demand paper surveys with cover</i> <i>letters</i>		Paper surveys to later paper survey requestors not in Mailing #3a (total n = 84); April 1, 2021
RESPONSES WERE REQUESTED BY/NEEDED A POSTMARK BY APRIL 16, 2021. THE SURVEY WAS DE-ACTIVATED ON MAY 17, 2021. RESPONDENTS COULD ACCESS THE WEB SURVEY UNTIL THEN.		
The probability sample generated 13,294 completions out of 50,495 possible cases (N includes 5 quality control cases). This represents a response rate of 26.3 percent.		

Production survey contact and access protocol: Email-only replicates

As mentioned previously, SERL also prepared *Virginia Educated* survey invitations for cases in the SCHEV master file with email addresses who were not *already* included in the mail/email correspondence pool described above. Four important differences distinguished these cases, most of which are alluded to elsewhere. First, they were handled via replicates – meaning that only small groups of email cases were asked to take the survey before *other* small groups of email cases were contacted. Second, these cases received solely email communications about the survey; they did not *also* get advance/reminder letters or postcards (they also had unsubscribe links in all messages). Third, these individuals only ever saw a clone of the electronic survey – SERL did not present them with the paper questionnaire unless they specifically requested it. Fourth, these individuals did not get the \$1 upfront incentive that accompanied the original protocol’s advance letter; they also could only claim their \$10 gift card in electronic form.

Replicate arrangements for the email-only group allowed the project team to conduct a “soft launch” of the web survey, beginning in mid-December 2020 (n = 1,976 graduates in the email-only group plus three quality control cases), ahead of the probability sample. Replicates also helped staff manage email traffic and maintain security and quality control. They also helped keep printing/mailing and incentive costs in-line with budget, because project staff adjusted each replicate’s release according to the survey’s response rate dynamics.

Table B-9 and Table B-10 document the email-only contact sequence for *Virginia Educated* production.

Table B-9: Email-only Supplement Contact Sequence by Replicate, Virginia Educated Production Survey, Part A

CONTACT TYPE	RECIPIENT STATUS AND DATE	CONTACT TYPE	RECIPIENT STATUS AND DATE
<u>REPLICATES 1-4</u> EMAIL INVITATION	<u>REPLICATES 1-4</u> SELECT CASES WITH EMAILS, NOT ALREADY IN PROBABILITY SAMPLE (n = 1,976) December 15, 2020 440 bouncebacks; 1,536 people receiving email	<u>REPLICATES 5-14 & 201</u> EMAIL INVITATION	<u>REPLICATES 5-14 & 201</u> SELECT CASES WITH EMAILS, NOT ALREADY IN PROBABILITY SAMPLE OR REPLICATES 1-4 (n = 5,888) January 15, 2021 679 bouncebacks; 5,209 people receiving email
<u>REPLICATES 1-4</u> EMAIL REMINDER A	<u>REPLICATES 1-4</u> Same conditions as above, less completers and opt-outs (n = 1,932) December 18, 2020 228 bouncebacks; 1,704 people receiving email	<u>REPLICATES 5-14 & 201</u> EMAIL REMINDER A	<u>REPLICATES 5-14 & 201</u> Same conditions as above, less completers and opt-outs (n = 5,752) January 18, 2021 686 bouncebacks; 5,066 people receiving email
<u>REPLICATES 1-4</u> EMAIL REMINDER B	<u>REPLICATES 1-4</u> Same conditions as above, less completers and opt-outs (n = 1,898) December 26, 2020 229 bouncebacks; 1,669 people receiving email	<u>REPLICATES 5-14 & 201</u> EMAIL REMINDER B	<u>REPLICATES 5-14 & 201</u> Same conditions as above, less completers and opt-outs (n = 5,621) January 23, 2021 692 bouncebacks; 4,929 people receiving email
<u>REPLICATES 1-4</u> EMAIL REMINDER C	<u>REPLICATES 1-4</u> Same conditions as above, less completers and opt-outs (n = 1,866) January 2, 2021 228 bouncebacks; 1,638 people receiving email	<u>REPLICATES 5-14 & 201</u> EMAIL REMINDER C	<u>REPLICATES 5-14 & 201</u> Same conditions as above, less completers and opt-outs (n = 5,517) January 28, 2021 700 bouncebacks; 4,817 people receiving email
<u>REPLICATES 1-4</u> EMAIL REMINDER D	<u>REPLICATES 1-4</u> Same conditions as above, less completers and opt-outs (n = 1,833) January 11, 2021 228 bouncebacks; 1,605 people receiving email	<u>REPLICATES 5-14 & 201</u> EMAIL REMINDER D	<u>REPLICATES 5-14 & 201</u> Same conditions as above, less completers and opt-outs (n = 5,452) February 6, 2021 717 bouncebacks; 4,735 people receiving email

Table B-10: Email-only Supplement Contact Sequence by Replicate, Virginia Educated Production Survey, Part B

CONTACT TYPE	RECIPIENT STATUS AND DATE	CONTACT TYPE	RECIPIENT STATUS AND DATE
<u>REPLICATES 15-65</u> EMAIL INVITATION	<u>REPLICATES 15-65</u> SELECT CASES WITH EMAILS, NOT ALREADY IN PROBABILITY SAMPLE OR EARLIER REPLICATES (n = 25,127) February 24, 2021 2,982 bouncebacks; 22,145 people receiving email	<u>REPLICATES 66-104</u> EMAIL INVITATION	<u>REPLICATES 66-104</u> SELECT CASES WITH EMAILS, NOT ALREADY IN PROBABILITY SAMPLE OR EARLIER REPLICATES (n = 19,182) March 22, 2021 2,218 bouncebacks; 16,964 people receiving email
<u>REPLICATES 15-65</u> EMAIL REMINDER A	<u>REPLICATES 15-65</u> Same conditions as above, less completers and opt-outs (n = 24,532) February 27, 2021 2,992 bouncebacks; 21,540 people receiving email	<u>REPLICATES 66-104</u> EMAIL REMINDER A	<u>REPLICATES 66-104</u> Same conditions as above, less completers and opt-outs (n = 18,781) March 25, 2021 2,223 bouncebacks; 16,558 people receiving email
<u>REPLICATES 15-65</u> EMAIL REMINDER B	<u>REPLICATES 15-65</u> Same conditions as above, less completers and opt-outs (n = 24,119) March 4, 2021 2,982 bouncebacks; 21,137 people receiving email	<u>REPLICATES 66-104</u> EMAIL REMINDER B	<u>REPLICATES 66-104</u> Same conditions as above, less completers and opt-outs (n = 18,436) March 30, 2021 2,231 bouncebacks; 16,205 people receiving email
<u>REPLICATES 15-65</u> EMAIL REMINDER C	<u>REPLICATES 15-65</u> Same conditions as above, less completers and opt-outs (n = 23,748) March 10, 2021 3,008 bouncebacks; 20,740 people receiving email	<u>REPLICATES 66-104</u> EMAIL REMINDER C	<u>REPLICATES 66-104</u> Same conditions as above, less completers and opt-outs (n = 18,175) April 5, 2021 2,237 bouncebacks; 15,938 people receiving email
<u>REPLICATES 15-65</u> EMAIL REMINDER D	<u>REPLICATES 15-65</u> Same conditions as above, less completers and opt-outs (n = 23,590) March 16, 2021 3,022 bouncebacks; 20,568 people receiving email	<u>REPLICATES 66-104</u> EMAIL REMINDER D	<u>REPLICATES 66-104</u> Same conditions as above, less completers and opt-outs (n = 17,993) April 11, 2021 2,248 bouncebacks; 15,745 people receiving email
Over time, 105 replicates were released, for a total of 52,173 emails addresses contacted (plus three quality control cases). A total of 2,054 responses were received, for a response rate of 3.94 percent among the email-only group. Email communication varied by day of the week and time of day. The email-only survey was deactivated on April 28, 2021.			

Printing and mailing: Envelopes, stationery, proofing, postage, and undeliverable mail

The production survey #10 advance letter envelope featured a special, enlarged Commonwealth seal. The display of the seal was tested in the pilot survey, and the slightly-modified version had an incrementally-higher response rate (30 percent) than the standard option (28 percent), at no difference in cost. All letter and envelope printing and mailing also proceeded on standard paper, with the exception of the paper survey request postcard. This is because linen stationery demonstrated little appreciable difference in response rate in the pilot experiments (28 percent to 27 percent), and it was more expensive. Like in the pilot, SERL staff read hundreds of PDF proofs over the course of the production probability sample sequence to ensure letter and envelope content accuracy.

Some significant procedural notes: although the printing/ mailing vendor, Taylored Printing, was located in Yorktown, Virginia, all outgoing mail had a Richmond postmark. Also, VCU prepaid all postage, so as to avoid delays/interruptions in the timing of each mailing wave. Furthermore, all mail was stamped and handled first-class. This was to make sure it arrived as expediently as possible and did not look like bulk mail.

Also, SERL provided its VCU mailbox as the return address on all outgoing pieces, as it had done in the pilot. This was so that the project team could handle paper surveys and manage postage-related accounting. Additionally, it meant that staff could process undeliverable mail, refund returned \$1 bills to the project account, and clean up subsequent mailing lists (e.g., undeliverable addresses were removed from later mailing waves, saving postage and recipient confusion).

Survey codes

Like in the pilot, SERL assigned each person in the *Virginia Educated* production sample a non-identifying 7-digit numeric code. These codes were distinct from SCHEV's unique, non-identifying hashed case numbers in the master file. SERL codes also involved logic that differentiated between participants in the probability-based sample, email replicate invitees, and quality control cases (i.e., SERL project staff members included in the mailing). SERL used these codes to prepare and track mail/email correspondence, to monitor survey attempt/completion activities, to respond to inquiries from participants, and to disburse gift cards and drawing prizes (see other discussion). None of SERL's survey codes were recycled between pilot and production stages.

Regardless of how they found their way to the survey, respondents were required to furnish their particular code – plus a custom 4-character PIN – to fill it out. This was by design, intended for security. If recruits decided to do the survey via the anonymous weblink, QR, or text-back paths provided in their advance or reminder letters, they had to supply their code and their PIN at the

Qualtrics home screen. If participants received an email invitation, they were able to click on a special link which had their code already embedded within it.

Other survey quality control and security procedures

SERL staff used a variety of other techniques to safeguard the *Virginia Educated* production survey. As in the pilot, the survey was not circulated publicly. The SERL team also instituted content validation controls on certain questions within Qualtrics to encourage legitimate, standardized answers (e.g., entering ZIP codes in 5-digit numeric format). They also “piped” in personalized degree, institution, and award year information for each survey taker inside Qualtrics and on paper survey cover letters.

Similar to the pilot, too, SERL used VCU’s secure, temporary use file-sharing technology, FileLocker, for making the *Virginia Educated* production contact lists and letter content available for mail merging, printing, and mailing. The print vendor also transported all mailings directly to a U.S. Postal Service location with no intervening stops. Furthermore, SERL team members seeded themselves into each production contact wave, to help make sure that mail and email traffic arrived in a correct and timely fashion. Staff also decided to create a separate clone of the survey in Qualtrics for exclusive use with the email-only group, as mentioned elsewhere. This was to avoid contact wave confusion and to enhance survey security.

Throughout data collection, project team members also scrutinized survey activity for signs of hacking or “botting,” and they created a Qualtrics “trigger and trap” mechanism to prevent duplicate attempts and completions (e.g., erroneous electronic *x* electronic submissions; erroneous electronic *x* paper submissions). Likewise, staff implemented some of the same measures that governed the pilot – tracking odd completion times (e.g., from “speeders”), looking for improbable answer patterns (e.g., from “straightliners”), identifying unusually large segments of missing data, and locating gibberish responses using SPSS syntax. When concerns arose regarding these situations, the SERL team convened and discussed keeping, or throwing out, the response sets in question. Thrown out cases were ineligible for gift cards and drawing prizes.

Specific paper survey precautions

As described in the *Virginia Educated* pilot technical appendix, SERL implemented custom quality control standards for paper survey data handling. These standards carried over to the production phase of the study. First, SERL logged all paper survey completions to watch for – and reduce the possibility of – respondents submitting electronic *and* paper surveys. If no duplication was found, team members entered the paper survey into the live Qualtrics module.

Second, over the course of data entry, if paper survey respondents selected in excess of the recommended number(s) of answer(s) to certain survey questions, SERL staff used an Excel random number generator to choose the answers to record. Third, if participants gave more than

one response for matrix-Likert questions (e.g., marking two answers per row), staff referenced the Excel random number generator to identify the answer to input as well.

Contacts log and gift card tracking

As they had done earlier, SERL maintained special databases for the production survey. The first database contained the sample, which helped with overall organization and mail merge activities. Similar to the pilot, this database also linked to: (a) a Contacts Log, where SERL made note of phone/email inquiries about the survey; and (b) a Gift Card Tracking Log, which captured gift card distribution. This second extract contained *solely* reward dispensation information, per VCU's internal control/audit requirements (e.g., gift card serial numbers, to whom each gift card was assigned, and gift card mailing batch dates).

Data analysis preparations

Several areas of the project required preparations for data analysis. They are described below.

Using the pilot as a roadmap to production

One crucial step in preparing for production data analysis was to closely examine pilot survey data. Throughout the Summer of 2020, the SERL team scoured outputs to look for expected, unexpected, and otherwise standout pilot results (e.g., variations in survey responses by SCHEV degree discipline group, by traditional or non-traditional student status, by in-state or out-of-state residency). This undertaking allowed staff to prepare for the production assessment.

For the mix of incentives, stationery, logos and contact approaches selected for the probability-based sample in the production survey, the pilot survey data predicted a yield of 13,061 completions with a response rate of 25.9 percent. The production survey finished with a yield of 13,294 completions with a response rate of 26.3 percent.

Testing for bias; comparing probability sample and email-only groups

Project staff also studied features of the *Virginia Educated* response set for evidence of different response rates and/or bias among subgroups in the data. This was important because it helped validate data quality ahead of reporting. The work was also particularly useful because it helped the team determine if probability sample and email-only responses could be combined in data analysis.

As part of its review, SERL considered survey results by characteristics such as:

- Type of sample – for instance:
 - AlumniFinder no contact information cases vs. cases with contact information in the sampling frame
 - Oversampled groups
- Method of contact:

- Probability sample
- Email-only replicate
- Booklet approach:
 - Technical/vocational census (all of these cases received booklets)
 - Other cases randomly sampled into booklet wave
- Completion status and distribution channel:
 - Booklet completion
 - QR code completion
 - Anonymous Qualtrics URL completion
 - Text-back completion
- Email status:
 - Cases with email addresses in the sampling frame vs. cases without email addresses in the sampling frame

Consultation, cleaning, and weighting

As production data collection drew to a close, SERL sought consultation from SCHEV and VEDP regarding ways to report results by certain demographic characteristics. In particular, before crafting the report, they invited clarification on how to handle:

- Race and ethnicity
- Age at entry into undergraduate education
- Income categories:
 - Median annual
 - Quintiles or collapsed categories (showing about 20 percent of respondents in each)
 - Comparison to Federal Poverty Level multiples (e.g., 0-200 percent)
 - Earnings relative to geographic location (e.g., Metropolitan Statistical Areas)
 - Raw earnings as well as adjusted earnings to reflect costs of living
- Hierarchies of degrees and highest degrees earned (implications for underemployment assessment):
 - Homing in on self-reported highest degree
 - Collapsing some degrees to facilitate data analysis (e.g., levelling specialist degrees, first professional degrees, and doctoral degrees)
- Ways to handle degrees supplemental or ancillary to the degrees that got individuals into the survey
- Ways to construct an underemployment variable or otherwise document underemployment:
 - Participants with education above and beyond what is needed in their primary occupation:

- Compare respondents' self-reported highest degrees with the degrees they indicate are required for their primary jobs
 - Potentially consider U.S. BLS occupational data
- Respondents who do not work as many hours as they would like to
- Participants whose salaries/wages are not as high as they would like
- Respondents who say, for themselves, that they are underemployed
- Definitions of non-traditional students:
 - Including participants who work full-time/near full-time while pursuing their degree(s)
- Definitions of under-represented students:
 - Using Pell Grant information where available and appropriate
 - Consulting rural/urban conceptions per the Federal Communication Commission's Rural Digital Opportunity Fund (<https://www.fcc.gov/auction/904>)
 - Running addresses through an Open Street Map geocoding processes, to transform them into county, tracts, block groups, and blocks
- Minimum cell sizes to be reported:
 - For example, 25 cases
- Primary reasons for pursuing undergraduate education – job or other
- Geographic mobility:
 - For instance, considering in-state/out-of-state tuition status at time of respondent matriculation
- Reporting selected study results by institution, as compared to grouped comparable institutions – for instance:
 - Including tables displaying response rates and substantive data for key subgroups like discipline group and demographics
 - Non-weighted N values, weighted percentages, and explanations of created variables and sampling error calculations
 - Limiting four-year institution comparisons to other, grouped four-year institutions
 - Limiting two-year institution comparisons to other two-year institutions, reflecting the community college grouping strategy described previously

Specific methodological approaches are outlined at the end of this document.

SERL also cleaned data in ways like:

- Removing bad cases that did not pass quality control checks
- Excluding non-5-digit ZIP codes
- Removing outliers in questions such as numbers of internships, household composition figures, personal/household income amounts, and student loan monthly payments
- Setting low and high bounds on years of age

- Checking the possibility of participants reporting degrees twice over – the degree that got them into the sample noted as supplemental education in Question 16
- Correcting 4-digit years for degrees received; eliminating reports of duplicate degrees
- Limiting weeks worked in a year to no more than 52

Field of study coding

Some data collected in the *Virginia Educated* production survey required special preparation and handling. For instance, SERL used SCHEV’s seven broad discipline groups in the questionnaire to have participants categorize their fields of study for additional credentials they may have earned (Question 16), instead of leaving the field of study question completely open-ended (as it was in the pilot survey). This strategy was employed for two reasons – to better systematize answers and also to reduce the amount of coding needed. These discipline groups, themselves derived from Classification of Instructional Programs (CIPs) families, included:

- Business and communication
- Education
- Health professions
- Liberal arts
- Psychology and social sciences
- STEM
- Trades – construction or vocational

Institution coding

Just like they did with the pilot, SERL staff referenced the 2018-19 Integrated Postsecondary Education Data System (IPEDS) from the National Center for Education Statistics (NCES; see: <https://nces.ed.gov/ipeds/use-the-data/download-access-database>) to get a sense of the selectivity of institutions respondents applied to for their undergraduate education (Question 14). They converted participants’ write-in responses to survey Question 14 to IPEDS 6-digit UNITIDs, which then matched to each IPEDS UNITID’s admission rate. They also translated answers to Question 16 (institutions attended for supplemental education) into IPEDS UNITIDs. Altogether, 17,681 responses were coded.

Of note, in Question 14 and Question 16 (institutions attended for supplemental education), when respondents reported institutions with multiple campuses and did not otherwise name specific campuses, the “flagship” of that system was coded (e.g., University of North Carolina at Chapel Hill; University of Massachusetts-Amherst).

It is important to point out that some non-IPEDS UNITIDs were created for use with Question 14 as well as for Question 16 (institutions attended for supplemental education). This was done to avoid excluding the responses from analysis. New codes were developed for:

- International colleges and universities (one code for any of these; e.g., the London School of Hygiene and Tropical Medicine)
- Air University (U.S. Air Force; U.S. Space Force)
- Army Command and General Staff College
- Army or Navy War College
- Community College of the Air Force
- Judge Advocate General School
- The Apprentice School at Newport News Shipbuilding
- Uniformed Services University of the Health Sciences
- Virginia-Maryland College of Veterinary Medicine

Notably, too, many kinds of professional associations or credentialing bodies could not be UNITID-coded in Question 14 or 16, and so they were designated “unassignable” (e.g., Project Management Institute; Certified Financial Advisors Institute; real estate schools). In addition, some Question 14 and 16 cases were “unassignable” because there were several institutions with the same name, and there was not enough information in the responses to distinguish them (e.g., King College/King’s College/The King’s College/King University). In other cases, acronyms reported might be for different institutions (e.g., ASU could be Arizona State University or Appalachian State University; SDSU could be San Diego State University or South Dakota State University) and they could not be coded, either.

Significantly as well, when IPEDS UNITIDs were available for online or private schools, but campuses could not be identified, a Virginia location was selected (e.g., Strayer University-Virginia; University of Phoenix-Virginia; South University-Richmond; Argosy University-Northern Virginia; Chamberlain University-Virginia). Moreover, Question 16 could not always differentiate between “brick-and-mortar” supplemental education and online education unless clearly stated by respondents (e.g., Purdue University vs. Purdue University-Global). When in doubt, the brick-and-mortar institution was coded.

HEGIS for course coding

Repeated from the pilot, SERL calculated numbers of math-intensive courses completed by participants consenting to secondary data linkage, using course-level indicators in the secondary data provided by SCHEV. The Higher Education General Information Survey (HEGIS) classification system proved essential to this task. These figures, along with SCHEV-assigned STEM course designations, were provided to CURA to incorporate into their multivariate analyses.

Open-ended response coding

SERL crafted a “project” within REDCap (Research Electronic Data Capture module) for processing the production survey’s tens of thousands of open-ended responses. Altogether, the

team applied 57,191 codes to 40,491 records. An analysis of open ends – as well as notable quotes – appear in the main report.

In terms of methodology, and by way of background, REDCap is a virtual, secure, HIPAA¹-compliant platform often used by universities for survey and database work (<https://ts.vcu.edu/askit/research-math-science/redcap/>). Decoupled from identifying data, the survey's open-ended responses were loaded into this REDCap project. From there, SERL staff and Data Entry Team students were able to assign thematic codes to responses. Each answer received up to four codes. Examples of coding categories appear below.

To help streamline the coding effort, SERL staff created a process document, a codebook with decision trees and sample responses (see below), and coding orientation videos. Although no formal inter-rater reliability process was in place, coders could request consultation through the REDCap form. They also met periodically to confer and/or to discuss coding progress. When coding was complete, coders went back through their responses for retrospective review – to verify the accuracy of their original codes and/or to adjust codes if necessary.

Where necessary, SERL staff reconciled or reformulated the pilot's open-ended codes and formatted them for use with production data. For example, Question 29 (In what ways do you not feel successful?) was new to the production survey, and it branched off of Question 28 (There are many ways to define success. In what ways are you successful?). To generate codes for Question 29, the eight answer choices from Question 28 were reversed. A total of thirty responses were then randomly selected and coded. From these responses, additional codes were added. SERL also used content domains described in Dunkel & Kerpelman (2006) to define codes. Some new codes were likewise added or adjusted based on respondent comments. In total, the following twenty codes were used for Question 29:

- NA; Not applicable; no response; prefer not to respond
- I don't know; Unsure
- Off-topic, not codable for some other reason
- Unspecified reason for lack of success
- Negative impact(s) from COVID-19
- Lack of career or job satisfaction; professional growth or professional status and/or difficulty finding a job
- Lack of community involvement, impact, or service (work-related)
- Lack of community involvement, impact, or service (not work-related)
- Lack of financial stability, security, self-sufficiency, control of debt; income does not meet needs or expectations
- Lack of educational achievement or progress, concerns about educational path; cost of additional education

¹ Health Insurance Portability and Accountability Act

- Lack of family relationships; problematic family relationships
- Lack of friendships or other social relationships
- Lack of sense of personal growth, fulfillment, confidence, or perspective, sense of being behind, stagnant
- Lack of physical and/or mental health
- Lack of institutional support for goals and/or generally poor experience at college/university; felt generally unprepared after graduation
- Career and/or employment is unrelated to obtained degree/field of study
- Degree was worthless or otherwise not helpful, for financial or other reasons, regrets getting degree, does not use degree
- Mention of discrimination
- Other, general comment
- Other reason for lack of success

In another instance, two questions (93 and 27) in the pilot survey were combined into one open-ended question in production (98). Codes from both questions were refined prior to deployment in REDCap; codes were revised again as the REDCap process unfolded.

Pilot Question: What are the biggest impacts your undergraduate education has had on your life – positive or negative?

Pilot codes identified: 37

Pilot Question: What would your life be like today without your undergraduate education?

Pilot codes identified: 32

Production Question: What are the biggest impacts your undergraduate education has had on your life – positive or negative? What would your life be like today without your undergraduate education?

Coding ReconciliationSteps:

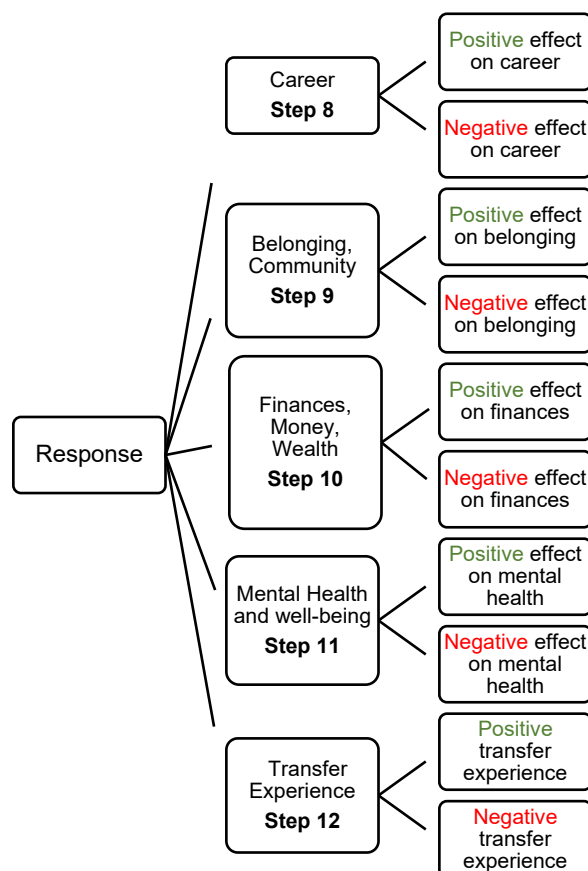
Review pilot codes
Identify major content categories (e.g., employment, career)
Merge similar codes
Establish directionality – positive or negative – of each code
Load codes into REDCap module
Revise, refine, add to codes as needed
Recode select records as needed (approximately 1 percent)

Production codes used: n=29

- Don't know, Not sure
- No answer or not applicable
- Unspecified change
- No effect (none)
- Off-topic comment
- Positive effect, unspecified
- Negative effect, unspecified
- Effect identified, but unclear if positive or negative
- Positive career or employment effect
- Negative career or employment effect
- Mention of trade or technical school or military
- Degree is unrelated to career
- Positive belonging or social effect
- Negative belonging or social effect
- Positive financial or wealth effect
- Negative financial or wealth effect
- Positive mental-health or well-being effect
- Negative mental-health or well-being effect
- Positive transfer student experience
- Negative transfer student experience
- Positive skill-building effect
- Positive achievement and/or personal growth effect
- Positive community or societal effect
- Positive extracurricular effect
- Positive knowledge effect
- Travel or relocation effect
- Mention of discrimination
- Negative or neutral knowledge effect
- Mention of COVID-19 effect

Regarding Question 98, coders followed guidelines like those illustrated in Figure B-6.

Figure B-6: Sample Decision Tree for Coding Open-Ended Response Content and Directionality by Major Category, *Virginia Educated* Production Survey Question 98



In other situations, SERL generated codes for new open-end production items, like Question 100 (“Please use this space for any other comments about the issues covered in this survey.”). To set up large-scale analysis, dozens of Question 100 records were reviewed and preliminary codes were established. From there, codes were revised or created as reviewers progressed through the open-ended answer stack. Ultimately, Question 100’s codes covered a wide range of responses and topics, such as:

- Don't know, Not sure
- No answer or not applicable, N/A, none
- Not codable
- Off-topic comment
- Survey feedback
- Personal data correction
- Positive impacts of COVID-19
- Negative impacts of COVID-19
- Mobility in and out of VA

- Positive effect and/or experience in higher education
- Positive transfer experience
- Positive effect of general education
- Negative effect and/or experience in higher education
- Negative transfer experience
- Negative effect of general education
- Lack of belonging and support
- Negative financial effect of higher education
- Lack of career/job/"real world" preparation
- Resource allocation or change to curriculum/instruction/practices suggestion (not career-related)
- An undergraduate degree is not enough
- Pathways to success other than higher education: is college for everyone?
- Support needed for specific student groups
- Direct advice to a student
- Intangible positive effect of higher education
- Comments or suggestions about higher education system overall
- Mention of discrimination
- No effect of higher education
- Degree unrelated to career
- Degree is worthless/valueless
- Other reason for success/lack of success

For Question 100, reviewers used coding pathways to assess responses, like those laid out in Figure B-7 and Figure B-8.

Figure B-7: Sample Decision Tree for Coding COVID-19 Response Content and Directionality, *Virginia Educated* Production Survey Question 100

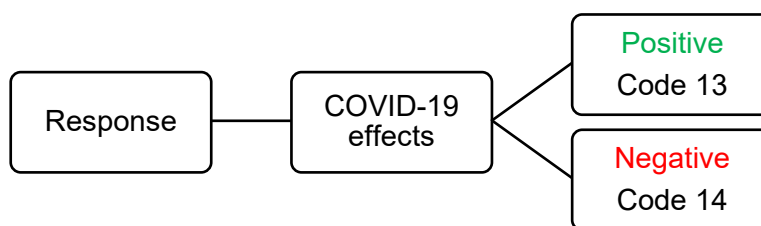
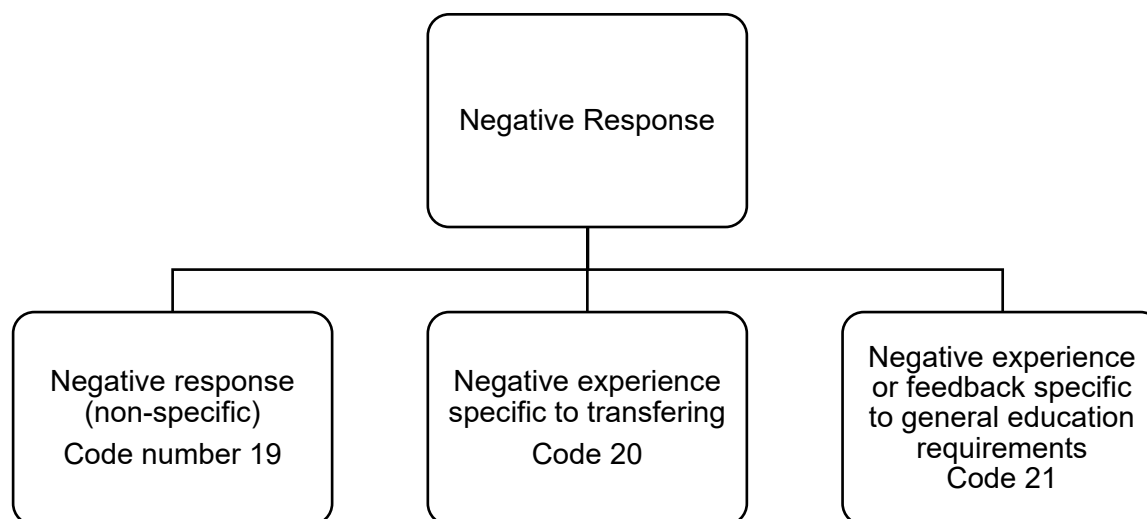


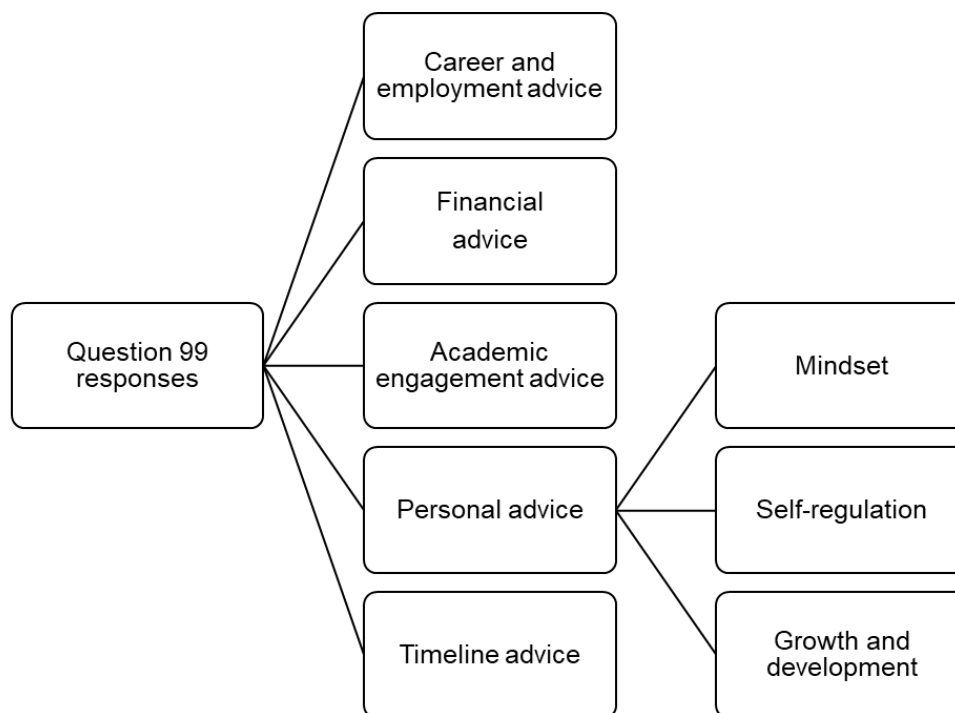
Figure B-8: Sample Decision Tree for Coding Higher Education Negative Response Content, *Virginia Educated* Production Survey Question 100



For Question 99 (“What advice would you give undergraduate students today?”), a total of 49 codes were generated. Pilot codes were expanded to more accurately capture the diversity of responses received in the production phase.

SERL staff identified the primary themes for each of the codes. Themes included career and job advice (e.g., “Look for job-related opportunities,” “May not get the job you want.”), financially-focused codes (“Stay local to save money,” “Save for retirement.”), academic engagement codes, (“Study abroad,” “Attend office hours.”), self-regulation and personal growth/discovery (“Find out what you love,” “Get uncomfortable.”). The SERL team also identified codes related to the timeline of undergraduate education (“Take a gap year,” versus “Start right away.”). See Figure B-9 for a thematic coding pathway.

Figure B-9: Sample Decision Tree for Coding Response Content, *Virginia Educated* Production Survey Question 99



The 49 codes utilized for Question 99 were:

- Job search - be aggressive/Start as early as possible
- Learn as much as you can/Develop critical thinking
- Take advantage of all the opportunities offered/Join extracurriculars/Take advantage of the privilege/Leadership experience/Live on campus/Go far from home
- Don't give up/Keep your head up/Finish what you started/Keep pushing/ Put the work in
- Loans - Don't take/Make sure your major will cover your debt/Avoid unnecessary loans/Be financially prepared for burden/Don't buy material things with loans/Pay off loans as soon as possible/Get credit or consumer counseling before taking on loans/Get as many scholarships as possible
- College is not the only route to a good living/Consider trade or military school/Make sure you really need to attend/Only go if you know exactly what specific skill or job you want/Don't go just because you think you have to/You may be happier without it
- Stay in state /Stay local and/Commute to save money/Consider school affordability

- Work hard/Stay focused/Take it seriously/Study/Good grades/Pay attention/Go to all classes/Treat it like a full-time job/Read/Get what you are paying for/Finish it/Strong work ethic/Don't procrastinate
- It will be worth the effort/It will pay off down the road/It will shape you in unexpected ways
- Ask for help when needed/Use resources for success
- Have fun along the way/Enjoy it/Don't take it for granted/It goes by quickly/It will never be as good again/Would like to go back but can't afford to/There is more to college than grades/Appreciate the privilege.
- Don't work full time while in school
- Have an end goal in mind/Think critically about your career goals/Prepare for life after college and adulthood/Plan/ Think ahead
- The major really doesn't matter a lot, just get the piece of paper/You can always switch jobs later/You don't need to figure it out right away
- Look for job-related opportunities in addition to college coursework/Get real-world experiences/Intern and volunteer where you think you want to work to ensure this is what you really want to do/Explore career paths/Work while in school/Learn workplace skills
- Go to community college first to save money/Transfer to community college/Clear out gen eds at community college/Take CLEP exam/CLEP during high school/Gen eds not worth the money
- The college experience is over-hyped/Not worth the money/Low college premium/Cost-benefit analysis of higher education
- Choosing major/school: Do a lot of research/Focus on your first two years/Get mentor and counselor advice/Learn the job market/Be practical/Shadow people in your field because then you are stuck with it/Link your degree to a job or career/Useful degree/ GPA and grades don't matter
- Go after your dreams/Think big/Shoot for the stars
- Take accounting/Learn to budget/Personal finances
- There is no timeline/Don't be afraid to stretch it out in order to keep debt down or make it work out/It's not a race/Follow your own pace/Pace your coursework
- Practice writing papers/ Develop communication skills/Public speaking
- Don't let the opinions of others interfere with your work/Be true to yourself and own path/Be happy/Don't sweat the small stuff/Keep your integrity and values
- Take care of your health (physical and mental)/Talk to someone if you need help/Don't take it too seriously
- Prepare for rejection after graduation/You will have to start at the bottom/May not get the job you want

- Get uncomfortable and curious/Personal growth/Develop independence/Challenge yourself/Learn about yourself now/Don't be afraid to fail/Broaden your class selection/Learn to think/Question everything/Try something new
- Attend office hours/Ask honest questions of professors and advisors/Get to know professors
- Save for retirement/Start building credit as soon as possible, save money in general/Prepare financially for adulthood
- Go to a four-year university/Go to college right away and when young
- Find a balance of education and experiences
- Time management/Use your time wisely
- Pay attention to the process/Requirements especially when transferring/Don't take unnecessary courses
- Don't attend [specific school]/Don't attend college/Don't take [name]'s class
- Network/Make connections/Focus on relationships/Who you know is all that matters/Friendships
- Gen ed is valuable/Everything you learn can be helpful later on
- Get additional degrees/Don't stop at AA level
- Study abroad/Travel
- Find research opportunities
- Find out what you love/What makes you happy or fulfilled/Self-discovery/Get a degree in what you love and enjoy rather than what can get you a job/Minor in something you are passionate in/Expand definition of success
- Pursue additional certificates
- Major in STEM/Take computer courses/Add technology certificates
- Get to know your college town and surrounding area
- Take some time after high school before going to college/Get work experience before college
- Find the right fit in a college
- You're never too old to learn/Never stop learning
- Other, not specified
- Be flexible/keep an open mind
- Nothing/NA
- Don't Know/Not sure

Another question in the survey had open ends: Question 68 (“What could your college or university have done differently to prepare you for the workplace?”). The SERL team used 41 codes from the pilot survey, then expanded and refined them into the following list in production:

- Nothing; not much; nothing different; no recommendations
- Internships, externships; shadowing; work study; apprenticeships; hands-on learning/training opportunities; real-world experience; on-the-job training; labs; clinics; clinical hours; required work experience; experiential learning
- Focus on workplace skills: communication, public speaking, professionalism, critical thinking, conflict management, teamwork, networking, interpersonal behavior, management style; salary negotiation; presenting; research; role play work issues
- Mentoring, mentorships
- Don't know, unknown, not sure
- Other unspecified workplace preparation
- Other, unspecified, not codable
- Faculty changes; change dynamics with faculty; faculty approach or attitude adjustment; faculty approach more similar to employers; more experienced faculty; faculty qualifications
- Reduce coursework repetition; require groupwork, presentations, speaking, and writing; reduce general classes; reduce class sizes; offer focused, practically-relevant classes; workplace specific classes; extend program length; increase course challenge
- Be more up to date
- No answer; not applicable; no comment; blank
- Financial education; provide information on how to handle student loan debt, retirement, savings, taxes; financial planning; home buying; insurance; employee benefits; personal finance
- Increased use of technology; technology integration in teaching; technology instruction; more math or science; more technical coursework; more software training; technical skills; laboratory skills
- General help transitioning to the real world; life skills training
- More social interactions; job/career-oriented social opportunities; networking opportunities; student organizations; new and different activities appealing to wider audience
- Reduce costs; improve financial aid options; better funding overall
- Felt prepared; satisfied
- In-depth information about career options; offer more/different majors and degrees; provide industry-specific options; help students learn about jobs matched to their skills, desires, strengths; explore career paths; inform about other job requirements

- Career services or graduate school assistance; job search/placement; targeted job fairs; career coaching; help with résumés, interviews, applications; mandatory job/career prep in courses; graduation follow up; career advising
- Work/life balance; mental health
- Dissatisfied; do not have recommendations
- Already working when enrolled; encourage students to work while in school
- Regular progress meetings with faculty, staff; more personalized faculty-student attention; more advising sessions; improve advising or guidance counseling; have career meetings when choosing major
- Dissatisfied and have recommendations
- Changes to campus climate or culture; courses or discussions on diversity/cultural experiences
- Changes to admission processes (e.g., interviews in addition to applications)
- Discuss realistic working world, job, or expectations or conditions; be realistic about job prospects and finances; job market outlook; prepare for job failures: discuss ways to apply skills to other fields
- Institution offered help but I didn't use it; more responsibility on students
- Communicate more with employers regarding skills needed; communicate with local or non-local employers; communicate with more employers generally; more employer visits; more employer interaction; interact with employers to understand education application
- More help or respect for non-traditional students (part-time, off campus, older, working, with families, other)
- Degree had little or no impact on job/career; job/career unrelated to degree or field of study
- Speakers/presenters/instructors from working world
- More online classes or degrees
- Standardize classes across the state in particular fields of study
- Less focus on graduate school and more focus on workplace preparation
- Increased focus on teaching; teaching skills; teaching preparation; teaching improvements
- More independent study or self-directed assignments; less groupwork or group projects
- Education overqualified for position
- Prepared for additional or different education; prepared for graduate school
- Study abroad opportunities
- Do not focus on workforce preparation

Primary job title coding

SERL also worked with staff at VEDP to translate some of the 13,567 primary job title responses to *Standard Occupational Classification* (SOC) codes using a list from Burning Glass Technologies (see generally, 2019). SERL first ran Excel’s fuzzylookup with a transformation table (in the XML configuration). Then, they used Python – with package fuzzymatcher – to also look for matches. Excel turned out to be more powerful at identifying matches, so the SERL team continued with it. If Excel and Python *both* matched a given response to the same code, SERL staff were more confident in the results.

In total, Excel was able to perfectly match 1,849 responses (about 13.6 percent). Where fuzzy match values were still high (e.g., fuzzylookup match value of greater than 0.91) and where both Excel and Python found the same results, an additional 1,987 (about 14.7 percent) responses matched. After looking for obvious errors like false positives, the fuzzy matching process matched 3,836 records, or about 28 percent of the total (see Figure B-10).

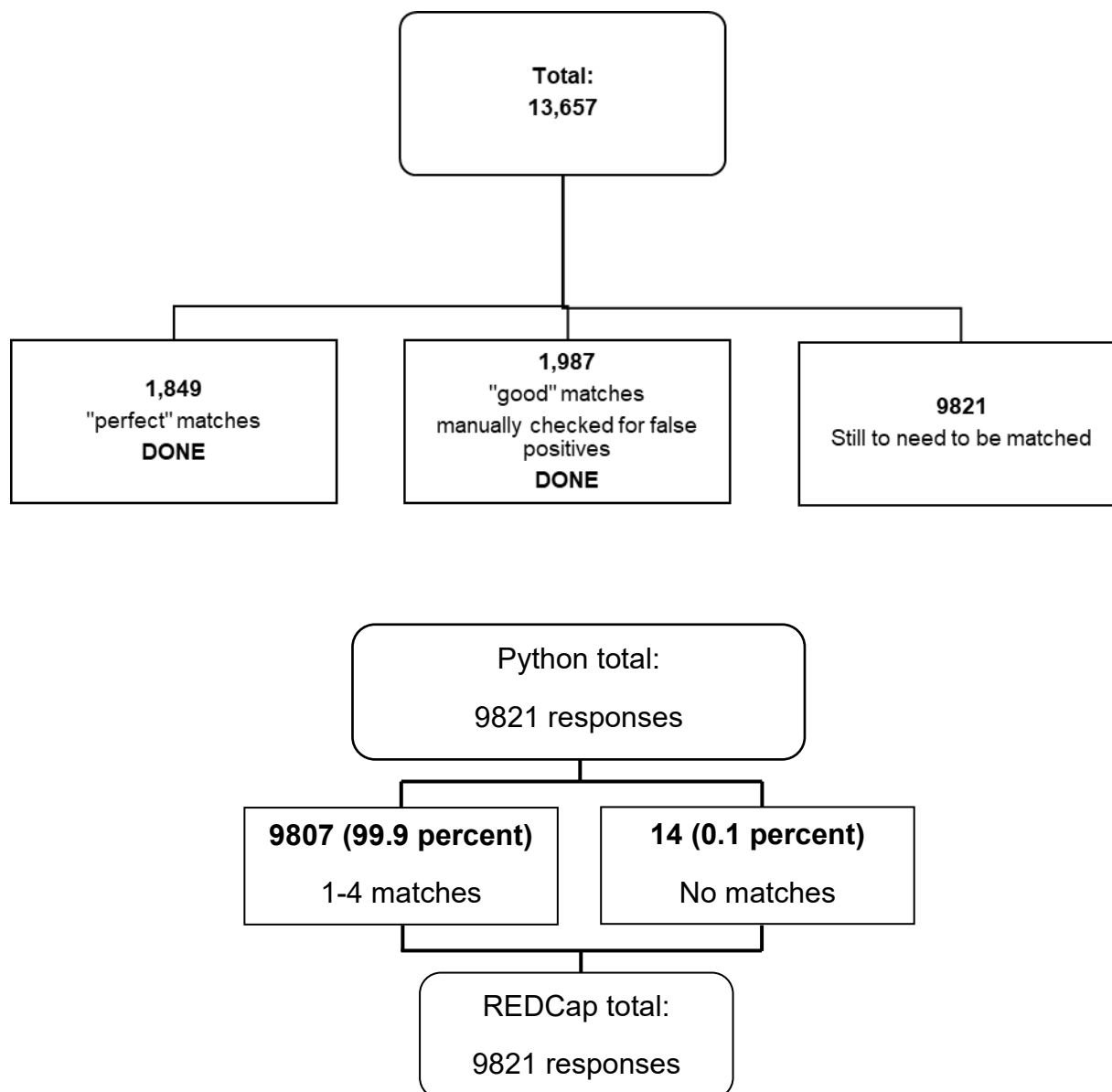
After initial work using the fuzzylookup plug-in in Microsoft Excel, a list of 0-4 recommended SOC codes was generated for the remaining respondents’ job titles using O*NET Web Services, a module sponsored by the U.S. Department of Labor, Employment and Training Administration (USDOL/ETA, 2021) and created by the National Center for O*NET Development. Using Python 3, first, a CSV file containing responses for Question 42, Question 41, and Question 44 with corresponding respondent SERLIDs was input into a DataFrame. The program then logged into O*NET Web Services using the credentials provided by the service and proceeded to pass sets of keywords incrementally into the service – for each set of keywords, the service sent back a series of SOC codes and their titles that were determined to be the best matches for the keywords in JSON format.

For each respondent, keywords passed to O*NET Web Services were generated based on several criteria. First, the keywords always included the respondent’s job title (Question 42) – in order to increase accuracy when the respondent’s answers were complete sentences, the value passed from Question 42 was limited to before the first period (i.e., “I am a banker. I do so and so...” passed as “I am a banker”). If the respondent provided an occupation answer (Question 41), then this value was concatenated with the value for job title. If the respondent did not provide an occupation answer but did provide an industry answer (Question 44), then the value for the industry answer was concatenated with the value for job title.

Each set of keywords had a maximum of four SOC codes and titles generated from the service. Once these results were returned by O*NET Web Services, the results were exported into a CSV file containing the respondent’s SERLID, their job title, occupation, and industry responses, as well as each of the SOC codes and titles generated by the service and their relevant codes. This CSV data was then entered into REDCap whereby a team of SERL coders could read through the available job title, occupation, and industry survey responses and designate the SOC code and title from those provided by O*NET Web Services that best matched the survey responses. If

none of the SOC codes and titles were suitable, then additional manual coding was necessary to determine the appropriate SOC code. In total, the Python application was used on 9,821 job title survey answers. Of those responses, fourteen did not receive any matching SOC codes from O*NET Web Services. All 9,821 responses were entered into REDCap for future review – and further manual coding if necessary.

Figure B-10: Excel and Python Fuzzy Matching Results for Primary Job Title, *Virginia Educated* Production Survey



Coding location of residence at time of enrollment

Project staff likewise applied Excel's fuzzylookup plug-in to Question 72, which asked respondents where they came from if they lived out-of-state prior to their undergraduate education. Excel was able to match FIPS codes to 2,762 write-in answers. Any similarity less than 0.97 was manually checked for accuracy and coded as needed. The following coding decisions were made:

- If a respondent listed multiple locations, the first location was assigned.
- If a respondent listed “military,” the FIPS code “1100 APO/FPO Addresses” was assigned.
- If a respondent listed a military base, the FIPS code corresponding to that location was assigned.
- If a respondent listed they were in the military but a resident of another state (other than Virginia), the FIPS code corresponding to their state of residency was assigned.
- If a respondent listed they went to another university (outside of Virginia) prior to coming to Virginia, but were a resident of another state, the FIPS code corresponding to their state of residency was assigned.
- If a respondent listed they were learning virtually, but listed no location, a location was not assigned.
- If a respondent listed they attended a Virginia university, but commuted (and lived in another state) or were attending a satellite campus in another state, the FIPS code for that location was assigned.
- If a respondent listed any foreign country, the FIPS code “1090 Foreign Countries” was assigned.
- If a respondent listed a U.S. location without being more specific, the FIPS code “1057 State Unknown” was assigned.
- If a respondent listed Virginia, the FIPS code “902 VA In-State (Virginia) Unknown” was assigned.
- If a respondent did not list a location or the location could not be deciphered, a FIPS code was not assigned.

Special data analysis notes: Other, write-in response coding

Twenty-nine questions included an “Other” space that allowed *Virginia Educated* respondents to write answers of their own. For two demographic questions (Race/Ethnicity and Gender), the “Other” text responses were recoded (see notes on data cleaning elsewhere in this appendix). Question 2 of the survey (In what semester did you start your undergraduate education?) was not analyzed, as SERL already had this information from SCHEV administrative data. For the remaining 26 questions, a total of 8,483 write-in responses were assessed by the SERL team. Staff completed this review to see if the percentage of participants who chose the “Other” response was less than 10 for most questions (range = 0.95 percent to 15.05 percent, n = 26).

For four questions, the percentage of participants who chose “Other” was greater than 10. These four questions had multiple response formats that allowed respondents to pick several answers at a time. For Question 21 (In the past 12 months, what kind of volunteer activities did you engage in?), 12.6 percent of respondents chose the “Other” option. However, only 6.7 percent of respondents *only* chose “Other.” For Question 32 (Which of the following describes why you are

not currently employed?), 14.6 percent of respondents chose the “Other” option, but 9.7 percent *only* selected the “Other” answer choice.

For Question 36 (If you work less than 35 hours per week, is it for any of the following reasons?), 15.1 percent of respondents chose the “Other” option, but 10.1 percent *only* selected the “Other” answer choice. For Question 73, (Why did you come to Virginia for your undergraduate education?), 14 percent of participants endorsed “Other,” but 7.9 percent *only* chose “Other.”

These results suggest that for most questions, the answer arrays provided captured at least one response from respondents.

Specific findings by question – as well as some additional details – are discussed below.

For Question 3 (“What is the primary reason you started your undergraduate education? [Select one only]”), 3.6 percent of participants chose the “Other” category. Participants who wrote responses indicated combinations of reasons for starting their undergraduate education (i.e., they were unable to pick one answer). Some of the respondents mentioned an athletic or sports scholarship or opportunity.

For Question 7 (“Which statements best reflect why you have this level of appreciation now about your general education experience?”), 3.4 percent of participants selected the “Other” category.

As noted above, for Question 21 (“In the past 12 months, what kind of volunteer activities did you engage in?”), 12.6 percent of participants chose the “Other” category. Common write-in responses included donating blood or conservation/environmental stewardship work.

Additionally, participants mentioned “election work,” which is also addressed in Question 24. Of the participants that marked the “Other” category, 6.7 percent selected *only* the “Other” answer choice.

For Question 31 (“Which one option best describes your current, primary employment status?”), five percent of respondents endorsed “Other.” Most answers suggested that participants had multiple jobs or were on disability (also addressed in Question 32).

As stated previously, for Question 32 (“Which of the following describes why you are not currently employed?”), 14.6 percent of respondents endorsed “Other.” Of the participants that marked the “Other” category, 9.7 percent selected *only* the “Other” answer choice. Write in answers suggest that some respondents are not working because they cannot find employment, they are not working because they do not want to be exposed to COVID-19, or they cannot work due to caregiving responsibilities.

As noted earlier, for Question 36 (“If you work less than 35 hours per week, is it for any of the following reasons?”), 15.1 percent of participants selected “Other.” Of the respondents who marked “Other,” 10.1 percent selected *only* the “Other” answer choice. Write in responses reveal

that, for some participants, 35 hours is the maximum amount of hours they can work, and also that caregiving responsibilities prevent them from working additional hours. Although the number of “Other” responses was more than the 10 percent guideline, this did not indicate issues with respondent comprehension of the question or other problems, in the research team’s judgment.

For Question 60 (“During your undergraduate experience, did you do any of the following?”), 1.9 percent of participants selected the “Other” category. Common write-in answers included “having a job” (addressed in Question 62). “Church and religious/spiritual activities” were also among the most frequent write-in responses.

As indicated earlier, for Question 73 (“Why did you come to Virginia for your undergraduate education?”), fourteen percent of participants went with “Other.” Of the participants that marked the “Other” category, 7.9 percent selected *only* the “Other” answer choice. The most frequent write-in responses were for military reasons or for the Reserve Officers' Training Corps (ROTC). ROTC is also an option in Question 60 (“At any point during your undergraduate experience, did you do any of the following?”).

For Question 77 (“What was the primary reason you left Virginia after completing your undergraduate education?”), 3.8 percent of participants selected the “Other” answer choice. The most common write-in response was “financial reasons.”

For Question 83 (“Did/has your undergraduate student loan debt delayed or interfered with any of the following?”), 6.5 percent of participants endorsed “Other.” The most frequent write-in responses included “lowered credit score,” and “mental and emotional health concerns.”

For Question 113 (“Do you rent or own your primary residence?”), 1.3 percent of participants selected the “Other” category. Common write-in responses included “being in the process of buying a house,” and “living with a partner/significant other.”

Table B-11: Percent of Responses in “Other” Category, in Ascending Order, Virginia Educated Production Survey

Question Number	Percent of responses that chose “Other”
Question 81	0.9%
Question 79	1.1%
Question 113	1.3%
Question 76	1.3%
Question 65	1.5%
Question 24	1.8%
Question 60	1.9%
Question 78	2.2%
Question 47	2.3%
Question 28	2.3%
Question 7	3.4%
Question 66	3.4%
Question 3	3.6%
Question 77	3.8%
Question 71	4.3%
Question 70	4.3%
Question 50	4.5%
Question 31	5.0%
Question 51	5.2%
Question 83	6.5%
Question 49	6.7%
Question 54	7.6%
Question 21	12.6%
Question 73	14.0%
Question 32	14.6%
Question 36	15.1%

Note: The percentage of response in the “Other” category was calculated by dividing the number of respondents that chose the “Other” category by the number of respondents that answered the question.

Key project dates

Contract start date:	July 1, 2019
Submit focus group report:	September 30, 2019
Submit cognitive interview report:	January 6, 2020
Submit final pilot survey report and technical appendix:	June 29, 2020
Attend SCHEV Full Council Meeting:	July 13, 2020
Presentation to SCHEV Data Project Advisory Committee:	July 23, 2020
Presentation to SCHEV IPAC:	September 4, 2020
Presentation to SCHEV Full Council Meeting:	September 15, 2020
Finalize production survey instrument:	September 2020
Submission of production modification package to VCU IRB:	September 18, 2020
Finalization of e-gift card purchasing for production survey:	October 2020
Finalization of printing/mailing services contract for production survey:	October 2020
Revised project MOU, extending to April 2021:	October 2020
Revised project MOU, extending to June 2021:	November 2020
Production data collection initiated, email replicates (soft launch):	December 15, 2020
Production data collection initiated, probability sample:	December 23, 2020
Update to SCHEV Full Council:	January 11, 2021
Paper survey booklets sent to a specially-sampled group and by request:	March 15, 2021
Update to SCHEV Full Council:	March 22, 2021
Final email replicates launched:	March 22, 2021
Final probability sample mailing:	March 26, 2021
Final email reminders to email replicates and probability sample:	April 11, 2021
Nominal production survey data collection close date:	April 16, 2021
Email-only group survey closed:	April 28, 2021
Probability sample survey closed:	May 17, 2021
Initial early draft report sent to SCHEV:	June 16, 2021
Second draft report sent to SCHEV:	August 16-18, 2021
Results presentation to SCHEV Council and Council of Presidents:	September 13, 2021
Revised final draft report sent to SCHEV:	October 15, 2021

Attachments

(for the paper version of the production survey questionnaire, see Appendix A)

1. Recruitment Letters and Emails: Probability Sample
2. Recruitment Emails: Email-Only Group
3. Mailing Proofs: #10 Outgoing Envelope and 10 x 13 Paper Survey Booklet Outgoing Envelope
4. *Virginia Educated* Website Copy
5. Participant Information Sheet: Probability Sample
6. *Virginia Educated* Website Copy: Email-Only Group
7. Participant Information Sheet: Email-Only Group
8. Communication to University Presidents, Chancellors, and Superintendents
9. *Virginia Educated* Production Survey Variable Cleaning Notes
10. VEDP Predictors of Underemployment Model

Recruitment: Probability sample advance letter**COMMONWEALTH of VIRGINIA**

Peter Blake
Director

STATE COUNCIL OF HIGHER EDUCATION FOR VIRGINIA
James Monroe Building, 101 North Fourteenth Street, Richmond, VA 23219

(804) 225-2600
www.schev.edu

December 2020

[prod_firstname, prod_middlename, prod_lastname]
[prod_address]
[prod_city, prod_state, prod_ZIP]

[SERLID]

Dear [prod_firstname]:

You are invited to complete a special survey about the impact of undergraduate education in Virginia. Your opinions can help the State Council of Higher Education for Virginia (SCHEV) and other policymakers chart the future of higher education for all Virginians. This survey is part of a broader research effort called *Virginia Educated: A Post-College Outcomes Study*. It is funded by the Virginia General Assembly and other state partners, and administered by SCHEV.

The purpose of *Virginia Educated* is to better understand how recent undergraduates are doing – in their communities, at work, and at home. It offers a unique opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your workforce activity, quality of life, and community involvement.

Your opinions matter because you are part of a scientifically-selected sample. Importantly, too, your responses are confidential. Soon, you should also receive an email with your unique survey link sent to [email address already merged] from the State Council of Higher Education for Virginia with the subject line “You’re invited – Virginia Educated: A Post-College Outcomes Study.”

SCHEV is working with Virginia Commonwealth University’s Survey and Evaluation Research Laboratory (SERL) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate’s degree, or a bachelor’s degree from a state-supported college or university in Virginia between 2007 and 2018.

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

View the survey at <https://surveys.schev.edu/go>, or get your survey by text or QR code below.

Your Survey ID is [SERLID] and your Survey PIN is [PIN]. Please do not share them.

We hope that you will be a part of *Virginia Educated*. If you have questions about this study, please visit <https://surveys.schev.edu/about>, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and participation.

Sincerely,

TEXT BOX

SIGNATURE

QR CODE

Advancing Virginia Through Higher Education

Recruitment: Probability sample email 1

Contact 2: Email 1 (Email Invitation)

All in the probability sample with emails, less completers, get this.

Subject line: You're invited – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

A few days ago you should have received a letter regarding a survey about the impact of undergraduate education in Virginia. This survey is part of a research effort called *Virginia Educated: A Post-College Outcomes Study*. It is funded by the Virginia General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia ([SCHEV](#)).

[You may view your survey here \(LINK\)](#)

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

The purpose of *Virginia Educated* is to better understand how recent undergraduates are doing – in their communities, at work, and at home. It offers a unique opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your workforce activity, quality of life, and community involvement.

Your opinions are important because you are part of a scientifically-selected sample. Your responses are confidential.

SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory ([SERL](#)) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported college or university in Virginia between 2007 and 2018.

We hope that you will consider participating in *Virginia Educated*. Your opinions can help SCHEV and other policymakers chart the future of higher education for all Virginians.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/about>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,

Peter Blake, Director

SCHEV

<<Opt-out link>>

Recruitment: Probability sample email 2

Contact 3: Email 2 (Email Reminder 1)

All in the probability sample with emails, less completers and opt-outs, get this.

Subject line: Reminder – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

This is just a friendly reminder about your *Virginia Educated* survey invitation. Your feedback is important. Your opinions represent many other people because you are part of a scientifically-selected sample.

[You may view your survey here \(LINK\)](#)

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

The purpose of the survey is to better understand how recent undergraduates are doing – in their communities, at work, and at home. The study offers a unique opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your workforce activity, quality of life, and community involvement. It is funded by the General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia ([SCHEV](#)).

SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory ([SERL](#)) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported college or university in Virginia between 2007 and 2018.

We hope that you will consider participating in *Virginia Educated*. Your opinions can help SCHEV and Virginia policymakers chart the future of higher education for all Virginians. Your responses are confidential.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/about>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,

Peter Blake, Director

SCHEV

<<Opt-out link>>

Recruitment: Probability sample first reminder letter**COMMONWEALTH of VIRGINIA**

Peter Blake
Director

STATE COUNCIL OF HIGHER EDUCATION FOR VIRGINIA
James Monroe Building, 101 North Fourteenth Street, Richmond, VA 23219

(804) 225-2600
www.schev.edu

January 2021

[taylored_fullname]
[taylored_address]
[taylored_city]

[SERLID]

Dear [taylored_firstname]:

Recently we asked you to do an important survey that will help shape higher education in Virginia. If you already submitted your responses, please accept our sincere thanks! If not, please consider adding your feedback. Because we drew only a small sample of recent graduates, your individual answers will make the survey results more accurate. Your responses are confidential.

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

View the survey at <https://surveys.schev.edu/go>, or get your survey by text or QR code below.

Your Survey ID is [SERLID] and your Survey PIN is [PIN]. Please do not share them.

Soon, you should also receive an email with your unique survey link sent to [ValidEmail] from the State Council of Higher Education for Virginia with the subject line "Friendly reminder – Virginia Educated: A Post-College Outcomes Study."

The survey is part of a broader research effort called *Virginia Educated: A Post-College Outcomes Study*. It is funded by the Virginia General Assembly and other partners, and administered by the State Council of Higher Education for Virginia (SCHEV). SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory (SERL) to conduct this study.

The purpose of *Virginia Educated* is to better understand how recent undergraduates are doing. It offers a unique opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your workforce activity, quality of life, personal networking, and community involvement.

We hope that you will consider participating in *Virginia Educated*. Your opinions can help SCHEV and Virginia policymakers chart the future of higher education for all Virginians.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/about>, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,

TEXT BOX

SIGNATURE

QR CODE

Advancing Virginia Through Higher Education

Recruitment: Probability sample first reminder letter postcard insert

Contact 4a: Paper survey on demand and opt-out return postcard
Included with Contact 4: Mail 2 (Reminder Letter 1).
All in the probability sample, less completers and opt outs, get this.
The postcard is in business reply format, returnable to SERL.

(Card measures 3.75" x 5.5" so that it fits into a #10 outgoing envelope.)

BRE postage-paid artwork included here

[SERLID]

The Virginia Educated survey is also available on paper. If you prefer to complete it by paper, please check the box below and mail this card – no postage needed.

- Please send me a paper survey by mail
- Please change my survey contact information from what is on file:
New Postal Address: _____
New Email: _____
- You can also check here to be removed from the contact list for this survey*

Questions? Please visit <https://surveys.schev.edu/about> or email us at surveys@schev.edu. Thank you for your time and consideration.

Peter Blake, Director, SCHEV

Recruitment: Probability sample email 3

Contact 5: Email 3 (Email Reminder 2)

All in the probability sample with emails, less completers and opt-outs, get this.

Subject line: Friendly reminder – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

A few days ago you should have received a reminder in the mail about a special survey that will help shape the future of higher education in Virginia. Your opinions are important because you are part of a small sample. However, we have not heard from you.

Please consider participating in our survey. Your responses are confidential.

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

You may view your survey here (LINK)

This survey is part of a broader research initiative called *Virginia Educated: A Post-College Outcomes Study*. The purpose of *Virginia Educated* is to better understand how recent undergraduates are doing – in their communities, at work, and at home. It is funded by the Virginia General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia ([SCHEV](http://schev.edu)).

SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory ([SERL](http://serl.vcu.edu)) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported college or university in Virginia between 2007 and 2018.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/about>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,
Peter Blake, Director
SCHEV
<<Opt-out link>>

Recruitment: Probability sample paper survey cover letter

COMMONWEALTH of VIRGINIA

Peter Blake
Director

STATE COUNCIL OF HIGHER EDUCATION FOR VIRGINIA
James Monroe Building, 101 North Fourteenth Street, Richmond, VA 23219

(804) 225-2600
www.schev.edu

March 2021

[taylored_fullname]
[taylored_address]
[taylored_city]

[SERLID]

Dear [taylored_firstname]:

Recently we invited you to participate in a special survey about the impact of your undergraduate experience. Your feedback is valuable and it can help the State Council of Higher Education for Virginia (SCHEV) and other policymakers chart the future of higher education in the Commonwealth. Please note that we must receive all survey responses by April 16, 2021.

As a reminder, you are part of a small sample of recent graduates, so your individual answers to the survey will make the results more accurate. Your responses are confidential.

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

Soon, you should receive a reminder email sent to [ValidEmail] from the State Council of Higher Education for Virginia with the subject line "Your feedback matters – Virginia Educated: A Post-College Outcomes Study."

The survey is part of a broader research study called *Virginia Educated: A Post-College Outcomes Study*. It is funded by the Virginia General Assembly and other state partners, and administered by SCHEV. SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory (SERL) to conduct this study.

Unless otherwise specified, when the survey asks you about your undergraduate education, please think about the [Block_Degree] you received from [CollegeName] in [Block_Year].

If you would like to complete the survey online instead, you may access it at:

<https://surveys.schev.edu/go> A survey link is also available by text or QR code below.

Your Survey ID is [SERLID]. [yourpin] Please do not share these.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/about>, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Text Box

Sincerely,

QR Code

SIGNATURE

Advancing Virginia Through Higher Education

Recruitment: Probability sample final reminder letter**COMMONWEALTH of VIRGINIA**

Peter Blake
Director

STATE COUNCIL OF HIGHER EDUCATION FOR VIRGINIA
James Monroe Building, 101 North Fourteenth Street, Richmond, VA 23219

(804) 225-2600
www.schev.edu

March 2021

[taylored_fullname]
[taylored_address]
[taylored_city]

[SERLID]

Dear [taylored_firstname]:

Time is running out to give your feedback about the full range of impacts of your undergraduate experience in all aspects of your life – good and bad. Your honest input will help shape the future of higher education in Virginia. But the survey closes soon, and we need to receive your response by **April 16, 2021**.

If you already completed the survey and this letter crossed in the mail, thank you! You do not need to do anything more.

If not, please go to <https://surveys.schev.edu/go> or get your survey by text or QR code below.

Your Survey ID is [SERLID]. [yourpin] Please do not share these.

You are part of a small sample of recent graduates, so your individual answers will make the survey results more accurate. Your responses are confidential.

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

Soon, you should receive a reminder email with your unique survey link sent to [ValidEmail] from the State Council of Higher Education for Virginia with the subject line “Your feedback matters – Virginia Educated: A Post-College Outcomes Study.”

The survey is part of a broader research initiative called *Virginia Educated: A Post-College Outcomes Study*. It is funded by the Virginia General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia (SCHEV). SCHEV is working with Virginia Commonwealth University’s Survey and Evaluation Research Laboratory (SERL) to conduct this study.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/about>, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Text Box

Sincerely,

QR Code

SIGNATURE

Advancing Virginia Through Higher Education

Recruitment: Probability sample email 4

Contact 7: Email 4 (Email Reminder 3)

All in the probability sample with emails, less completers and opt-outs, get this.

Subject line: Your feedback matters – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

This is a reminder about your *Virginia Educated* survey invitation. Your opinions represent many other people because you are part of a scientifically-selected sample. Your responses are confidential.

If you've already completed the survey, thank you! You do not need to do anything more.

You may view your survey here (LINK)

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

The purpose of the survey is to better understand how recent undergraduates are doing – in their communities, at work, and at home. The study offers a unique opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your workforce activity, quality of life, personal networking and community involvement. It is funded by the Virginia General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia ([SCHEV](#)).

SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory ([SERL](#)) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported college or university in Virginia between 2007 and 2018.

We hope that you will consider participating in *Virginia Educated*. Your opinions can help SCHEV and Virginia policymakers chart the future of higher education for all Virginians.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/about>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,

Peter Blake, Director

SCHEV

<<Opt-out link>>

Recruitment: Probability sample email 5

Contact 8: Email 5 (Email Reminder 4)

All in the probability sample with emails, less completers and opt-outs, get this.

Subject line: Last chance – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

This is our last appeal to you to participate in our *Virginia Educated* survey. The survey will close on April 16th. Your opinions represent many other people because you are part of a scientifically-selected sample. Your responses are confidential.

If you've already completed the survey, thank you! You do not need to do anything more.

You may view your survey here (LINK)

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

The purpose of the survey is to better understand how recent undergraduates are doing – in their communities, at work, and at home. The study offers an opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your quality of life, personal networking, workforce activity and community involvement.

It is funded by the Virginia General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia (SCHEV).

SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory (SERL) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported college or university in Virginia between 2007 and 2018.

We hope that you will participate in *Virginia Educated*. Your opinions can help SCHEV and Virginia policymakers chart the future of higher education for all Virginians.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/about>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,

Peter Blake, Director

SCHEV

<<Opt-out link>>

Recruitment: Email-only group email 1

Email Replicate: Email Invitation All selected into an Email Replicate receive this.

Subject line: You're invited – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

This email is to invite you to participate in a special survey, which is part of a research effort called *Virginia Educated: A Post-College Outcomes Study*. Funded by the General Assembly and other state partners, the study is administered by the State Council of Higher Education for Virginia ([SCHEV](#)).

[You may view your survey here \(LINK\)](#)

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

The purpose of *Virginia Educated* is to better understand how recent undergraduates are doing – in their communities, at work, and at home. It offers a unique opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your workforce activity, quality of life, and community involvement.

Your responses are confidential.

SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory ([SERL](#)) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported college or university in Virginia between 2007 and 2018.

We hope that you will consider participating in *Virginia Educated*. Your opinions can help SCHEV and other policymakers chart the future of higher education for all Virginians.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/e-survey>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,
Peter Blake, Director
SCHEV
<<Opt-out link>>

Recruitment: Email-only group email 2

Email Replicate: Reminder A
All selected into an Email Replicate, less completers and opt-outs, receive this.

Subject line: Reminder – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

This is just a friendly reminder about your *Virginia Educated* survey invitation. Your feedback is important. Your opinions matter.

[You may view your survey here \(LINK\)](#)

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

The purpose of the survey is to better understand how recent undergraduates are doing – in their communities, at work, and at home. The study offers a unique opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your workforce activity, quality of life, and community involvement. It is funded by the General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia ([SCHEV](#)).

SCHEV is working with Virginia Commonwealth University’s Survey and Evaluation Research Laboratory ([SERL](#)) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate’s degree, or a bachelor’s degree from a state-supported college or university in Virginia between 2007 and 2018.

We hope that you will consider participating in *Virginia Educated*. Your input can help SCHEV and Virginia policymakers chart the future of higher education for all Virginians. Your responses are confidential.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/e-survey>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,
Peter Blake, Director
SCHEV
<<Opt-out link>>

Recruitment: Email-only group email 3

Email Replicate: Reminder B

All selected into an Email Replicate, less completers and opt-outs, receive this.

Subject line: Friendly reminder – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

A few days ago you should have received a reminder about a special survey that will help shape the future of higher education in Virginia. Your opinions are important. However, we have not heard from you.

Please consider participating in our survey. Your responses are confidential.

You may view your survey here (LINK)

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

This survey is part of a broader research initiative called *Virginia Educated: A Post-College Outcomes Study*. The purpose of *Virginia Educated* is to better understand how recent undergraduates are doing – in their communities, at work, and at home. It is funded by the Virginia General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia ([SCHEV](#)).

SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory ([SERL](#)) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported college or university in Virginia between 2007 and 2018.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/e-survey>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,

Peter Blake, Director

SCHEV

<<Opt-out link>>

Recruitment: Email-only group email 4

Email Replicate: Reminder C

All selected into an Email Replicate, less completers and opt outs, get this.

Subject line: Your feedback matters – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

This is a reminder about your *Virginia Educated* survey invitation. Your opinions are important. Your responses are confidential.

You may view your survey here (LINK)

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

The purpose of the survey is to better understand how recent undergraduates are doing – in their communities, at work, and at home. The study offers a unique opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your workforce activity, quality of life, personal networking and community involvement. It is funded by the Virginia General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia ([SCHEV](#)).

SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory ([SERL](#)) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported college or university in Virginia between 2007 and 2018.

We hope that you will consider participating in *Virginia Educated*. Your input can help SCHEV and Virginia policymakers chart the future of higher education for all Virginians.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/e-survey>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

Sincerely,

Peter Blake, Director

SCHEV

<<Opt-out link>>

Recruitment: Email-only group email 5

Email Replicate: Reminder D
All selected into an Email Replicate, less completers and opt-outs, receive this.

Subject line: Last chance – Virginia Educated: A Post-College Outcomes Study

Dear [firstname]:

This is our last appeal to you to participate in our *Virginia Educated* survey. Your opinions matter. Your responses are confidential.

[You may view your survey here \(LINK\)](#)

You will receive a \$10 gift card if you complete your survey.

You can also win 1 of 32 drawings for \$50-\$250 in gift cards if you complete your survey.

If you wish to communicate about your survey, please reference your unique Survey ID number (NUMBER).

The purpose of the survey is to better understand how recent undergraduates are doing – in their communities, at work, and at home. The study offers an opportunity to reflect on experiences at publicly-supported community colleges and four-year institutions, and to share insights into your quality of life, personal networking, workforce activity and community involvement.

It is funded by the Virginia General Assembly and other state partners, and administered by the State Council of Higher Education for Virginia ([SCHEV](#)).

SCHEV is working with Virginia Commonwealth University's Survey and Evaluation Research Laboratory ([SERL](#)) to conduct this study. The target audience includes students who received an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported college or university in Virginia between 2007 and 2018.

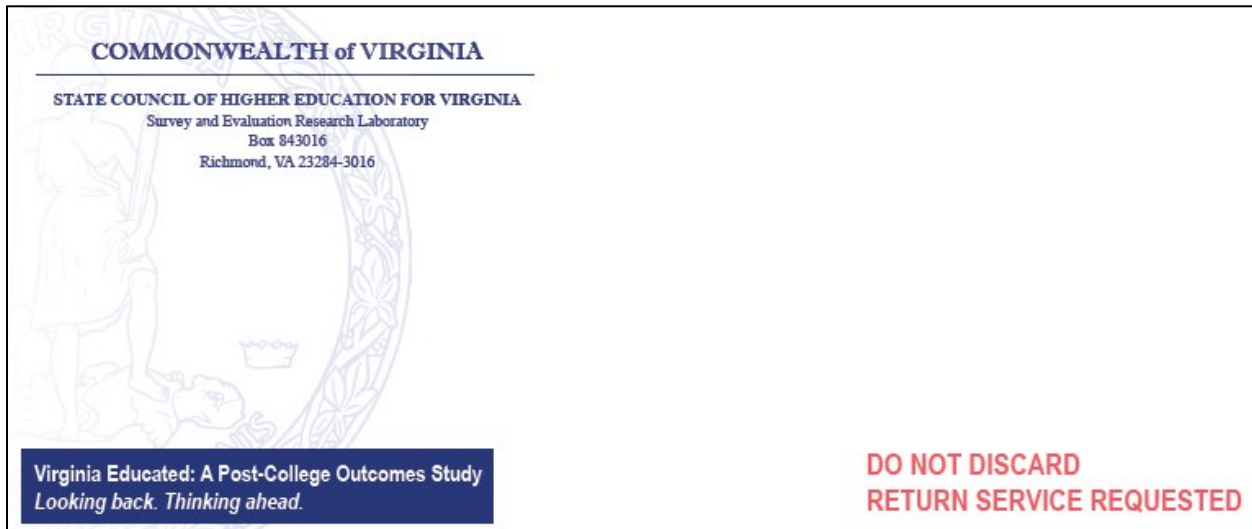
We hope that you will participate in *Virginia Educated*. Your opinions can help SCHEV and Virginia policymakers chart the future of higher education for all Virginians.

If you have questions about *Virginia Educated*, please visit <https://surveys.schev.edu/e-survey>, reply to this email, email surveys@schev.edu, or call SERL at 804-827-0047. Thank you in advance for your time and consideration.

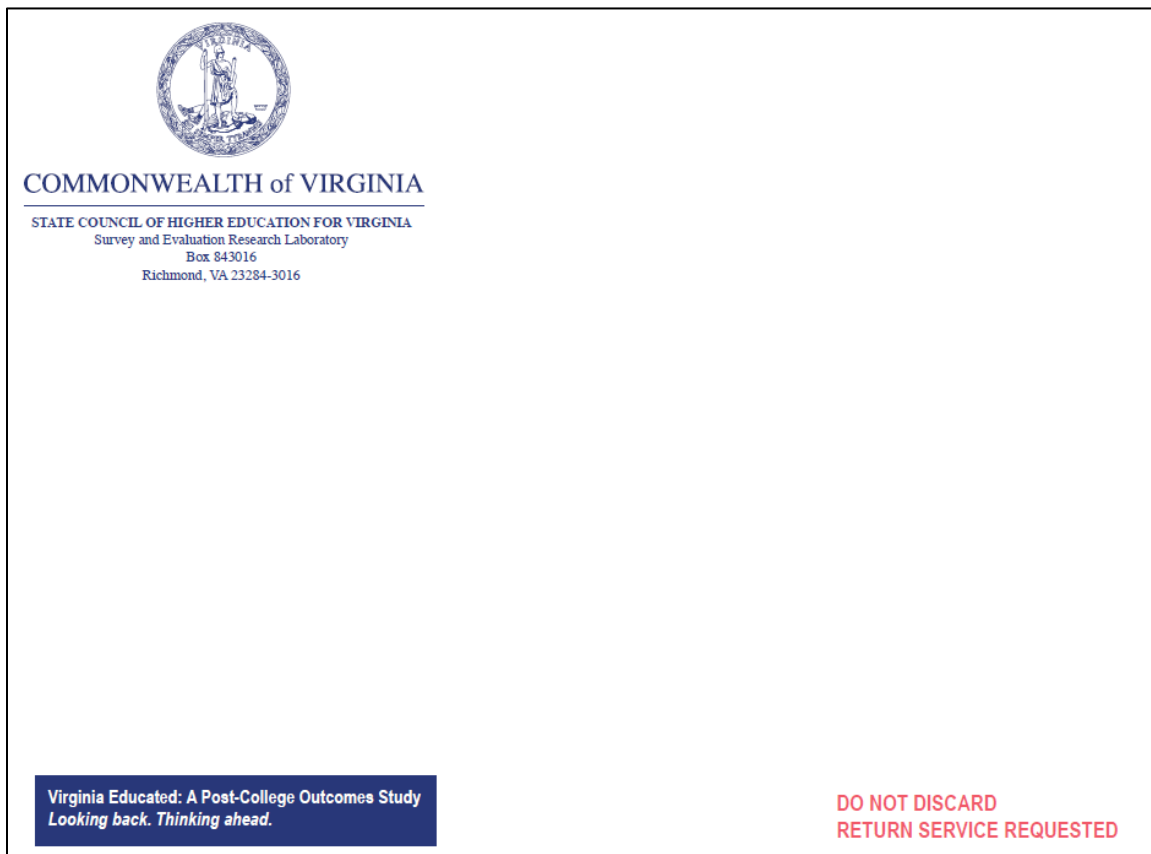
Sincerely,
Peter Blake, Director
SCHEV
<<Opt-out link>>

Mailing proofs

#10 Outgoing Envelope, Experimental Seal



10 x 13 Paper Survey Booklet Outgoing Envelope, Standard Seal



Website copy: Probability sample**Virginia Educated Website Copy****STATE COUNCIL OF HIGHER
EDUCATION FOR VIRGINIA****VCU** L. Douglas Wilder School of
Government and Public Affairs
Survey and Evaluation Research Laboratory**Virginia Educated: A Post-College Outcomes Study****Looking back. Thinking ahead.****What is Virginia Educated?**

Virginia Educated is a special effort of the State Council of Higher Education for Virginia (SCHEV) to learn more about the value and impact of the undergraduate experience. The centerpiece of this research study is a unique survey of recent certificate and degree recipients. The survey collects information on traditional economic outcome measures such as wages, employment, and career satisfaction, **but it goes beyond this**. The *Virginia Educated* questionnaire also gathers data about community involvement, student debt burden, personal **networking** and overall quality of life, and it allows you to provide feedback in your own words.

The *Virginia Educated* survey represents an opportunity for the state of Virginia to hear **directly from you** about your undergraduate experience and how it has affected your life – positively or negatively – so far. The survey offers a chance to **look back** on the time you spent earning your certificate or degree. The survey asks if – and how – that experience has influenced how you work, how you feel, and how you interact with others around you.

Additionally, *Virginia Educated* provides an open door for you to share your reflections, observations, and recommendations with state policymakers. Would you help them **think ahead** to the future of higher education?

More about the Virginia Educated survey: How does it work?

The *Virginia Educated* survey is administered in two ways. It is distributed electronically and by postal mail to **scientifically-sampled** alumni who completed an occupational or technical certificate, an associate's degree, or a bachelor's degree from a state-supported institution of higher education between 2007 and 2018.

What kinds of questions are on the Virginia Educated survey?

You can expect to see questions about:

- Overall health/general life satisfaction
- Specific college activities, like internships
- Employment – for example, hours worked each week
- Student debt – for instance, if and how student loans have affected life goals
- Community activities, like volunteering
- Staying in, or moving out of, Virginia after finishing your undergraduate education
- General demographics, such as how many people live in your household

The questions are geared toward diverse student experiences, including but going beyond the traditional, full-time undergraduate student attending a four-year institution right out of high school.

Do I have to participate? What will you do with the information I provide?

Participation in the *Virginia Educated* survey is **completely voluntary**.

In addition, if you choose to allow it, your survey responses can be linked to administrative data currently collected and maintained by SCHEV. This may include information like degree(s) received, field(s) of study, wages, and student loan amounts.

We hope you will choose to connect your survey responses to administrative data. The linkage will provide researchers with more accurate and robust information, helping Virginia's colleges and universities to make the education they offer even better for future students.

The decision to pair your survey data with SCHEV's administrative data is totally up to you, and your eligibility to complete the survey itself will not be affected. If you choose not to permit linkage, your survey responses will still be a valuable part of the research.

All information received – whether from the Virginia Educated survey or from SCHEV administrative sources – will be kept strictly confidential.

At the end of the study, a report will be published. All results will be discussed in aggregate, and no individuals will be named. The report will be used by SCHEV Council members, staff, and others in future policymaking activities.

Who administers Virginia Educated?

Virginia Educated is managed and conducted by Virginia Commonwealth University's Survey and Evaluation Research Laboratory (VCU-SERL) under contract to SCHEV. The research is approved under VCU Institutional Review Board protocol HM20017308.

How is this study funded?

The General Assembly funds *Virginia Educated* in its 2019 session (HB1700, Chapter 854, Item 143 Q; see: <https://budget.lis.virginia.gov/item/2019/1/HB1700/Chapter/1/143/>).

What if I want more information?

If you have any questions about the *Virginia Educated* research study, please contact VCU's SERL team at:

Telephone: (804)-827-0047

Email: surveys@schev.edu

[HYPERLINK TO PARTICIPANT INFORMATION SHEET](#) (see next page)

Thank you for sharing your experiences!

Participant information sheet: Probability sample**Information Sheet for Virginia Educated Survey Participants
November 2020**

You have been contacted because you completed a bachelor's degree, associate's degree, or a certificate at a public college or university in Virginia between 2007 and 2018.

The State Council of Higher Education for Virginia (SCHEV) is working with the Survey and Evaluation Research Laboratory (SERL) at Virginia Commonwealth University on a research study about the value and impact of higher education in Virginia. The study is funded by the Virginia General Assembly as well as other partners. It is administered by SCHEV.

As part of the study, SERL will distribute a survey to hear directly from graduates like you about the undergraduate experience. You will receive a letter and/or an email with a link to complete the survey questionnaire online via Qualtrics – you may request a paper copy of the survey to complete and return via mail at no cost to you.

Your candid feedback could improve the effectiveness and relevance of the data we collect, thereby providing better information to policymakers regarding higher education in Virginia.

In the survey you will see questions about your college experiences, general quality of life, student debt, employment, community involvement, and demographics. You will also be asked if you grant permission to link your survey responses to other records collected and maintained by SCHEV. These records may include information on course enrollment (including grades); financial aid; wages; degrees and credentials earned; and any demographics to include, but not be limited to, gender, age, race, and ethnicity. This administrative data was submitted to SCHEV by each public institution and private, nonprofit institution participating in the Tuition Assistance Grant Program, in accordance with state authority and both state and federal privacy law. Whether or not you decide to grant linking permission, your survey responses will be a useful part of the study.

The survey will take about 20-30 minutes of your time depending on your answers. Your participation is voluntary.

All information you provide will remain confidential. Your personal information will not be shared with anyone outside of SCHEV and its subcontractors. Your name will not be associated with any of your data in any report.

In addition to the small cash gift sent by mail, at the end of the survey you will offered a \$10 gift card for your participation. You will also be able to participate in a drawing for additional rewards.

Your contact information was obtained through a paid service that uses public records and commercially available data.

Thank you for your help with this important discussion!
We appreciate you joining our efforts to improve higher education for all Virginians.

Contact information:

Mr. Daniel Davis, *Research Support Specialist*, Survey and Evaluation Research Laboratory, VCU:
ddavis28@vcu.edu, 804-827-0047

Dr. Jim Ellis, *Director of Design and Methodology*, Survey and Evaluation Research Laboratory, VCU:
jmellis@vcu.edu, 804-828-2839

SERL website: <https://serl.vcu.edu/>

Approved by the VCU IRB on 11/19/2020

Website copy: Email-only group

Virginia Educated Website Copy: Email Only Group



Virginia Educated: A Post-College Outcomes Study

Looking back. Thinking ahead.

What is *Virginia Educated*?

Virginia Educated is a special effort of the State Council of Higher Education for Virginia (SCHEV) to learn more about the value and impact of the undergraduate experience. The centerpiece of this research study is a unique survey of recent certificate and degree recipients. The survey collects information on traditional economic outcome measures such as wages, employment, and career satisfaction, **but it goes beyond this**. The *Virginia Educated* questionnaire also gathers data about community involvement, student debt burden, personal networking and overall quality of life, and it allows you to provide feedback in your own words.

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- Student debt – for instance, if and how student loans have affected life goals
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- Staying in, or moving out of, Virginia after finishing your undergraduate education
- General demographics, such as how many people live in your household

The questions are geared toward diverse student experiences, including but going beyond the traditional, full-time undergraduate student attending a four-year institution right out of high school.

Do I have to participate? What will you do with the information I provide?

Participation in the *Virginia Educated* survey is **completely voluntary**. In addition, if you **choose to allow it**, your survey responses can be linked to administrative data currently collected and maintained by SCHEV. This may include information like degree(s) received, field(s) of study, wages, and student loan amounts.

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What if I want more information?

If you have any questions about the Virginia Educated research study, please contact VCU's SERL team at:

Telephone: **(804)-827-0047**

Email: surveys@schev.edu

[PARTICIPANT INFORMATION SHEET \(PDF\)](#)

Thank you for sharing your experiences!

Participant information sheet: Email-only group**Information Sheet for Virginia Educated Survey Participants
November 2020**

You have been contacted because you completed a bachelor's degree, associate's degree, or a certificate at a public college or university in Virginia between 2007 and 2018.

The State Council of Higher Education for Virginia (SCHEV) is working with the Survey and Evaluation Research Laboratory (SERL) at Virginia Commonwealth University on a research study about the value and impact of higher education in Virginia. The study is funded by the Virginia General Assembly as well as other partners. It is administered by SCHEV.

As part of the study, SERL will distribute a survey to hear directly from graduates like you about the undergraduate experience. You will receive an email with a link to complete the survey questionnaire online via Qualtrics.

Your candid feedback could improve the effectiveness and relevance of the data we collect, thereby providing better information to policymakers regarding higher education in Virginia.

In the survey you will see questions about your college experiences, general quality of life, student debt, employment, community involvement, and demographics. You will also be asked if you grant permission to link your survey responses to other records collected and maintained by SCHEV. These records may include information on course enrollment (including grades); financial aid; wages; degrees and credentials earned; and any demographics to include, but not be limited to, gender, age, race, and ethnicity. This administrative data was submitted to SCHEV by each public institution and private, nonprofit institution participating in the Tuition Assistance Grant Program, in accordance with state authority and both state and federal privacy law. Whether or not you decide to grant linking permission, your survey responses will be a useful part of the study.

The survey will take about 20-30 minutes of your time depending on your answers. Your participation is voluntary.

All information you provide will remain confidential. Your personal information will not be shared with anyone outside of SCHEV and its subcontractors. Your name will not be associated with any of your data in any report.

At the end of the survey you will be offered a \$10 gift card for your participation. You will also be able to participate in a drawing for additional rewards.

Your contact information was obtained through a paid service that uses public records and commercially available data.

Thank you for your help with this important discussion!
We appreciate you joining our efforts to improve higher education for all Virginians.

Contact information:

Mr. Daniel Davis, *Research Support Specialist*, Survey and Evaluation Research Laboratory, VCU:
ddavis28@vcu.edu, 804-827-0047

Dr. Jim Ellis, *Director of Design and Methodology*, Survey and Evaluation Research Laboratory, VCU:
jmellis@vcu.edu, 804-828-2839

SERL website: <https://serl.vcu.edu/>

Approved by the VCU IRB on 11/19/2020

Communication to institutional leadership

Information and update regarding the SCHEV Post-Graduate Outcomes Survey *Virginia Educated: Looking Back. Thinking Ahead.* December 2020

Background and update: As you may recall, the State Council of Higher Education for Virginia (SCHEV) contracted with the Survey and Evaluation Research Laboratory (SERL) at Virginia Commonwealth University to design and carry out a study describing the value and impact of higher education in Virginia. A unique feature of the study is how it combines survey data collected by SERL with administrative data held by SCHEV.

Pilot survey: After productive conversations with an advisory committee comprised of representatives from several state-supported institutions of higher education, SCHEV, the Virginia Economic Development Partnership (VEDP), and the Federal Reserve Bank of Richmond, SERL launched the pilot survey in March 2020. More than 1,000 people completed the pilot survey from a sample of 3,648. That experience aided refinement of a production survey questionnaire and contact protocol.

Production survey: We expect to launch the production survey in December 2020 and collect data through early 2021. The survey will be offered to a probability-based sample of more than 50,000 graduates. Invitations will be distributed by U.S. mail and email. The survey will be available by web, although some people may receive or request a paper copy of the questionnaire. In addition, SERL will offer the survey – but only by web and email – to several thousand more graduates. This “email-only” group is a low-cost way to supplement probability-based data.

Who is eligible for the survey? As in the pilot survey conducted earlier in 2020, people who earned an undergraduate credential (bachelor’s degree, associate’s degree, or certificate) at a state-supported institution between 2007 and 2018 are eligible to complete the production version of the survey. There are approximately 500,000 such persons. People who were invited to do the pilot survey will be excluded from production survey eligibility.

Communication with potential survey participants: As was the case during the pilot survey, we ask that institutions not send communications to alumni telling them to expect a survey request. For the pilot survey, this was because only small fractions of alumni at each college or university were asked to participate, and the sampling covered only those who graduated from 2007 to 2018. For the production survey, the sampling proportions vary across institutions as well as for subgroups within institutions; invitations also vary for the email-only group. It would be counterproductive to try to convey these complexities to multiple audiences.

The “survey” and the “study”: The survey is part of a broader study that will examine administrative data maintained by SCHEV. Survey respondents will be asked for consent to pair their survey responses with their administrative data – two-thirds of respondents agreed to this linkage in the pilot survey. Production phase participants who decline this linkage will still provide useful survey data and will remain part of the overall study and its findings.

How was the study funded? The study was funded by the General Assembly in the 2019 session. Additional funds were contributed by SCHEV, VEDP, and the institutions themselves.

Responding to questions: As in the pilot, all production survey invitations will include contact information at SERL for potential participants to use if they have questions. However, people may prefer to contact their alma maters. Please feel free to confirm the survey’s authenticity and refer questions to SERL or SCHEV (contact information below), or use the information found at <https://surveys.schev.edu/about>

Institutional Review Board (IRB) approval: This study was approved by the VCU IRB – protocol #HM20017308.

Contacts:

SERL: Jim Ellis, Ph.D., jmellis@vcu.edu, 804-828-2839 / Daniel Davis, ddavis28@vcu.edu, 804-827-0047
SCHEV: Joseph G. DeFilippo, Ph.D., joedefilippo@schev.edu

Notes on production survey variable definitions and data preparation

Q1 – “In what year did you start your undergraduate education? Enter YYYY format.”

- Recoded into Q1c: All values below 1950 are coded into system-missing.

Q16_1_1_1 to Q16_1_5_1 – “Additional certificates or degrees, [degree #] – Year”

- Recoded into Q16_1_#_1c (# corresponds to matching original variable name): Corrections were made for common formatting issues in responses (i.e. “YYYY” when response was “MM/YYYY”) and punctuation removal. Altered variable type of Q16_1_#_1c from string to numeric.

Q43 – “Under typical, non-COVID-19 conditions, what is the ZIP code of your primary job location? Enter in five-digit format.”

- Recoded into Q43c: All values below 501 or higher than 99950 are coded into system-missing as those are the lower and upper value limits on viable US zip codes.

Q57 – “Including yourself, how many people are currently employed by your company/ies? Please estimate how many people. Write in a number.”

- Recoded into Q57c: All values below 1 and above 3,500,000 are coded into system-missing. Largest employer globally had approximately 3.2 million employees as of 2015 and minimum employee count is 1 as it is supposed to include the respondent.

Q58 – “During your undergraduate experience, how many paid or unpaid internships did you complete? Write in a number (Enter 0 if none):”

- Recoded into Q58c: All values above 8 are coded into system-missing (Cut-off is < 0.05 percent of respondents).

Q89 – “Please write in your approximate monthly payment. Enter numeric values only. \$:”

- Recoded into Q89c: All values above \$9,999 are coded into system-missing (Cut-off is < 0.05 percent of respondents).

- - Q102_4_TEXT – “What is your gender identity? - Prefer to self-describe, Write In: - Text”
 - Recoded genuine responses into gender_rc: “Male,” “Female,” “Non-binary/third gender,” and “Choose not to answer” values for Q102 were coded into the same values for gender_rc. Genuine responses to Q102_4_TEXT were recoded into “Self-describe” and remaining ingenuine responses were recoded into system-missing.

Q103 – “What is your current age? Write in numeric values only:”

- Recoded into Q103c: All values below 18 and higher than 85 are coded into system-missing. Cases above cutoff appear to be ingenuine responses or mistypes.

Q112 – “What is the ZIP code of your primary residence? Enter in 5-digit format.”

- Recoded into Q112c: All values below 501 or higher than 99950 are coded into system-missing as those are the lower and upper value limits on viable US zip codes.

Q115 – “Please write in the dollar amount of your estimated personal earned income before taxes for the calendar year 2019. A guess is OK. \$:”

- Recoded into Q115c: All values below 0 or higher than 2,000,000 are coded into system-missing. Values above cutoff appear to be ingenuine responses or mistypes based on response to Q114.

Q116 – “Please write in the dollar amount of your estimated personal earned income before taxes for the calendar year 2020. A guess is OK. \$:”

- Recoded into Q116c: All values below 0 or higher than 1,650,000 are coded into system-missing. Values above cutoff appear to be ingenuine responses or mistypes based on responses to other income and/or Q117 (extra zeros or adding the weeks worked onto the end of their income).

Q117 – “About how many weeks did you work in 2019? Please include any paid time off in your number. A guess is OK. Write in number of weeks:”

- Recoded into Q117c: Corrections were made for string equivalents of numbers in responses (i.e. “52” when response was “all year”) and punctuation removal. Altered variable type of Q117c from string to numeric.

Q118 – “About how many weeks did you/will you work in 2020? Please include any paid time off in your number. A guess is OK. Write in number of weeks:”

- Recoded into Q118c: Corrections were made for string equivalents of numbers in responses (i.e. “52” when response was “all year”) and punctuation removal. Altered variable type of Q118c from string to numeric.

Q121 – “Please write in the dollar amount of your estimated household income before taxes for the calendar year 2019. A guess is OK. \$:”

- Recoded into Q121c: All values higher than 1,000,000 are coded into system-missing. Values above cutoff appear to be ingenuine responses or mistypes based on responses to other income responses (extra zeros).

Q122 – “Please write in the dollar amount of your estimated household income before taxes for the calendar year 2020. A guess is OK. \$:”

- Recoded into Q122c: All values higher than 3,000,000 are coded into system-missing. Values above cutoff appear to be ingenuine responses or mistypes based on responses to other income responses (extra zeros or adding responses to Q123/Q124 on the end).

Q123 – “Please write in the number of people in your household for 2019. Please include yourself. 2019 household size, including yourself:”

- Recoded into Q123c: All values higher than 10 are coded into system-missing (Cut-off is < 0.05 percent of respondents).

Q124 – “Please write in the number of people in your household for 2020. Please include yourself. 2020 household size, including yourself:”

- Recoded into Q124c: All values higher than 10 are coded into system-missing (Cut-off is < 0.05 percent of respondents).

Variable Creation Strategy

2-yr vs. 4-yr Credential [plev_lohi]

- Created by recoding the certificate or degree that they were selected into the survey for [PLEVONE] into two levels. If the value was “Award of less than 1 academic year,” “Award of at least 1 but less than 2 academic years,” “Associate degree (Bachelor Credit),” or “Associate degree (Occupational/Technical Credit),” they were defined as having “Certificate or associate degree.” If the value was “Four-Year Bachelor's Degree” or “Five-Year Bachelor's Degree,” they were defined as having “Bachelor's degree (4-yr or 5-yr).”

2019 Estimated Gross Personal Income [pincome_q]

- Created by recoding the 2019 estimated gross personal income recorded by respondents [Q114] into quintiles of (1) Under \$25,000, (2) \$25,000 to \$49,999, (3) \$50,000 to \$74,999, (4) \$75,000 to \$99,999, and (5) \$100,000 or higher.

2019-2020 Avg. Est. Gross Personal Income [avg_pincome & avg_pincome_q]

- Created by calculating the mean of the self-reported 2019 and 2020 estimated gross personal incomes [Q115 & Q116] to create an average value [avg_pincome], then that average is coded into quintiles [avg_pincome_q] of (1) Under \$25,000, (2) \$25,000 to \$49,999, (3) \$50,000 to \$74,999, (4) \$75,000 to \$99,999, and (5) \$100,000 or higher. If the respondent only provided a value for 2019 or 2020, that value is used as the mean.

2019 Estimated Gross Household Income [hhincome_q]

- Created by recoding the 2019 estimated gross household income recorded by respondents [Q120] into quintiles of (1) Under \$25,000, (2) \$25,000 to \$49,999, (3) \$50,000 to \$74,999, (4) \$75,000 to \$99,999, and (5) \$100,000 or higher.

2019-2020 Avg. Est. Gross Household Income [avg_hhincome & avg_hhincome_q]

- Created by calculating the mean of the self-reported 2019 and 2020 estimated gross household incomes [Q121 & Q122] to create an average value [avg_hhincome], then that average is coded into quintiles [avg_hhincome_q] of (1) Under \$25,000, (2) \$25,000 to \$49,999, (3) \$50,000 to \$74,999, (4) \$75,000 to \$99,999, and (5) \$100,000 or higher. If the respondent only provided a value for 2019 or 2020, that value is used as the mean.

Additional certificate/degree level [add_degree_lv]

- Created by comparing the responses for additional degrees earned for questions Q16_3_1 through Q16_3_5 to the credential the respondent was sampled into the survey for (the “reference” credential) [plevone_rc].
 - If the value of any of the 5 additional credentials is lower than the reference credential [plevone_rc], the additional degree level is assigned as “Lower than original certificate/degree.”
 - If the value of any of the 5 additional credentials is the same as the reference credential [plevone_rc], the additional degree level is assigned as “Same as original certificate/degree.”
 - If the value of any of the 5 additional credentials is higher than the reference credential [plevone_rc], the additional degree level is assigned as “Higher than original certificate/degree.”
 - As with underemployment, for the purposes of credential comparison, the values 7, 8, and 9 are considered equivalent in calculations. If any of the 5 additional credentials are 7 or greater and the reference credential [plevone_rc] is also 7 or greater, the additional degree level is assigned as “Same as original certificate/degree.”

Age at Entry [ageatentry]

- Created by subtracting the year the respondent reported starting their undergraduate education [Q1] from the year that they completed the survey [compdate], then subtracting that value from the respondent’s self-reported age [Q103].

Age at Entry (Categorized) [age_cat]

- Created by recoding the calculated age at entry [ageatentry] into the categories: “Under 18,” “18 to 24,” “25 to 44,” “45 to 64,” and “65 or older.”

Caregiver during UG [caregiver]

- Respondents are defined as a caregiver during their undergraduate education if they selected any of the following responses to the question “While you completed your undergraduate education, did you...?”:
 - “Take care of your own children age 6 or younger” [Q108_1]
 - “Take care of your own children age 7 or older” [Q108_2]

- “Take care of an elderly, ill or disabled adult relative” [Q108_3]
- “Take care of someone else” [Q108_4].
- If the respondent chose the option “Did not take care of anyone” [Q108_5], they are not defined as a caregiver.

First Generation [firstgen]

- Created by recoding the question, “Did any of your parent(s) or guardian(s) complete a certificate, an associate degree, or a bachelor's degree?” [Q110] where the respondent is not considered first generation if they responded “Yes, one did,” or “Yes, more than one did,” and they are considered first generation if they responded “No, none of them did.”

Loan Stress [loanstress]

- Created by first calculating whether the respondent answered that whether they currently have student loan debt or money owed to pay for their undergraduate education [Q84] – only individuals who had current student loan debt or money owed to pay for their undergraduate education were evaluated in additional calculations for loan stress.
- If the respondent answered that they were moderately, very, or extremely worried about student loans [Q85], they were designated as “Stressed.”
- If the respondent chose one of the options “Other forbearance” or “Deferral” for either why they are making reduced payments [Q88] or why they aren’t making payments [Q90], they are designated as “Stressed.”
- If the respondent was paying more than 8 percent of their monthly personal income from 2019 on monthly student loan payments [loanpct], then they are designated as “Stressed.”

Maximum degree earned [plev_max]

- Created by calculating the maximum value from the degree that the respondent was selected into the survey for [PLEVONE] and the five survey items that asked the respondent about any additional certificates or degrees that they have earned [Q16_1_3_1 & Q16_1_3_2 & Q16_1_3_3 & Q16_1_3_4 & Q16_1_3_5]. Prior to this calculation, the values for PLEVONE and Q16_1_3_1 through Q16_1_3_5 were converted into the following standardized list of values (the original values are included in the parentheses):
 - 1 Certificate/Award of less than 2 academic years (PLEVONE: 10 & 15, Q16: 1)
 - 2 Associate degree (PLEVONE: 20 & 25, Q16: 5)
 - 3 Bachelor's Degree (PLEVONE: 40 & 41, Q16: 6)
 - 4 Post-Bachelor Certificate (Q16: 2)
 - 5 Graduate Certificate (Q16: 3)
 - 6 Master's Degree (Q16: 7)
 - 7 Specialist Degree (Q16: 4)
 - 8 First Professional Degree (Q16: 8)
 - 9 Doctoral Degree (Q16: 9)

Non-Traditional [nontrad]

- Created first by initializing the variable to only include those who completed the survey. Second, the respondent is considered non-traditional if they selected any non-White race or ethnicity [Q104_2 & Q104_3 & Q104_4 & Q104_5 & Q104_6]. Respondents are also considered non-traditional if they responded that they acted as a caregiver for their own children, an elderly, ill or disabled adult relative, or someone else during their undergraduate education [Q108_1 & Q108_2 & Q108_3 & Q108_4]. Third, respondents are designated non-traditional if their age at entry [ageatentry] was 25 or higher. Finally, respondents were considered non-traditional if they responded that they worked for pay while completing their undergraduate education [Q62], worked “All” or “Most” semesters [Q63], and worked 25+ hours on average [Q64].

Number of friends made during UG and still in direct contact with [Q109_cat]

- Created by recoding the values for Q109 into the following categories: “0,” “1 to 2,” “3 to 9,” “10 or more.”

Paid/Unpaid Internship during UG [compintern]

- Created by recoding the survey item “During your undergraduate experience, how many paid or unpaid internships did you complete? Write in a number (Enter 0 if none):” [Q58] into dichotomous values. If the respondent answered “0,” then they were recorded as “No.” If they respondent answered any value above 0, then they were recorded as “Yes.”

Percent of Monthly Income of Student Loans [loanpct]

- Created by first checking whether the respondent provided their 2019 personal income [Q115] and the value of their monthly student loan payments [Q89] – both responses were required for further calculations.
- Calculated by dividing the 2019 personal income [Q115] by 12 months, then dividing that result into the monthly student loan payments [Q89], and multiplying the final result by 100 to get a percent value.

Primary reason for starting UG [Q3_rc]

- Created by collapsing the original categories into “Career-related,” vs. “Not career-related.” The value is designated as “Career-related” if the respondent chose any of the following options:
 - “Get a good job”
 - “Get a promotion or advance your career”
 - “Get the job or career you wanted”
 - “Change careers”
 - “Attend an apprenticeship program”

- The value is designated as “Not career-related” if the respondent chose any of the following options:
 - “Your family, friends, or teachers expected you to”
 - “Feel empowered or more independent”
 - “Learn new things”
 - “Figure out what you wanted to do”
 - “Meet new people”
 - “Be somewhere new or different other than your home community”
 - “Have a well-rounded education”
- The values for “Other” and “Choose not to answer” are coded into the equivalent values.

Race/Ethnicity [race_rc]

- Created using the responses to the multiple response set Q104_1 through Q104_8.
 - If the respondent chose any singular option for Q104_1 through Q104_8, those values are recoded to the same value.
 - For each race/ethnicity option [Q104_1 through Q104_6] selected by the respondent, the value of race_count is increased by 1.
 - If the value of race_count is greater than 1, then the respondent’s race/ethnicity is set to “Multiracial.”
 - If race_count was exactly 2 and the respondent chose “White” [Q104_1] and “Hispanic/Latino/Latina/Latinx/Spanish origin” [Q104_5], then the respondent’s race/ethnicity is set to “Hispanic/Latino/Latina/Latinx/Spanish origin.”
- Multiple responses to self-describe open-ended question [Q104_7_TEXT] were recoded into either “Hispanic/Latino/Latina/Latinx/Spanish origin” or “Multiracial” if their responses were applicable.

Race/Ethnicity – Black/Non-Black [race_black]

- Created by setting the value to “Non-Black/African-American” if the respondent chose a race/ethnicity option but did not select the “Black or African-American” option. If the respondent selected “Black or African-American,” the value is set to “Black/African-American.”

Self-Reported Mobility [mobility]

- Created using the participants’ responses to the survey items asking whether they are a current VA resident [Q111] and whether they were a VA resident at the start of their undergraduate education [INOUT].
 - If the response to current VA status is “Yes” and they were listed as in-state at the start of undergraduate [INOUT], then the respondent is defined as “In-state student currently in VA.”

- If the response to current VA status is “No” and they were listed as in-state at the start of undergraduate [INOUT], then the respondent is defined as “In-state student left VA.”
- If the response to current VA status is “Yes” and they were listed as out-of-state at the start of undergraduate [INOUT], then the respondent is defined as “Out-of-state student currently in VA.”
- If the response to current VA status is “No” and they were listed as out-of-state at the start of undergraduate [INOUT], then the respondent is defined as “Out-of-state student left VA.”

Student of color [studentofcolor]

- Created by using the created variable for Race/Ethnicity [race_rc].
 - If the respondent is listed as “White (Non-Hispanic)” [race_rc], then the value is set to “Not a student of color.”
 - If the respondent is listed as any other race/ethnicity [race_rc] (with the exception of “Other” and “Choose not to answer”), then the value is set to “Student of color.”

Transfer Student [transferred]

- Created by recoding the items for the question “Did you transfer between institutions at any point?” whereby the respondent is labeled a transfer student if they selected the responses “Yes, I transferred from one community college to another community college” [Q11_1], “Yes, I transferred from a community college to a four-year institution” [Q11_2], “Yes, I transferred from one four-year institution to another four-year institution” [Q11_3], or “Yes, I transferred from a four-year institution to a community college” [Q11_4]. Respondents were designated as not a transfer student if they selected “No, I was not a transfer student at any point” [Q11_5].

Underemployment [underemp]

- Created by first calculating whether the respondent answered that they were employed at the time of survey completion [Q31]—only those who were employed are further evaluated in the calculations for underemployment. Three elements of underemployment are calculated as follows:
 - “Occupation requires less education than the individual possesses” [underemp_1]
 - If the response to the question, “What level of education is required to perform the functions of your primary job?” [Q38] is lower than the calculated maximum degree level earned [plev_max]. For this, Q38 was recoded to the standardized list of values listed under the plev_max section. For the purposes of calculating underemployment, the values of 7, 8, and 9 for plev_max are treated as equivalent (e.g. an individual is not

- considered underemployed if their job requires a Specialist Degree and they have completed a Doctoral Degree),
- OR If they selected the response, “My job doesn't use my education and/or skills sufficiently” [Q47_4]
 - “Individual works fewer hours than desired” [underemp_2]
 - If they selected the response “Lack of employment opportunities” for the question, “If you work less than 35 hours per week, is it for any of the following reasons?” [Q36_1],
 - OR If they selected the response, “Shortage of raw materials” for the question, “If you work less than 35 hours per week, is it for any of the following reasons?” [Q36_2],
 - OR If they selected the response, “Seasonal work” for the question, “If you work less than 35 hours per week, is it for any of the following reasons?” [Q36_3],
 - OR If they selected the response, “Inability to find full-time work” for the question, “If you work less than 35 hours per week, is it for any of the following reasons?” [Q36_4],
 - OR If they selected the response, “I work part-time and would rather work full-time” [Q47_7]
 - “Individual makes less income than desired” [underemp_3]
 - If they selected the response, “I do not earn enough at my primary job” [Q47_1]
 - If any of these three elements is fulfilled, the respondent is considered underemployed [underemp]

Under-Represented Student [underrep]

- Created by calculating whether a respondent meets one of 3 criteria:
 - If the respondent chose any race/ethnicity other than White, then the value of under-represented is set to “Yes.”
 - If the respondent’s calculated age of entry into undergraduate [ageatentry] was 25 or higher, then the value of under-represented is set to “Yes.”
 - If the respondent is listed as living in a location during undergraduate that is a VA locality in the lowest quintile of associate and baccalaureate attainment rates [LOCDOMI]. The localities included are: Accomack County, Buckingham County, Charles City County, Cumberland County, Hopewell, Northampton County, Petersburg, Richmond City, Westmoreland County, Alleghany County, Buena Vista, Caroline County, Highland County, King and Queen County, Nelson County, Northumberland County, and Waynesboro.
 - NOTE: There is a fourth component intended for under-represented calculations, but it is not implemented yet so this value may underestimate actual cases of

under-represented students (the missing element is “received Pell grants at any time during the five years prior to degree award”).

VEDP predictors of underemployment model

PREDICTORS OF UNDEREMPLOYMENT AND EARNINGS

DRAFT

Predictors

