INTRODUCTION

World War II veterans returned after the war with a wide range of diverse life experiences that previously were not available to them. When the time came to leave military service and reintegrate into the civilian workforce, many opted to expand upon the skills and knowledge they learned while in the military through the Serviceman’s Readjustment Act of 1944. Commonly known as the GI Bill of Rights, thousands of veterans enrolled in post-secondary programs around the nation and pursued a variety of different majors or fields of study (Humes, 2006; Altschuler & Blumin, 2009).

What came to be called the GI Bill of Rights would later be referred to as the single most transformative bill of the twentieth century. It would be credited as a launching pad for “The Greatest Generation,” producing Nobel Prize winners, Supreme Court Justices, three Presidents, Pulitzer Prize winners, teachers, scientists, doctors, engineers, plus a million lawyers, nurses, businessmen, artists, actors, writers, pilots and others in a variety of categories.

Today, similar federal education benefits exist to help today’s military personnel pay for educational expenses.

The current Post-9/11 GI Bill® provides a level of education benefit close to the original GI Bill of Rights. There is little information available to the public on the current generation of student veterans’ majors or intended degree fields, due to the difficulty in tracking these factors, as they can change several times within an academic term. This challenge makes it difficult for businesses to properly prepare for student veterans’ entry into the nation’s workforce.

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The SVA Spotlight Research Brief series is an effort to fill the gaps of existing databases and provide basic demographic information on student veterans to institutions, organizations and the public.
REVIEW

Because there has been little data collection on student veterans’ majors and degree fields, it has been difficult to draw conclusions on which or how student veterans choose their majors. Examining trends or changes in student veterans’ majors is also challenging. Thanks to recent reports by the Institute for Veterans and Military Families (IVMF) at Syracuse University and SVA Census 2015 data, there may be new insights.

In November 2015, the IVMF released a report detailing survey findings from service members and student veterans (Zoli, Maury, & Fay, 2015) which suggest a strong connection between military service and decisions to pursue a STEM-related degree or career field. Nearly half (43%) of their sample reported their military specialization, job or training as STEM related. The findings suggest that U.S. military training exposes service members to STEM training, then provides practical field experiences to apply that training in real world situations.

A listwise method of data analysis was used to clean the data. Entire cases were deleted when essential data to verify student veteran status, such as branch of service and school rank, were missing. In addition, cases where conflicting or improbable responses, such as a 23-year-old serving in the Korean War, were also removed from the sample and all analyses. The result was a sample size of 1,352 individuals, producing a margin of error of approximately 2.8% using Department of Veterans Affairs GI Bill population data (U.S. Department of Veterans Affairs, 2015).

“Recent research suggests that U.S. military training exposes service members to STEM training, then provides practical field experiences to apply that training in real world situations.”

Whether these service members continue to pursue STEM majors or fields of study when they enroll in college is unknown. What we do know is that a great opportunity exists to tap into the veteran population to encourage them to use their GI Bill benefits to pursue degrees in STEM fields and build on technical skills gained in the military. Without knowing and following student veterans’ majors or degree fields, it is difficult to examine or explore the number of student veterans potentially capitalizing on their STEM training and experiences while in the military.

SVA’s 2015 Census begins to shed light on these answers.

METHODOLOGY

The SVA Spotlight Brief series contains data that was collected through the use of the SVA 2015 Census online web survey. Participants were primarily selected through a database of Student Veterans of America chapter leaders (President, Vice President, etc.), chapter advisors, on-campus veteran center directors and school VA certifying officials as well as through established SVA social media networks, such as Facebook, Twitter and LinkedIn. The survey was launched October 13, 2015 and closed on October 31, 2015 with reminder emails sent out at regular intervals.

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Majors

Respondents were asked to choose a major from a comprehensive list of program offerings. The list was derived using the Department of Education’s Classification of Instructional Programs (CIP) list (Institute of Education Sciences, 2016). The Department of Education uses CIPs to accurately track and report post-secondary majors and fields of study. The top, most universal level generalizes the field of studies or majors into large family groups, such as “Biological and Biomedical Sciences.” The next level groups field of studies or majors into more specific groups under the larger family groups, such as “Genetics” under “Biological and Biomedical Sciences.” The final level is the most specific classification, such as “Human/Medical Genetics” as a listing under “Genetics” within the “Biological and Biomedical Sciences.” The final, most detailed list was used in the development of the list of options for the survey, thus giving each respondent a diverse and accurate list to report their major.

For ease of reporting, the specific list of majors or field of studies used in the survey was regrouped into the more general, top-level groups. More detailed reports of top majors could then be broken down to one of the two more specific levels of classification.

Science and Engineering Classifications

The National Science Foundation (NSF) has an established list of Science and Engineering fields often used to classify college majors into science, technology, engineering, and mathematics (STEM) degrees and majors (National Science Foundation, 2016). There is debate over the inclusion of “Social Sciences” into the NSF Science and Engineering list. Those that strictly view the STEM fields as “hard sciences” such as biology, chemistry, and mathematics, are likely to exclude “Social Sciences” from the list of majors; whereas those that are not as strict would include “Social Sciences.” This report will use both the original NSF Science and Engineering list of majors as well as an edited list removing the family category “Social Sciences” from the NSF Science and Engineering list in the analyses of Science and Engineering majors and degree fields.

A more detailed methodology of SVA’s Spotlight Brief series is available in the first research brief of this series (Cate & Davis, Student Veteran Demographics: Select Results from Student Veterans of America Spotlight 2016, 2016).

RESULTS

Demographics

80.4 percent of the sample was over the age of 25, and over one-quarter (26.94%) reported being female. A minority (30.19%) of the sample reported being single and never married. A majority (70.86%) of the respondents reported their race/ethnicity as “White/Caucasian.”

For detailed demographic data of this sample please refer back to the first brief in this series (Cate & Davis, Student Veteran Demographics: Select Results from Student Veterans of America Spotlight 2016, 2016).

Top Areas of Study

When grouped in the top level, a majority (53.05%) of the sample made up the five most frequent majors. Business, Management, Marketing and Related Support Services topped the list of majors (17.83%) for this sample. The second most frequent major or field of study was Health Professions and Related Programs (15.10%). Engineering was third with 8.01 percent of the sample. Social Sciences and Computer and Information Sciences and Support Services complete the five most
frequent majors or fields of study with 6.10 percent and 6.01 percent respectively.

253 respondents did not select a major or field of study from the provided list. Because of the uncertainty of the non-responses such as respondents not having a major or field of study, not being able to find their major or field of study in the list, or other reasons, these non-responses were removed from the overall analysis.

The results from this analysis show that student veterans and military connected students pursue a variety of degrees and majors while enrolled.

Science and Engineering

When using the full NSF Science and Engineering majors or degree fields list, nearly one-third (31.30%) of the respondents were pursuing a degree in a Science and Engineering field (see Table 1). When the “Social Science” major is removed from the NSF Science and Engineering list, the percentage drops, but still a substantial percentage (25.11%) of respondents report pursuing a major or degree in the Science and Engineering Fields.
Science and Engineering Majors or Degree Fields

A closer examination shows that Engineering is the most frequent response (25.29%) in the Science and Engineering grouping that includes “Social Sciences” (see Table 2).

Table 2: Top Five Science and Engineering Majors

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>25.29%</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>19.48%</td>
</tr>
<tr>
<td>Computer and Information Sciences and Support Services</td>
<td>19.19%</td>
</tr>
<tr>
<td>Psychology</td>
<td>11.63%</td>
</tr>
<tr>
<td>Biological and Biomedical Sciences</td>
<td>9.88%</td>
</tr>
</tbody>
</table>

N = 344

Second was Social Sciences (19.49%), then Computer and Information Sciences and Support Services (19.19%), followed by Psychology (11.63%), and Biological and Biomedical Sciences (9.88%). There was not much change in the order of the degree fields or majors when “Social Sciences” is removed, except that Physical Sciences is added to the list in the fifth spot (see Table 3).

Table 3: Top Five Science and Engineering Majors (excluding Social Sciences)

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>31.52%</td>
</tr>
<tr>
<td>Computer and Information Sciences and Support Services</td>
<td>23.91%</td>
</tr>
<tr>
<td>Psychology</td>
<td>14.49%</td>
</tr>
<tr>
<td>Biological and Biomedical Sciences</td>
<td>12.32%</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>6.88%</td>
</tr>
</tbody>
</table>

N = 276

Download SVA Spotlight Brief 1: Demographics

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The Top 5 STEM Fields Chosen by Student Veterans

Engineering | Social Sciences | Computer/IT | Psychology | Biological/Biomedical

25%  19%  19%  11%  10%
The results from SVA’s 2015 Census also show that like their predecessors current student veterans are pursuing Science and Engineering degrees. Depending on how you classify “Social Sciences” as a Science and Engineering degree field or major, at least one quarter of respondents reported their primary major in the Science and Engineering field. In addition, taken together, respondents reporting an Engineering or a Computer and Information Sciences and Support Services account for 14.02% of the overall reported majors or degree fields.

Completion Rates

When compared to the completion rates from the Million Records Project (Cate, 2014), there is a stark contrast between primary majors currently being pursued and degree field completions. The SVA 2015 Census reported that 31.30% of respondents are currently pursuing a Science and Engineering major; however, the MRP found that 17.8% of completed degrees were in Science and Engineering fields. This may suggest that student veterans begin pursuing Science and Engineering majors, but at some point change their majors. Majors such as Engineering and Computer Science typically take longer than four academic years to complete. This combined with the limited months the GI Bill will pay for tuition may force some student veterans to switch to related majors to avoid taking out student loans or pay out-of-pocket for the extra time to complete these degrees.

Post-9/11 GI Bill Attracting Student Veterans to STEM Fields

Alternatively, the results of the SVA 2015 Census could indicate a trend of more student veterans pursuing Science and Engineering degrees. MRP used a combination of Montgomery GI Bill (MGIB) and Post-9/11 GI Bill users in their sampling. There are several contrasts between the MGIB and the Post-9/11 GI Bill, such as the greater amount of benefits under the Post-9/11 GI Bill covering more of the cost of tuition and fees than the MGIB. The greater benefits of the Post-9/11 GI Bill may reduce the overall financial burden of pursuing these degrees, thus encouraging student veterans into Science and Engineering majors.

Understanding the Data

Finally, the difference between the MRP and SVA 2015 Census results could be a product of response bias. Although the list used for the selection of majors was developed from the diverse and comprehensive Department of Education CIP codes, respondents may have unintentionally misclassified their majors if they could not find an exact match. When the results of IVMF’s report (Zoli, Maury, & Fay, 2015) are compared with the results of the SVA 2015 Census, there may be a potential shortfall between the percentage of military service members trained in STEM-related jobs or specialization and the percentage of student veterans reporting a primary major in the Science and Engineering fields—regardless of the inclusion or exclusion of “Social Sciences” from the definition. This would suggest that there is a potential loss in the investment the U.S. military expends on
STEM training and specialization and its carryover to the civilian workforce. The depth and breadth of this investment loss is outside the scope of this study, but deserves further investigation.

Some weaknesses of the SVA 2015 Census should be noted and discussed. Similar to the prior research brief, the project used chain sampling, or snowball sampling, for recruitment, meaning the initial recipients could forward the emails to other student veterans or military connected college students. This method of sampling has certain disadvantages that should be noted. Two disadvantages with this technique are finding primary contacts that are not connected to the target population and the lack of control over the sampling method. In this type of sampling technique, the primary investigator surrenders control over recruitment to the respondents, specifically the primary contacts. If the primary contacts are not representative or misrepresent the population, this could lead to skewed or biased results. These disadvantages were addressed by using primary contacts that were strongly connected and had regular interactions with the target population, such as veteran certifying officials, veteran center directors and student veteran campus leaders.

Another disadvantage with this sampling technique is the inability to estimate the overall sample size. This is true of the overall student veteran and military connected student population as individuals are not required to disclose their veteran or military service status to schools or education programs.

While data on the GI Bill users allows for a closer approximation, it does not provide complete population data as veterans may choose to enroll in college without using their GI Bill benefits or may have exhausted these benefits. Therefore, no accurate national lists or obvious sampling techniques allow for probability-based sampling of student veterans or military connected college students, which makes chain or snowball sampling technique appropriate for this population.

CLOSING

The results from this study will begin to offer definitive evidence as to student veterans’ perusal and completing Science and Engineering degrees.

One of the unexpected side effects of the Serviceman’s Readjustment Act of 1944 (GI Bill of Rights) was the large number of student veterans earning Science and Engineering degrees. It is difficult to predict with certainty whether the current generation of student veterans will follow their predecessors and earn Science and Engineering degrees. Two studies that looked at this provide conflicting results, leaving more questions than answers. With an array of different potential explanations and questions of student veterans’ interest and persistence in Science and Engineering degrees, it is evident that more research into this topic is needed.

The research should focus on the motivations of choosing a Science and Engineering major, and for maximum effect should be longitudinal following the journey of veterans through higher education, noting changes in their majors and cataloging the motives for the change. The results from this study will offer definitive evidence as to student veterans’ perusal and completing Science and Engineering degrees.
What we do know is that the need for a STEM workforce is on the rise. To fill this need the U.S. will need to increase the number of students who receive STEM degrees. When coupled with the need to increase veterans’ success in higher education, this research is the first step to inform solutions to help veterans leverage their education benefits and military experience by attracting them to the majors that will help them become the STEM leaders of the future.

REFERENCES


