Securing Our Future: Closing the Cybersecurity Talent Gap

October 2016 results from the Raytheon-NCSA survey of young adults in 12 countries about cybersecurity career interest and preparedness
Overview

As cyberthreats worldwide increase in sophistication, the demand for cybersecurity professionals to protect commercial and government networks continues to grow. Countries around the world need new talent in order to strengthen their cybersecurity postures and protect their societies. Yet last year there were 1 million postings for cybersecurity jobs around the world.\(^1\) Ignoring this talent gap is not an option as efforts continue to keep domestic and international economies and information secure.

A recent study, *Securing Our Future: Closing the Cybersecurity Talent Gap*, was commissioned by Raytheon in partnership with the National Cyber Security Alliance with the goal of addressing the problem at its base. The survey, conducted by Zogby Analytics, was a global study of the long-term talent pool — young adults, or millennials — and found some good news for the future.

The ongoing effort to raise awareness among millennials about the issue, combined with near-daily news regarding cyberattacks, has both made today’s young adults increasingly aware of and interested in cybersecurity jobs. This increase in informed young adults will also likely have effects beyond the obvious jobs to be filled — it very well could sway the nation’s future at the voting booths, as most young Americans said cybersecurity issues would likely affect how they vote in elections. Fully half of young Americans surveyed also noted there had not been enough discussion around cybersecurity issues in the recent U.S presidential campaign. Young adults also prefer higher-paying jobs with varied skills for ethical companies, all of which are available to today’s cyber professionals.

Further positives could be generated by a dedicated outreach to young women, who showed in the survey that they were less inclined toward and less informed on careers in cybersecurity than male professionals. This growing gender gap must be addressed as part of the effort to correct the general shortfall of cyber talent that’s expected to continue for years to come.

Business, policy and technology leaders are in agreement that there will be serious implications for the world’s security, safety and economic stability if a cybersecurity workforce capable of protecting information and critical infrastructure is not in place. While the survey is providing confirmation that overall trends are generally positive, more work is needed to nurture and grow this pool of interested young people to pursue science, technology, engineering and math programs. Even more of those young people must come to understand that a career in cybersecurity is a lucrative and worthwhile option for them to explore. Failure to do so is not an option worth considering.

The Securing Our Future: Closing the Cybersecurity Talent Gap survey was fielded by Zogby Analytics from Aug. 11–24, 2016. The responses were generated from a survey of 3,779 adults ages 18–26 in Australia, Germany, Japan, Jordan, Poland, Qatar, Saudi Arabia, Singapore, Turkey, United Arab Emirates, United Kingdom and the Unites States. Using trusted interactive partner resources, thousands of adults were invited to participate in this interactive survey. Each invitation was password coded and secure to ensure each respondent could only access the survey one time. Using information based on census data, voter registration figures, CIA fact books and exit polls, Zogby used complex weighting techniques to best represent the demographics of the surveyed population. Weighted variables may include age, race, gender, region, party, education and religion.

Based on a confidence interval of 95 percent, the margin of error for each region is shown in the table below. This means that all other things being equal, the identical survey repeated will have results within the margin of error 95 times out of 100.

### Methodology and Sample Characteristics

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of Respondents</th>
<th>Margin of Error</th>
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</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>1,007</td>
<td>+/- 3.2 Percentage Pt's</td>
</tr>
<tr>
<td>Europe</td>
<td>755</td>
<td>+/- 3.6 Percentage Pt's</td>
</tr>
<tr>
<td>Middle East</td>
<td>1,012</td>
<td>+/- 3.1 Percentage Pt's</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>1,005</td>
<td>+/- 3.2 Percentage Pt's</td>
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### Awareness of Cybersecurity Issues and Careers

As evidence of growing awareness and media coverage of cyber attacks worldwide, the number of millennials who have read or heard a news account of cyberattacks within the last year increased more than 45 percent from 2015 to 2016. In the U.S., the figure nearly doubled from 36 percent in 2015 to 64 percent this year. In the Asia Pacific region, the number keeping tabs on cyberattack headlines doubled from 22 percent to 44 percent year over year.

**Young adults who heard about cyberattacks in the news last year**

- **Global:** 33% (2015) vs. 48% (2016)
- **U.S.:** 36% (2015) vs. 64% (2016)
- **Europe:** 34% (2015) vs. 39% (2016)
- **Middle East:** 39% (2015) vs. 44% (2016)
- **Asia Pacific:** 22% (2015) vs. 44% (2016)
Awareness of Cybersecurity Issues and Careers

With a global shortage of talent, there has been a major push in recent years to increase awareness about the cyber profession among young adults. The campaign seems to be effective, as the number of millennials globally who said they were aware of what a cyber pro’s job entails rose from 39 percent last year to 45 percent in 2016. Unfortunately, the gap between genders widened by five points during that time, with 54 percent of young men saying they understood the profession compared to just 36 percent of young women.

Respondents in the Asia Pacific region proved to be less aware than their peers about cyber careers, with just 36 percent overall saying they knew what the job entails. But that region also has a large gender gap in regard to this knowledge, with 46 percent of men vs. 26 percent of women saying they were knowledgeable about cyber career tasks.

Despite the relative obscurity of cyber competitions, 36 percent of respondents said they were aware of such activities at their school. But the awareness is lopsided when applied to genders, with 42 percent of men aware of the contests compared to 29 percent of women.

Enrichment activities and career exploration incentive programs in cybersecurity, including clubs, job fairs, competitions, scholarships, internships and mentoring programs, are growing in prevalence worldwide as employers attempt to cultivate the talent pool. The number of young adults who said that cyber programs were available to them increased by 26 percent from the previous year, but the gender gap maintains its presence with nearly twice as many men as women knowing about such activities. There also seems to be an issue with awareness of available cyber programs in the Asia Pacific area, with 47 percent of respondents saying there were none available to them (53% saying they were available), compared to 32 percent globally (68 percent saying they were available.)
Growing Interest in Cyber Careers

Awareness of cyber careers among young adults is growing, and it’s leading to an increase in interest in the field. About 43 percent of men and 30 percent of women said they were more likely to choose a cyber career than they were a year ago — a significant boost in the right direction. Hopefully, a significant portion of these young adults will convert their interest into the actual pursuing of degree programs or applications for cyber jobs.

**Millennials more likely than a year before to choose a career to make the Internet safer**

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<tr>
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<th>2015</th>
<th>2016</th>
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<tbody>
<tr>
<td>Men</td>
<td>33%</td>
<td>43%</td>
</tr>
<tr>
<td>Women</td>
<td>24%</td>
<td>30%</td>
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</table>

Raising awareness of cyber competitions could help bring in the interest of even more millennials, and there is room to grow in that arena. Twenty-one percent of young men and fifteen percent of young women surveyed said they would want to participate in a cyber competition if one were available to them. This may be due to a lack of awareness in what the contests entail, as young adults don’t believe they are qualified to pursue these contests, with just 15 percent saying they have sought out or participated in them and many saying they don’t think they’re qualified (34 percent) or possess enough information about them (32 percent).

**If a cyber competition were available, young adults who would participate:**

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<tbody>
<tr>
<td>Men</td>
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<tr>
<td>Women</td>
<td>15%</td>
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However, young adults are still becoming more aware of the cyber opportunities that are available to them. The percentage of respondents saying no activities were available to them dropped from 46 percent last year to 32 percent in 2016. The gender gap strikes again here though as women (38 percent) are more likely to believe than men (25 percent) that they have no activities available in cyber.

Slightly less than a third of respondents said they have ever knowingly met a cyber professional, but among those that have, a strong 75 percent said they discussed cybersecurity with them as a career option. In the Middle East, respondents were much more likely to have met a cyber professional, with 64 percent of men and 59 percent of women saying they had done so, with 86 percent of both genders saying they had discussed a cyber career with that professional. This suggests students of both genders in the Middle East have been given more opportunities, perhaps in school, to meet a cyber pro than their global peers.
Growing Interest in Cyber Careers

What would increase interest in a cybersecurity career?

- More information about what the jobs might entail: 48%
- More relevant training to see if I would be good at it: 44%
- Opportunity to speak to current professionals: 37%
- Reassurance that I would earn a good living: 34%

Education Improvements

While marketing and the news has played a large part in increasing cyber awareness among the general population, young adults said there were other factors in their lives that made them cognizant about the issue. As the world becomes more intertwined with the benefits and dangers of technology, those saying they received formal cyber safety lessons increased from 41 to 55 percent with 8 percent more men than women globally saying they had received such training. Countries in the Middle East scored best in this category, with Saudi Arabia (86 percent), Qatar (76 percent) and the UAE (73 percent) leading in respondents who had taken formal online safety lessons.
Education Improvements

Europe saw basically no difference on formal training based on gender (48 percent of men vs. 47 percent of women). However, the region had nearly twice as many men (17 percent) than women (9 percent) strongly agree that high school had prepared them to use technology safely, securely, productively and ethically in the workplace. More men (36 percent) than women (26 percent) agreed their schooling had offered them the skills to pursue a cyber career.

**Received formal cyber safety lessons in school**

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<tbody>
<tr>
<td>Men</td>
<td>43%</td>
<td>59%</td>
</tr>
<tr>
<td>Women</td>
<td>40%</td>
<td>51%</td>
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Globally, only 27 percent of men and 19 percent of women strongly agreed their high school prepared them to use technology safely and ethically in the workplace, so it’s no surprise that the level of education received by a young adult also directly effects their cyber career opportunities. Overall, less than half of respondents said that teachers or counselors in high school mentioned cyber careers to them, with 40 percent of men and 28 percent of women saying they received such advice, numbers that are slightly up from 2015.

**High school prepared students to use technology safely in the workplace (somewhat or strongly agree)**

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</thead>
<tbody>
<tr>
<td>Men</td>
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<td>66%</td>
</tr>
<tr>
<td>Women</td>
<td>49%</td>
<td>58%</td>
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**Classes prepared students to pursue a cybersecurity degree**

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Parents traditionally play a large role in guiding a young person's job path. However, parents' level of general career influence does not match their children's confidence in them when it comes to their knowledge of cyber-related jobs.

Globally, for example, 43 percent of men said parents are the most influential person in their lives when it came to a career, but just 26 percent were confident in their parents' ability to guide them in pursuing a cybersecurity career. There was an even larger gap for women, with 38 percent saying a parent held the most career influence, but only 18 percent showing confidence in their parent's knowledge of cyber careers. These results suggest targeting parents with more information to provide to their children could be beneficial in closing the talent gap.

In the Middle East, however, there was very little gender gap when it came to parents' influence on career (47 percent for men vs. 44 percent for women) or their confidence in a parent in guiding them to a cyber career (42 percent for both). Young men in the Middle East were also just two percent (59 vs. 57 percent) more likely than women to consider a cyber career than last year.

**Education Improvements**

However, the results show a disparity between those with only high school educations and those who completed higher education programs. Just 26 percent of those with only high school educations said they were approached about cyber careers by teachers. Meanwhile, the number of those with an education beyond college or with an advanced degree who were asked the same question skyrocketed from 29 percent last year to 55 percent in 2016. This suggests that the more recent graduating classes had the benefit of more teacher engagement than previous students. Also, forty percent of young men and twenty-eight percent of young women reported being approached by a teacher about cybersecurity careers.

**The Role of Parents**

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The Role of Parents

Who is the most influential person helping you with career advice?

- 19% No one
- 16% Friend
- 10% Teacher
- 6% Other relative
- 40% Parent
- 9% Other adult

Who gave you your first “talk” about staying safer online?

- 41% Parent
- 21% No one
- 18% Teacher
- 17% Friend
- 16% Other adult
- 9% Other

Career Choice Factors

To fill the cyber talent gap and encourage even more awareness and interest, examining what young adults want in a career is important. As expected, a combined 90 percent of respondents said a high salary was either important, very important or extremely important to them.
Career Choice Factors

Further, when asked about skills they would like to use in their careers, both men and women showed an interest in some or all of the skills used in cybersecurity that were presented as choices. In a reversed gender gap, more women than men said they were interested in problem-solving (58 percent vs. 55 percent), communication (58 percent vs. 50 percent) and management (51 percent vs. 48 percent).

If you were a cyber pro, what type of organization would you want to protect?

Young adults also have an overwhelming desire to feel personally connected to the goals of their employer. A combined 96 percent said this was either important, very important or extremely important to them. When asked what type of organization they would want to protect if they chose a cybersecurity career, millennials showed a wide range of interest in everything from government (40 percent) to technology companies (48 percent) to banks (43 percent), health care (41 percent) and more.
Career Choice Factors

These factors are all positive signs in the fight to close the talent gap, as cybersecurity careers typically pay above average, present an opportunity to use a wide variety of skills, and are important in protecting the organizations that millennials care about.

2016 U.S. Presidential Election (U.S. Respondents Only)

Awareness of these issues has risen to the point that cybersecurity might now also be playing a role in the voting booth for young adults. In the U.S., 53 percent surveyed said a candidate’s position on cybersecurity affected their support for them, showing that these young adults are aware of the problem and care about it even if they are not jumping to be the solution.

Young men are making a stronger connection between the political atmosphere and cybersecurity issues the nation faces and were more likely (60 percent vs. 47 percent of women) to say a candidate’s position on cybersecurity would influence how they view a candidate. And only one-third of all U.S. respondents also said that cybersecurity had been a big enough part of the discussion in the U.S. presidential election.

**Does a political candidate’s position on cybersecurity impact your level of support for that candidate?**

- 53% Yes
- 24% No
- 23% Not Sure

**Do you think cybersecurity has been a big enough part of the discussion leading up to the presidential election?**

- 33% Yes
- 50% No
- 17% Not Sure
Conclusion

The consequences of the cybersecurity talent gap have never been more serious. Initiatives to raise awareness have been a large focus for several years and are beginning to bear fruit in the form of an ever-increasing pool of informed and interested young adults. Other factors that have led to this increase of awareness include school cyber competitions, an increase in cyber safety education, and cyberattack and political issues that are prevalent in today’s news. That’s the good news — young adults are likely more aware of cybersecurity issues today than ever before.

Even better, more young adults than ever are now saying they would consider a cybersecurity career. Young adults showed great interest in high-paying careers using skills such as problem-solving, analytical thinking and communication — all of which are the hallmarks of a career in cybersecurity. Millennials, like most people, also greatly care about working for a company or organization that has the same goals and beliefs as they do. With cyber jobs covering almost every aspect of our economy and society, from small startups to governments to hospitals, there lies great potential for millennials to become cybersecurity professionals in the varying types of organizations that might attract their interest.

As the outreach to bring young adults into cybersecurity careers continues, it is also important to ensure that females are receiving the same information and opportunities as their male counterparts. The gender gap on this issue is nothing new, but the recent survey shows the trend is slowly getting worse, and the world cannot afford to have half of the potential pool feeling left out or ignored in this talent recruitment. It is critical to have gender parity in terms of representation within our existing cybersecurity workforce from both ethical and practical perspectives.

Educators and parents are still influential in young adults’ lives, according to the survey, and have had varying degrees of success in leading millennials into the cybersecurity field. But educators and parents cannot immediately understand the significance of falling behind the curve on cyber when many boardroom leaders are just beginning to see the light. The gap offers a tremendous opportunity for industry and business leaders to partner with and help protect the communities within which we work.

While there may be no simple answers to the cybersecurity workforce shortage the world continues to face, there are positive signs that awareness issues are helping to address the problems. Continued and sustained effort is required in order to secure the future.
About Raytheon

Raytheon Company, with 2015 sales of $23 billion and 61,000 employees worldwide, is a technology and innovation leader specializing in defense, civil government and cybersecurity solutions. Raytheon is headquartered in Waltham, Massachusetts.

Raytheon became the three-year sponsor of the National Collegiate Cyber Defense Competition in 2014 and also provides technical resources and employee volunteers to the event. The tournament-style competition features student-only teams from 180 U.S. colleges and universities competing to protect computer networks against real-world cyberthreats. These contests are preparing students to take on threats in technology careers following graduation.

The company is also leading several cyber education initiatives. Raytheon decided to make its own cyber pros with an in-house school, Foreground University, available to employees and customers. An 18-month training program, the university turns college grads into members of an elite cyber team that hunts down and stops damaging network threats.

Raytheon has also partnered with the (ISC)² Foundation to establish the Raytheon Women's Cybersecurity Scholarship, a program that offers $90,000 in scholarships and paid internships between 2016 and 2018 to encourage women to pursue degrees in cybersecurity.

Raytheon's Cyber Academy, a global cyber education program, was launched in 2016 in the United Arab Emirates with a vision for expansion to additional countries. Meanwhile, across the pond, Raytheon sponsors the Cyber Security Challenge UK, an event series that tests amateur applicants with cyber skills.

The company has several executives currently serving on the advisory boards of different colleges and universities, and runs internship programs that brings college students into the business to learn firsthand. Other Raytheon initiatives include MathMovesU*, an ever-expanding family of unique initiatives and key partnerships that connects with students from elementary school through college to address the STEM education crisis; the Raytheon MATHCOUNTS National Competition; and Teachers in Industry, a program through the University of Arizona that gives teachers summer internships so they can bring knowledge back into the classroom.

For more about Raytheon, visit us at www.RaytheonCyber.com and follow us on Twitter @RaytheonCyber.
About Zogby Analytics

Zogby Analytics is respected nationally and internationally for its opinion research capabilities. Since 1984, Zogby has empowered clients with powerful information and knowledge critical for making informed strategic decisions.

The firm conducts multiphased opinion research engagements for banking and financial services institutions, insurance companies, hospitals and medical centers, retailers and developers, religious institutions, cultural organizations, colleges and universities, IT companies and federal agencies. Zogby's dedication and commitment to excellence and accuracy are reflected in its state-of-the-art opinion research capabilities and objective analysis and consultation.

About The National Cyber Security Alliance

The National Cyber Security Alliance (NCSA) is the nation's leading nonprofit public-private partnership promoting the safe and secure use of the internet and digital privacy. Working with the Department of Homeland Security (DHS), private sector sponsors and nonprofit collaborators to promote cybersecurity awareness, NCSA board members include representatives from ADP, AT&T, Bank of America, BlackBerry, Comcast Corporation, ESET, Facebook, Google, Intel, Logical Operations, Microsoft, PayPal, PKWARE, RSA — the Security Division of EMC, Raytheon, Symantec, Verizon and Visa. Through collaboration with the government, corporate, nonprofit and academic sectors, NCSA's mission is to educate and empower digital citizens to use the internet securely and safely, protect themselves and the technology they use, and safeguard the digital assets we all share. NCSA leads initiatives for STOP.THINK.CONNECT., a global cybersecurity awareness campaign to help all digital citizens stay safer and more secure online; Data Privacy Day, celebrated annually on Jan. 28, and National Cyber Security Awareness Month, launched every October.

For more information on NCSA, visit staysafeonline.org/about-us/overview/.