

Defending the Digital Frontier

A Barclays and Per Scholas Issue Brief



**PER
SCHOLAS**



BARCLAYS

```
mod = modifier_ob.modifiers.new("mirror")
# mirror object to mirror_ob
mirror_mod.mirror_object = mirror_ob
```

```
operation == "MIRROR_X":
    mirror_mod.use_x = True
    mirror_mod.use_y = False
    mirror_mod.use_z = False
operation == "MIRROR_Y":
    mirror_mod.use_x = False
    mirror_mod.use_y = True
    mirror_mod.use_z = False
operation == "MIRROR_Z":
    mirror_mod.use_x = False
    mirror_mod.use_y = False
    mirror_mod.use_z = True
```

```
# selection at the end -add back the deselected
```

```
mirror_ob.select=1
modifier_ob.select=1
context.scene.objects.active = modifier_ob
print("selected" + str(modifier_ob)) # modifier
mirror_ob.select = 0
key=context.selected_objects[0]
scene.objects[key.name].select = 1
```

```
print("please select exactly two objects,")
```

```
OPERATOR CLASSES -----
```

```
class MirrorOperator(Operator):
    """Mirror ob & mirror to the selected object"""
    def execute(self, context):
        context.mirror_mirror_x"
```

```
def execute(self, context):
    context.active_object is not None
```

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Summary

A robust defense against today's sophisticated cybercriminals requires a paradigm shift in thinking not just of *how* a company's defenses are built, but of *who* is building them.





In this new world of work, where business is increasingly global in character, and where most companies' operations are transforming every day through technology, it has become increasingly obvious that workforces must evolve and adapt in similarly dramatic fashion. Since our founding, Barclays has believed deeply that investments in people are the best investments we can make, and that when our team is diverse, our team is strong.

Apprentices have been crucial to our company, in part because of the diversity they foster. And in this era, when building a strong, stable and agile workforce is critical to maintaining a business' competitive advantage, the apprenticeship model has been a powerful part of the solution.

In this paper, we feature three proven solutions for effective and scalable IT workforce development initiatives for consideration, across industries and organizational structures. While each solution has its own unique attributes, they are held together by a common thread of partnership, and a shared understanding that when cross-sector collaboration occurs, the potential of a diverse workforce can truly be realized.

A handwritten signature in black ink that reads "Jes Staley". The signature is fluid and cursive, with the first name "Jes" and last name "Staley" clearly distinguishable.

Jes Staley,
Chief Executive Officer
Barclays

II. Executive Summary

“The cybersecurity staffing shortage is reaching crisis proportions.”

– Maria Korolov, cybersecurity journalist, CSO Online, July 2017¹



Information technology and networked systems are integrated into almost every aspect of today's modern life. Emerging technologies such as artificial intelligence promise to further extend this reach. As companies of all sizes make use of connecting technologies to better serve their customers, the risk of cyber threats is rapidly increasing, and the demand for talented cybersecurity professionals is multiplying as a result.

Keeping companies and their customers secure is growing more difficult by the minute. Nothing is out of reach for today's sophisticated cybercriminals, from harming computers, networks, and smartphones, to targeting people, cars, railways, planes and power grids. In 2016, the average company handled a bombardment of 200,000 security events per day,² a number that is projected to rise as cyber threats grow even more complex.

While cybercriminals are becoming increasingly more organized and aggressive, the teams defending against these attacks are struggling to fill their ranks.

At the time of this report's publication, there are more than 285,600 cybersecurity job openings in the United States³ and an additional 1.5 million cybersecurity professionals that will be needed to accommodate the predicted global shortfall by 2020.⁴ Certificate holders are also in urgent demand. There are

30,000 open postings for people with the Certified Information Security Manager certification – but only about 10,500 certificate holders.⁵

Given the demand for cybersecurity professionals, one might think that sufficient efforts to build a strong talent pipeline would be well underway. However, few young people are made aware of and encouraged to pursue a career in cybersecurity. In the Raytheon

and National Cyber Security Alliance (NCSA) 2015 annual survey "Securing Our Future: Closing the Cyber Talent Gap," 62 percent of men and 75 percent of women said their high school or secondary school did not offer classes or training needed to excel in a cybersecurity position. Additionally, 67 percent of men and 77 percent of women agreed that the option of taking this career path was never mentioned to them by a teacher, guidance counselor or supervisory adult, and 80 percent of U.S. respondents have never interacted with a cybersecurity professional or, if they have, were unaware of it.⁶

Progress, however, is on the horizon. As media covers ever-more frequent stories about cybersecurity attacks, more individuals are becoming aware of this career path and the need to grow the profession. The same report by Raytheon and NCSA a year later, in 2016, unveils some promising updates:

In 2015, 46 percent of young men and 33 percent of young women were aware of cyber careers. In 2016, awareness increased by 9 percent for young men and 3 percent for young women. Interest in cyber careers is also building, with 43 percent of men and 30 percent of women reporting that they are more likely to go into cybersecurity than they were a year before. The number of U.S. millennials who say that there are cybersecurity training programs or activities available to them has increased from 57 percent in 2015 to 70 percent in 2016.⁷

1. Maria Korolov, "Look Beyond Job Boards to Fill Cybersecurity Jobs," CSO Online, Accessed December 13, 2017, <https://www.csoonline.com/article/3206688/it-careers/firms-look-beyond-job-boards-to-find-and-recruit-cybersecurity-talent.html>.

2. Marc van Zadelhoff, "Cybersecurity Has a Serious Talent Shortage. Here's How to Fix It," Harvard Business Review, May 4, 2017, <https://hbr.org/2017/05/cybersecurity-has-a-serious-talent-shortage-heres-how-to-fix-it>.

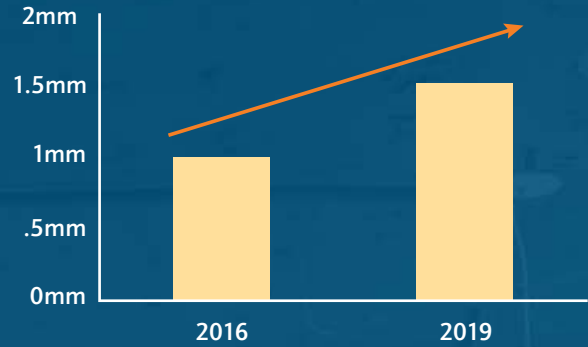
3. "Cybersecurity Supply/Demand Heat Map," CyberSeek.org, Accessed on December 13, 2017, <http://cyberseek.org/heatmap.html>.

4. "ISC² Global Information Security Workforce Study (GISWS)," Frost & Sullivan, April 15, 2017, http://blog.isc2.org/isc2_blog/2015/04/isc-study-workforce-shortfall-due-to-hiring-difficulties-despite-rising-salaries-increased-budgets-a.html.

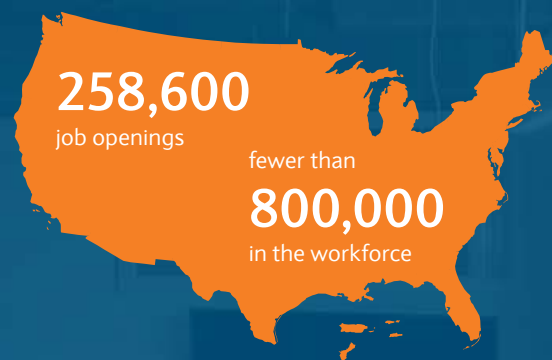
5. Maria Korolov, "Look Beyond Job Boards to Fill Cybersecurity Jobs," CSO Online, Accessed December 13, 2017, <https://www.csoonline.com/article/3206688/it-careers/firms-look-beyond-job-boards-to-find-and-recruit-cybersecurity-talent.html>.

6. "ISC² Global Information Security Workforce Study (GISWS)," Frost & Sullivan, April 15, 2017, http://blog.isc2.org/isc2_blog/2015/04/isc-study-workforce-shortfall-due-to-hiring-difficulties-despite-rising-salaries-increased-budgets-a.html.

7. "Securing Our Future: Closing the Cybersecurity Talent Gap," Raytheon and National Cybersecurity Alliance, October 2016, https://www.raytheon.com/cyber/rtnwcm/groups/corporate/documents/content/rtn_335212.pdf.



The number of open cybersecurity jobs will increase from **1 million** in 2016 to **1.5 million** by 2019.⁸



Right now, in the United States, there are more than **258,600** job openings for cybersecurity professionals, and fewer than **800,000** people total in the nation's cybersecurity workforce.⁹



There are 30,000 open postings for people with the Certified Information Security Manager credential – but only about 10,500 certified professionals.¹⁰

40%
versus
26%

40 percent of financial services companies worldwide report that they have been the target of cybercrime vs. 26 percent of companies in other industries.¹¹

An issue that affects us all:
A majority of Americans
(64 percent) have personally
experienced a major data
breach such as fraudulent
credit card charges and
stolen account numbers.¹²



Despite the growing awareness, there remains a widespread concern – from private, public and government institutions of all sizes – about the difficulty of finding and hiring qualified cybersecurity professionals. Until the higher education system catches up with the demand, companies have begun looking beyond traditional recruiting channels to cultivate their own talent pipelines, including tapping into previously overlooked or underestimated populations. Workforce development and often community-based nonprofit organizations are emerging as a powerful link to new pools of talent.

One such nonprofit, Per Scholas, with whom Barclays has partnered in New York City, has managed to maintain an 80 percent placement rate with some of the country's top tech firms. Per Scholas offers focused, hands-on training that prepares participants for entry and mid-level cyber jobs by building technical skills, nurturing professional skills, and fostering connections with potential employers. The evidence-based model is among a small set of proven solutions for addressing the growing demand for cybersecurity professionals. This issue brief dives into the organization's workforce development model as told through the lens of those who have experienced its impact.

"The widening gap between the demand for cybersecurity talent and the supply of a professional workforce can be felt across all sectors, from the federal government to Fortune 500 companies. As more of society connects to the Internet – and as countries continue to adopt and embed more Internet of Things devices in every part of life – we will see even more need for cybersecurity professionals."¹³

– Melissa Hathaway, President of Hathaway Global Strategies, LLC.

8. "ISC² Global Information Security Workforce Study (GISWS)," Frost & Sullivan, April 15, 2017, http://blog.isc2.org/isc2_blog/2015/04/isc-study-workforce-shortfall-due-to-hiring-difficulties-despite-rising-salaries-increased-budgets-a.html.

9. "Cybersecurity Supply/Demand Heat Map," CyberSeek.org, Accessed on December 13, 2017, <http://cyberseek.org/heatmap.html>.

10. Maria Korolov, "Look Beyond Job Boards to Fill Cybersecurity Jobs," CSO Online, Accessed December 13, 2017, <https://www.csoonline.com/article/3206688/it-careers/firms-look-beyond-job-boards-to-find-and-recruit-cybersecurity-talent.html>.

11. "Global Economic Crime Survey 2016," PWC, Accessed December 13, 2017, <https://www.pwc.com/gx/en/services/advisory/forensics/economic-crime-survey/data-explorer1.html#showFilters>

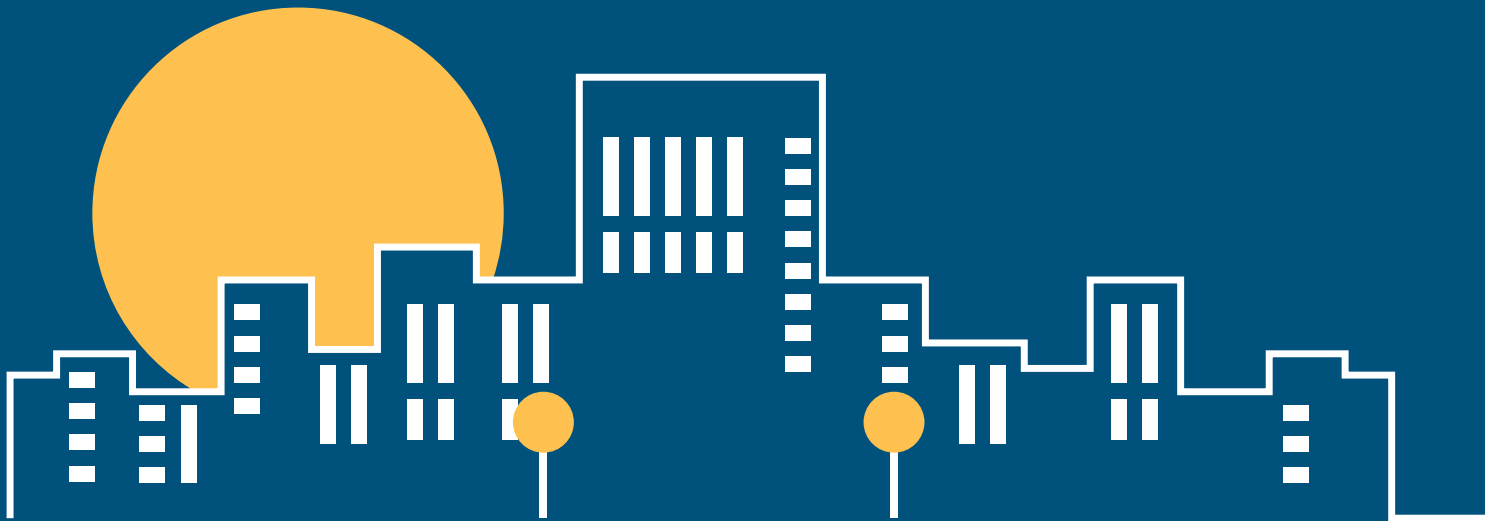
12. Kenneth Olmstead and Aaron Smith, "Americans and Cybersecurity," Pew Research Center, January 26, 2017, <http://www.pewinternet.org/2017/01/26/americans-and-cybersecurity/>.

13. Alex Moersen, "Developing the Cyber Workforce of the Future," Innovation And Tech Today, April 19th, 2018, <https://innotechtoday.com/developing-cyber-future-workforce/>

III. Business Leading the Way

“The skills gap in this country has become too big for government to solve alone. Corporations stand to lose the most without action, but they also stand to benefit the most by taking a lead on this issue.”

– Plinio Ayala, President and CEO, Per Scholas



In February 2016, The White House launched The Commission on Enhancing National Cybersecurity to assess the current state of cybersecurity in our country. The Commission's report was the first from the White House to categorize cyber threats as a national security issue, categorizing it as "one of the greatest challenges we face as a nation."¹⁴ – Plinio Ayala, President and CEO, Per Scholas.

100K
new jobs

 **\$50K**
annual salaries

 **3,500**
cyber jobs

New York City followed suit shortly thereafter by unveiling a 10-year plan to make New York City the "new home" for cybersecurity professionals. The *New York Works* campaign is set to introduce 100,000 new jobs over the next 10 years, with annual salaries of \$50,000 or greater. The plan calls for investments in several industries, with the greatest investment in cybersecurity.

As stated in the announcement of the new initiative, "New York City can be the cybersecurity capital of the world," and according to an official City Hall press release, this initiative is designed to directly create 3,500 cyber jobs over the next decade and indirectly spawn an additional 6,500.

Critical to meeting both the White House's and New York City's calls to action is an increase in employer-led workforce development programs. But in most companies, there remain limited opportunities for internship or fellowship in what is considered such a high stakes position, and therefore virtually no pathways to grow a diverse pool of talent into the career.

To meet the skills gap in cybersecurity and ensure future innovation, business leaders are beginning to look beyond traditional talent resources, leveraging partnerships with educators, nonprofit and community-focused organizations to identify and attract a more diverse and broader pool of candidates, and experience a triple bottom line benefit in the process.

While businesses might set out to build partnerships that meet their own identified talent needs, many have realized far greater community and social benefits, including more invested employees and stronger community relations.¹⁵ Most importantly, these businesses recognize their central role in building a stronger ecosystem, one that connects businesses with previously overlooked talent.

"The work we see happening now in workforce development, between corporations and nonprofit education partners like ours, are some of the most innovative, intuitive and impactful of all time. What we've discovered in partnering with Barclays on building a customized cybersecurity curriculum is more than success; it is an ability to scale a concept that stands to benefit far more companies – and their clients – over time."

– Plinio Ayala, President and CEO, Per Scholas

14. "Report on Securing and Growing the Digital Economy," Commission on Enhancing National Cybersecurity, https://obamawhitehouse.archives.gov/sites/default/files/docs/cybersecurity_report.pdf.

15. Deloitte Volunteer Impact Research, 2017, <https://www2.deloitte.com/us/en/pages/about-deloitte/articles/citizenship-deloitte-volunteer-impact-research.html>.



Barclays' Commitment Beyond Brooklyn

At Barclays, our role is to encourage economic growth and stability. But access to employment and the changing definition of 'a job' challenge our collective progress. The evolution of work demands new skills, and businesses require new forms of talent to keep moving forward.

That's why we're building connections across both sides of the employment gap. Our unique programs – Connect with Work, Unreasonable Impact and LifeSkills – help people prepare for the future of work, while also supporting businesses to connect with job-ready candidates and create jobs.

By supporting both work skills and businesses, we aim to build more resilient individuals and prosperous communities.

Connect with Work

Is an employability program that's aimed at individuals with the aptitude and attitude to enter the workplace, but who face barriers such as a lack of qualifications, experience or confidence. The program connects individuals aged 16 and over with businesses that are recruiting but struggling to find skilled and motivated individuals for their workplace. Together with a selection of charity partners, we train people in the job-specific skills that businesses are looking for and support them into jobs or apprenticeships.

Unreasonable Impact

Is an innovative multiyear partnership between Barclays and Unreasonable Group to launch the world's first international network of accelerators focused on scaling up entrepreneurial solutions that will help employ thousands worldwide, while solving some of our most pressing societal challenges.

LifeSkills

Inspires millions of 11- to 24-year-olds to get the skills they need to move forward in the 21st-century workplace and offers work experience for 14- to 19-year-olds. As one of the biggest youth employability programs in the U.K., LifeSkills works with teachers, parents and businesses to help young people by providing free tools, tips and work experience opportunities that help build confidence and boost employability. It also provides support to U.K. businesses – they can upload work experience placements on the LifeSkills platform, which teachers use to find their students a suitable opportunity.



IV. The Power of Fresh Perspective

“In order for us to meet the emerging workforce skills gaps, we must – all businesses must – work to foster innovation through diverse perspectives and experiences.”

– Rita McCaffrey, Programme Manager, Wholesale Lending, Barclays



IV. The Power of Fresh Perspective

Understanding the cybersecurity profession requires going beyond the common image of a cybersecurity professional, often portrayed as a “warfighter, computer geek, or secret operative.” This perception has caused significant pools of talent to opt out of the cybersecurity workforce because they felt like they would not fit in.¹⁶

Perceptions exist among hiring managers as well. The natural inclination among many hiring managers is that “if you have a security background, preferably in law enforcement, you’ll be naturally inclined to thrive in cybersecurity.” But in hindsight, there is actually very little linking the two groups. Cybersecurity professionals require fierce attention to detail, quick thinking and problem-solving skills – all similar to security professionals, but the best cybersecurity professionals also require a nimbleness to learning, a natural comfort to sink into new and emerging technologies, and an ability to find answers even when no clues exist.

“The new cyber professional needs to think differently about the ways in which a cyber attack might happen,” says Rita McCaffrey, Programme Manager, Wholesale Lending, Barclays, “because the attacks happen differently every time. But it’s not about warfare, it’s about creativity, design, and problem solving.”

“Engaging women, under-represented ethnic and racial groups, and people with disabilities brings essential perspectives to problem solving,” adds McCaffrey. “In order for us to meet the emerging workforce skills gaps, we must – all businesses must – work to foster innovation through diverse perspectives and experiences.”

“Per Scholas students are motivated, curious, and they’ve learned to survive through difficult challenges,” says Kelly Richardson, Managing Director of Per Scholas. “Students come from a broad spectrum of backgrounds, ages and experiences, and they think very differently about problems than perhaps the student who has taken a more traditional educational pathway.” And as it relates to their interest in cybersecurity, “Students understand the opportunity that exists within the industry, and they want to be part of the ground game.”

Nicolio Sambrano, one of the first Per Scholas cybersecurity graduates to be hired by Barclays, and valedictorian of the graduating class, shared at his graduation: “This course was the first step for us. We are grateful for the opportunity Per Scholas gave us and for Barclays for taking a chance on us.”



Women represent just **11 percent** of the cybersecurity workforce.¹⁷

<12 percent

African-Americans, Asians and Hispanics account for less than 12 percent of information security analysts in the U.S.¹⁸



16. Tom Gjelten, “Cyberwarrior Shortage Threatens U.S. Security,” NPR, July 10, 2010, <https://www.npr.org/templates/story/story.php?storyId=128574055>.

17. “The 2017 Global Information Security Workforce Study: Women in Cybersecurity,” Frost & Sullivan, March 1, 2017, <https://iamcybersafe.org/wp-content/uploads/2017/03/WomensReport.pdf>.

18. “Labor Force Statistics from the Current Population Survey,” Bureau of Labor Statistics, Accessed December 13, 2017, <https://www.bls.gov/cps/cpsaat11.htm>.

V. Building Stronger Businesses and Stronger Communities

“At Per Scholas, students are incredibly hungry, with a desire for continuous learning. This makes them a strong match within the cultures of our corporate partners, and even more so in the ever-changing field of cybersecurity.”

– Kelly Richardson, Managing Director, Per Scholas



Per Scholas is a national nonprofit headquartered in the South Bronx, an area notorious for being the poorest Congressional district in the country¹⁹ with 38 percent of residents living below the federal poverty line. Plinio Ayala, Per Scholas' President and CEO, grew up in the neighborhood and says that while the physical decay may be better than it was during the 1980s, the people still feel left behind. "The borough has always lacked opportunities, and the residents have lacked opportunities." Better jobs, he believes, are the only way to stimulate a change.

"The success of programs such as Per Scholas is vital to the future of our economy," says Bronx Borough President Ruben Diaz Jr. "We want to be the next tech hub of the world and in order to fulfill this goal, we will need qualified talent. Per Scholas helps teach and build up our future tech geniuses that will help take our great borough to the next level."

But teaching our nation's future tech geniuses is an empty promise if the doors to opportunity are not open to all. The development of long-lasting collaborative partnership models is a signature trait of Per Scholas, and the results have been significant for the cities in which Per Scholas operates.

"At Per Scholas, students are incredibly hungry, with a desire for continuous learning. This makes them a strong match within the cultures of our corporate partners, and even more so in the ever-changing field of cybersecurity," added Kelly Richardson of Per Scholas.

Per Scholas impact by the numbers



7,500

individuals trained since 1995



80%

of graduates land jobs



75%

of graduates retain their employment for at least one year



19. Richard Sisk, "South Bronx is poorest district in nation, U.S. Census Bureau finds: 38% live below poverty line," New York Daily News, September 29, 2010, <http://www.nydailynews.com/new-york/south-bronx-poorest-district-nation-u-s-census-bureau-finds-38-live-poverty-line-article-1.438344>.

VI. Leadership Essays

It Takes a Borough: The Barclays Apprenticeship Model

Strengthening the platform for pre-employment training:
Per Scholas and Cognizant Technology Solutions

A model built to thrive: Per Scholas and
Thrive Impact Sourcing



Leadership Essay 1

It Takes a Borough: The Barclays Apprenticeship Model

Barclays has supported Per Scholas' employment initiatives in New York City since 2012. More than 500 Barclays employees have volunteered with Per Scholas, including hosting large-scale mock interview events that provide Per Scholas students with feedback on their resumes and interview skills and serving as guest lecturers and mentors. In 2016, Barclays worked with Per Scholas to establish a first-time cybersecurity curriculum tailored toward entry-level individuals wishing to join the field of cybersecurity.



Partnership Launched in 2012

Since 2012, Barclays has supported **1,460 individuals** to participate in its training programs

120 total cybersecurity students enrolled with **104 graduated**; the average class features **30% women** and **13% veterans**²⁰

Over 40 Per Scholas grads hired into Barclays as interns, apprentices or full-time hires

"In a field where it's become increasingly common to hire ex-CIA and ex-Interpol officers into cybersecurity positions, we've been surprised, and frankly impressed, by just how much of a fit Per Scholas graduates fare in such a high stakes environment."

– Miles Dolphin, Vice President and Head of GIS Data Services in Identity and Access Management, Barclays

If you can't find it, build it

After identifying an opportunity to support hiring into its technology division and in particular the cybersecurity practice, Barclays decided to create a professional training program from the ground up, partnering with Per Scholas to develop a customized curriculum that could be delivered in Per Scholas' Brooklyn-based training site. Graduates of the program then had an opportunity to interview with Barclays for a rotating internship program or apprenticeship program. To date, 43 Per Scholas graduates have completed internships or apprenticeships with Barclays.

"As Cybersecurity is a fairly complex field, we were not able to identify an existing program with enough breadth of security technology as well as depth in specific skill sets to enable an entry-level role to join as a security professional and hit the ground running," said Miles Dolphin, Vice President and head of GIS Data Services in Identity and Access Management at Barclays, and a key architect of the Barclays/Per Scholas curriculum. "Most programs were previously an IT training center which covered a couple of key technologies but had an IT Support focus. So we built our own by first teaming up with our peers to better understand the common requirements across the industry and then partnering with Per Scholas to build out a custom tailored curriculum which could cater to the constantly evolving field of Cybersecurity."

"Engaging an employer partner is a tricky process for any community-based nonprofit, understanding who within those institutions are the right people to talk with, and who can help create a curriculum," noted Richardson, of Per Scholas. "With Barclays, we presented a willingness and a level of expertise to create a cyber curriculum that Barclays, Per Scholas, and our prospective students found intriguing – and ultimately served as a wise business decision for Barclays." Since the initial formation of the partnership, the direct and regular connection between the two companies – and their champions for this partnership – have never wavered. "I believe this partnership at its broadest level works so well because of how well we work together on a personal one-on-one level," added Richardson.

20. Source all to Per Scholas, 2017 data.

A demand that goes beyond Barclays

After experiencing the benefits of prior Per Scholas graduates transitioning into various teams at Barclays, the company made a significant investment into the partnership. “There are few partnerships that have the same kind of impact as our partnership with Per Scholas. Employees who come to Barclays through the Per Scholas pipeline are among our most committed, creative and loyal to the firm,” notes Wayne Kunow, Head of Cyber and Information Security Governance for Barclays International. “Employees from Per Scholas appreciate the investment we made early in their careers, and in turn, they’ve made investments back in us. It’s a win-win relationship.”

“With Per Scholas, Barclays’ New York office took inspiration from its European counterparts in developing an apprenticeship model. This provided a long enough runway for any new individual on the Barclays team to build a proper foundation of skills, so that when he or she converted to full time, there was a shared understanding of the skill sets, the team, and the purpose,” says Dolphin.

Per Scholas offered a very different approach to Barclays in terms of training, however. Instead of providing one standard curriculum on cybersecurity, the organization provided the flexibility for Barclays to create a curriculum together, and they presented it with a set of extraordinary professors and teachers. Students now spend 17 weeks in a classroom setting, with lessons directly inspired and informed by real-time workforce issues, which makes the transition into the professional setting seamless.

Barclays, however, didn’t set out to create a Barclays-specific cybersecurity curriculum. The company realized that given the enormity of the need, there was an opportunity to create a curriculum that could have broader impact on the field and prepare many more people for career-wage jobs. “We knew at the outset that we could not hire every graduate, but we wanted them all to be able to land meaningful cybersecurity positions within the industry. Our aim was to invest in a cybersecurity program that gave students the exact skills they needed, in a matter of 17 weeks, to be an asset at an entry-level position. I feel that we accomplished that goal,” added Dolphin.

To achieve this goal, Barclays hosted several working group sessions with a broad range of its corporate peers in the financial services industry — long seen as competitors — to collectively strategize on what such a curriculum should include. Together, the group examined the set of skills that would be most valuable, and determined how best to cultivate them in a 17-week period. Both Barclays and Per Scholas attribute this early learning time to job functions, industry needs and course curriculum priorities, essential to the partnership’s success.

“We went into this partnership believing that the investment would not only provide a very valuable contribution in our community as a corporate citizen, but would also create a long-term, sustainable influx of talented individuals for entry-level positions at Barclays, for years to come,” added Deborah Goldfarb, Managing Director of Citizenship for Barclays International. “With Per Scholas, we’ve truly been able to cultivate the next generation of professionals from the ground up.”

● ● ● Per Scholas Cybersecurity Curriculum Highlights



17-week course: Launched in September 2016, and co-authored with Barclays. Each course is taught by three Per Scholas instructors. Classroom instruction is supplemented by technology staff where required

Weeks 1–4: Provides the OS level foundations on Windows, Unix and Mac and increases understanding of troubleshooting skills

Weeks 5–6: Focuses on CCNA Cyber Ops certification to give candidates essential tech skills and certifications relevant to the industry

Weeks 8–9: Leverages Cisco’s Security Curriculum to provide awareness of industry trends and security context

Week 12: Involves the candidate being onsite at Barclays where they are exposed to more advanced techniques within the field of Cybersecurity control and operations

Week 17: Wrap-up and placement support to facilitate graduates’ transition from training to employment



“At Barclays, we’ve always recognized the importance of entry-level talent who want to hit the ground running, and I don’t believe we’re unique in that way. Where our model does stand alone is in how we bring our talent in, how we invest in them and how we prepare them for the world.”

– Wayne Kunow, Head of Cyber and Information Security Governance for Barclays International



Leadership Essay 2

Strengthening the platform for pre-employment training: Per Scholas and Cognizant Technology Solutions

The desire to create a stronger and more skilled entry-level workforce also served as a catalyst for Platform by Per Scholas, a new series of customized training tracks that put students in direct hiring pipelines with major technology employers. Cognizant is one such employer who has built a newly established training center in the South Bronx. The branded partnership provides no-cost technology skills training and career development resources for as many as 650 New Yorkers in the first 18 months of the program alone. Cognizant intends to hire up to 350 of the program's initial graduates to expand its New York operations.

Cognizant's relationship with Per Scholas began two years ago as Cognizant was supporting a client's digital IT transformation. "A significant portion of our client's workforce had skills that were out of date. These individuals were in need of retraining to effectively support and innovate the business in a digital environment. But the type of curriculum to bring them up to speed quickly, with the specific skills required, didn't readily exist," said Eric Westphal, Senior Director, Cognizant. "We recognized an opportunity to advance our client's agenda – as well as to look further, and develop individuals who could help support our own talent pipeline needs – by creating a custom training program. What began as an initiative to provide for one client's needs has quickly blossomed into a program helping to develop tomorrow's tech workforce in a number of communities across the country."

In developing the program, Per Scholas's reputation and focus on serving underserved and overlooked groups attracted Cognizant's attention. "We were extremely impressed with Plinio's vision and the talent they had already produced. They were passionate, innovative and agile," added Westphal. "We worked together to create the curriculum – Per Scholas drove the development and Cognizant informed and supported it. The Bronx training facility opened in July 2017 and brought in the first cohort of Quality Engineering and Software Support students." Platform by Per Scholas has since developed an additional four training tracks to meet hiring demands: Data Engineering, Security Operations Center Analyst, Java Developer and Java Basics, an intensive five-week boot camp to develop fundamental knowledge in the coding language.

Employer partner insights to solve the skills gap

"The pace of technological innovation and disruption is accelerating, and in order to compete, organizations require a workforce that can keep pace," says Westphal. "The programs we've designed provide students with foundational computational thinking and technology skills that enable them to continue advancing their skills and sustain a career in technology."

Per Scholas worked with Cognizant leadership and client service managers to develop the curriculum that would graduate students who possessed the skills and the nuanced knowledge needed to ensure success. Per Scholas also sat down with Cognizant clients to better understand their needs and the specific gaps in skills that must be addressed within the individuals that drive their business.

"Because of the tech sector's constant pace of change, our employer base is our best source of information," says Plinio Ayala. "It's the information that they provide us that helps us create effective programming, so that we can train people for relevant skills that are in demand now and fill jobs that are going vacant at corporations throughout our cities."

Program development doesn't end when courses begin, Westphal stresses. "The program's ability to adjust to changing industry, student and client needs is an important part of its success. The curriculum we anticipated, the number of weeks required to teach it, and expected outcomes continue to evolve as Per Scholas spends more time with our clients and as they collect student feedback throughout each course." Cognizant gains additional insights about what's needed to bridge the skills gap, even after graduation, through skills assessment, the interview process and by measuring job placement outcomes and long-term retention.

"It's exciting to see progress in the classroom, concepts clicking, improving test scores, and increasing comfort presenting to a room," says James Judge, Managing Director of Platform by Per Scholas. "But the proof and impact is when they start the transition from pupil to professional and seeing the success, the confidence, and hearing what they learned that they are using day to day is what we're after and confirmation we are on the right track."



A space for collaboration and business assimilation

Unique to the Per Scholas/Cognizant partnership is a co-branded state-of-the-art training facility that features four computer labs, a student lounge, and a reception room. The space was designed to enhance student learning and facilitate collaborative problem solving of actual client case studies presented in course work.

The training center also plays an important role in helping students understand and become acquainted with Cognizant's corporate culture. Cognizant business leaders spend time interacting with students informally in the lounge areas. They host lunch-and-learn sessions and lead in-class presentations that give students a look at a day-in-the-life-of a Cognizant employee.

"We are interacting with the students from day one," says Westphal. "The hope is that having opportunities to build rapport with our business leaders will provide meaningful engagement early on and motivate the students to pursue the potential job opportunities with us as they graduate from the program."

Cognizant is soon opening a second training facility. Located within a Cognizant office center in Irving, Texas, the facility will include 10,000 square feet of dedicated training rooms and workspaces to expand the Platform pre-employment program. Plans call for training of at least 1,050 individuals over the course of 36 months. Cognizant expects to hire as many as 750 of the program's initial graduates to fill newly created jobs in the Irving area.

Leadership Essay 3

A model built to thrive: Per Scholas and Thrive Impact Sourcing

“Software testing is in especially high demand and is a skill that can be trained in a reasonable amount of time. We saw this Per Scholas partnership as a way to quickly make strides to end poverty in our region while meeting market demands.”

– Michael Kroeger, Ingage/Thrive Impact Sourcing co-founder



In Cincinnati, Ohio, the market is experiencing a similar talent crunch, but a creative staffing solution is underway at Thrive Impact Sourcing, a Cincinnati-based B-Corporation pioneering an impact sourcing business model in the city’s urban core, with Per Scholas at the center. The company’s “disruptive approach impacts local employment rates” by providing high-quality opportunities in low-employment, urban areas.

As in the Barclays apprenticeship model, small firms are thinking similarly about how to build the tech workforce, and that in most cases, it must go beyond technical training. Thrive’s model focuses on student growth in three areas: personal (life skills, transportation, housing), professional (communication, leadership, accountability) and technical (practical skills to build and test software). And just as with Barclays, Thrive’s IT Support/Software Testing workforce development programs are helping to build a workforce of IT-ready individuals who can continue to advance in their career and more easily obtain additional certifications, thereby adding to the ecosystem of qualified candidates who will lead our global workforce into the next generation of cybersecurity defenses.

“There is a documented shortage of IT professionals in Cincinnati, especially for software testers and developers,” notes Michael Kroeger, co-founder of Thrive Impact Sourcing. Without investments in growing the talent pool, it’s common for trained IT professionals to jump from one company to another, and for companies to lure away talent from one another. The unfortunate reality is that, until recently, our efforts to expand the talent pool were actually quite limited, which was just driving up salaries, but not actually increasing the size of the talent pool.

So, the founders of Ingage and Thrive Impact Sourcing saw a very different opportunity. Rather than trade talent with their competitors to build a new IT consulting practice, the group teamed up with Per Scholas to launch a new software testing training

course, designed to engage new and often overlooked talent pools, and then committed to hire at least 50 percent of its graduates. After three courses, however, Thrive has hired over 80 percent of the graduates, demonstrating the quality of candidates and training the students receive at Per Scholas.

To this day, Thrive has hired **37** Per Scholas alum for positions as QA (Quality Assurance) Analysts in their firm.

“I have nothing but hope and excitement about my future. Just three or four months ago I was expecting to be just above minimum wage ... I work for a company that cares about my success and they pay for my training,” says Taj Crooms, a Per Scholas ambassador.

Thrive’s Software Testing course provides participants with industry-leading testing skills and techniques in a lab-based, instructor-led environment. In addition, students can access real-life projects and participate in field studies to learn alongside working professionals. Graduates then have the opportunity to interview for full-time positions with Thrive Impact Sourcing and with other corporate partners.

“We know there are plenty of people capable of succeeding in these open IT jobs, if we are willing to invest in training them,” added Kroeger.

Thrive’s preliminary data shows that before employment with the company, Per Scholas students were making an annual average wage of \$10,365. After 12 months of employment at Thrive, these same individuals were earning an annual average wage of \$49,648 including comprehensive benefits such as health coverage and 401k matches. And while this particular group of Per Scholas hires had previously received \$140,001 in public assistance per year, the group now contributes to the economy as taxpayers, through payroll, federal, state and local taxes, a total of \$137,861 in tax contributions.



Per Scholas is a springboard, but we don't let the training end on the day the certificate is achieved.

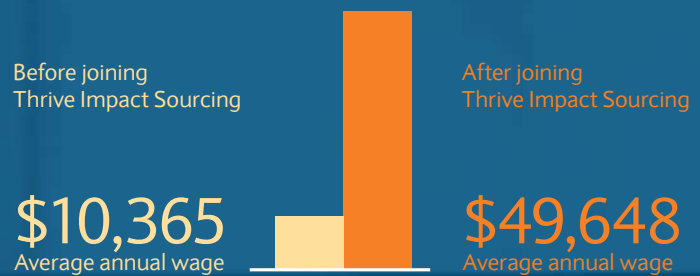
– Michael Kroeger, Ingage/Thrive Impact Sourcing

Thrive went from an idea to a \$5 million enterprise with 70 employees in less than two years. The company hires individuals early in their career and sells consulting services through an apprenticeship approach, pairing senior analysts with junior analysts. Thrive Impact Sourcing has already hired 37 students full time from Per Scholas.

“Per Scholas provides the curriculum and technical training ... Thrive and Ingage supports the program and delivers meaningful job opportunities for the graduates,” notes Paul Cashen, Per Scholas Managing Director in Cincinnati. “The unique mix of training and career opportunities have proven to transform lives and help end the cycle of poverty in our city.”

Our Impact

After 12 months of employment



Result

4.8x

Increase after 12 months

VII. Key Considerations

Cybersecurity is the number one security threat of every business in America. As businesses explore various ways to close their own gap in hiring talent, one thing is certain: **Being ready for today's cybercriminal requires investing in tomorrow's cyber expert.**





In developing this report, several distinct themes – lessons learned – emerged as central to the development of a cybersecurity workforce



First, understand that the diverse nature of the cybersecurity threat needs to be matched by diversity in the workforce. By investing in the ecosystem of cybersecurity talent, companies will be far better equipped to take on the cybersecurity challenge. While it is important to focus on the short-term needs of an organization, to produce a cybersecurity workforce at scale, there will need to be more strategic industry partnerships that can help shape the long-term sustainability of the cyber workforce.

By developing formal and informal partnerships with colleges and universities, community colleges, coding bootcamps, and nonprofit training programs, companies can stay ahead of the rapidly changing skills needed to create a pipeline of credentialed talent at every level.



Then, understand what you're solving for. Do you need a built-from-the-ground-up curriculum, specific to your company, or can you benefit from existing offerings, perhaps with not much more than adjustments? Understanding what your unique need is can help in the process of filling it. And could the talent you need be hidden in plain sight, inside your company? Consider opportunities to upskill current employees who already understand a company's culture, customers and business models by providing training through partnerships with local organizations and community colleges.



Focus on capability and credentials in evaluating potential hires, not solely on degrees. Many characteristics of a successful cybersecurity professional do not require advanced degrees, and today, robust technical skills are being learned in a variety of settings. This approach is one way to move your hiring process beyond biases to attract and retain diverse talent. Barclays and Thrive were looking for people who could hit the ground running when they joined the team. For success, it meant shifting the importance of hiring criteria, away from traditional resume reviews to finding the right people, with the right sense of agility.



Find – or become – the champion. Being willing to think differently about recruiting – exploring both traditional and nontraditional paths to recruitment, especially related to the high stakes world of cybersecurity can be difficult for many companies. Provide opportunities for new hires to shadow colleagues in the cybersecurity field. This approach helps to build an inclusive culture and may spark interest among participants in developing new skills. Encourage employees to participate in mentoring programs that can give interested talent a window into the opportunities available to them in computer science and cybersecurity fields. Whatever the path, remember that the majority of America's great untapped talent lies outside of the traditional talent pool. Go look for it. And then find someone – maybe it's you – who can champion the cause.



Consider the apprenticeship model. Given the rapid growth of cybersecurity as a necessary business asset, and that traditional four-year institutions are in many cases still catching up, consider what role a formal or informal apprenticeship model might play in your business model. But plan accordingly. While trainings may happen in a 17-week window, plan for a six- to nine-month process if you're looking to build or adjust a curriculum that caters to your company's needs.

VIII. Closing

When it comes to building strong, stable and agile technology workforces, this report shows that there are far more ways than one way to accomplish the task – though not always obviously so. From the Barclays apprenticeship model with Per Scholas in Brooklyn to Thrive’s innovative partnership model in Cincinnati, the building of a technology workforce requires that hiring managers be as nimble in their thinking as the technologists that a company aims to hire, and that when done right, the business and the community benefit is great.

As Barclays and Per Scholas continue to work together to bring untapped talent to the New York City technology workforce, other markets are eager to benefit from the same innovative model. This partnership is poised to expand, creating opportunities that will redefine talent pipelines for business beyond New York, and elevate career prospects for talented job seekers in the process.



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About Per Scholas

Per Scholas is a national nonprofit that drives positive and proven social change in communities across the country. Through rigorous and tuition-free technology training and professional development, we prepare motivated and curious adults who are un- or underemployed for successful careers as IT professionals, and we create onramps to businesses in need of their talents. Today we provide our solutions in six cities across the country: Atlanta, GA; Cincinnati and Columbus, OH; Dallas, TX; the National Capital Region; and New York, NY. To date, Per Scholas has trained 7,500 individuals, helping them build lasting, life-changing skills and careers in technology.

To learn more visit www.perscholas.org.

About Barclays

Barclays is a transatlantic consumer and wholesale bank offering products and services across personal, corporate and investment banking, credit cards and wealth management, with a strong presence in our two home markets of the U.K and the U.S.

With over 325 years of history and expertise in banking, Barclays operates in over 40 countries and employs approximately 80,000 people. Barclays moves, lends, invests and protects money for customers and clients worldwide.

For further information about Barclays, please visit our website home.barclays.

```
mirror_mod = modifier_ob.modifiers.new("mirror")
# Add mirror object to mirror_ob
mirror_mod.mirror_object = mirror_ob
```

```
operation == "MIRROR_X":
    mirror_mod.use_x = True
    mirror_mod.use_y = False
    mirror_mod.use_z = False
operation == "MIRROR_Y":
    mirror_mod.use_x = False
    mirror_mod.use_y = True
    mirror_mod.use_z = False
operation == "MIRROR_Z":
    mirror_mod.use_x = False
    mirror_mod.use_y = False
    mirror_mod.use_z = True
```

```
# Selection at the end -add back the deselected objects
mirror_ob.select= 1
```

```
modifier_ob.select=1
```

```
 bpy.context.scene.objects.active = modifier_ob
```

```
 print("selected" + str(modifier_ob)) # modifier
```

```
    mirror_ob.select = 0
```

```
 bpy.context.selected_objects[0]
```

```
 bpy.data.objects[one.name].select = 1
```

```
 print("please select exactly two objects,")
```

```
----- OPERATOR CLASSES -----
```

```
 bpy.types.Operator):
    """Add mirror to the selected object"""
    bl_label = "Add mirror_x"
    bl_options = {'REGISTER', 'UNDO'}
    mirror_x
```

```
 bpy.context):
    """Add mirror to the selected object"""
    if bpy.context.active_object is not None
```



“Barclays is proud to partner with Per Scholas, to play a part in driving economic growth and social progress. This initiative highlights the humanity that sits behind banking and finance, and the ability of financial services companies, like Barclays, to work together with people from all walks of life to help them succeed in achieving their deepest ambitions. We know that when our talented employees join forces to innovate with the very best nonprofits, like Per Scholas, we can make an even deeper impact in our communities. It is about our determination to leave things better than when we found them.”

– Jes Staley, Chief Executive Officer, Barclays