The Wireless Infrastructure and Diversity Jobs Gap Case Study:

A WIAAI Consortium Solution through the Urban League of Central Carolinas Apprenticeship Model

September 2017

Wireless Infrastructure Apprenticeship Access Initiative

National Urban League

MMTC
Multicultural Media, Telecom & Internet Council

WIA
Wireless Infrastructure Association

The Challenge: The Telecom Industry Jobs and Skills Gap

Executive Summary

The nation is on the dawn of the next generation in wireless. Fifth-generation, or 5G, networks promise significantly increased speeds and data capacity for users, as well as an increased demand for telecom infrastructure buildout.

As companies race to upgrade, expand, and build out their networks, we face a demand for trained technology professionals – yet the nation, and especially women and communities of color, continue to lag in the STEM education necessary to become the skilled labor force required to fulfill this need. A registered apprenticeship program is a workforce development strategy gaining traction within the wireless industry to address this challenge.

Registered Apprenticeship is a proven approach for preparing workers for jobs while meeting the needs of business for a highly-skilled workforce. Registered Apprenticeship is an employer-driven, "earn while you learn" model that combines on-the-job training provided by the employer that hires the apprentice, with job-related instruction in curricula tied to the attainment of national skills standards. The model also involves progressive increases in an apprentice's skills and wages.[1]

Future wireless networks including 5G will require very robust infrastructure that can handle massive data growth. Fiber optic cable-based infrastructure can support this growth due to its seemingly boundless capacity. Wireless and wireline industries have begun planning the expansion of the fiber optic-based networks and will be in need of a skilled workforce that can design, deploy, and maintain these networks. Wireless Infrastructure Apprenticeship Access Initiative (WIAAI Consortium) members are working to address this need. With the assistance of the U.S. Department of Labor's ApprenticeshipUSA program, the Consortium is executing its plan to apply the apprenticeship model to satisfy the needs of the industry.

This Case Study examines the Urban League of Central Carolinas' (ULCC) workforce development programs, including its Fiber Optic Technician Training Program, as a "best practices" model that can be used by the WIAAI Consortium to achieve its goals of creating successful apprenticeship programs in the wireless telecommunications sector.

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[1] "Frequently Asked Questions," ApprenticeshipUSA Toolkit, U.S. Department of Labor. Available at https://www.dol.gov/apprenticeship/toolkit/toolkitfaq.htm. Last visited September 5, 2017.

Overview of the Wireless Jobs and Skills Gaps

"Training a qualified workforce to support the continuing development of 4G, the upcoming development of 5G technologies and the impending Internet of Things (IoT) is imperative as new technologies, spectrum and efficiencies are introduced into networks."
Skills Gap Paper, Wireless Infrastructure Association

The 2016 Wireless Infrastructure Association (WIA) White Paper, "*The Skills Gap in Wireless Infrastructure Training and Education*" (*Skills Gap Paper*) reports that "[t]he demand for wireless infrastructure continues to outpace the industry's existing labor force of trained technology professionals, engineers, and field technicians."[2] Yet the U.S. Bureau of Labor Statistics reports that telecommunications industry employment has declined since 2006. According to the *Skills Gap Paper*, this decrease can be attributed to a lower cost of technological development, high employment rates in general, and training overseas. In short, the industry has a demand for skill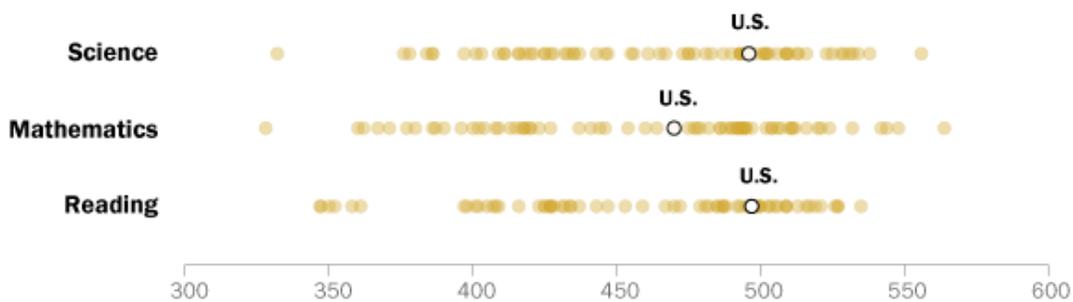ed labor, but the U.S. lacks the supply – and the paradoxical shortage of skilled labor versus growing demand in the U.S. will further exacerbate this decline.

When compared with the rest of the world, the U.S. outlook is even more grim, given the low STEM literacy rates. According to the 2016 Program for International Student Assessment (PISA) measuring math literacy in 2015, U.S. students ranked 30th out of 35 OECD countries.[3] As the *Skills Gap Paper* states, "To keep pace as technology advances, industry will need to regularly update the training and skills of its workforce."

The nation's labor gap in the telecom sector presents tremendous opportunity for unemployed people in underrepresented groups. The U.S. Department of Labor's Bureau of Labor Statistics reported in April 2017 that although the nation's unemployment rate was 4.4% overall, it was 7.9% for African Americans and 5.2% for Hispanic Americans, compared to just 3.8% for whites.[4] The racial STEM gap further limits opportunities for these communities to connect to the opportunities for skilled laborers in the telecommunications sector. The 2016, the U.S. News/Raytheon STEM Index found that while "the number of white students who earned STEM degrees grew 15% in the last five years, the number of black students fell by roughly the same margin."[5]

Internationally, U.S. stands in middle of pack on science, math, reading scores

Average scores of 15-year-olds taking the 2015 Program for International Student Assessment

Note: Scale ranges from 0-1,000. Results from China not included because only four provinces participated in PISA 2015.
Source: OECD, PISA 2015

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[2] https://wia.org/resource-library/the_skills_gap_in_wireless_infrastructure_education/
[3] http://www.pewresearch.org/fact-tank/2017/02/15/u-s-students-internationally-math-science/
[4] https://www.bls.gov/cps/demographics.htm
[5] https://www.usnews.com/news/articles/2016-05-17/the-new-stem-index-2016

The WIAAI Consortium: A Solution for Achieving Equity in Wireless Telecom Apprenticeship

Consortium details: In 2016, the National Urban League (NUL), the Wireless Infrastructure Association (WIA), and the Multicultural Media, Telecom and Internet Council (MMTC), formed the Wireless Infrastructure Apprenticeship Access Initiative (WIAAI) to create and promote Registered Apprenticeship (RA) programs and opportunities in the Information and Communications Technology (ICT) sector.

Aim of the Consortium: WIAAI has two principle objectives. First, WIAAI will work with industry employers and other relevant stakeholders to create Registered Apprenticeships in vocations focused on wireless and telecommunications infrastructure. Second, WIAAI will leverage a set of regional opportunity partnerships, consisting principally of Urban League Affiliates and HBCUs, to recruit underrepresented populations for the resulting employment opportunities.

ULCC: A Best Practices Model for Fiber Optic Broadband and Premise Cabling National Certification

The Urban League of Central Carolinas (ULCC) is a multi-service, nonprofit agency, organized in 1978. Its mission is to empower the community to attain financial stability and social justice in a global economy through education, training, placement, and entrepreneurship. ULCC is also an opportunity partner in the WIAAI Consortium.

In July 2017, the WIAAI Consortium conducted a site visit to the Urban League of Central Carolinas (ULCC) located in Charlotte, NC, where it audited and assessed ULCC's existing national certification programs in Fiber Optics Broadband and Premise Cabling, Heating Ventilation and Air Conditioning, and their Highway Construction and Trade.

WIAAI is using ULCC's existing Fiber Optics Certification Program as a model upon which to build its new pre-apprenticeship program. Based on the ULCC program's best practices and impressive results in fiber optics cabling, as well as in heating, ventilation, air conditioning and highway and construction, WIAAI's partnership with ULCC forecasts the opportunity to expand programming beyond the wireless telecommunications sector.

The ULCC's Entry Level Fiber Optic/Broadband training program is designed to develop skills for the real-world application of broadband telecommunications technology, including the use of hand tools, various cable installation techniques, the use of computerized equipment, and safety regulations and concerns.

A dynamic team of instructors also prepares Fiber Optic Association (FOA) Clients with the "core skills" needed for employment such as interviewing, resume writing, employment basics, and business etiquette. The course is specially designed in two phases for both entry-level and experienced individuals. Upon completion, participants are prepared to sit for the Certified Premise Cabling Technician and the Certified Fiber Optic Technician exams offered through the FOA, which is the international professional society for fiber optics.

"Now more than ever, a diverse and skilled workforce is needed to meet high demand in the telecom industry. Apprenticeship programs in the telecom industry give opportunity for living wage jobs, access to economic and social mobility and ultimately, dignity. When we began discussions with employers, a concern was the rapid refinement of the current workforce and a lack of knowledge, and therefore interest of potential participants. Our shared goals to develop, hire and retain qualified technical talent are key to providing solid opportunities for family-sustaining careers."

- Maya Norvel, ULCC Director of Marketing & Communications

In today's tech world, certification is considered proof of professional status and is often required for jobs. FOA certifications are recognized by the US Department of Labor[6] and many other organizations worldwide. Certification means employees have achieved certain performance criteria set by the certifying organization, usually knowledge, skills and abilities (KSAs),[7] either through training or experience. Certifications attest to employees' KSAs, and their value is the recognition of those KSAs to customers, coworkers and employers. This recognition is primarily why ULCC selected industry-based certification (IBC) as an integral part of its workforce development programming.

IBCs represent an assessment of learning, not any particular program a student has pursued. In most cases, it does not matter where the learning occurred, so long as the individual attempting to gain certification demonstrates proficiency on the assessment. As discussed below, there is also a natural tie-in to Registered Apprenticeship Programs (RAPs), and the Fiber Optic Broadband and Premise Cabling National Certification Program will pursue designation as a TIRAP-approved pre-apprenticeship program once TIRAP completes development of a Fiber Optic Technician occupation.

ULCC Best Practices: Corporate Advisory Council

To best serve its community, ULCC has created a Corporate Advisory Council (CAC), with the goal of developing, hiring, and retaining diverse technical talent. Specifically, ULCC identifies key employers and addresses their desires to align with apprenticeship diversity, hiring, and retention goals, including recruitment, course delivery, certification, and case management for retention, which directly aligns with WIAAI's key goals.

The CAC value proposition is to:
- ✓ Participate in specialized technical training and talent development
- ✓ Efficiently select and hire the best prepared candidates to meet immediate job requirements
- ✓ Establish a collaborative six-month retention and performance strategy

Members of ULCC Corporate Advisory Council include representatives from broadband telecommunications companies, such as Spectrum/Charter, MasTec, and OnePath, making this program particularly suited for RAPs. Indeed, as mentioned above, the ULCC Fiber Optic Broadband and Premise Cabling National Certification Program will pursue designation as a TIRAP-approved pre-apprenticeship program for the Fiber Optic Technician occupation.

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[6] http://www.thefoa.org/Certs.htm#DOL
[77] http://www.thefoa.org/KSAs.html

The Urban League of Central Carolinas Fiber Optics Training Program:

A Success Story

At the dawn of the Digital Age, the Urban League of Central Carolinas saw a need in the Charlotte-Mecklenburg community to create workforce development programs to empower the local community through living-wage and family-sustaining employment. In 2008, ULCC conducted extensive research in its book, "Faces of Reality: The State of Ethnic Charlotte." The book examines economics, education, health, and social justice among ethnic populations in the Charlotte-Mecklenburg area and exposes large deficits in opportunity for community members and an untrained – yet very capable – workforce.

In 2013, a Harvard University/UC Berkeley study uncovered the other part of the story: the community ranked 50th out of 50 in economic mobility – that is, the ability of a child born in the bottom income quintile to rise to the top income quintile as an adult – among the largest U.S. cities. If you're poor and grow up in Mecklenburg County, you have among the worst chances in the country of climbing the income ladder as you get older. That's according to a study by a group of researchers at Harvard, who looked at the earnings records of millions of families. The study found that poor children in Stanly County, just two counties over, have a much better chance at earning more money as adults. Because of this need, Patrick Graham, James Burns, and Scott Coulter, two concerned Charlotteans with backgrounds in Fiber, launched the Michael Mentor Workforce Development Program at ULCC.
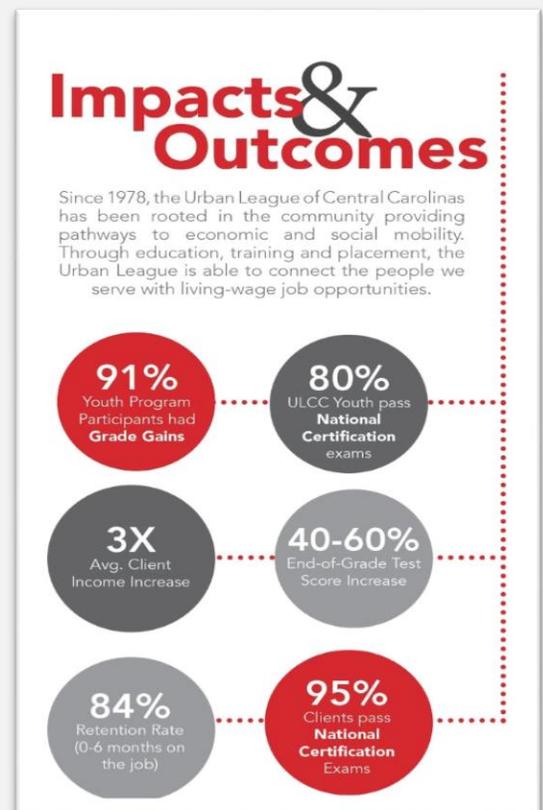
James Burns, who is a Lead Project Manager (NC/SC, IBS, DAS/Small Cell) at T-Mobile, has been the main instructor for the ULCC Fiber Program since its inception in 2008. WIth over 26 years in the field, Burns brings a wealth of knowledge to the classroom. His up-close experience with the industry enlightened him to the need for a diverse talent pool. Even more, as a native-Charlottean, Burns knew the impact this program would have on the local economy and neighborhoods.

Burns quickly learned that in order for ULCC program graduates to be successful, he had to incorporate bringing companies into the classroom.

"I can't take anything from the curriculum, but I can add to it," said Burns. "I knew the fiber industry was constantly adapting to consumer needs, and I had to have hiring companies involved in curriculum mapping."

Thanks to their unique approach, over the last 9 years, James Burns and his team of instructors have had a 96 percent success rate in certifying and graduating participants in the ULCC Fiber Optic and Broadband Program. Time Warner, along with other Tier-2 telecom companies, has helped ULCC maintain a 100 percent success rate for job placement in the wireless sector.

ULCC has successfully conducted 8 Fiber Optic and Broadband courses annually. With the industry's dedication to hiring diverse talent as it prepares a new workforce to fit its developing needs, programs such as these illuminate equitable opportunities to empower underrepresented communities.

The Urban League of Central Carolinas Corporate Advisory Council:
A Success Story

The Urban League of Central Carolinas' Corporate Advisory Council is a natural access point for a formalized apprenticeship program. The unique idea to form the CAC came into being after the ULCC team had several brainstorming sessions on how they engaged companies to hire the talented individuals graduating from their program, and how to initiate pre-apprenticeship programs and pipelines for these companies. In brainstorming, the team began strategic planning for its new Fiber Optic Broadband and Premise Cabling Corporate Advisory Council (CAC).

After extensive research, ULCC compiled a robust list of 25 prospective companies with many engaging options to partner.

Since this initial groundwork, ULCC has solidified a partnership with The City of Charlotte's Economic Development Division and Goodwill Industries of the Southern Piedmont. These valuable partnerships focus on ULCC's Fiber Optics/Broadband and Premise Cabling program and its Highway Construction and Trades workforce development program. They provide skills and training as well as supportive services to help individuals obtain careers in the respective industries.

Over time, a new project was born from the synergies created through all these partnerships. The Project P.I.E.C.E. (Partners for Inclusive Employment and Career Excellence) Workforce Development Program focuses on addressing identified labor market shortages in key industries and increasing employment opportunities among individuals with multiple barriers to employment. Project P.I.E.C.E. participants will have access to state-of-the-art career centers and services such as mentoring, coaching, and intensive case management.

The program will initially serve 180 participants with career-related training in the following industries:
 ➢ Fiber Optics/Broadband and Premise Cabling
 ➢ Residential and Commercial Construction
 ➢ Highway Construction and Trades

Program objectives are for individuals to complete training and be placed into training-related career paths including full-time employment, pre-apprenticeships, and apprenticeships. A unique aspect of the initiative is the inclusion of corporate advisory councils for each training area that will advise on curriculum, build rapport with participants, and become potential employers.

ULCC's Fiber Optic Training Program and Corporate Advisory Council both have laudable success-metrics and they model best practices that the WIAAI Consortium can leverage and build from to create a successful pre-apprenticeship program and achieve its goals under the DOL contract.

CORPORATE ADVISORY COUNCIL (CAC)

GOAL
To develop, hire and retain quality, diverse technical talent.

CAC MEMBER VALUE PROPOSITION
• Participate in specialized technical training and talent development
• Efficiently select and hire the best prepared to meet immediate job requirements
• Establish collaborative six month retention and performance strategy

ULCC Best Practices: Measurements of Success

With its Industry Based Certifications, Corporate Advisory Council, and core skills training elements, the Urban League of the Central Carolinas (ULCC) Fiber Optic Technician Training Program is a model of success, both in terms of graduation rates and in terms of pass-certifications. Since its inception in 2008, the program has had 429 graduates. As of September 2017, the program has successfully completed five cohorts, and 75 graduates have passed their certification exams with scores in the 99th percentile.

The attached flyer (Appendix) provides more details about the ULCC Fiber Optic training program.

Conclusion

The WIAAI Consortium is working with the Telecommunications Infrastructure Registered Apprenticeship Program (TIRAP), a National Sponsor of the Department of Labor's Office of Apprenticeship (OA) ApprenticeshipUSA Initiative, to register and develop curriculum for apprenticeship and pre-apprenticeship programs in the telecom sector. The WIAAI Consortium is in the process of developing a Fiber Optic Technician Occupation, and the Fiber Optic Training Program at ULCC closely resembles the pre-apprenticeship program that will be developed for this new occupation.

The ULCC Model is an excellent model of the "best practices" the Wireless Infrastructure Apprenticeship Access Initiative (WIAAI Consortium) can implement in the following ways:

- The ULCC Program is repeatable (program defined by FOA; replicable model of best practices)
- The ULCC Program is sustainable (industry demand)
- The ULCC Program will qualify as a TIRAP-approved "pre-apprenticeship program" once the Fiber Optic Technician occupation is approved by the U.S. Department of Labor (with the assistance of TIRAP's National Sponsor, the Wireless Infrastructure Association)
  - TIRAP is already building an occupation for the Fiber Optic Technician with WIA's technical assistance

Moreover, geographic expansion of the UL Affiliate network from 7 Affiliates to 38 Affiliates in October 2017 provides an opportunity for WIAAI to use this model for deploying similar programs in areas where TIRAP participating employers exist. Geographic expansion also provides an opportunity for the WIAAI Consortium to get involved in fulfilling the employers' recruitment needs so that it can become an important part of the employer's recruiting force.

WIAAI will leverage UL Affiliates' assets – starting with the successful ULCC program – to bring more employers and diverse participants into registered apprenticeship, and ultimately to help bridge the telecom skilled labor and diversity employment gaps that continue to leave many populations locked out of opportunity in this sector.

The most successful apprenticeship programs are employer-driven with support from key workforce development partners providing the following types of technical assistance: assisting employers to recruit and screen apprentices; providing basic skills training or partnerships in pre-apprenticeship efforts; and contributing supportive services, such as curriculum development, books, tools, and other supplies.

The ULCC model certainly fulfills these elements of a successful apprenticeship program that can be used by the WIAAI Consortium as a model of best practices. Through this case study, the WIAAI Consortium aims to share information on an innovative approach to meeting an immediate need for qualified talent within the wireless industry through a unique partnership of industry and workforce development experts.

Appendix: Urban League of Central Carolinas Fiber Optic/Broadband & Premise Cabling Certification Program Flyer

Fiber Optic/Broadband (FOA) & Premise Cabling
Certification Program

The Urban League's Entry Level Fiber Optic/Broadband curriculum is designed to develop skills in the theory and real world application of broadband Telecommunication technology, including the use of hand tools, various cable installation techniques, the use of computerized equipment , and safety regulations and concerns. This course is specially designed in two phases for both entry level and experienced individuals. Upon completion, participants are prepared to sit for the Certified Premise Cabling Technician and the Certified Fiber Optic Technician exams offered through the Fiber Optic Association (FOA). A dynamic team of instructors will also prepare FOA Clients with the "core skills" needed for employment such as interviewing and resume writing.

FOA CERTIFICATION
FOA is the international professional society for fiber optics. Members are certified fiber optic or premises cabling technicians.

The FOA CFOT® is the certification for most fiber optic technicians. It is based on the knowledge, skills and is recommended for anyone involved in the design or management of fiber optic communications systems.

PREREQUISITES
• Personal interview with Site Coordinator
• TABE testing

CERTIFICATE OPPORTUNITIES
• Certified Fiber Optic Technician Exam
• Certified Premise Cabling Technician

2017 COURSE SCHEDULE
MONDAY - THURSDAY 6 - 9:30 P.M.

January 9 - February 2

February 27 - March 23

April 17 - May 11

June 5 - June 29

July 24 - August 17

September 11 - October 5

October 30 - November 30

ENROLL TODAY!!
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