Soft Skills in Computer Science Pathways

YouthForce NOLA's Early-Phase Proposal to the

U.S. Department of Education Office of Elementary and Secondary Education

FY2020 Education Innovation and Research Program

Under Absolute Priority 1 (Demonstrates a Rationale) and Absolute Priority 2 (Field-Initiated Innovations – Promoting STEM Education, With a Particular Focus on Computer Science) and Competitive Preference Priority 1 (Computer Science for high-needs students).

CFDA Number: 84.411C

Cate Swinburn, President

YouthForce NOLA

Table of Contents

1. *Quality of Project Design*

a. Goals, Outcomes and Objectives

YouthForce NOLA ("YouthForce")'s Soft Skills in Computer Science Pathways program aims to increase student readiness for good jobs and career pathways in computer science and science, technology, engineering, and math (STEM) industries, improve student performance in high school, and increase student soft skills for future success. Soft Skills in Computer Science Pathways also aims to inform the field by testing and refining a model of integrating soft skills into computer science training courses at charter high schools. YouthForce is applying under **Early-Phase Grant** for **Absolute Priorities 1** (Demonstrates a Rationale) **and 2** (Field-Initiated Innovations – Promoting STEM Education, With a Particular Focus on Computer Science) and **Competitive Preference Priority 1** for projects designed to improve student achievement or other educational outcomes in computer science.

The program will serve high-needs students in New Orleans public high schools. Massive income and wealth disparities between white students and Black students continue to grow in New Orleans. This project seeks to decrease those disparities by helping Black students access high-paying jobs in the growing STEM and computer science industries. YouthForce and its experienced evaluator, MDRC, seek to learn how industry-specific career and technical education (CTE), when paired with soft skills training, can help train high-needs students for high-paying jobs. YouthForce will partner with two leading training providers (providers) in New Orleans, Operation Spark (Op Spark) and Spark Mindset, to provide computer science technical training. The program components, and associated outcomes and objectives, follow:

Table A: Program Components, Outputs and Outcomes

Program	Description	Outputs	Outcomes

Component			
Student Support	YouthForce provides case management and job placement support.	*(1) Soft Skills in Computer Science Pathways will enroll 500 students over the program period.* *(2) 50% of students participating in the program will either: gain full-time employment in "promising jobs" or "good jobs" in computer science or STEM, or attend a college/university within two years of program completion.*	More New Orleans public school graduates are employed in promising or good computer science or STEM jobs[1]. This leads to more racial and economic equity in New Orleans.
Computer Science Training	Op Spark and Spark Mindset provide a sequence of full-credit computer science courses through their own instructors as part of the regular school day schedule	*(3) 80% of students who sit for a computer science industry-based IBC exam will pass*	Students show increased readiness for promising or good computer science or STEM jobs, as shown through an increase in the number of students earning an Industry-Based Credential (IBC) in computer science.
Soft Skills Integration	YouthForce provides training for Op Spark and Spark Mindset teachers and staff to integrate soft skills into their computer science training courses.	*(4) 80% of students will demonstrate proficiency in at least three of the six Soft Skills Building Blocks*	More New Orleans public school graduates are employed in promising or good computer science or STEM jobs and stay in them.

- Student Support

YouthForce and the providers will increase student readiness for computer science and STEM jobs through the following components of student support:

Table B: Components of Student Support

Program Component	Description	Frequency
School Recruitment	YouthForce and training provider directors meet with schools to recruit more schools to offer the program	Annually, in January to plan for the following school year.
Student Recruitment	YouthForce recruitment team holds info sessions for interested students, and follows up with students who attend and who are referred by school staff.	Annually, in April (before course registration) and August

[1] "Promising jobs" are defined as paying a living wage or higher, including benefits, and offering the potential to advance to a "good job" within two years. "Good jobs" are defined as paying the regional median wage or higher, including benefits, and involving advancement potential.

		(for new students).
Case Management	YouthForce social worker and provider administrators meet at least monthly with every student in the program to help them overcome barriers to program completion. Social worker and administrators provide referrals to local agencies and nonprofits, support students in goal-setting, and help the student access resources from schools.	Monthly, and available more frequently upon request.
Internship Placement	YouthForce places rising high school seniors into internships in industries leading to good jobs, and supports them with additional workplace training and coaching. Program students will receive priority placement for STEM and computer science internships.	Annually, with placements finalized by June 1.
Job Placement	YouthForce and provider administrators will work with local employers to identify full-time employment opportunities for seniors graduating with IBCs that have prepared them for full-time roles.	Annually, with job offers secured by August 1.

Since its founding in 2015, YouthForce has developed strong relationships with every open enrollment high school in New Orleans. For the 2020-21 school year, YouthForce has established formal partnerships with 96% of them. YouthForce will draw on these partnerships to recruit more program students. To meet program growth goals, YouthForce will build out a robust recruitment function to hold information sessions and follow up with interested students. Table C, below, shows the student enrollment target for each year of the program, which will be tracked through high school course records schools already share regularly with YouthForce.

Table C: Student Enrollment Targets

Year	Student Enrollment Target	Target Number of Schools
2021	60	4
2022	97	6
2023	110	7
2024	115	7
2025	118	8
Total	**500**	**At least 8**

Once students enroll, YouthForce and providers will offer case management services. YouthForce's Social Worker and administrative staff at each provider will supply monthly meetings, referrals to relevant agencies, support in goal-setting, and access to school resources.

YouthForce and providers will help students gain employment in computer science or STEM jobs. The providers will pair students with industry mentors to create a network for them to help remove barriers to employment. YouthForce will connect students directly to employers for internships through the existing YouthForce Internship program and full-time positions as part of YouthForce's existing employer engagement programs with more than 250 employers. Letters of support from STEM employer partners such as Ochsner Health, Louisiana's largest healthcare employer and Lucid, a leading technology company, are included in Appendix C. Building on its first alumni survey in 2019, YouthForce and MDRC will track alumni employment through annual surveys paired with outreach directly to alumni and employers, as Louisiana's data privacy laws do not allow this kind of workforce data sharing currently.

- Computer Science Training

Students will take at least one credit-bearing course from a sequence of computer science courses. Both providers already partner with New Orleans schools to offer computer science courses during the school day by training and placing teachers into high schools. Op Spark will offer a progression of five courses leading to IBCs in Levels 1, 2 and 3 for "Fundamentals of Javascript, Functional Programming and Web Development." Spark Mindset will offer a two-course sequence focused on preparing students for cybersecurity careers, culminating in the "CompTIA Network+" and "CompTIA Security+" IBCs. When completed, both providers' sequences prepare students for full-time computer science employment immediately

post-program. Additional detail on course sequences and standards are included in Appendix I. 80% of students who take an IBC exam following course completion will pass. Each school and provider will report IBC statistics to YouthForce twice-annually, per their partnership agreement.

- Soft Skills Integration

YouthForce teaches soft skills using the six Building Blocks established by MHA Labs, a national leader and close YouthForce partner. The six Building Blocks are Personal Mindset, Planning for Success, Social Awareness, Verbal Communication, Collaboration, and Problem Solving. YouthForce currently supports high schools, training providers, community organizations, and employers in teaching and reinforcing the Building Blocks. In this project, YouthForce will train provider teachers and administrators in the Building Blocks through the four components listed in Table D. Provider teachers and administrators will integrate student instruction in the Building Blocks into their curriculum and program materials.

Table D: Components of Soft Skills Instruction

Program Component	Purpose	Audience	Frequency	Evaluation Method
Fellowships	Teachers are trained to integrate soft skills into long-term academic plans.	All program teachers.	Monthly workshops + individual support.	Surveys after each meeting reviewed by YouthForce and used to adjust future instruction; longer annual survey used for continuous improvement.
Introduction Workshop	Teachers and administrators learn the basics of the Building Blocks and of soft skills integration.	In their first year of the program, all provider administrators and teachers.	One-time session.	Surveys reviewed by YouthForce and provider directors collaboratively and used to adjust future instruction.
Community of Practice	Teachers and administrators learn best practices, address common challenges, and receive ongoing support from a community of practice.	All provider administrators and teachers are invited. This is not mandatory..	Bi-monthly.	Surveys after each session reviewed by YouthForce administrators and used to adjust future instruction; longer annual survey used for continuous improvement.

Online Hub (Soft Skills Library)	Program administrators and teachers receive access to dynamic online resources (video, audio, quizzes, presentations and readings) aligned to the Building Blocks.	Program administrators, teachers.	Available free online in the 2020-21 school year.	Track monthly usage (to meet annual goal of usage by teachers supervising 3000 students/year) and number of artifacts (at least 75/year uploaded).

YouthForce has effectively implemented these components previously. YouthForce will evaluate soft skills success by measuring student proficiency on pre and post evaluations using tools aligned to the Building Blocks. During the planning year (2021), YouthForce and providers will work with MDRC to refine the soft skills evaluation and observation rubrics.

b. Addressing the Needs of the Population

This program focuses on high-need students who are economically disadvantaged, based on the Louisiana Department of Education's (LDOE) definition of "economic disadvantage". Families that qualify for these programs make, on average, less than $46,000 per year for a family of four. In New Orleans, 82% of public school students are Black and 84% are considered economically disadvantaged, according to the LDOE. Economically disadvantaged Black students in New Orleans face a range of barriers to their success, including shelter and food insecurity, high levels of community unemployment, exposure to trauma in high-poverty neighborhoods, lack of transportation, and lack of connections to local employers and networks, as well as historical challenges advancing in high-wage pathways relative to their white peers. As a result, the income disparity between white and Black households in New Orleans has grown by more than 13% in the past decade (Racial Wealth Divide Institute). The average Black household in New Orleans earns only 41% of the average white household, and Black incomes in New Orleans in 2016 were almost identical to what they were in 1989 (Racial Wealth Divide Institute). Far too few New Orleans' public school graduates are successfully transitioning to

post-secondary education and career. Meanwhile, employers indicate that entry level employees lack the soft skills they need to succeed at work. According to a report from The Monitor Institute, 70 percent of employers stated that the high school graduates they employ had deficits in professionalism and critical thinking/problem solving and 50 percent stated this same population lacked sufficient verbal communication skills.

Integrating soft skills throughout computer science courses will empower students with the knowledge, confidence, agency, network and self-advocacy skills needed to succeed academically and pursue education or a STEM or computer science job. This project will then connect students to good STEM jobs in New Orleans, through mentors, internships, and employer connections that meet the needs of employers. The region has significant demand for STEM workers. Before the COVID-19 pandemic, economic forecasters predicted a decade of growth for STEM jobs in the region, with more than 70,000 STEM-related jobs (GNO, Inc). Bloomberg found people working in STEM jobs in New Orleans earn more than double ($73,660/year) the annual salaries of their non-STEM-employed peers ($31,720) (Cannon, 2015). Even amidst the COVID-19 fueled economic downturn, the region's economic development agency projects continued growth of technology companies (including gaming and cloud computing) due to reshoring, aggressive state tax incentives, and the presence of large employers such as Xbox Game Studios and DXC (GNO, Inc). With more work remote due to COVID-19, economic forecasters predict an increase in information technology jobs (GNO, Inc). Finally, the program is well-positioned to succeed even amidst the uncertainty due to the COVID-19 pandemic. YouthForce, Op Spark, and Spark Mindset rapidly adapted internal operations and moved all coursework online for remote learning in spring 2020. This fully

remote learning model, which includes all computer science courses and soft skills professional development, will continue through this school year (2020-21), and longer, if needed.

c. Reflecting Research and Effective Practice

This project's design is grounded in research literature on the positive effects of CTE on academic and life outcomes, and evidence from effective practice that shows concrete learning gains and improved self-perception for students. This project reflects up-to-date knowledge from research and effective practice on CTE, computer science training, and soft skills education. Research has shown the impact of CTE and employment on a range of youth outcomes – from high school graduation and college-going rates, to employment outcomes and reduced rates of violent crime (Kemple, 2008). This includes a 2016 study by the Fordham Institute that shows that students who take multiple CTE courses in the same pathway were 20+ percentage points more likely to graduate from high school (Dougherty, 2016). National research also supports the impact of computer science training on student outcomes. A Mathematica study showed that students participating in a computer programming course showed statistically significant improvements in both reasoning skills and self-efficacy, compared to non-participants (Psycharis and Kallia, 2017). Computer science courses offered through this program have been modeled on coding boot camps, which allow adult students to break into the industry quickly. According to Conduct Science's 2019 roundup of studies, boot camps with curricula similar to those used in this program have shown promising professional outcomes for participants. Half of boot camp graduates earned a salary of $75,000 or higher (Vieira, 2020). The program also builds on promising local practices in computer science. Since 2016, Op Spark has run a 60-hour Boot camp, whose curriculum forms the foundation for the high school programming. Op Spark

currently has a 100% job placement rate for the 212 graduates of its boot camp, with an average starting salary of $60,000.

This program also builds on a research base supporting the idea that soft skills training will help workers in STEM industries. A 2019 MIT randomized controlled trial showed that soft skills training made employees 20% more productive. Trained employees reported higher wages and greater desire to receive more education. The soft skills program increased wages, empowered employees, and increased organizational effectiveness (Adhvaryu, Kala, and Nyshadham, 2019). Moreover, research has shown growing employer demand for soft skills. A 2017 report showed that high levels of U.S. workplace social interaction grew by 12 percentage points between 1980 and 2012 (Deming, 2017). The return (measured in wages) to workers' time learning social skills was much greater for workers since 2000 than in the two prior decades.

YouthForce's soft skills work has also shown promise. In 2019-20, students taught by teachers participating in YouthForce's soft skills fellowship took a pre and post survey. Students showed a seven percentage point increase in self confidence and self-awareness of their own skills. In addition the soft skills instruction which has been integrated into YouthForce's Internship program has led to 85% of employers indicating a willingness to refer the program to other employers for three straight years. Both existing research and YouthForce's practices support the idea that soft skills integration in computer science will improve student outcomes.

d. Potential to Increase Knowledge of Problems, Issues and Effective Strategies

YouthForce's proposal for Soft Skills in Computer Science Pathways has the potential to increase the evidence base for skills-based approaches to CTE, effective methods for integrating computer science training in charter schools and portfolio school systems, and the impacts

combining computer science with soft skills on student academic performance and employment outcomes. According to MDRC and Results for America's 2019 "What Works in Career and Technical Education," career readiness and skills training programs still need a larger evidence basis to show impact on student outcomes. This project helps build that evidence base.

In addition, computer science training in New Orleans's all-charter school system can help increase the field's understanding of provider-decentralized school partnerships. While New Orleans is the first urban school district in the United States made up entirely of charter schools, the proportion of charter schools continues to grow, particularly in high-needs urban districts similar to New Orleans. Coordinating technical training in computer science and student support across a range of charter management organizations and charter schools presents unique challenges. The lessons from this project can be applied broadly to community organizations that work with charter schools or in portfolio districts.

Finally, Soft Skills in Computer Science Pathways presents an opportunity to learn about how the integration of soft skills into technical computer science training impacts student outcomes. Although both strategies individually have significant research bases documenting their positive impact on students, little research exists on the combination of the two strategies. Through publicizing program progress, and then by authoring an impact study, the project team will increase the national understanding of combining soft skills with computer science training.

2. Adequacy of Resources and Quality of Management Plan

a. Adequacy of Management Plan to Achieve Objectives

Tables E and F and our procedures for ensuring continuous improvement constitute the Project Management Plan. The timeline in Table E below shows the high-level activities planned

for each phase of the grant. The project begins with a Planning Phase during which YouthForce will hire staff, finalize partnerships and work with providers and MDRC to finalize the soft skills offerings and measurement tool. This will be followed by a Formative Phase, which includes two cycles of implementation. In Cycle 1 (spring 2022), YouthForce will pilot the soft skills offerings and student support. After a process of data collection and improvement over the summer of 2022, YouthForce will update its offerings and student support for Cycle 2 in fall 2022. In the Summative Phase, YouthForce will fully implement the intervention, and MDRC will use data during this time as part of their impact study. Finally, in the Scaling Phase, YouthForce will scale the intervention to more schools across New Orleans.

Table E: Timeline by Phase and Key Program Activities

Phase & Dates	Key Program Activities
Planning Phase 1/1/21 - 12/31/21 Planning	● Finalize soft skills offerings and measurement tool. ● Offer computer science courses ● Develop study design plan (including IRB approvals, data sharing agreements, protocol development) ● Hire Community Engagement Manager/Recruiter and finalize key school relationships
Formative Phase 1/1/22 - 12/31/22 Developing and Testing the Intervention	● Pilot soft skills offerings (trainings, measurement tool) and student support (case management, industry mentor, career programming) in spring 2022 (Cycle 1). ● Offer computer science courses. ● Use data from spring 2022 to make programming improvements for fall 2022 (Cycle 2)
Summative Phase 1/1/23 - 12/31/24 Implementing and Evaluating the Intervention	● Fully implement soft skills offerings and student support beginning in spring 2023. ● Offer computer science courses with soft skills integration. ● Based on student surveys, teacher surveys, and program results, adjust programming and make improvements through the annual improvement cycle.
Scaling Phase 1/1/25 - 12/31/25 Scaling Intervention	● Implement and scale intervention in more New Orleans schools, using early findings from the summative phase to improve programming. ● Plan collaboratively with schools to ensure program sustainability.

Below, Table F shows key milestones, start and completion dates, and the responsible party for implementation of each of the activities outlined.

Table F: Key Milestone Chart

Key Milestone	Start-Completion Date	Responsible Party
Student Support		
Recruit students for the program.	December 1, 2021 - January 15, 2022 May 1 - August 15, 2022 May 1 - August 15, 2023 May 1 - August 15, 2024 May 1 - August 15, 2025	Recruiter, Provider Directors
Pair every student with a coach (for case management) and an industry mentor (for job placement) for every year they are in the program.	January 1 - February 15, 2022 August 1 - September 30, 2022 August 1 - September 30, 2023 August 1 - September 30, 2024 August 1 - September 30, 2025	Executive Vice President, Social Worker, Provider Directors
Conduct ongoing career coaching and case management with all students	January 1-June 1, 2022 August 1, 2022 - June 1, 2023 August 1, 2023 - June 1, 2024 August 1, 2024 - June 1, 2025	Social Worker, Provider Directors
Place program students into computer science internships (if 11th graders) or support them in job search (if graduating 12th graders).	April 1 - June 1, 2022 April 1 - June 1, 2023 April 1 - June 1, 2024 April 1 - June 1, 2025	Executive Vice President, Social Worker
Computer Science Training		
Implement full-credit courses in computer science, aligned to IBC, culminating in students sitting for the IBC exam at the end of each academic year.	January 1 - June 1, 2022 August 1, 2022 - June 1, 2023 August 1, 2023 - June 1, 2024 August 1, 2024 - June 1, 2025	Provider Directors, Provider Teachers
Assess student mastery of computer science skills (aligned to IBC for that course), and adjust student instruction based on student progress.	Oct, Dec, March, May annually	Provider Directors, Provider Teachers
Soft Skills Integration		
Collaboratively select and refine (if needed) tool for measuring soft skill growth in students in the program, and refine program plan/offerings for soft skill integration trainings (teacher fellowship, workshops, community of practice).	January 1, 2021 - November 1, 2021	Vice President of Programs, Provider Directors, MDRC
Pilot soft skill growth trainings and measurement tool in program courses and use data from implementation to refine tool and processes	January 1 - June 1, 2022	Vice President of Programs, Provider Directors, MDRC
Implement soft skills integration training during each year, including monthly **teacher fellowship** meetings for all program teachers focused on integrating soft skills into academic plans; quarterly **workshops** for all new teachers and staff on the basics of soft skills integration; and bi-monthly **community of practice** meetings for all program administrators and teachers	January 1 - June 1, 2022 August 1, 2022 - June 1, 2023 August 1, 2023 - June 1, 2024 August 1, 2024 - June 1, 2025	Vice President of Programs
Implement soft skills measurement tool in program, and use data to make improvements for next academic year	March 15 - June 1, 2023 March 15 - June 1, 2024 March 15 - June 1, 2025	Vice President of Programs, Provider Directors

Provide annual training for all program staff in accessing and using the Online Hub (Soft Skills Library)	January 1 - February 1, 2022 August 1 - September 1, 2022 August 1 - September 1, 2023 August 1 - September 1, 2024 August 1 - September 1, 2025	Vice President of Programs

b. Reasonable Costs in Relation to the Significance of Project

The program costs outlined in the budget are reasonable to serve 500 students with a new combination of strategies that can lead to improved student outcomes and nationally significant results. With evaluation costs removed, this program costs [redacted] per student. Based on median wage data, though, this program will help participants more than double their annual salary from $31,720 to $73,660, on average showing a $41,940 increase in median salary for a [redacted] investment. (Cannon, 2015). These costs reflect several lessons learned from implementation of individual program components so far in New Orleans, including:

- **Case management** must support high-needs students in urban communities like New Orleans. YouthForce's flagship YouthForce Internship program has seen increased retention and satisfaction numbers by improving case management for students. Students need ongoing support to persist in the program amidst challenges, which include family income instability, unreliable transportation, food and shelter insecurity, and a lack of neighborhood resources.
- **Collaborative planning** time improves programming. YouthForce has increased student success through collective planning in LAUNCH, the bridge year program that provides college courses and technical training for new high school graduates that was launched in 2019, and the 21st Century Community Learning Center program, which also launched in 2019 to provide afterschool and summer technical training with four local providers. YouthForce has included a full planning year to recruit students, align on program expectations, and refine evaluation tools.

MDRC's evaluation reflects [redacted] of the budget. MDRC is the national leader in studying CTE, and will commit significant resources to determine impact. These resources will result in initial evidence of effectiveness that supports others to implement similar interventions, and in an impact study that helps improve CTE, computer science, and soft skills programming.

c. Qualifications and Experience of Key Organizations and Project Personnel

YouthForce and the providers have the qualifications to manage this project. YouthForce was founded in 2015 as an education, business, and civic collaborative that prepares New Orleans public school students to succeed in the region's high-wage, fast-growing industries. Through its network of partner schools, employers, training providers, and community organizations, YouthForce offers high school students opportunities to explore, plan for, and prepare for careers. When YouthForce first launched, very few New Orleans schools offered career pathways programming and very few employers opened their doors to host public school students. YouthForce has worked to change the system at all levels, with encouraging results from its first five years. Since 2015, the number of New Orleans public high school students completing meaningful work experience has grown 14-fold, and the number of students earning industry-based credentials seven-fold. Meanwhile, Operation Spark has worked with over 1,500 New Orleans youth and trained 60 teachers in their programming since its founding in 2013. It has a 100% job placement rate in the last four years with its 212 boot camp graduates. Op Spark has been a key partner in YouthForce's federally-funded 21st Century Community Learning Center program, which serves over 500 students per year at three sites. Spark Mindset launched in 2017 to equip high school students to gain high-value technical computer science IBCs, particularly in cyber security in New Orleans, Colorado Springs and Denver. MDRC, a

nationally recognized research firm with specific CTE expertise, has worked with YouthForce since 2016. MDRC has conducted an implementation study of the YouthForce model and provided YouthForce guidance and support around building its data collection strategy.

The project team has the qualifications, relevant training and experience needed. Since its founding, YouthForce has been led by **Cate Swinburn**, President, a career educator, convener of system-level collaboratives, cross-sector thinker, and strategic leader. She will serve as the Principal Investigator on this project. Cate previously served as President of Educate Now!, which supported the continued reimagining of the traditional school district, Chief of Data and Accountability with DC Public Schools and President and Executive Director of the DC Public Education Fund. **Melissa Ehlinger**, Executive Vice President, will lead the job matching and employer engagement components for this project. She leads industry and employer engagement for YouthForce. Prior to YouthForce, Melissa served as the Interim CEO and Senior Vice President for Strategy and Business Development at NOLABA, New Orleans' official economic development organization and a project supporter. **Imani Miller**, Vice President of Programs, will lead the soft skills integration component and contribute to student support. Imani leads YouthForce's school partnership strategy. Imani served as Academy Principal for two years and as an instructional coach for three years at Edna Karr High School after spending her early career with IBM. The "provider directors" are John Fraboni and Lawrence Wagner. **John Fraboni**, CEO of Op Spark, will oversee Operation Spark's computer science training, student support, and job placement work. John has 24 years of professional experience in software development, including work with Microsoft, Ernst and Young, Disney, and Sony. **Lawrence Wagner**, CEO of Spark Mindset, will oversee their computer science training, student support and job

placement work. Lawrence has over 10 years of experience in software project management, including seven years with the Missile Defense Agency. The lead evaluator for the project is MDRC Research Associate, **Ivonne Garcia**. She has served as a data manager and/or impact analyst for evaluations of the Investing in Innovation expansion of the Success for All program; Response to Intervention; and Ninth Grade Academies. In addition, oversight will come from YouthForce's Collaborative Steering Committee (CSC), which meets monthly as an Advisory Board for the program. Membership includes representatives from community, civic, and business organizations, including LDOE, NOLA Public Schools, economic development organizations, and representatives of families and communities. Additional support for this project will be provided by YouthForce staff, including the Director of Learning Design, Soft Skills Program Manager, Social Worker and Community Engagement Manager/Recruiter. Resumes for all existing staff, and job description for the new position (Recruiter) are in Appendix B.

d. Procedures for Ensuring Feedback and Continuous Improvement

YouthForce has the experience and capacity to ensure feedback and continuous improvement in the operation of the proposed project. YouthForce has the financial management capacity, including clean annual audits and effective management of federal multi-year, multi-provider grants (21st Century and Carl Perkins), to take on grant management. President Cate Swinburn will update the CSC on program progress monthly, and will lead quarterly meetings for the entire project team to examine progress towards goals, spending against budget goals, and plans for improvement. YouthForce has successfully implemented similar cross-partner continuous improvement procedures as the grantee on a 21st Century Community

Learning Center grant, awarded in 2019 for 36 months in partnership with four provider partners, including Op Spark.

Meanwhile, the key personnel will implement continuous program improvements with an immediate feedback loop that helps address student needs during the program, and then with a programmatic feedback loop that uses summative data to make program changes for future cohorts. Continuous program improvement will occur through the following structures:

- **Student support**: To accommodate immediate feedback, the Executive Vice President, Social Worker and Provider Directors will examine student grades, retention (i.e. remaining in the course vs. dropping out) and job support in quarterly meetings at the conclusion of each academic quarter. The Social Worker and Provider Directors meet with students at least monthly to keep student grades and retention high and ensure students are receiving internship and job offers. These personnel will make programmatic improvements by holding annual meetings in September to examine student employment outcomes from the prior year, and create follow up plans to improve student employment outcomes.
- **Computer science training**: The Provider Directors and Teachers will meet at least quarterly to ensure student academic progress is meeting ambitious goals. Students take quarterly exams showing student progress on standards towards IBC. After receiving student achievement data, the Provider Directors and Teachers meet to review student progress and adjust future plans to ensure students master the most important standards. In addition, these personnel meet with the Vice President of Programs annually in June to review the previous year's IBC results and to determine curriculum improvements for the following school year.

- **Soft skills integration**: After every training, the Vice President of Programs will administer a survey of all participants to measure how much the training achieved its objective and will then use the data to improve future sessions. In order to receive data on students' use of soft skills in the classroom, the Vice President of Programs will lead a team with Provider Directors and MDRC in 2021 to refine a measurement tool to observe and track students' use of soft skills in the classroom. The tool will be piloted in Cycle 1, adjusted to feedback from implementation, and implemented again in Cycle 2. In June of each year during 2023 - 2025, the team will meet to use soft skills data to improve training for the next year.

In addition, MDRC will collect formative data in the formative phase about the program's *usability* (whether staff understand and are comfortable with how to use and implement the curricula), *feasibility* (whether staff feel that it is possible to teach the curriculum with a reasonable amount of effort with available tools), and *fidelity* (whether staff are able to deliver the training as intended). This plan is in the "Project Evaluation" section.

e. Dissemination Plans

YouthForce plans to disseminate program updates throughout the grant period, and to share the broader impact of the work as the grant ends. YouthForce currently has active relationships with several national networks through which it will share its lessons annually, including Partnership to Advance Youth Apprenticeships supported by the Annie E. Casey Foundation, the Bill and Melinda Gates Foundation's Equitable Futures career pathways intermediary grantee network, and Pathways to Tomorrow. In addition, YouthForce will share program specific updates with key audiences, including: representatives from 25 New Orleans public high schools, more than 250 regional employers, six of the city's major technical training

providers and two institutions of higher education, more than 1,000 high school students and their families, and over 1,000 YouthForce NOLA alumni. YouthForce also regularly reaches the broader community through its email list of 5,000 subscribers, its social media channels (Facebook, Twitter, Instagram, over 1,100 followers), and a partnership with *New Orleans Agenda*, which boasts over 13 million page views. YouthForce has plans to hire a Director of Communications in early 2021. While not directly a part of this project, this hire will expand YouthForce's dissemination capacity. In addition, YouthForce will participate in at least two conferences per year to share the program results. YouthForce and MDRC also will share the broader impacts of the strategies via publication of an impact study.

3. Project Evaluation

a. Overview of Evaluation Design and Research Questions

MDRC will conduct an independent evaluation of Soft Skills in Computer Science Pathways. The evaluation will include a *formative phase* to inform and improve program design, and a *summative phase* that will evaluate whether the fully-developed intervention has the potential to improve students' readiness for a career in computer science or STEM academic performance, and soft skills. MDRC's activities for the Planning Phase in 2021 are included in the "Quality of the Management Plan" section above. The evaluation activities for the Formative and Summative Phases are as follows:

Formative Phase (January 2022-December 2022): The soft skill integrations will be developed and refined during the planning year (January 2021-December 2021) and piloted during the year-long formative phase, in two iteration cycles. In Cycle 1 (Spring 2022), the program will be field-tested with staff and students in three YouthForce schools, and revised based on formative

feedback collected during Cycle 1. In Cycle 2 (Fall 2022), the program will be field-tested again in three YouthForce schools, followed by a further round of revisions based on formative feedback from Cycle 2.

During each cycle, formative data will be collected about the program's *usability*, *feasibility*, and *fidelity* . Data sources for each cycle will include: observations of trainings; focus groups with staff delivering and taking the training; focus groups with students; and end-of-training surveys. The formative phase will also be used to pilot different research-based assessment tools for measuring pre-post gains in students' soft skills, one of which will be selected to assess program students' gains. MDRC will conduct the data collection and analysis with YouthForce. Findings will be shared with YouthForce on an ongoing basis and discussed in monthly phone calls; MDRC will also share a feedback memo at the end of each cycle.

Summative Phase (January 2023 – December 2024): With an impact study and an implementation study, the two-year summative phase will evaluate the fully updated program courses. The impact study will focus on juniors and seniors in YouthForce schools who are enrolled in program courses during the summative phase, with a focus on their medium-term outcomes (readiness for computer science and STEM careers, and academic success). The effect of program courses on these students' outcomes will be evaluated using a student-level matched comparison group design. The study will also explore moderators and mediators of effects, and descriptively examine changes in students' short-term outcomes (soft skills, computer science mastery) and longer-term outcomes (career plans). The evaluation also will include an implementation study. Fidelity during the summative phase will be assessed using program records, teacher and administrator surveys, student surveys, and usage data for online tools. To

inform continuous improvement, annual semi-structured phone interviews will be conducted with program and school staff, to identify facilitators and barriers to fidelity, and adaptations (intended or not) to the program. Implementation findings will be shared with YouthForce on regular phone calls and in annual memos. Summative findings will also be disseminated to practitioners and policymakers in a report, conference presentations, and a two-page brief.

Table G: Research Questions, Outcomes and Data Sources for the Summative Evaluation

Research Questions	Outcomes/Measures	Data Sources
Impact evaluation		
What is the effect of program courses on students' readiness for CS careers?	● Whether student earned an IBC in CS	School records
.... on students' readiness for STEM careers?	● Number of IBCs earned in STEM ● Credits earned in STEM courses	School records
.... on academic success?	● Overall GPA	School records
Do effects differ by gender? By prior exposure to CS? By grade at the start of the program?	● CS/STEM career readiness outcomes (see above)	School records; Program enrollment records
Do effects differ by the number of program courses taken? By students' soft skills gains?	● CS/STEM career readiness outcomes (see above)	School records; Program data; Pre/post soft skills assessment (TBD)
Outcomes evaluation		
Did students make gains on their soft skills? Did gains increase across project years?	● % of program students who are proficient in soft skills	Pre/post soft skills assessment (TBD)
Has the % of students planning on a CS/STEM career increased across project years?	● % of program students who intend to pursue employment in CS/STEM	End-of-course student survey
Has mastery of course content increased across years?	● % of program students exhibiting mastery of course content	End-of-unit CS mastery tests (program data)
Implementation study		
Were the core components of Soft Skills in Computer Science Pathways implemented with fidelity?	● Fidelity indicators (with thresholds) for each core program component activities	Program records; teacher & admin. surveys; usage data for online tools
What are the drivers of fidelity?	● Facilitators to implementation ● Barriers to implementation ● Adaptations to the program	Annual interviews with instructional staff, program managers

b. The Evaluation Will Meet What Works Clearinghouse Standards

Study design: The effect of program courses will be assessed using a matched comparison group design. Students taking program courses ("Program students") will be

matched to similar comparison students using the process described below. The evaluation will meet WWC standards with reservations, the highest level for a quasi-experimental study design.

Student Sample: The impact study will focus on 11th and 12th graders taking the program for the first time during the first three semesters of the summative phase (spring 2023, fall 2023, and spring 2024). The impact study will also include a matched comparison group. Based on the literature on quasi-experimental designs, MDRC will choose comparison students who are (1) enrolled in the same schools as the program students ("local matching") and (2) similar with respect to their baseline characteristics and measurable prior outcomes ("focal matching"). This combination of "local" and "focal" matching has been shown to reproduce the results from experimental designs (Cook et. al., 2008; Hallberg et. al., 2016). For each program student, the pool of comparison students will include other 11th/12th graders attending the same high school. This will make it possible to identify the effect of the program *over and above* the typical high school experience, including any other YouthForce or STEM/CTE programming at the schools. Because the program is open to all, all 11th/12th graders who have never taken a program course will be included in the matching pool. Propensity score matching (PSM) will be used to measure the "similarity" between program students and students in the comparison pool (Rosenbaum and Rubin, 1983). PSM has been shown to replicate experimental impact estimates when baseline data on student outcomes or close proxies are available (Bifulco, 2013; Tuttle, 2013; Fortson, 2012). Accordingly, the matching variables in the propensity score model will include students' outcomes from the prior school year (attendance, course performance, IBCs andSTEM credits) and their demographic characteristics (race/ethnicity, gender, economically disadvantaged status, special education status, English as a second language status). Propensity

scores will be estimated for students in the program group and the comparison pool and used to match students. To optimize sample size, each program student will be matched to the two non-program students with the most similar propensity score in the same school and grade. To maximize baseline equivalence, matching will be conducted with replacement (a comparison student can be chosen as the match for more than one program student).

For the matching, student records *from the prior school year* (baseline) will be obtained for all juniors and seniors enrolled in YouthForce schools in *Spring 2023 and SY 23-24*. Only students with baseline data will be included in the matching process and the study sample. We expect the study sample to include 151 program students across all program high schools (168 students, of whom 90% will have baseline data) and 242 matched comparison students (two comparison students per program student, of whom 80% will be unique). There will be no crossover, because the comparison pool will exclude students who have taken a program class.

Attrition: MDRC will evaluate the impact of program courses on the subset of students in the study sample for whom outcomes data are available. Outcomes for the impact study will come from school records, so attrition is expected to be low based on WWC standards (10% overall based on other MDRC studies, and similar across program and comparison students).

Minimum Detectable Effect Size (MDES): Given expected attrition rates, approximately 354 students will be included in the impact study (136 program students and 218 comparison students). Given this sample size, the study will be able to detect an effect size between 0.25 and 0.27 on computer science/STEM career readiness, which are "substantively meaningful" effect sizes as viewed by the WWC. The MDES for subgroup analyses will be about 0.35 to 0.39.

These MDES are based on 80 percent power, an alpha of 0.05, and an R^2 (variance explained by the baseline covariates) ranging from 0.25 to 0.40, based on other MDRC high schools.

Impact analysis: The estimated effect of program courses will come from an ordinary least squares regression model where the dependent variable is the outcome of interest and the key independent variable is a binary indicator for students in the program group. The model will also control for students' baseline grade level, indicators for the matching blocks (i.e., school year*school*grade at baseline), and the matching covariates (prior outcomes and characteristics) to improve precision and account for any remaining between-group differences. Comparison students selected as the "match" for more than one student will be given a greater weight.

Baseline equivalence: Prior to the impact analysis, we will confirm that the characteristics and prior outcomes of program and comparison students are similar at baseline, and that differences are less than 0.25 standard deviations, as required to meet WWC standards.

Moderators: The study will explore whether program courses' effects differ by: gender, having previously taken STEM courses, and grade at program start (11 vs 12).

c. Components, Mediators, Outcomes, and Measurable Thresholds for Fidelity

Components and fidelity thresholds: The planned components of the program interventions (soft skills infused computer science training, student supports, and job placement) are outlined in the logic model. The formative phase will be used to refine the logic model and inform the development of a framework for measuring fidelity. This framework, developed in collaboration with YouthForce, will include indicators that measure adherence to activities in the logic model and a priori benchmarks for acceptable implementation of each component and overall. The

framework will then be used to measure fidelity during the summative phase, using program records, teacher/administrator surveys, student surveys, and usage data for online tools.

Mediators: MDRC will use subgroup analyses to explore whether the effect of program courses on career readiness differs by two mediating characteristics: (1) *dosage*: program students who take one *vs.* more than one course; and (2) *soft skills*: program students who made bigger gains on their soft skills *vs.* smaller gains. These subgroup analyses will be based on program students in these subgroups and their matched counterparts in the comparison group.

d. Valid and Reliable Performance Data on Relevant Outcomes

Impact study (medium-term outcomes). The impact study will focus on students' *readiness for jobs in computer science and STEM fields* (based on IBCs and credits earned in computer science and STEM) and their *success in high school* (based on students' overall GPA). These outcomes will be reliably measured because they will come from administrative records obtained from NOLA Public Schools and LDOE. MDRC will obtain records for both program and matched comparison students to measure outcomes through fall 2024, the summative phase's follow-up period. The key outcomes will be defined cumulatively from the time students take a program course to the end of high school. The measurement period for the comparison students will be the same as the period for the matched program student. For students first taking program courses in 2023 as juniors, the follow-up period will only include the first half of senior year, which is a sufficiently long follow-up period for effects to appear.

Short-term outcomes. The formative phase will be used to pilot two research-based self-report tools of *soft skills* with program students, to identify a tool that can be reliably used for program monitoring. An example is the Social and Emotional Competency Assessment

(SECA), developed by a collaborative of district staff, researchers, and CASEL. During the summative phase, the selected tool will be administered to program students at the start and end of courses to measure gains and explore mediation. *Mastery of computer science* will be measured using end-of-unit tests administered by providers, and used to descriptively look at the percentage of students with mastery across formative cycles and summative years.

Longer-term outcomes. The study will also examine whether the proportion of students intending to *pursue a career in STEM or computer science* is increasing across project years, using items from a student survey administered to program students at the end of the course.

4. References

Adhvaryu, Achruta, Namrata Kala and Anant Nyshadham. 2019. “Returns to On-the-job Soft Skills Training.” Poverty Action Lab Dec 2019.

Bifulco, L. 2013. “Citizen participation, agency and voice.” European Journal of Social Theory 16(2):174-187

Cannon, Chris, Patrick Clark, Jeremy Scott Diamond, and Laurie Meisler. 2015. “The Unlikely Cities that Will Power the U.S. Economy.” *Bloomberg*. https://www.bloomberg.com/graphics/2015-stem-jobs/

Cook, T. D., W. R. Shadish, and V. C. Wong. 2008. "Three conditions under which experiments and observational studies produce comparable causal estimates: New findings from within-study comparisons." Journal of Policy Analysis and Management 27 (4):724-750.

Deming, David. 2017. “The Growing Importance of Social Skills in the Labor Market.” NBER Working Paper No. 21473.

Dougherty, Shaun. 2016. “Career and Technical Education in High School: Does it Improve Student Outcomes?” Thomas B. Fordham Institute.

Fortson, Kenneth, Natalya Verbitsky-Savitz, Emma Kopa, and Philip Gleason. “Using an Experimental Evaluation of Charter Schools to Test Whether Nonexperimental Comparison Group Methods Can Replicate Experimental Impact Estimates.” NCEE Technical Methods Report 2012-4019. Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education, 2012.

GNO, Inc. 2020. “The Economic Landscape of Greater New Orleans.” Presentation given July 2020.

Hallberg, K., V.C. Wong, and T.D. Cook. 2016. "Evaluating Methods for Selecting School-Level Comparisons in Quasi-Experimental Designs: Results from a Within-Study Comparison." EdPolicyWorks Working Paper.

Louisiana Department of Education. 2019. “Department Celebrates Schools and School Systems Demonstrating Top Student Progress.” https://www.louisianabelieves.com/newsroom/news-releases/2019/08/27/department-celebrates-schools-and-school-systems-demonstrating-top-student-progress

MDRC and Results for America. 2019. “What Works in Career and Technical Education: Evidence Underlying Programs and Policies That Work.” https://www.mdrc.org/publication/what-works-career-and-technical-education

Monitor Institute. 2018. “Preparing Tomorrow’s Workforce for the Fourth Industrial Revolution.” Deloitte. https://www2.deloitte.com/content/dam/Deloitte/br/Documents/technology-media-telecommunications/preparing-tomorrow-workforce-for-4IR_C.pdf

Psycharis, Sarantos and Maria Kallia. 2017. “The Effects of Computer Programming on High School Students’ Reasoning Skills and Mathematical Self-Efficacy and Problem Solving.” Instructional Science Oct 2017.

Racial Wealth Divide Institute. CFED. 2016 “Racial Wealth Divide in New Orleans.” https://prosperitynow.org/files/resources/Racial_Wealth_Divide_in_New_Orleans_OptimizedforScreenReaders.pdf

Rosenbaum, Paul R., and Donald R. Rubin. 1983. "The central role of the propensity score in observational studies for causal effects." Biometrika 70:41-55.

Tuttle et al., 2013. KIPP Middle Schools: Impacts on Achievement and Other Outcomes. Mathematica Policy Research, Washington D.C.

Vieira, Anahita. 2020. “Data Analysis Part 1: What are the Outcomes of Coding Boot Camps?” Conduct Science. https://conductscience.com/data-analysis-what-are-the-outcomes-of-coding-boot-camps/

.

YouthForce NOLA

Logic Model for Soft Skills in Computer Science Pathways

Resources	Activities	Outputs	Outcomes – Impact		
			Short-Term	**Medium-Term**	**Long-Term**
• Open enrollment New Orleans high schools offering Computer Science (CS) courses with outside providers • New Orleans open enrollment high school students eager to take CS courses (as indicated by demand) • YouthForce staff with experience in soft skills integration and student support. • CS providers (Op Spark, Spark Mindset) with curriculum and expertise in computer science instruction. • Laptops and an internet connection for every student to use during remote learning, and space for instruction if deemed safe. • Contracted evaluator with experience evaluating career pathway programs (MDRC). • MHA Labs Building Blocks, a framework used by YouthForce, providers and partners for teaching students skills needed to succeed in school and workplace • Regional employers in need of employees with software development and workplace success skills • Existing philanthropic, corporate and government funding to support project	*Student Support:* • YouthForce, CS providers, schools recruit students for CS courses and provide them technology if needed • CS providers and YouthForce deliver case management (academic planning, student support) and job placement support (industry mentors, career connections programming, internship/job support) based on the YouthForce model. *CS Training:* • Providers train students in CS instruction aligned to meaningful certifications through full courses • Evaluate student progress in CS (using quarterly assessments) and use data to adjust instruction *Soft Skills Integration:* • YouthForce trains CS provider teaching staff in integrating soft skills into instruction, and coach staff throughout school year • YouthForce and CS providers evaluate teacher implementation through quarterly surveys and check-ins, and student progress through twice-annual surveys	*Student Support:* • 500 students take CS courses through program over 5 years • 200 (building to a goal of 50%) participating in the program will either: gain full-time employment in "promising jobs" or "good jobs" in computer science or STEM, or attend a college/university within two years of program completion *CS Training:* • 80% of those who sit for certification exams receive the certification *Soft Skills Integration:* • 400 students (80% of program students) demonstrate proficiency in at least three of the six Soft Skills Building Blocks as based on twice-annual YouthForce assessments	*In the first two years of the grant:* • The number of students in the program earning certifications in CS increases annually. • Students show improvements in their GPAs after taking Soft Skills in Computer Science courses. • The number of students demonstrating proficiency in the Soft Skills Building Blocks increases annually.	*By the end of the grant period:* Students show increased readiness for promising or good CS or STEM jobs, as shown through an increase in the numbers and of students earning a certification in CS. More students graduating having taken the program gain full-time employment in "promising jobs" or "good jobs" in CS or STEM (see definition in long-term outcomes) or are attending a college within two years of program completion	*After the grant period ends:* More New Orleans public school graduates are employed in promising or good CS or STEM jobs. This leads to more racial and economic equity in New Orleans. "Promising jobs" are defined as paying a living wage or higher, including benefits, and offering the potential to advance to a "good job" within two years. A "good job" is defined as paying the regional median wage or higher, including benefits, and involving advancement potential.