

# REACH Cost Analysis Report

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## ABSTRACT

In this report, we present a cost analysis of Raising Educational Achievement Coalition of Harlem (REACH), a partnership between Teachers College, Columbia University, and five high-needs schools in Harlem, New York City. A rigorous cost analysis can help illuminate the resources used to implement its theory of action, in addition to contextualizing the size of measured effects in a broader implementation framework and helping decision-makers select among alternative uses of scarce resources. REACH entails deep collaboration between schools and program staff in five key areas: Leadership, Teaching and Learning, Expanded Learning Opportunities, Physical and Mental Health, and Family and Community Engagement. The program supports schools in achieving their goals for student learning by utilizing university and community resources, including research from faculty, and graduate student assistants working as interns or volunteers in exchange for hands-on learning experiences. We used the ingredients method for cost analysis, documenting all resources utilized to operationalize the program's theory of action regardless of whether each resource has a monetary cost or who pays for or provides the resource, in order to fully capture the economic or opportunity cost of the program. We obtained data on ingredients from program documentation, a detailed report on program implementation, and interviews and personal communications with program staff. In 2016-17, REACH cost \$2,732,960, or \$1,560 per student, with substantial variation by school site, domain of REACH, type of ingredient, and source of ingredient and associated funding. We supplement this analysis with a case study of the Teachers College Community School and sensitivity analysis. While the costs of REACH are substantial, the program itself is comprehensive and wide-reaching; further study should compare the costs of REACH to measured effects in a variety of areas, including student test scores, and behavioral, health, and socioemotional learning outcomes.



# CONTENTS

|   |    |
|---|----|
| <b>Introduction</b>   | 7  |
| Context and Theory of Action                                  | 7  |
| Description of REACH  | 9  |
| Cost Analysis in a Broader Evaluation Framework               | 10 |
| Research Questions and Perspective                            | 11 |
| <b>Literature Review and Conceptual Framework</b>             | 12 |
| Literature on School-University Partnerships                  | 12 |
| Other Partnerships: What We Know                              | 13 |
| Emerging Evidence on Effects and Costs                        | 14 |
| <b>Data and Methods</b>                                       | 14 |
| Measuring Costs in Education                                  | 14 |
| The Ingredients Method  | 15 |
| Distribution of Costs   | 15 |
| Sources of Data and Data Collection Methods                   | 16 |
| Prices  | 16 |
| <b>Findings</b>   | 18 |
| Descriptive Statistics on Schools                             | 18 |
| <b>Case Study of Teachers College Community School (TCCS)</b> | 21 |
| <b>Discussion</b>   | 25 |
| Variability in Cost   | 25 |
| Incremental Costs vs. Business-as-Usual                       | 26 |
| Uncertainty and Sensitivity Analysis                          | 27 |
| National Prices   | 28 |
| <b>Conclusion</b>   | 29 |
| Summary of Results  | 29 |
| Limitations and Next Steps                                    | 30 |
| <b>References</b>   | 31 |
| <b>Technical Appendix</b>                                     | 34 |
| Description of Ingredients                                    | 34 |
| Data Sources  | 37 |
| Sources of National Prices                                    | 38 |
| Other Assumptions   | 39 |
| Interview Protocol for Principals/Community School Directors  | 39 |



## ■ ■ INTRODUCTION

Raising Educational Achievement Coalition of Harlem (REACH) is a partnership between Teachers College, Columbia University (TC) and five high-need schools in the Harlem neighborhoods of New York City. The program's objectives are to take advantage of university resources to provide support to schools in their work to increase student achievement and to demonstrate that strategic university-school partnerships can be a cost-effective and sustainable way to meet a diverse range of student and family needs. Under the auspices of the Office of School and Community Partnerships at TC (OSCP) and with the coordination of the REACH team led by the program's Director, TC and partner organizations provide service to schools in five domains: Leadership, Teaching and Learning (abbreviated T&L), Expanded Learning Opportunities (ELO), Physical and Mental Health and Family and Community Engagement.

In this report, we present a cost analysis of REACH, documenting the resources or ingredients that are used to achieve the program's objectives and how the cost of providing those ingredients varies by provider and source of funding (society at large, TC, and the schools), by domain of REACH, by school site and by type of funding. As part of a larger framework of program evaluation, it is important to consider a program's costs as well as its effects when making decisions about scaling and replication. Full understanding of the costs of program and policy alternatives can help decision-makers select the programs that provide the greatest benefits relative to their costs, or to maximize desired student outcomes within budgetary and resource constraints. The costs of a program can also help contextualize the "size" of its effects; whether a particular effect is worthwhile depends on what it costs to achieve it, in addition to competing demands for resources and the availability of alternative options. Even in the absence of measured effects and policy alternatives for comparison, an analysis of the costs of a single program can be very informative. Carefully documenting the resources that are used in implementing a program can help uncover more about how a program works, what it takes to make it work effectively, how its implementation aligns with its theory of action, and what might be required for replication or scale-up of the program. Analysis of how costs vary along multiple dimensions can also uncover variability in resource allocation, possibly related to variability in implementation and effects, and can help program planners understand how the costs are borne by various stakeholders in the program.

This introductory section provides additional context and background on the design and implementation of REACH, the program's theory of action, the purpose and objectives of this analysis and how it contributes to a larger framework of program evaluation. The next section briefly summarizes the extant research literature on the costs, design, implementation, and effects of school-community partnerships, with a specific focus on school-university partnerships, followed by a section that describes the methods and data employed in this analysis in more detail. Subsequent sections present findings, a case study of the Teachers College Community School (a similar partnership that is coordinated by the OSCP but is not part of REACH), sensitivity analyses, and conclusions. A technical appendix provides additional detail on methods and sources of data.

## ■ Context and Theory of Action

The schools with which REACH collaborates have significant assets in terms of talent, commitment, and resources within the community, but also face substantial challenges. There is ample evidence that out-of-school factors affect students' academic learning and non-academic needs in school (physical and mental health, social and emotional learning, and youth development among them) and that high rates of neighborhood poverty are associated with greater educational challenges due to higher levels of stress, fewer outside resources and opportunities, and less robust support systems, among other factors (Basch, 2011; Conger & Conger, 2002; Dearing, 2008; Dearing & Taylor, 2007; Rothstein, 2010).

Research by the New York City Department of Health finds that Central Harlem is the second poorest neighborhood in Manhattan, with 29% of residents living below the federal poverty level. While families, community leaders and organizations, and schools have made tremendous strides in developing the neighborhood and improving socioeconomic outcomes for residents, several indicators of health and wellness continue to place additional demands on local schools beyond their core academic mission. For example, teen pregnancy and elementary school absenteeism rates remain well above the city average; the region faces the third highest rate of incarceration and seventh highest rate of assaults among New York City's 59 Community Districts; and the rate of childhood asthma is almost twice the citywide average<sup>1</sup>.

Before partnering with REACH, partner schools had between 1% and 12.3% of students demonstrating grade level proficiency on the New York State English Language Arts (ELA) exam, compared with 26.4% citywide, 13.4% in Community School District 5 (primarily centered on Harlem and home to three REACH schools) and 41.7% in Community School District 3 (including parts of Harlem and the Upper West Side of Manhattan and home to two REACH schools).<sup>2</sup> REACH aims to support schools in addressing these challenges via a close partnership with schools aligned with the University-Assisted School framework (Hayes & Zemke, 2014; Streim & Pizzo, 2007). Through this partnership, K-12 schools and students benefit from resources, research, and expertise of universities. At the same time, universities have the opportunity to contribute to their surrounding communities while also providing their students with training through hands-on volunteer and internship experience and their faculty with research, teaching, and service opportunities. Finally, the partnership can help schools access and leverage preexisting resources in the community in a strategic framework, expanding beyond the university and schools to encompass a school-university-community partnership.

There are two key elements undergirding this theory of action: universities have a unique role to play in providing services to schools in their communities, and many already share their expertise and resources in myriad ways. A structured partnership provides a strategic avenue to best leverage the resources of a university. Faculty can share knowledge and expertise, while undergraduate and graduate students seeking to help the community while honing their own knowledge and skills can contribute time and experience as interns or volunteers. Universities also feature unique programming, facilities, and equipment in areas such as sciences and the arts that can be shared with younger schoolchildren, as well as clinical resources available through faculty and students in social work, psychology, medicine, and other helping professions. A university can also act as a clearinghouse to connect schools with the latest research-based practices, programs, and policies, including evidence-based theories of learning, curricula, professional development, and school leadership and turnaround practices. The university benefits, as well, particularly by providing its students with opportunities for applied learning in environments of practice, not just in university classrooms.

An effective and genuine partnership with schools requires deep collaboration by school stakeholders, including the principal, teachers, other school staff, parents, and members of the community. While the university and its faculty and students provide services and support through the partnership, it is imperative that schools play a leading role in setting goals and identifying needs so as to customize the resources and services provided to meet the needs of the student population, to capitalize on the strengths and resources already present in the school and the community, and to build support for the partnership among school staff, families, and other stakeholders.

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1 <https://www1.nyc.gov/assets/doh/downloads/pdf/data/2015chp-mn10.pdf>

2 <http://schools.nyc.gov/Accountability/data/TestResults/ELAandMathTestResults>

## ■ Description of REACH

The work of REACH is designed, implemented, and monitored by a central team led by the program's Director:

- Senior and Junior Instructional Specialists
- An Expanded Learning Opportunities Associate
- A Family Engagement Coordinator
- Community School Directors (CSDs) at three REACH sites
- A part-time Assistant to the CSD at a fourth school site.

Note that the central team is employed by Teachers College with funding support from a number of sources. CSDs in particular are part of a larger reform initiative within the New York City Department of Education, the Community Schools Initiative, of which REACH is one of several community-based organizations (CBOs) that coordinates support services for schools. While other CBOs in the Community Schools Initiative, such as Counseling in Schools, do not have other staff in identical roles to those of the REACH team, many CBOs do have analogous staff that provide similar services.

This central team directs work at one or more of the five REACH sites, aligned with and customized to each individual school's goals and needs as described in an annual workplan that each school completes with the guidance and support of REACH staff. Much of the support and programming provided by REACH, in particular leadership coaching, professional development for teachers, and outreach to parents and the community, is conducted directly by these staff. REACH staff also connects schools with other resources at TC, other schools at Columbia University, and, as appropriate, other community-based organizations, to provide services to schools. Many of these additional services not directly provided by REACH staff are provided by TC and Columbia faculty, as well as graduate students serving in supervised internships, community service, and part-time student employment capacities. We describe the REACH services and the ingredients entailed in providing them in more detail in the main body of the report detailing the program's ingredients, as well as in a Technical Appendix.

The program's five domains serve as an organizing framework for the partnership. Table 1 summarizes the key staff and activities under each domain.

**Table 1. REACH Domains**

| Domain                          | Key Staff*   | Example Activities   |
|---------------------------------|--|--|
| Leadership                      | Director<br>Senior Instructional Specialist  | <ul style="list-style-type: none"> <li>• Support school leaders in analyzing student performance data, setting goals, and making plans for improvement in advancement of those goals.</li> <li>• Provide coaching and professional development to school leaders.</li> <li>• Support school leaders in developing annual workplans.</li> <li>• Lead annual retreat of school leaders and teacher leaders.</li> </ul> |
| Teaching and Learning           | Senior Instructional Specialist<br>Junior Instructional Specialist                               | <ul style="list-style-type: none"> <li>• Lead PD workshops and coaching sessions with teacher leaders to improve instructional planning and delivery and pedagogical content knowledge.</li> </ul>   |
| Expanded Learning Opportunities | ELO Associate<br>Community School Directors<br>Graduate Student Workers, Interns, and Volunteers | <ul style="list-style-type: none"> <li>• Coordinate work of graduate students and contracted service providers to deliver school-day and after-school tutoring and enrichment programs to students.</li> </ul>   |

*continued*

**Table 1. REACH Domains (continued)**

|                                 |   |   |
|---------------------------------|---|---|
| Physical and Mental Health      | Community School Directors Assistant to the CSD | <ul style="list-style-type: none"> <li>• Connect students and families with opportunities to develop health knowledge and skills and to access physical and mental health resources in the community (including some provided by faculty and students of TC and Columbia).</li> </ul> |
| Family and Community Engagement | Family Engagement Coordinator                   | <ul style="list-style-type: none"> <li>• Support families in their efforts to connect with schools and other community resources to support their children's development.</li> <li>• Provide direct services to families through workshops and other events.</li> </ul>               |

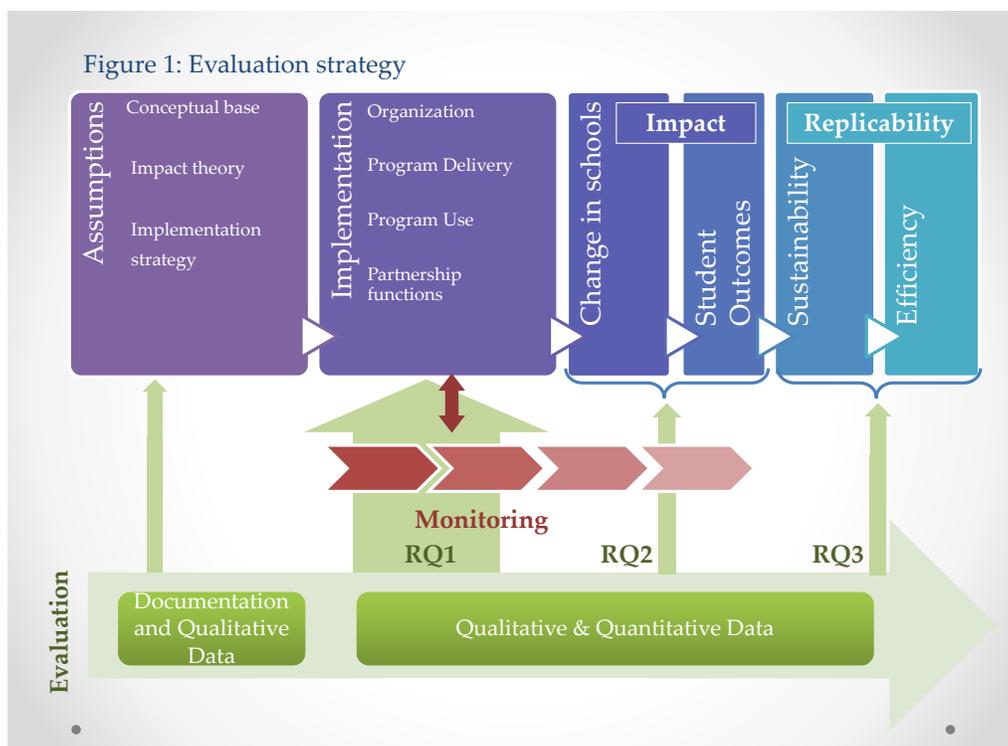
\*Note: many staff members, particularly the REACH Director and the Community School Directors, work across multiple domains, and all domains involve some degree of support from graduate student workers. Staff members are listed here alongside the domain with which their work is most closely associated, but in general work across domains.

## ■ ■ Cost Analysis in a Broader Evaluation Framework

This cost analysis, conducted by the Center for Benefit-Cost Studies of Education at Teachers College, Columbia University (CBCSE), is part of ongoing evaluation work of REACH, which includes detailed data collection and analysis on program implementation based on an evaluation framework developed with the National Center for Restructuring Education, Schools, and Teaching (NCREST) at TC. Figure 1 shows a stylized representation of the overall framework. The evaluation framework includes documenting the program's theory, conceptual basis, and strategy, and analyzing how program organization, delivery, uptake, and partnership development occurs and aligns with this theory and strategy. In addition, the evaluation contains the assessment of proximal and more distal impacts, including ultimate impacts on student learning, and analysis of sustainability and efficiency needed for future scale-up. It should be noted that the REACH program, as described above across its various domains, is quite comprehensive. A full and accurate evaluation should capture impacts not just on student learning, but also on the myriad other dimensions of schooling touched upon by the program, including school climate, student socioemotional learning, physical and mental health outcomes, and outcomes related to the engagement of families.

The cost analysis complements the existing implementation analysis and the forthcoming impact evaluation in two key ways. First, by building upon rich data collected in the implementation analysis (Kim, 2016) on the resources that go into REACH, the ways REACH programming is delivered, and the usage of REACH programming by stakeholders, the cost analysis provides a bridge between implementation and impact evaluations. In other words, by carefully documenting all of the resources from TC, schools, and the community that enter into providing REACH, and identifying who provides these resources and how they vary along multiple dimensions, the cost analysis can address the question of what it takes to implement REACH in order to achieve the observed impacts. Second, in the ultimate stages of the evaluation framework entailing analysis of replicability, which includes generalizability, sustainability, scalability, and efficiency, a cost analysis can contribute to several relevant analyses. It can contribute to a comparative cost-effectiveness analysis that can inform whether a university-school partnership, such as REACH, is a productive investment of scarce school and university resources. It can aid in the identification of ingredients necessary, at both the school and university levels, to build a productive and sustainable partnership. Finally, it can help uncover potential efficiency gains for cost savings by analyzing which program components and ingredients are more or less costly and which may be contributing more or less to program impacts based on analysis of site-level variation.

**Figure 1. REACH Evaluation Framework**



Source: Barnett and Kim, 2015

## ■ Research Questions and Perspective

Since REACH is a demonstration project, lessons from this cost analysis can inform if and how a university partnership can be more efficacious than alternatives, as well as potential ways to improve efficiency and resource allocation. The primary research questions of this cost study are:

- What are the total costs of REACH, including all resources or ingredients employed by the program that have an economic opportunity cost, required to achieve the program’s theory of action under current implementation (during the 2016-2017 school year)?
- What is the average cost per student of REACH?
- How do the costs vary by program site?
- What are the costs attributable to each domain of REACH?
- How do costs vary by perspective – to society at large, to Teachers College, and to the schools?
- What costs are incremental – above and beyond “business as usual” – versus costs that would have been incurred even in the absence of REACH?
- How does the average cost per student differ from the marginal cost of serving one additional student?

The last three research questions have the potential to be particularly instructive, though challenging to answer, regarding program design, efficiency, and sustainability. The primary perspective that will be employed when analyzing costs and financing is that of Teachers College, the program’s sponsor. However, total social costs to all stakeholders and costs specifically to schools will be considered, as well. That is in part because in order to consider scaling up or

replicating the program, it is important to understand what prerequisites a school must have in place in order to make the program successful and to anticipate the potential burden on school staff and other resources of implementing the program. That said, REACH has the potential to be of great value from the school's perspective – the program can connect the school to university and community resources at relatively low cost to the school due to the availability of student workers, supported financially by the university, seeking to gain practical learning experiences while helping the surrounding community.

Even from the university and society's perspective, REACH has potential for value relative to marginal cost. There is potential for synergy from the partnership, through the strategic use of resources. For instance, faculty seeking laboratory and demonstration sites for research in curriculum, teaching and learning, professional development, and school leadership can combine their research, community outreach, and student training activities by providing services directly to schools. Graduate students can also contribute services while honing skills and gaining experience through volunteer and internship experiences. Still, building such a successful partnership does not come without challenges, including the need to provide training, oversight, and support for relatively inexperienced graduate students, to provide adequate coordination of partnership activities, and to leverage resources and supports in the schools and community.

## ■ ■ LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

### ■ Literature on School-University Partnerships

The concept of universities' social responsibility to serve their local communities dates to the mid-18th century. Upon founding the University of Pennsylvania, Benjamin Franklin expressed his view that universities were not just for the elites but more broadly for all members of the community (Franklin, 1749). In recent years, however, concrete applications of this concept have expanded, particularly in partnerships with neighborhood schools.

One of the first and best-documented examples of university-school partnerships in the literature is the “university-assisted community schools” efforts by the University of Pennsylvania's Netter Center for Community Partnerships (CCP). Beginning in 1985, the CCP partnered with various community-based organizations (CBOs) to offer daytime school and after-school programs at public schools in West Philadelphia. Program areas include health and nutrition, conflict resolution/peer mediation, performing and visual arts, technology, career planning, and reading, and the focus at each school can vary depending on the school's priorities (Harkavy & Hartley, 2009). This model encourages students at the University of Pennsylvania to work as volunteers at these schools through community service components of coursework (Harkavy, 2005). The partnership in this initiative engaged not only the university and the schools but also CBOs; hence it is often referred to as “university-community-school partnership” (e.g., Harkavy & Puckett, 2000; Hopson & Miller, 2016).

Much of the existing research on university-school, university-community, or university-community-school partnership is concentrated on qualitative case studies of partnership experiences. Two key strands that emerge from this literature are the characteristics of collaborative and sustainable partnerships and challenges to building and implementing the complex relationships entailed. The theory of inter-organizational relationships, focusing on the processes of developing successful partnerships through three phases – negotiation, commitment, and execution – guides some of the literature (Goldring & Sims, 2005; Ring & Van deVen, 1994). Case studies of successful partnerships have found that establishing mutual commitment, making decisions collaboratively, and building a shared culture were key to sustaining university-community-school partnership (e.g., Kilbourne, Decker & Romney, 1994; Melaville & Blank, 1993). However, implementation challenges include significant human capital and communication requirements (e.g.,

Brookhart & Loadman, 1992; Million & Vare, 1994). A cost analysis is able to shed light on the presence and dynamic of these challenges across schools.

## ■ Other Partnerships: What We Know

More broadly, partnerships have become a common phenomenon for schools in the United States. For instance, a qualitative study on partnerships among universities, communities and schools by the Pew Partnership for Civic Change described more than 1,000 university-school partnerships proliferating across the nation in the early 2000s (Dugery & Knowles, 2003, cited in Goldring and Sims, 2005). Schools are also partnering with institutions and agencies external to the education sector. A recent study on cross-sectoral collaborations for education found 182 place-based, multi-sector, collaborative leadership efforts aimed at improving educational outcomes across 100 major cities and school districts in the U.S. (Henig, Riehl, Houston, Rebell & Wolff, 2016). Examples of these initiatives include district-led partnerships with local universities and companies for instructional improvement, community-school initiatives to offer supplemental services at schools through community-based organizations (CBOs), and broader city- or community-wide initiatives for community development and school improvement supported by private and/or public funds (Henig et al., 2016).

Behind such zeal for partnership is a movement to make schools into institutions that addresses various needs of students that might, if left unaddressed, hinder their learning. Children's school performance can be affected not only by instructions at schools but also by various out-of-school factors such as family hardships, health issues or social and emotional problems. This implies that students from disadvantaged families may face multiple barriers to learning. Based on this view, schools have been attempting to improve students' academic achievement by going beyond the academic sphere and supporting other domains such as health, socioemotional/behavioral learning, and family. Partnering with CBOs or other institutions in the community with resource and expertise to provide services in these areas has become a standard strategy for schools (Dryfoos, 2002). Moreover, shrinking school resources have motivated schools to seek to take advantage of available community and university resources through these partnerships.

These new school models are found in various forms and names; "full-service community schools," "comprehensive student support," "wraparound services," "promise neighborhoods," "communities in school," or "collective impact" are different in names, but share common characteristics and broader objectives (Walsh, Gish, Foley, Theodorakakis & Rene, 2016). Moore et al. (2014) reviewed nine programs that fall under these school models and found five common characteristics: (i) the process of providing services usually starts with needs assessments; (ii) the implementation involves coordination of supports such as matching/referring students with appropriate services outside school; (iii) the program's approach is highly integrated within schools; and (iv) services are provided through community partnerships; and (v) students' needs and progress are monitored by data collection and tracking.

These partnerships and school reform efforts operate in complex policy contexts. In the late 1980s, the Carnegie Foundation for the Advancement of Teaching pledged to finance partnership initiatives between schools and various institutions in the community (Boyer, 1988), which resulted in numerous concrete initiatives. In 1992, a report by a bi-partisan panel, the National Commission on Children<sup>3</sup> called for more actions by various actors in the society to support disadvantaged children. Currently, the Every Student Succeeds Act (ESSA) of 2015 provides a framework in which schools, communities, businesses and the government work together to provide "fair, equitable and high-quality" educational opportunities and addressing achievement gaps.

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<sup>3</sup> The Commission closed in April 1993.

## ■ Emerging Evidence on Effects and Costs

In addition to the study of partnership design and implementation, recent research has focused on program effects. According to a literature review by Moore, Terzian and Stratford (2014), the evidence of impact is just emerging and the results are mixed. There is one randomized-controlled trial (RCT) evaluation for the Comer School Development Program (SDP) (Comer, 1999), three RCT evaluations of some components of the Communities in Schools (CIS) model (ICF International, 2010a, 2010b and 2010c), one multi-site assessment of the full CIS model with a quasi-experimental design (ICF International, 2010), a more recent randomized controlled trial of the case management component of the CIS model (MDRC, 2016), and four evaluations of the City Connects model with the propensity-score matching method (Boston College Center for Optimized Student Support, 2012, 2010; Walsh et al., 2014; Walsh, 2014).

Another critical question, albeit less studied than program impact, is the costs of community-school model and the costs of partnership. To date, we have found only one rigorous cost study conducted, a benefit-cost study of City Connects program in Boston, which found that the benefits of the program exceeded the costs, even under extremely conservative assumptions (Bowden et al., 2015). On a theoretical level, Rice (1995, 2001) discussed how to estimate the costs of “comprehensive, community-based support systems.” One of the highlights of her work is the importance of carefully distinguishing marginal/incremental costs. For example, when services are offered as add-ons to or alongside what is already provided, the marginal cost is the costs of these additional interventions. If a program which has already existed in the community becomes a component of the new comprehensive initiative, then the marginal cost is minimal, if at all. Finally, when some existing programs are dropped and replaced by programs under the new comprehensive approach, the marginal costs would be the difference between the old and new programs. In the present analysis, we were not able to empirically estimate the business-as-usual costs, so we made assumptions about counterfactual conditions to estimate the marginal/incremental costs. In future studies, it will be important to further analyze business-as-usual costs.

## ■ ■ DATA AND METHODS

### ■ Measuring Costs in Education

In order to estimate the costs of a program, the resources used to implement activities that generate program impact need to be identified and accounted for regardless of how they are budgeted and financed. In this study, we refer to the costs of a program as the value of the resources that are required to replicate the intervention. Costs differ from finance in the sense that finance deals with the way the costs are paid for and who pays for them. For example, consider an education program that relies on volunteer time for its implementation. Volunteer time is a resource that is necessary for the implementation and is necessary to achieve the impact the program generates. This resource will not appear in any budget or financial analysis, as it is a resource borne by the volunteer. However, if one were to replicate the program elsewhere, where there were no availability of volunteers, one would need to hire workers to replace volunteer time. Therefore, restricting costs only to those accounted for in the budget would understate the overall costs of the program because they do not include costs borne by other sources.

Economic analysis of costs is based on the foundational concept of opportunity cost, the value of what is sacrificed by using a specific resource in one way rather than in its next best use. This long-standing concept lies at the heart of both microeconomic theory and its application to numerous fields (see, e.g., Posnett & Ian, 1996, for a discussion of its relevance to health economics). The cost accounting system developed at the Center for Benefit-Cost Studies of

Education (CBCSE) uses this underlying concept to address costs and is known as the ingredients method (Levin, 1975, 1983; Levin, McEwan, Belfield, Bowden & Shand, 2017). This method has been widely validated from an economics and accounting perspective and provides consistency in cost estimation for purpose of comparison across programs and interventions.

## ■ The Ingredients Method

The ingredients method of cost analysis begins with the identification of the ingredients or resources that are required and used to implement the program being evaluated. Note that since one purpose of cost analysis is to estimate the resources required to replicate a particular effect in a cost-effectiveness framework, our focus in data collection and analysis is on estimating the costs of the program as implemented, not as designed. Employing a variety of data sources and collection methods, both the quantitative and qualitative characteristics of these ingredients are ascertained. For example, the precise types and amounts of personnel are specified according to their qualifications, functions, and time commitments. A similar exercise is carried out for facilities, equipment, and other program inputs as well as required client resources. For this study, this information was obtained from the REACH implementation report (Kim, 2016) and program documents such as Professional Development (PD) attendance records that provide additional information on resource use. Additional information was collected through interviews with school principals, Community School Directors, and REACH and OSCP staff. Data collection procedures and instruments are described in more detail below and in the Technical Appendix. All ingredients required for the intervention are identified and specified regardless of how they are financed.

Once the ingredients are identified, the next step entails establishing their costs. As much as possible, market prices should be used to establish the value of each ingredient. Opportunity cost is usually considered to be approximated by the market price, the price that equates supply and demand in the competitive marketplace. Nonetheless, many markets do not have competitive market conditions that provide a true price of the resource and in some cases, a market for the resource does not exist (for example, a unique source of talent). A deeper discussion of the methods and the assumptions used to estimate the opportunity costs of these resources are discussed in the analysis section of this report.

## ■ Distribution of Costs

In a final step of the cost analysis performed in this study, the distribution of the cost burden is analyzed across domains of the program, by schools and across funding source. These costs include in-kind contributions of ingredients, cash subsidies such as user charges, and philanthropic contributions. These adjustments enable the calculation of net costs per “funding” constituency for each intervention. For this analysis, the primary perspective of interest is that of the program sponsor, Teachers College. However, for comparative purposes it is also important to document the total costs from a social perspective, inclusive of all ingredients regardless of who provides them and whether there is a monetary cost or they are provided in-kind by schools, such as staff time and facilities space. From a school’s perspective, however, the program may provide great value due to the resources provided by the university, by volunteers, and through philanthropic contributions.

In addition to analyzing costs according to perspective, the agency that provided the ingredients, and the funding source for each ingredient, we also analyze how costs vary according to category of ingredient, among the program’s five domains, and by school site.

## ■ Sources of Data and Data Collection Methods

Data collection began with developing a hypothesized list of ingredients under the categories of personnel, facilities, materials and equipment, required client inputs, and other, based upon a thorough review of program documentation. These documents include the implementation analysis report, attendance records for professional development sessions by teachers and graduate student employees, rosters of graduate student employees documenting role, domain, school site, salary, funding source, and hours worked, and contracts with community-based organizations providing services. From this hypothesized list, we identified gaps in our knowledge and developed iterative, semi-structured interview protocols with targeted questions for the REACH Director, other REACH staff, the Assistant Director of OSCP, and school-based staff, primarily CSDs and one principal (see Technical Appendix for sample interview protocols). We intended to collect information from all 5 REACH schools. However, one school is phasing out its REACH participation, so for that school, we are only including the costs of student workers and contracts with CBOs. In a sensitivity analysis, we attribute a small share of administrative overhead costs for the program to that school to show how the distribution of costs across sites would change, and to highlight the importance of accounting for potential hidden costs. We performed a similar series of steps for TCCS, which shares some resources with REACH and some similarities with the REACH model, but operates under a different partnership arrangement and thus serves as a case study of the resources required to implement a different partnership model.

If these costs are to be used in a future comparative cost-effectiveness analysis, the costs that should be included are only those that are incremental, or over-and-above “business as usual,” or what would have been received anyway in the absence of the REACH treatment. For this report, we were unable to identify and collect data from representative comparison schools to empirically determine what share of the costs of REACH, such as teacher PD and principal leadership coaching, would have occurred anyway. Future work, incorporating an impact evaluation with a comparative control group of schools and a cost-effectiveness analysis, may include such empirical work. For the purposes of this report, however, we have attempted to estimate incremental costs based upon questioning principals and CSDs about their work in non-REACH schools or before the implementation of REACH, complemented by assumptions about the share of principal and teacher work that is incremental; these assumptions are tested in sensitivity analysis.

## ■ Prices

After quantities and qualitative descriptions of all ingredients are obtained, the next step is to apply an appropriate market or shadow price that represents the economic value of each ingredient in opportunity cost terms. When competitive market prices exist, they are generally preferred as they represent a proxy for the economic value for each ingredient based upon revealed preference of willingness to pay. We present two sets of results using slightly different prices. The main results use actual REACH prices, including actual salaries and fringe benefits for REACH and OSCP staff, so as to best approximate the true total cost of the intervention to each entity, in particular Teachers College. These include actual salaries for REACH and OSCP staff, and contractual rates for brokered services under the assumption that these contracts represent market value for the services provided. To protect individual privacy, individual salaries are not presented in this report and prices are presented in aggregate form. Principal and teacher salaries and fringe benefits were estimated using publicly available school budget data from the New York City Department of Education. For other ingredients provided by Teachers College that are not directly provided by REACH and OSCP, for instance faculty time spent on curriculum and professional development and supervising student workers, we estimate the portion of their time devoted to REACH and assign salary and benefits based upon average salaries at research universities. Facilities and equipment costs were estimated using prices from the CBCSE Database of Educational Resource prices, annualizing new construction or purchase prices over 30 years for facilities and 5 years for technology at a 3.5% interest rate.

The results presented in the section below are all cost estimates obtained from using actual local prices. These results represent the true economic cost of the program as it was implemented in New York City. However, using local prices, as opposed to national prices, can compromise comparability of costs across different programs implemented in different regions in the country. This is especially true when the local prices considered can vary dramatically from the national average, as is the case for New York City. Therefore, as a sensitivity analysis for comparability and generalization with other interventions, we present another set of results using the national average prices as compiled by CBCSE. These prices and their sources are documented in the Technical Appendix. Note that materials and equipment prices remain steady across the estimates, as there is little regional variation in these prices.

For contractual services, we use the actual amounts in the New York City price estimates, and use the Regional Price Parity adjustment to adjust from New York metropolitan prices to a national average. The Regional Price Parity index is a measure of how the cost of goods and services in a specific region compares to the national average cost. The New York City Regional Price Parity Index is 121.9, meaning that New York City's cost of goods and services is on average 21.9% higher than the national average. With this in mind, the average national prices can be recovered with the collected local ones. All costs are expressed in 2017 dollars, using the Consumer Price Index to adjust for inflation as needed.

An important challenge for generalizability that remains, even when using national prices instead of local prices, is that the adjustment of national prices is, after all, an average adjustment and may not apply to all regions. Local price contexts may vary due to a number of circumstances that are not controlled for in the price adjustment. For example, a program that requires personnel with specific and rare skills for its implementation might not be able to find local workers with such skills in rural areas, because the local market does not attract the kind of human capital needed. Therefore, implementation would require these professionals to move to the areas of implementation, which may generate additional recruitment costs than it would if implementation were carried out in an otherwise more costly area of the country. Finally, separately from the question of regional price variation due to differences in local labor markets and overall cost of living, programs in more densely populated areas may exhibit economies of scale; fixed costs may be divided over a larger number of participants, sites may become more efficient by learning from others nearby, and the program may become large enough to have market power to drive down prices for its ingredients. These two competing factors offset one another, but the extent to which they do so is unclear *a priori*. Hence, the results presented in the sensitivity analysis must be interpreted cautiously, taking these considerations into account.

One challenge in identifying appropriate regional and national average prices for personnel ingredients is determining the appropriate economic value or opportunity cost of the large number of graduate student workers. On the one hand, it is likely that they are receiving below-market wages for the services they provide as they are benefiting from the experience as volunteers or interns by gaining valuable work experience and learning opportunities; they are, in a sense, "paying" for the general training they are receiving by accepting below-market wages (Becker, 1964). This is, in fact, part of the value proposition of a university-school partnership such as REACH. However, in the absence of available graduate student workers willing to work for below-market wages in exchange for training and work experience, schools and partner agencies would need to hire workers at market wages. For this reason, we use the full market rate of hiring a full-time employee to perform equivalent services as a baseline estimate. This may overestimate the costs, however, as graduate student workers are also relatively inexperienced; thus, for most graduate student assistants we use entry-level salaries in our national price estimates. Note that we use the general terms "graduate student workers" and "graduate student assistants" as generic titles that cover a wide range of roles, including instruction, coaching, and curriculum development, and do not imply that graduate students are working strictly as "assistants."

## ■ ■ FINDINGS

In this section, we present the total incremental cost of REACH, or the estimated costs above and beyond “business-as-usual,” as well as the average per student cost and the ways costs vary by school site, category of ingredient, REACH domain, and funding source. We also explore some possible causes for variability in costs in this section and the Discussion section.

### ■ Descriptive Statistics on Schools

**Table 2. Descriptive Statistics of Schools, 2016-2017**

|          | Total Enrollment | Female | Asian | Black | Hispanic | Students with Disabilities | English Language Learners | Poverty |
|----------|------------------|--------|-------|-------|----------|----------------------------|---------------------------|---------|
| School A | 386              | 39.6%  | 2.8%  | 64.0% | 29.5%    | 23.6%                      | 9.3%                      | 70.2%   |
| School B | 427              | 53.4%  | 1.2%  | 42.4% | 52.5%    | 29.3%                      | 7.3%                      | 88.3%   |
| School C | 317              | 46.4%  | 6.6%  | 55.8% | 31.2%    | 23.3%                      | 18.0%                     | 97.5%   |
| School D | 309              | 63.1%  | 1.0%  | 55.3% | 40.1%    | 24.6%                      | 3.2%                      | 100.0%  |
| School E | 321              | 50.2%  | 2.8%  | 28.0% | 63.6%    | 22.7%                      | 7.5%                      | 91.3%   |
| TCCS     | 273              | 53.8%  | 4.0%  | 39.2% | 34.8%    | 12.8%                      | 2.2%                      | 44.0%   |

Source: NYC Data, Demographic Snapshots

Table 2 presents some descriptive statistics of the 5 REACH schools and TCCS. In general, these schools have similar enrollments. The school with the largest enrollment is School B with 427 enrolled students for the 2016-2017 academic year, while the school with the smallest enrollment is TCCS with 273 students. In addition, all schools have similar demographic characteristics. However, some significant differences across schools are worth noting. For example, School A has a surprisingly low female enrollment, with only 40% of enrolled student being girls. Furthermore, School E is predominantly Hispanic, while School A is predominantly African American. Finally, in TCCS, only 44% of its student are in poverty, while this rate is much higher for all of the other schools in the sample.

Table 3 presents the total and per student costs of the program by school. Note that for all reported findings, figures are rounded to the nearest \$10 to avoid false precision. Due to rounding, row and column totals may not sum exactly. There is a significant variation of the cost per student across sites. School A is the school that has the lowest cost of implementation per student<sup>4</sup> with a \$1,320 cost per pupil, while School D has the highest per student cost of \$2,100 per pupil. The pooled average per student cost of delivering REACH is \$1560 when including all five schools, and \$1690 when excluding School E, which is only partially implementing the program.

<sup>4</sup> Note that School E has the lowest per student cost, but this is due to the fact that the costs accounted for in School E concern only contract costs and graduate student worker cost, as core REACH support and school staff participation are phasing out. None of the other ingredients are included in the cost estimation for School E.

**Table 3. Costs by Site**

|          | <b>Cost Per Student</b> | <b>Number of Students</b> | <b>Total Cost</b>  |
|----------|-------------------------|---------------------------|--------------------|
| School A | \$1,320                 | 386                       | <b>\$508,760</b>   |
| School B | \$1,750                 | 427                       | <b>\$747,290</b>   |
| School C | \$1,650                 | 317                       | <b>\$522,830</b>   |
| School D | \$2,100                 | 306                       | <b>\$642,970</b>   |
| School E | \$970                   | 321                       | <b>\$311,110</b>   |
| Total    | \$1,560                 | 1757                      | <b>\$2,732,960</b> |

Table 4 shows the distribution of the costs for each school across categories of ingredients. OSCP staff refers to the central administrative team that supports REACH and other school partnership endeavors at TC, while the REACH Team refers to the core group of staff dedicated to REACH, including the Director, Senior and Junior Instructional Specialists, ELO Associate, and Family and Community Engagement Coordinator. Site-level personnel include time provided to REACH by principals and teachers at the school, in addition to CSDs and the Assistant to the CSD (even though those positions are TC employees, they are included in this category as they are school-based). Contracts refer to all contractual services provided not directly by REACH, but rather by third parties. While OSCP and REACH team personnel are constant across schools, there is some variation in the level of support by graduate student assistants and even more so among site-level personnel. This is in part a result of the presence of Community Schools Directors (CSDs) in only three of the REACH sites. In addition, it may also reflect differences in implementation of the program across schools, in particular in the degree of participation of principals and teachers in professional development and other REACH activities. Finally, some REACH programming at each site is determined by particular sources of grant funding for programs unique to one or more REACH sites, driving some differences in implementation and costs across sites.

**Table 4. Distribution of Costs by Ingredients**

|                                | <b>School A</b>  | <b>School B</b>  | <b>School C</b>  | <b>School D</b>  | <b>School E</b>  | <b>Total</b>       |
|--------------------------------|------------------|------------------|------------------|------------------|------------------|--------------------|
| <i>Personnel</i>               |                  |                  |                  |                  |                  |                    |
| OSCP Staff                     | \$24,850         | \$24,850         | \$24,850         | \$24,850         | —                | <b>\$99,380</b>    |
| REACH Team                     | \$125,460        | \$125,460        | \$125,460        | \$125,460        | —                | <b>\$501,840</b>   |
| Graduate Students              | \$56,860         | \$73,520         | \$68,660         | \$46,250         | \$15,940         | <b>\$261,230</b>   |
| Site-Level Personnel           | \$96,200         | \$70,130         | \$117,080        | \$130,690        | —                | <b>\$414,100</b>   |
| <i>Materials and Equipment</i> |                  |                  |                  |                  |                  |                    |
| Materials                      | \$660            | \$670            | \$670            | \$640            | —                | <b>\$2,640</b>     |
| Material Contracts             | \$5,780          | \$5,780          | \$6,960          | \$5,780          | \$5,780          | <b>\$30,080</b>    |
| Contracts                      | \$172,240        | \$431,830        | \$149,900        | \$253,110        | \$289,390        | <b>\$1,296,460</b> |
| Facilities                     | \$23,470         | \$15,060         | \$29,270         | \$52,940         | —                | <b>\$120,730</b>   |
| Other                          | \$3,250          | \$0.00           | \$0.00           | \$3,250          | —                | <b>\$6,500</b>     |
| <b>Total</b>                   | <b>\$508,760</b> | <b>\$747,290</b> | <b>\$522,830</b> | <b>\$642,970</b> | <b>\$311,110</b> | <b>\$2,732,960</b> |

Table 5 shows the distribution of costs across the different domains of the program. The majority of resources are allocated to activities pertaining to the Expanded Learning Opportunities (ELO) domain, comprising approximately 50% of the program resources. This aggregate result is driven mainly by two schools, School A and School B, where 53% and 61%, respectively, of the school's REACH resources are allocated to ELO activities. The second largest domain in terms of resource use is Health. This domain accounts for approximately 20% of the program resources and is also driven by two schools, School C and School D, where health accounts for 24% and 33%, respectively, of the total school resource use. This is followed by Teaching and Learning (T&L), Family and Community Engagement, and Leadership, which are all relatively similar across schools.

**Table 5. Distribution of Costs by Domain**

|              | <b>Leadership</b> | <b>T&amp;L</b>   | <b>Health</b>    | <b>ELO</b>         | <b>Family</b>    | <b>Total</b>       |
|--------------|-------------------|------------------|------------------|--------------------|------------------|--------------------|
| School A     | \$59,480          | \$85,380         | \$45,150         | \$263,630          | \$55,120         | <b>\$508,760</b>   |
| School B     | \$47,840          | \$83,290         | \$122,680        | \$447,220          | \$46,270         | <b>\$747,290</b>   |
| School C     | \$61,710          | \$97,160         | \$130,960        | \$173,430          | \$59,570         | <b>\$522,830</b>   |
| School D     | \$63,440          | \$88,760         | \$215,260        | \$220,030          | \$55,470         | <b>\$642,970</b>   |
| School E     | \$5,120           | \$5,120          | \$90,120         | \$203,650          | \$7,120          | <b>\$311,110</b>   |
| <b>Total</b> | <b>\$237,590</b>  | <b>\$359,710</b> | <b>\$604,160</b> | <b>\$1,310,960</b> | <b>\$223,560</b> | <b>\$2,732,970</b> |

Finally, Tables 6 and 7 present the distribution of the costs across perspective (Teachers College versus the school) and funding source<sup>5</sup>. As can be seen from these tables, it is clear that the majority of the cost is borne by TC and is provided in cash. Out of the \$1,560-dollar cost of the program per pupil, \$1,430 is borne by TC while only \$120 is borne by the school. In addition, \$1,410 of the cost per student is provided in cash, while \$140 is provided in kind via donated services, space, or reallocation of existing resources such as principal or teacher time to REACH.

**Table 6. Distribution of Costs by Perspective**

|              | <b>Cost to School</b> | <b>Cost to TC</b>  | <b>Total Cost</b>  |
|--------------|-----------------------|--------------------|--------------------|
| School A     | \$39,140              | \$469,620          | <b>\$508,760</b>   |
| School B     | \$56,490              | \$690,800          | <b>\$747,290</b>   |
| School C     | \$61,140              | \$461,690          | <b>\$522,830</b>   |
| School D     | \$57,780              | \$585,190          | <b>\$642,970</b>   |
| School E     | \$0                   | \$311,110          | <b>\$311,110</b>   |
| <b>Total</b> | <b>\$214,560</b>      | <b>\$2,518,400</b> | <b>\$2,732,960</b> |

The majority of the costs to TC require cash payment or financing, noted in Table 7 as “Expenditure,” with the exception of some TC-provided facilities, whereas all of the costs to the school are provided in-kind. In other words, the costs to the school represent reallocation of existing resources – primarily principal and teacher time, and classroom and office space for REACH staff and activities – from other purposes to REACH. We include these costs from a social and replication perspective, as even though there is not a direct cash outlay for them, they represent opportunity costs in

<sup>5</sup> Please see the Technical Appendix for a breakdown of contract financing by grant and graduate student workers by funding source.



economic terms. Further, in order to make the program work in other settings, schools need to be willing and able to devote principal and teacher time, as well as classroom and office space, to the program, all of which would have a monetary cost to purchase on the market if they were not already in place. In fact, one CSD shared in an interview that school-level support for the program, both in terms of resources and prioritization, were critical to an authentic and successful partnership.

**Table 7. Distribution of Costs by Funding**

|              | <b>Expenditure</b> | <b>In-kind</b>   | <b>Total Cost</b>  |
|--------------|--------------------|------------------|--------------------|
| School A     | \$463,110          | \$45,650         | <b>\$508,760</b>   |
| School B     | \$684,760          | \$62,530         | <b>\$747,290</b>   |
| School C     | \$455,690          | \$67,150         | <b>\$522,830</b>   |
| School D     | \$569,340          | \$73,630         | <b>\$642,970</b>   |
| School E     | \$311,110          | \$0              | <b>\$311,110</b>   |
| <b>Total</b> | <b>\$2,484,000</b> | <b>\$248,960</b> | <b>\$2,732,960</b> |

## CASE STUDY OF TEACHERS COLLEGE COMMUNITY SCHOOL (TCCS)

### *Introduction*

**Purpose of Case Study.** This section summarizes the results of the cost analysis of the Teachers College Community School (TCCS). TCCS is another university-school partnership initiative under the Office of School and Community Partnership (OSCP) at TC that shares a common objective with REACH to provide comprehensive educational opportunities to children in Harlem, but with a distinct design from the REACH program. Moreover, TCCS came about as a result of TC’s unique collaborative project in the community while REACH aligns more closely with a broader New York City-wide initiative for community schools. Although the two initiatives are not directly comparable, this case study is intended to shed some insights into similarities and differences in cost structures based upon different approaches to university-school partnerships.

**About TCCS.** TCCS (PS517) was founded in 2011 as a university-assisted, non-selective public PreK-8 school through a partnership among TC, Columbia University (CU), the New York City Department of Education, and Manhattan Community Board 9. With the addition of one grade each year, the school enrollment has expanded since then, and the student body in the 2016-17 School Year included 273 students from Pre-K to grade 5 (NYCDOE, 2017). The school will reach its full capacity in the 2019-20 school year, serving grades Pre-K through 8. The school gives priority to students from families living in Community School Districts 5 and 6, but is also accessible to students outside these districts. TC aims to play an active role in assisting TCCS to fulfill its mission of supporting children’s academic, social, emotional and physical development (<https://www.tccsps517.org>) through coordinating and leveraging various resources at TC and in the community, with particular attention to enrichment in music, visual arts, and math and science.

**Highlights of the TCCS Model.** As with REACH, TC’s contribution to TCCS includes expertise, resources and services in the areas of leadership, teaching and learning, expanded learning opportunities, social-emotional and



health services and parental engagement, although these domains do not directly follow the domains of the REACH model. The partnership between TC and TCCS extends beyond the five REACH domains and includes areas such as school planning, operations, staff selection, curriculum, governance and accountability. In the area of teaching and learning, the TCCS model does not employ dedicated full-time personnel such as REACH’s Director and Instructional Specialists; it rather mobilizes TC resources such as graduate students and subject-area expert faculty more extensively than REACH does. Graduate students from TC and CU serve as course assistants and primary course instructors of music and science. Subject-area experts in math, science and reading/writing (e.g., doctoral students and faculty) from TC, alongside OSCP staff, assist the school in curriculum development, PD and planning. In the area of expanded learning opportunities, university resources—TC and CU graduate students with training in art, music, STEM and other areas—are utilized in a similar fashion to the REACH model, but more extensively. Instructors for violin, music composition, choir and visual art courses, as well as instructors and assistants for after-school dance, orchestra, math/science-focused games, and robotics clubs are TC and CU students. Similarly to REACH, OSCP assists TCCS by helping to arrange services (both via contract and on a more informal basis) for enrichment activities and teacher PD, the most notable one being the TC Reading and Writing Project (TCRWP) (<http://readingandwritingproject.org>). Collaboration with Community-Based Organizations (CBOs) in the Harlem region is central to both the REACH and TCCS models, but the REACH model has a heavier focus on leveraging community resources whereas the TCCS model has more emphasis on utilizing university resources. While TCCS does not have a CSD, a TCCS Coordinator similarly serves as a liaison between the school and Teachers College. Given these overall similarities and shared resources, subsections below provide a closer look at the total cost, per student cost, and distribution of costs by ingredient type, by domain, perspective, and funding source of TCCS resources.

### Core Costs of TCCS

**Table 8. Costs for TCCS (School Year 2016-17)**

| Cost Per Student | Number of Students | Total Cost  |
|------------------|--------------------|-------------|
| \$3,890          | 273                | \$1,063,130 |

The total costs of implementing the school-university partnership aspects of TCCS for all 273 students enrolled in 2016-17 is approximately \$1.1 million, as shown in Table 8.<sup>6</sup> Many of the ingredients utilized to support TCCS are similar to those used for REACH schools; however, the quantities of these ingredients were larger for TCCS, deriving greater total costs. The average per student cost is \$3,890, which is approximately twice as large as the per student costs of REACH at \$1,560. The higher per student cost is because of a greater total cost and smaller enrollment than that of the average REACH school. However, as the TCCS student population continues to grow with the addition of one grade each year up to grade 8, the average cost per student is projected to come down. Another source of this difference is that the fixed costs of central program administration are divided among a greater number of schools with REACH than with TCCS. Finally, TC provides TCCS with an operating subsidy that the principal uses to support core instructional costs, which is not a component of REACH.

<sup>6</sup> Note that this does not include the baseline costs of providing the basic instructional program incurred in any NYCDOE school, such as regular classroom teachers and school facilities during the school day (or what we refer to as “business as usual”), but rather focuses primarily on the supplemental and support services provided by TC, other parts of Columbia University, the school, and other community agencies that comprise the university partnership.



**Table 9. Distribution of Costs by Ingredients**

| <b>Ingredient Category</b> | <b>Cost</b>   |
|----------------------------|---|
| Personnel                  | <b>\$893,330</b>  |
|                            | OSCP Staff  |
|                            | \$174,820   |
|                            | TC Staff  |
|                            | \$11,060  |
|                            | Graduate Students   |
|                            | \$414,470   |
|                            | Site Level Staff (TCCS Liaison, Administration, Teachers) |
|                            | \$221,160   |
|                            | Community Staff   |
|                            | \$11,830  |
| Materials and Equipment    | <b>\$42,360</b>   |
| Facilities                 | <b>\$37,490</b>   |
| Other Services             | <b>\$89,950</b>   |
|                            | Contracts/Services  |
|                            | \$88,450  |
|                            | Staff Retreat   |
|                            | \$1,500   |
| <b>Total</b>               | <b>\$1,063,130</b>  |

Table 9 shows the distribution of costs by ingredient type. Personnel represents the largest cost category (approximately \$893,000, or 84% of the total), followed by the “other services” category which includes services for PD in reading and writing, educational consultants, and some administrative fees (approximately \$90,000, or 8%), materials (approximately \$42,000, or 4%), and facilities (approximately \$37,000, or 4%). One notable finding in the cost composition of the TCCS model is a greater share of services are directly provided by TC and CU graduate students (45%) rather than via contracts with community partners or consultants (8%) as compared to the REACH model. REACH provides services related to enrichment activities and instructional support mainly through contracts with CBOs and consultants (on average 43% of total costs) with the assistance of TC or CU graduate student workers (13%).

There are multiple factors leading the personnel category to be the largest. In addition to the aforementioned larger role of graduate student workers, other university resources—TC faculty and doctoral student experts such as Zankel Fellows, Milman/Burger Literacy Fellows, and instructors for music, math and science—also have greater involvement under the TCCS model. For instance, collaboration between TC doctoral students with expertise in mathematics education and the school staff in developing a new math curriculum and PD plans for the 2015-2016 school year entailed regular planning and frequent communications. Site staff such as the Principal and the Assistant Principal were also involved in general coordination and communication activities with the OSCP and other TC personnel.

The most substantial contractual service is provided by the TCWRP. This category also includes education service providers—mostly Harlem-based, non-profit CBOs—specialized in areas such as fitness and sports, and math and science. TC provides an annual financial allocation to support the school’s activities, which may vary slightly from year to year based on school needs and available TC resources. Based on a review of the data, approximately \$150,000 of this allocation supports university-community-school partnership activities relevant to this study. We allocate these funds to specific ingredients, including contractual services such as these.

Major materials and equipment include books purchased for the TCCS library and musical instruments for the orchestra and guitar club, resources unique to TCCS. In terms of facilities, space used for “TC Clubs” -- activities related to visual arts, music, STEM programs, and health and wellness—was the main cost. On average, the absolute amount of the facilities category and its share in the total costs are similar between the TCCS and REACH models.

**Table 10. Distribution of Costs by Domain**

| Leadership | T&L       | Health   | ELO       | Family   | Total       |
|------------|-----------|----------|-----------|----------|-------------|
| \$74,360   | \$355,860 | \$60,930 | \$511,060 | \$60,930 | \$1,063,130 |

While the TCCS model does not directly follow the REACH domains, we provide a similar breakdown of costs according to the five REACH domains in Table 10 for comparison. Among the five program domains, Expanded Learning Opportunities (ELO) incurred the largest costs (approximately 48%), followed by Teaching & Learning (T&L; approximately 33%), Leadership (approximately 7%), Health and Mental Health (approximately 6%) and Family (approximately 6%). These compositions of the costs are similar for the TCCS model and the REACH model in that ELO makes up the largest domain. Much of the ELO costs for TCCS come from graduate student workers' and other TC personnel time, spaces used for activities taught by these graduate student workers, and contracted services. The cost of T&L in TCCS appears to be slightly larger than those of REACH. T&L costs for TCCS included some types of support that REACH schools did not have, such as TC doctoral student or faculty experts in certain subject areas. TCCS also had more Literacy Fellows involved in curriculum development and teaching than any one REACH school.

**Table 11. Distribution of Costs by Perspective**

| Cost to School | Cost to TC | Total Cost  |
|----------------|------------|-------------|
| \$116,110      | \$947,020  | \$1,063,130 |

Table 11 shows that from the perspective of financing these costs, TC appears to be paying most of the costs (approximately \$947,000 or 89%) with smaller contributions by the school (approximately \$116,000 or 11%). In other words, of the per student cost of \$3,890, the cost to TC is approximately \$3,340 whereas the cost to school is about \$430. This allocation is similar to that of REACH. The only costs that the school bears are staff time and spaces for TC-supported activities. More specifically, these are: teacher time attending PD sessions and planning of TC-supported activities; principal and assistant principal time spent on communicating with the TCCS Coordinator, planning and coaching with the OSCP AVP, and attending and preparing for meetings related to technical support by TC; office space for the TCCS Coordinator; and classrooms and other school facilities used for school-day and afterschool programs supported by TC. All other costs are borne by TC. Overall, this shows that partnering with universities can be a low-cost option for schools, in that this model only requires schools to contribute approximately 10% of the resources to support the partnership.

**Table 12. Distribution of Costs by Funding**

|      | Expenditure | In-kind   | Total Cost  |
|------|-------------|-----------|-------------|
| TCCS | \$921,030   | \$142,100 | \$1,063,130 |

Table 12 shows that most of the TCCS costs (87%) are financed via goods and services that must be purchased on the market, labeled "Expenditure." Resources provided as in-kind contributions or reallocated from other purposes include: site-level staff time of the principal, assistant principal and teachers; time that science graduate student volunteers devote to TCCS; and spaces at school used for TC-supported daytime and afterschool programs. While all of the costs borne by the school are "In-Kind," most of the costs borne by TC are financed as cash payment.

## ■ ■ DISCUSSION

### ■ Variability in Cost

The costs of REACH represent a significant investment of resources to provide the wide range of services that the program offers across its five domains. The pooled average cost per student of REACH, \$1,560 in 2017 dollars, represents approximately 8% of the annual per student spending in New York City public schools of \$18,260 as of 2012, adjusted for inflation to \$20,122 in 2017 dollars.<sup>7</sup> For context, it is of a similar magnitude to the average across New York City of \$1,790 currently spent on leadership support services, and approximately half of the average of \$3,015 spent on instructional support services. To interpret the magnitude of these costs, it is also helpful to consider the scope of the services REACH provides and the needs of the schools it serves. One point of comparison is the 21<sup>st</sup> Century Community Learning Centers grant from the United States Department of Education, which in part supports the work of the program to mobilize community resources for academic enrichment, supplemental support services, and family engagement. That program has a cap of \$1,600 per student, suggesting the breadth of services it supports.

The costs of REACH should also be considered in light of the resource constraints the schools it serves face. The New York City Department of Education reports that the State of New York is funding New York City schools at \$2 billion lower than the legally mandated level set by the Campaign for Fiscal Equity case, and the city is only able to fund approximately 87% of their own baseline estimate of needed amounts under the Fair Student Funding formula on average.<sup>8</sup> The level of funding at School A, School E, and P.S. 36 is close to this average, although P.S. 154 and School D are funded by the city at somewhat higher rates. Therefore, in addition to supporting students and families through enrichment and supplemental services, REACH is also helping to fulfill the basic resource needs of the school by connecting it to university and community supports.

Although the sample of five school sites is small, analyzing variability in costs across sites, across domains, and across categories of ingredient can help identify differences in program implementation, resource allocation, and potential for future efficiency gains or economies of scale. While core personnel divide their time roughly evenly across schools, the schools vary substantially in terms of the time devoted to REACH by school staff, the facilities used by REACH, the number and hours of work of graduate student workers, and the level of contractual services. It should be noted that materials costs appear quite low for all schools, but this is in part because many of the instructional materials employed by REACH, such as enrichment and tutoring materials used in ELO activities, are embedded in contractual services and thus included in the breakdown of ingredients by category under “contracts.” Note that if an overall contractual service entails the use of materials, among other ingredients, we include the entire cost of the service under the “Contracts” category; if a contract is exclusively for materials, then those ingredients are counted under the “Materials” category.

Scale is one key driver of costs, particularly as many of the costs of REACH are relatively fixed across a school, including the core REACH staff, principal time, and OSCP support. Therefore, schools with higher student enrollment will have a lower per student cost as long as most costs remain fixed. For instance, P.S. 36 has the highest overall costs at \$747,290, but also has the highest student enrollment, and thus has per student costs very close to the program-wide average. Questions of scale can also inform differences in the average per student cost and the marginal cost of serving one additional student. Given that most of the costs are fixed at the school level, at least within relatively wide margins

<sup>7</sup> <https://www.newyorkfed.org/data-and-statistics/data-visualization/nyc-school-spending#interactive/table>

<sup>8</sup> [http://schools.nyc.gov/offices/d\\_chanc\\_oper/budget/dbor/DFPM\\_Home\\_Page/cec\\_fsf\\_deck.pdf](http://schools.nyc.gov/offices/d_chanc_oper/budget/dbor/DFPM_Home_Page/cec_fsf_deck.pdf)

(e.g., additional teacher professional development would not likely be needed unless enrollment increased by 50-100 students), the extra or marginal cost of providing one additional student with REACH services is likely very low. We do not have a precise estimate of the marginal cost, as much of the variable costs that are incurred for each student are in the \$1,296,460 of contractual services. We have not interviewed contract service providers to determine which services have excess capacity and can absorb additional students at minimal cost. Nonetheless, at current scale the marginal cost of the program is no more than \$740 per student, and is likely much lower.

## ■ Incremental Costs vs. Business-as-Usual

From a social perspective, an important question is the share of REACH costs that are above and beyond what would have been incurred even in the absence of the program. Keep in mind that some of the REACH services may substitute for those that schools provided before REACH was initiated. From the perspective of the program sponsor, Teachers College, all of the central costs of operating REACH – OSCP and REACH staff, graduate student assistants, contracts, TC facilities, and materials and equipment – are incremental in that in the absence of a program like REACH, the sponsoring university would not be incurring any share of the costs of school support. However, from society’s perspective, whereby a school partnering with REACH may do so instead of partnering with another school support organization or CBO, the question of how the total cost of a program like REACH compares to alternative scenarios, regardless of who bears the costs, is critical and more difficult to answer. Moreover, if further research on REACH extends to a cost-effectiveness analysis, it is critical that the costs are measured similarly to the effects. If the effects are measured relative to some baseline comparison group, the costs should be, as well. Finally, in replicating or expanding the program, if a school is deciding whether or not to partner with REACH, the question of what additional time and effort is required for the partnership is essential to consider, as well.

For the present analysis, we divide REACH costs into three categories when considering what is incremental, or beyond the costs a school would have incurred even in the absence of REACH. First, all REACH central costs, including program and OSCP staff, are assumed to be incremental. In prior years, this may have been a stronger assumption to make, as schools had flexibility to select community partner organizations such as New Visions for Public Schools or NYCDOE-sponsored networks to provide a range of leadership and curricular support services similar to those provided by REACH. Under the present administration, however, community school district superintendents have greater authority over, and responsibility to support the schools. Therefore, when a school partners with REACH, whatever other supports it is receiving from the district and other partner organizations is likely to remain in place. Thus, REACH supplements, rather than supplants, any existing services.

We make a similar assumption about contractual services. The principal we interviewed highlighted that one of the key benefits of REACH was bringing additional resources and opportunities into the school from community agencies outside the school. Bringing additional community resources into the school, particularly in light of the funding gaps from state and city sources mentioned above, has become an increasingly important part of the program’s theory of action. The REACH program cannot provide all of the services required by its theory of action and under its five domains exclusively with resources at Teachers College and Columbia University, and an important part of the program’s theory of action is to help schools leverage enduring resources in the community such as the Harlem Dowling program. Since REACH can directly provide services via the university, as well as provide resources to connect schools with community resources given funding gaps, these resources are considered incremental to business as usual.

Finally, from the school’s perspective, the time devoted to activities such as leadership coaching, data analysis, and professional development by principals and teachers likely represents to some degree the time that would have been

devoted to those activities anyway. Therefore, our baseline model attributes time that principals and CSDs report that principals spend actively managing REACH activities to REACH, as well as the time spent in leadership coaching based upon the hours of leadership coaching reported by the Senior Instructional Specialist. For teachers, we attribute time spent recruiting students for ELO and other activities based upon CSD interviews, in addition to their reported PD hours in the areas of pedagogy workshops, data workshops, and secondary science and math coaching, to REACH. We attribute the cost of REACH-provided PD for teachers to the program because of the nature of the PD provided, by which the Senior and Junior Instructional Specialists work closely with selected lead teachers in specific identified areas of need. Due to its specific focus, this PD is likely to be supplemental to training teachers are otherwise receiving. In the next section, we describe sensitivity analyses in which we vary each of these assumptions to determine if they substantially alter the costs or distribution of who bears the costs across constituencies.

Overall, data limitations, particularly on the counterfactual condition of what would have happened in these schools if they were not partners with REACH, required us to make rather strong assumptions about what costs are incremental to business as usual. Therefore, a key area for further research is more information about business-as-usual, or the types of partnerships, external school and student support, and community-based programming that comparison schools receive. Business as usual costs also include ways a program such as REACH interacts with the general costs of operating schools, including the types of leadership support, teacher professional development, and student and family support services that schools receive under the domains of REACH that comparison schools might receive from other sources.

## ■ Uncertainty and Sensitivity Analysis

In cost analysis, it is important to examine sources of uncertainty in estimates and test the robustness of results to assumptions via sensitivity analysis. Cost analysis is more limited than other forms of economic evaluation, such as cost-effectiveness or benefit-cost analysis, in that it does not imply a decision rule. Therefore, we cannot test, for instance, whether changes would alter the efficiency ranking of programs according to cost-effectiveness, or the break-even point under which a program's benefits would no longer exceed its costs. Rather, we follow Boardman, Greenberg, Vining, and Weimer (2011) and perform a series of parameter variation tests, by which we select the assumptions about which we are most uncertain or which are most likely to significantly impact our results, and test a range of plausible values. We then combine these sensitivity tests into "best case" (lowest cost) and "worst case" (highest cost) scenarios to estimate upper and lower bounds on the costs.

- **Professional Development for principals and teachers** – As noted above, in our baseline estimates we include coaching hours for principals as well as PD and coaching hours for teachers. We place bounds on these estimates by subtracting the \$35,220 cost to schools for teacher time for PD and 103 hours of principal coaching time (as was reported in the 2015-2016 implementation report), for a lower bound of \$2,697,740.
- **Parent volunteer time** – In our baseline estimates, we only include a small amount of time for one parent volunteer at one school, as was reported by the Community School Director. However, parents also attend a wide range of activities under the Family and Community Engagement domain. We exclude this time as a cost to the parents, as these are activities intended to serve them, but for replication purposes parental participants are required to give of their time (which has value as an opportunity cost) to engage in these activities. Therefore, as a sensitivity analysis we add in the value of 4,380 hours of parental time (assuming each FCE activity attracts about 20 parents and lasts about 90 minutes) valued at the national median wage of \$21 per hour. This creates an upper bound estimate of \$2,824,940.
- **Fringe benefits for graduate student assistants** – In our baseline estimates, we include fringe benefits of 35.1% of wages for all workers (note that we do not include fringe benefits on stipends for Zankel and Milman Fellows,

following the accounting convention used by the college). In doing so we follow the accounting convention used by the sponsor agency Teachers College under which all offices are “charged” for fringe benefits for all workers, regardless of whether they are full-time or part-time and whether those benefits are actually received. The other rationale for this assumption in our baseline estimates is that in the absence of available graduate student workers, much of the work would be performed by employees on the regular labor market who would need to be paid fringe benefits. However, if the program were to be replicated elsewhere, as part-time employees graduate students may not receive fringe benefits. Therefore, in a sensitivity analysis we “deduct” fringe benefits for all graduate student workers and obtain an estimate of \$2,706,180.

- **Best/worst overall** – Combining these parameter variation estimates, we can obtain a lowest-cost (no principal or teacher PD, no parent volunteer time, and no graduate student fringe benefits) and highest-cost (both principal and teacher PD time, parent volunteer time, and fringe benefits) estimate of the program. This range is \$2,670,960 to \$2,824,940. This range is from \$62,000 (2.3%) less than our baseline estimate to \$26,780 (1%) more, which is narrow enough to suggest that the baseline estimate is reasonably robust to assumptions.
- **Distribution of administrative overhead across sites** – Our baseline estimates divide back-end support from OSCP among four schools that are actively participating in REACH, only attributing the direct costs of graduate student workers and contracts under the ELO domain to the fifth school that is phasing out the program. However, to highlight the importance of accounting for all costs, including potential hidden costs, we perform a sensitivity analysis whereby we assign 5% of the administrative overhead costs of REACH incurred by OSCP to School E and divide the remaining 95% among the other four sites. This analysis raises the cost per student at School E to \$1000, and lowers the respective cost per student at the other four sites by approximately \$10 per site, to \$1310 at School A, \$1740 at P.S. 36, \$1640 at P.S. 154, and \$2090 at School D.

## ■ National Prices

Our main estimates largely employ prices that are unique to the program, particularly in the area of personnel and contracts. We use actual salary data for REACH and OSCP staff and graduate student assistants, actual principal and school-level average teacher salaries and fringe benefits for New York City Department of Education personnel, and actual contractual amounts as proxies for the market value of the services provided by those personnel and contracts. We do use national price estimates for facilities and materials, which constitute a very small share of the costs of the program. This analytic choice was made because the primary perspective of interest is that of the program sponsor, and thus an attempt was made to estimate costs as closely to those used in this implementation as possible. However, for replication in other settings and comparison to other programs, it is useful to estimate the costs using national average prices so as to be able to attribute differences in costs to differences in real resource utilization, as opposed to local markets and prices.

A major challenge in using national prices is matching a suitable price to each ingredient based upon the roles, responsibilities, qualifications, and characteristics of that ingredient, especially when exact title matches do not exist in large national surveys. We used CBCSE’s Database of Educational Resource prices in its *CostOut* tool, drawing primarily from the National Compensation Survey of the Bureau of Labor Statistics, as well as the College and University Professional Association for Human Resources, to match each REACH personnel ingredient with a corresponding national average price based upon the position description and qualifications with regard to education, experience, and training. A full list of ingredients, corresponding national prices, and their sources is in the Technical Appendix.

With a program such as REACH, which employs a large share of graduate students as employees, a challenge is determining the appropriate market value of the services they provide. On the one hand, graduate student workers generally accept below-market wages in exchange for the training and experience they gain from student employment. Further, one of the aims of a university partnership such as REACH is to provide opportunities for students, faculty, and others at a university to contribute to their surrounding communities as volunteers or as paid or unpaid interns, benefiting themselves both by the work and research experience this can provide as well as fulfilling altruistic motivations. On the other hand, estimating the full economic cost of the program for replication purposes requires estimating the market value of the services provided, even if the actual students and volunteers providing the services are doing so at lower rates. Therefore, we matched graduate student workers to administrative assistant, teacher, and teaching assistant salaries, depending upon the nature of the services they provided.

Table 13 shows the costs of REACH by school and ingredient using national average prices. In addition to adjusting personnel prices as noted above, we apply a regional price adjustment of 0.859 to the contract prices to reflect the prices of New York City relative to the national average, according to Regional Price Parities. For some ingredients, in particular the graduate student assistants, the national prices were higher than local prices, whereas for several others, they were lower. On balance, the personnel costs are higher but the contractual costs are sufficiently lower so that the estimate is very similar to the local one, at \$2,791,310.

**Table 13. REACH Cost Estimates by Ingredient, National Average Prices**

|                                | School A         | School B         | School C         | School D         | School E         | Total              |
|--------------------------------|------------------|------------------|------------------|------------------|------------------|--------------------|
| <i>Personnel</i>               |                  |                  |                  |                  |                  |                    |
| OSCP Staff                     | \$23,530         | \$23,530         | \$23,530         | \$23,530         | \$0.00           | <b>\$94,130</b>    |
| REACH Team                     | \$142,370        | \$142,370        | \$142,370        | \$142,370        | \$0.00           | <b>\$569,460</b>   |
| Graduate Student Workers       | \$85,790         | \$130,820        | \$124,630        | \$78,000         | \$24,570         | <b>\$443,820</b>   |
| Site Level                     | \$106,010        | \$51,150         | \$118,460        | \$139,850        | \$0.00           | <b>\$415,460</b>   |
| <i>Materials and Equipment</i> |                  |                  |                  |                  |                  |                    |
| Contracts                      | \$660            | \$670            | \$670            | \$640            | \$0.00           | <b>\$2,640</b>     |
| Facilities                     | \$152,920        | \$375,900        | \$134,740        | \$222,380        | \$253,550        | <b>\$1,139,500</b> |
| Other                          | \$23,470         | \$15,060         | \$29,270         | \$52,940         | \$0.00           | <b>\$120,730</b>   |
|                                | \$2,790          | \$0.00           | \$0.00           | \$2,790          | \$0.00           | <b>\$5,580</b>     |
| <b>Total</b>                   | <b>\$537,530</b> | <b>\$739,490</b> | <b>\$573,660</b> | <b>\$662,500</b> | <b>\$278,120</b> | <b>\$2,791,310</b> |

## ■ ■ CONCLUSION

### ■ Summary of Results

Overall, these results suggest that the costs of REACH are substantial, at \$2.7 million per year to serve 1,757 students across five schools, or \$1,560 per pupil. These costs represent significant commitment and investment of resources by Teachers College, Columbia University, other partner organizations, and schools. Determining whether these costs are “worth it” in economic terms is beyond the scope of this study and requires evaluation of program impacts, alternative uses of resources, and the estimated value of program impacts. However, it should be noted that the REACH program and its five domains, incorporating a wide range of ingredients provided by multiple stakeholders, is quite

comprehensive and seeks to provide supports that address a wide range of school and student needs. These include school leadership and overall climate, student behavioral and socio-emotional learning outcomes, physical and mental health, enrichment services in music, art, and athletics, and parental engagement including workshops to directly serve parents, in addition to the emphasis on student learning, as measured by test scores, under the Leadership and T&L domains. In any event, the scope of these costs should be considered with respect to the resource needs of the schools. The NYCDOE reports that three of the REACH schools are funded at 87-88% of estimated needs under the DOE's own Fair Student Funding formula, and university and community resources provided under the auspices of REACH in part address these funding gaps by connecting them with additional resources and supports to help meet student needs. Excluding site-level costs to the school that are already covered by their budgets, the incremental costs of REACH represent between 13 and 24% of each school's budget, suggesting that REACH is utilizing university resources to address this funding gap.

These costs do vary quite a bit by school, category of ingredient, domain of REACH, and distribution of who pays. Most notably, contractual services, primarily in the ELO domain, comprise nearly half of the overall costs of REACH. It should also be noted that only about 6% of the costs of REACH are borne by the school. If one of the aims of the program is to share university resources with high-needs schools that require more resources to more fully realize their missions, then the REACH program represents tremendous value from the school perspective.

## ■ Limitations and Next Steps

While this study represents a thorough and comprehensive study of the resources required to implement the REACH program, and the results of the study are robust to assumptions according to sensitivity analyses, including the use of national average prices, we were not able to address all possible questions about the costs of REACH. Several possible limitations of this study contextualize the findings and raise important questions for further research.

Specifically:

- **What share of the costs of REACH are incremental to business as usual?** As noted above, we were able to partially address this question in our data collection efforts in REACH schools, and tested several of our assumptions about the share of school resources that are incremental in sensitivity analysis. However, since our sample did not include schools that did not partner with REACH, we cannot say with certainty that all of the core and contractual REACH costs are incremental to business as usual without knowing what support services schools would receive in the absence of REACH. Therefore, further study on the counterfactual condition is necessary, particularly if a cost-effectiveness or benefit-cost study is to be done.
- **What share of costs are fixed vs. variable? How do marginal costs compare to average cost per student?** As noted above, it is very likely that the marginal cost of serving one additional student with core REACH services, particularly under the Leadership and Teaching and Learning domains, is very close to zero, as many of those costs are relatively fixed across a wide range of enrollments. However, since we did not interview contractual service providers, we do not know much about their cost structures and how fixed costs compare to variable costs, and average costs compare to marginal costs.
- **What drives the cost of REACH, and are there opportunities for efficiency gains, for instance, through expansion and economies of scale?** Because we only observe REACH at one particular scale (with five schools and about 1700 students), there is little we can say about how costs and cost per student would change at different levels of enrollment. If the program were able to, for instance, expand to serve more schools in the neighborhood without significant expansion of central staff, the fixed costs of the program per student would decline dramatically.

However, that could come at some loss of program intensity, dosage, and fidelity of implementation, so should be approached with caution.

- **What are the effects of REACH on student learning and other desired outcomes? How do the costs of REACH compare to the effects, and how does this compare to other, similar programs?** In its pure economic definition, a cost is the value of the resources required to produce or achieve some unit of output or effectiveness. We have emphasized the costs required to achieve the goals of REACH's theory of action, but in order to fully understand those costs, they must be paired with measures of the ultimate objectives of the program. These are diverse, and should not be limited to student achievement outcomes, given the comprehensive nature of the program. This can help ascertain the relative value of what is obtained for the costs, how that compares with the costs of the program, and how that ratio compares with alternative educational investments (Levin, McEwan, Belfield, Bowden & Shand, 2017). A proposed impact evaluation would assess the program's effects on a range of student outcomes, including test scores, attendance, graduate rates, disciplinary actions, credit accumulation, enrollment in rigorous college preparatory and college level courses, health indicators, school climate indicators, and social-emotional learning metrics. A causal design utilizing a comparative interrupted time series method, which measures a change in pre-post trajectory between a group exposed to a treatment such as REACH and a comparison group constructed via propensity score matching, can estimate the changes in these outcomes attributable to REACH (Kim, 2015).
- **What can analysis of the costs of REACH teach us about the characteristics of successful school-university-community partnerships and the resources required to sustain them?** The intent of this report is not to compare REACH or TCCS with any other model of school-university and/or school-community partnership; rather, careful investigation of the ingredients necessary from universities, the surrounding community, and the schools themselves that are required to sustain a successful partnership can be informative to the design and implementation of partnership programs more generally.

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## ■ ■ TECHNICAL APPENDIX

### ■ Description of Ingredients

This study used the ingredients method to estimate the costs of providing the REACH program for one year. The first step in the ingredients method is to identify all ingredients utilized to implement a program and to qualitatively describe each of them and determine quantity. All personnel, materials, equipment, facilities, training, transportation, food or any other services or goods required for replicating the program are considered as ingredients regardless of who paid for or contributed them. Then in the second step of the ingredients method, each ingredient is assigned prices based on market values. Finally, the third step of the ingredients method estimates the total cost of the program and the cost per student based on the quantities and the prices of the ingredients. Distribution of costs such as costs for each program sites, costs borne by schools or by the central program office is also analyzed. This section of the Technical Appendix describes key ingredients included in the REACH cost analysis and assumptions made to estimate the quantity and price of these ingredients.

#### Personnel

##### *REACH Administrators*

The time spent by REACH central program office staff and key staff members of the Office of School and Community Partnership (OSCP) at Teachers College (TC), to the extent that they work on REACH implementation, were included as ingredients. For REACH staff at the central program office, 100% of their staff time is accounted as costs while the time of OSCP staff members are weighted based on how much each personnel devotes their time for REACH (information obtained through email correspondence). The costs are equally divided across the four REACH school sites (i.e., 25% each) that fully implemented the REACH model (i.e., School A, School B, School C and School D).

The **REACH Director** is responsible for overall planning and coordination, including fundraising and advocacy for the program through state and local policy and research networks. The Director also provides principal coaching, and supports school work-plan development and other activities. For the national price analysis, this position was matched with a market price of \$117,567, which is the mean annual salary for a postsecondary education administrator, based on similar experience and qualifications to that position. The Director is a full-time employee of the TC. Based on email correspondence with the Director, we assumed that the Director's time is equally divided across the five domains.

The **Senior Instructional Specialist** is primarily responsible for the overall implementation of the Teaching and Learning (T&L) domain and some of the Leadership domain working closely with the Director, school principals and teachers. This specialist is responsible for the design, implementation, and monitoring of teacher PD through REACH, and supports principals with the development of their school-based PD programs. For the national price analysis, this position was matched with a market price of \$95,390, which is the mean annual salary for an elementary or secondary school administrator, again based on similar experience and qualifications. In collaboration with the Senior Instructional Specialist, the **Junior Instructional Specialist** provides on-site coaching and the monthly professional development sessions at TC. For the national price analysis, this position was matched with a market price of \$89,516, which is the mean annual salary for a Subject Area Supervisor. Both the Senior and Junior Instructional Specialists are full-time employees of TC. Based on communication with the REACH team, we assumed that the Senior Instructional Specialist works equally on Leadership and T&L domains, and Junior Instructional Specialists works only on the T&L domain.

The **Expanded Learning Opportunities (ELO) Associate** manages the day time and after school enrichment programs held at each school site and provide overall oversight and training to graduate student workers. For the national price analysis, this position was matched with a market price of \$62,500, which is the mean annual salary for an Instructional Coordinator. The ELO Associate is a full-time employee of TC. Based on communication with the REACH team, all of the ELO Associate's time is accounted for by the ELO domain.

The **Family Engagement Coordinator** assists the development and implementation of various family workshops and activities at each school sites working closely with other REACH staff. For the national price analysis, this position was matched with a market price of \$48,534, which is the mean annual salary for an Event Coordinator. The Family Engagement Coordinator works up to 25 hours a week for 32 weeks a year and all of the time is accounted for by the Family domain.

The **Associate Vice President (AVP)** of the OSCP provides overall oversight, conducts evaluation and carry out fundraising activities for REACH. For the national price analysis, this position was matched with a market price of \$199,393, which is the mean annual salary for a Vice President of a research university. Based on communication with the OSCP staff, we assumed that 7.5% of the AVP's time (i.e., average of 5-10%) is spent for REACH and that the cost is distributed equally among all domains and REACH schools.

The **Assistant Director** of the OSCP supports REACH implementation by fiscal, contract and human resources management and oversight of procurement and payment reporting. For the national price analysis, this position was matched with a market price of \$69,681, which is the mean annual salary for a Social and Community Services Manager. Based on communication with the OSCP staff, we assumed that the Assistant Director spends 47.5% (i.e., average of 45-50%) of the time for REACH and works on all domains with equal weights.

The **Program Assistant** of the OSCP is involved in REACH implementation by supporting fiscal management and staff on-boarding, managing purchases and payments, serving as the focal point for individual consultants, and providing event planning, logistics, and other administrative support. For the national price analysis, this position was matched with a market price of \$36,632, which is the mean annual salary for an administrative assistant. The Program Assistant is a full-time employee of TC. Based on communication with the OSCP staff, we assumed that the Program Assistant uses 45% of the time for REACH, which is equally divided among the five domains.

### *Community School Directors*

The **Community School Directors (CSDs)** are based at their school sites and play an integral part in coordinating activities mainly under ELO domains, as well as other domains. There are currently three CSDs (i.e., School A, School C and School D) whose responsibilities vary because of the varying needs of the schools they are based at and grants they are funded by. The CSDs work closely with the Principal and Assistant Principal(s) with frequent check-ins or communications. For the national price analysis, this position was matched with a market price of \$63,649 and \$86,744 for different schools, based upon different roles and qualifications, which is the mean annual salary for a counselor and an assistant principal, respectively. The CSD is a full-time employee of TC, and 100% of their time is accounted as costs for REACH.

### *School Staff*

At school sites, **Principals, Assistant Principals,** and **classroom teachers** were involved in REACH implementation. The Principals' time spent for REACH consists of: (i) time spent for coaching and work-plan development, and (ii)

time spent for communicating with CSDs about planning and implementation of REACH activities. Of these two, we consider that only the latter one is “incremental” as the former happens at non-REACH schools, as well. Based on interviews with CSDs, we also assumed that the interaction between the Principals and CSDs happens daily while schools are in session (9 months), each time for 30 minutes. This was about 5.8% of the Principal’s time assuming a 2080 hour calendar working year. For the national price analysis, we assume that the Principal’s salary is approximately \$90,737, and the benefits ratio is 46.63% of the salary. For the Assistant Principals, we made an assumption that interaction between Assistant Principals and CSDs are similar to that of Principals and CSDs. For the national price analysis, the Assistant Principals are matched with the salary of \$86,744, with benefits of 46.63% of the salary. For teachers, their time attending REACH Professional Development (PD) sessions and on-site coaching are considered as incremental costs. For elementary school teachers, REACH held monthly 5-and-a-half-hour PD sessions (6 times a year). For secondary schools, REACH offered four science coaching sessions and another four mathematics coaching sessions during the Spring, each session lasting for an hour. Based on the actual PD attendance information that we obtained from program record, we estimated the total PD hour for each school. We use a national average teacher salary of \$61,241 for an academic year, with a fringe benefits rate of 47.63%.

### *Graduate Student Assistants*

Activities under the ELO domains include various enrichment programs such as art, music, literacy, mathematics and science during and after school. The instructors, assistants and tutors of these programs are [graduate student assistants](#) of TC. For School Year 2016-2017, REACH employed 12 Zankel Fellows, 3 Millman Fellows, 11 Work Study students, 2 part-time workers, and 5 summer bridge instructors and assistants. Zankel Fellows work 10 hours a week during the academic year and receive a fixed stipend of \$13,510 a year, accounting for fringe benefit charges that are averaged across Teacehrs College. Millman Fellows receive the yearly stipend of \$13,510 and 6 tuition points. For the national price analysis, we carefully reviewed each student’s roles and responsibilities and matched each of them with salaries for an administrative assistant, teacher assistant or training teacher.

### *Materials & Equipment*

The materials and equipment used for REACH implementation at the central program office level and school sites include computers, tablets and printers. For the materials used for OSCP personnel, we used the same weights applied to estimate the staff time. The prices of these ingredients were drawn from the CostOut database and amortized over a life expectancy of 3 years with the discount rate of 3.5%.

### *Facilities*

The implementation of REACH involves using facilities such as office space at TC, classrooms at TC, spaces at schools such as classrooms, gym, library and cafeteria.

Based upon correspondence with the OSCP Assistant Director, we assumed the REACH Director’s office space of approximately 80 sq. ft., the Senior and Junior Instructional Specialists’ office of approximately 360 sq. ft., the ELO Associate’s office of approximately 80 sq. ft., Family and Community Engagement Coordinator’s office of approximately 42 sq. ft., and a shared office space for CSDs at TC of approximately 140 sq. ft. We also made assumptions that OSCP AVP’s office is about twice the size of REACH Director, that the OSCP Assistant Director’s office is about the same as

REACH director, and the Program assistant's office space is about half the size of the REACH director's office. For the office spaces used by the OSCP personnel, we applied the same weights as the staff time to the use of the offices. The price for each square foot was annualized for 30 years with the discount rate of 3.5%.

Elementary PD and Data Workshop sessions for teachers are held at TC classrooms. We assume a graduate school classroom of about 900 sq. ft. used for 2080 hours per year and estimate the proportion of time the classroom is used for PD to estimate the quantity. The price per square feet are annualized for 30 years with the discount rate of 3.5%. Science and Mathematics Coaching for secondary school teachers are held at each school, and a school classroom is assumed to be 900 sq. ft. in size and used for 2080 hours a year.

For ELO activities and Family and Community Engagement activities, classrooms, gyms, libraries or cafeteria at schools are used.

The CSDs had a small office space at each school site with varying size. These spaces were used throughout the School Year for CSDs to perform general administrative and coordination tasks, and for meeting with graduate student workers. Assumptions made for pricing and annualization were similar to the classrooms and other school spaces.

### *Other Inputs*

The implementation of the REACH program at the school sites also involved training activities such as school retreat and contracted activities under the ELO domain. The school retreat is held during the summer each year and attended by the Principals, Assistant Principals and other members of the leadership team to conduct a review of data from the previous school year and brainstorm school needs and goals for the upcoming school year. Contracted activities range from sports, visual arts or science and mathematics classes/clubs to summer bridge instructors and tutors. According to the list of contracts provided by the OSCP office, the number of contracts for each school ranged from approximately 15 to 40.

## ■ Data Sources

The ingredients method requires ascertaining of the quantities of ingredients used and their associated qualities, qualifications, and other factors that might affect the price of each ingredient, from multiple sources, often qualitative in nature. Table A.1 summarizes the data sources for ingredients measured in this report, and the information that was obtained from each source.

**Table A.1. Summary of Data Sources**

| Data source  | Information contained  |
|--|--|
| <i>Documents</i>   |  |
| Implementation Evaluation Report   | <ul style="list-style-type: none"> <li>• Detailed description of REACH program implementation for the 2015-2016 School Year</li> <li>• Types and qualifications of human resources</li> <li>• Types of activities that graduate students contribute to</li> <li>• Types of training and professional development activities that REACH offers to partnering schools</li> </ul> |
| PD session attendance record   | <ul style="list-style-type: none"> <li>• Dates, number of hours for PD sessions held for School Year 2016-2017</li> <li>• Attendance of invited teachers for each session</li> <li>• Cumulative attendance hours by school</li> </ul>  |
| List of contractors  | <ul style="list-style-type: none"> <li>• Name and description of contractors</li> <li>• Schools for which the contractors work</li> <li>• Contract values for each contractor</li> <li>• Sources of funding and distribution (percentage) for each contract</li> </ul>   |
| List of graduate student workers   | <ul style="list-style-type: none"> <li>• Name and description of all graduate student worker positions for School Year 2016-2017</li> <li>• Description of the position and the type of position (e.g., Zankel Fellow, Millman Fellow, Work Study, etc.)</li> <li>• Schools for which each student worker works</li> <li>• Hours worked and hourly or yearly rate</li> </ul>   |
| REACH and OSCP staff salary  | <ul style="list-style-type: none"> <li>• Yearly salary of REACH and OSCP staff members</li> </ul>  |
| School workplans   | <ul style="list-style-type: none"> <li>• Targets for the type and quantity of services to be delivered by REACH for the School Year</li> <li>• Personnel that are involved in implementing these services</li> </ul>   |
| <i>Interviews/email communication</i>  |  |
| REACH program staff  | <ul style="list-style-type: none"> <li>• Rough estimates of how each of REACH program staff distribute their time across different domains</li> <li>• Activities at each school site under the Family and Community Engagement domain and the frequencies of each activity</li> </ul>  |
| OSCP staff   | <ul style="list-style-type: none"> <li>• Estimates of how much weight the Associate Vice President (AVP), the Assistant Director (AD) and the Program Assistant (PA) of OSCP puts for supporting REACH implementation</li> <li>• Description of roles and responsibilities performed by the AVP, the AD, and the PA related to REACH implementation</li> </ul>                 |
| CSDs (School A, School C, School D); Assistant to CSD (School B); and Principal (School C) | <ul style="list-style-type: none"> <li>• Description of the type and quantity of personnel, materials and equipment, facilities, training and other resources involved in implementation of REACH program at each school site</li> </ul>   |

**■ Sources of National Prices**

All the prices in this study were adjusted to the year 2016 to achieve comparability and consistency across ingredients. In terms of pricing for personnel ingredients, several sources were used in order to find the best match of the ingredient to its true opportunity cost. Among the sources used, the Occupational Outlook Handbook of the Bureau of Labor Statistics includes information about employment, working conditions, training and education and earnings for hundreds of different occupations in the United States. In addition, the College and University Professional Association for Human Resources provide survey data with information on salary and benefits for higher education administrators,



professionals, faculty, and other staff. Finally, the National Education Association provides estimates of teacher pay across the country.

When pricing personnel ingredients, an important assumption used is the number of hours for a full-time job. This can vary significantly across professions. In this study teachers were assumed to have a full-time load of 1260 hours per year. All other personnel were assumed to have a full-time load of 2080 hours per year.

Opportunity costs for facilities were taken from College Planning and Management magazine, School Planning and Management magazine and the Reed Construction Data. Finally, for material and equipment ingredients, the prices were taken from national retailers such as Staples, Best Buy and Dell where resources used by the program, such as computers and printers, can be purchased.

## ■ Other Assumptions

Among the other assumptions used for the cost analysis we include the interest rate that was set to 3.5%. Facilities were amortized over 30 years, while some materials and equipment ingredients, such as computers and tablets, were amortized over 3 years. Another assumption that was maintained across the study was the assumption of the size and hours of use for facilities. Some facilities were assigned a fixed area, such as classrooms, which were assumed to have 900 square feet and gymnasiums, which were assumed to have 6200 square feet for all schools. Other facilities were assumed to vary in size according to enrollment. For example, cafeterias were assumed to have 11 square feet per student, while libraries were assumed to have a fixed 1000 feet squared plus and additional 3 feet squared per student. In addition, all facilities were assumed to be potentially used for 2080 hours per year.

Finally, parent volunteer time was not accounted for as a cost in the study in the main analysis. In the Family and Community Engagement domain of the program, several schools provided activities where parents were recipients of services, such as workshops. Because of this, we considered parents to be beneficiaries of the program rather than a resource needed for the implementation of the program. We did account for this time in a sensitivity analysis.

## ■ Interview Protocol for Principals/Community School Directors

We would like to consider what is required to make the program work from the school's perspective, regardless of whether there is any direct impact on your school's budget. Given that REACH is integrated into some of the core functions of the school, we'd like you to consider only the time and resources that are expended *over and above* what would have happened if the school did not partner with REACH (or, in other words, how things might have changed since your partnership with REACH). These resources might include changes in how the leadership team at your school spend time, any additional time required of teachers (or substitute teachers to release classroom teachers for REACH-related PD and other duties), and any space, materials, or equipment that REACH programming utilizes at your school.

### *Personnel*

- Compared with how you allocated your time before REACH, how much additional time are you spending on the five REACH domains and on any management or oversight of REACH activities at your school (hours per week or per month)?
- What about other members of your leadership team, such as Assistant Principals and any department chairs, other teacher leaders, mentors or coaches, etc.?

- What additional time is required of teachers to implement any aspects of the REACH program?
- Do you need to hire any substitute teachers to cover classes for teachers to attend meetings, professional development sessions, etc., for REACH?

### *Training*

- Do any aspects of REACH require you or any member of your staff to receive any special training beyond the PD provided by REACH? Could you describe this training?

### *Facilities*

- What spaces in the school are provided to implement REACH programs (particularly the Expanded Learning Opportunities programs)? Can you estimate approximately how much space (e.g., how many square feet, or how many average-sized classrooms or office spaces) are used and for how many hours or what percentage of time?
- What spaces and facilities does the Community School Director (CSD) at your school use for his or her work?

### *Materials/Equipment*

- Does the school provide any materials or equipment – e.g., computers, printers, phones, books, office/school supplies, etc. – to implement any REACH programming?

### *Other Resources*

- Do any REACH programs in your school make use of volunteers that the school enlists? If so, about how many volunteers are involved for how many hours?
- Does REACH entail any travel costs for your staff (e.g., to the annual retreat)? What are these costs (e.g., how many staff members, using what mode of transportation, for what distance/time/frequency)?



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