

**Contextualizing Project Exploration: 10-Year Retrospective Program Evaluation Report
Reflection Memo
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Introduction

This memo provides a contextual reflection on the work of Project Exploration over the past ten years. Drawing upon an evaluation study of the 10-year impact of the program, I draw connections to the relevant research findings that have emerged in education research.

The University of Chicago Urban Education Institute (UEI) is dedicated to creating knowledge to produce reliably excellent schooling for children growing up in urban America. To answer this question, UEI conducts rigorous research, trains outstanding teachers and leaders for urban schools, creates scalable tools and practices to improve student social and academic outcomes, designs and operates charter schools, and supports new schools across Chicago.

In this memo, I draw connections between the evaluation findings on Project Exploration and four bodies of work: 1) *From High School to the Future*, a set of studies that track the pathways of Chicago Public Schools' graduates into post-secondary pathways; 2) *Passing through Science*, a study that examines the effects of raising graduating requirements in science courses in Chicago Public Schools; 3) Research on social capital; and 4) Research on resiliency.

I begin with a brief description of Project Exploration and of the evaluation report and findings. In each of the sections that follow, I outline the findings of the four areas of educational research listed above, explore connections to the work and evaluation of Project Exploration, and provide recommendations for program improvement. I close with recommendations for research and evaluation going forward.

Project Exploration

Project Exploration (PE) is a nonprofit organization started in 1999 with the intent to create opportunities for students to engage in science learning. PE is geared especially toward engaging students traditionally underrepresented in science professions. Each year, PE youth-development programs engage more than 300 Chicago youth, at the low- to mid-level of achievement ranging in age from 12 to 17, during out-of-school time . Approximately 85% of PE participants come from low-income families and are predominantly African-American or Latino. PE creates personalized interactions with real-world scientists and authentic, hands-on science

experiences to help students build confidence and belief that science is accessible and relevant to their lives.

Evaluation Study

Evaluators from the Center for Research, Evaluation, and Assessment (REA) at the Lawrence Hall of Science, University of California, Berkeley undertook a 10-year retrospective review of PE participant programming and participation (REA, 2010). The REA evaluation team investigated the influence of PE on educational and career life choices of alumni. REA had two goals: (1) describe PE's influence on its past participants, and (2) explain the organizational practices that support science learning for traditionally underrepresented students in science. The REA evaluation study relied upon multiple research methods including survey, interview, and document analysis.

The REA study revealed three main benefits for participation in PE: 1) increased science capacity; 2) positive youth development; and 3) engagement in a community of practice. Each of the three areas is described in more detail below:

1. **Increased Science Capacity (REA, pp. 28-36).** Past participants expressed newfound or enhanced interest in science topics and doing science activities after participating in PE programs. Participants reported increased confidence in the ability to think scientifically, use scientific tools and to become a scientist.
2. **Positive Youth Development (REA, pp. 21-28).** Participants in PE programs reported positive benefits in dispositions such as self-confidence, communication skills, leadership, networking, independence, social connections with youth interested in school and in science, and more positive feelings about their future.
3. **Engagement in a Community of Practice (REA, pp. 21-28).** Past participants reported PE was a community of practice, based on shared interests and inquiry, a community that nurtures relationships and helps members learn from each other, and has members that share not only interests but practices. PE nurtured personal relationships and a community among peers and between students and science experts and mentors who helped students envision careers in science and conceptualize their future.

In the sections that follow, I draw upon education research to reflect upon these major evaluation findings about PE and to provide recommendations for improvements in PE programs.

From High School to the Future

Researchers from the Consortium have undertaken a longitudinal study of postsecondary pathways of CPS students by systematically examining the college experiences and performance (Roderick et al, 2006; Roderick et al, 2008). The series of studies focuses on a broad set of questions about the post-secondary transition of CPS high school students:

- How many CPS graduates are going to college? Where are they going and how does that differ by race/ethnicity, gender, and high school attended?
- How prepared are CPS graduates for college and how does this shape their access to different types of colleges?
- How many CPS students graduate from four-year colleges within six years of high school graduation?
- Which students aspire to college and what are the potholes on the road to college?
- How do students from college preparatory course work perform in college (honors, Advanced Placement, International Baccalaureate)

Relevant Findings

1. *College-going rates in CPS vary significantly by race/ethnicity and gender.* Latino graduates were the least likely to go to college, particularly 4-year college. Males were also less likely to go to college, particularly African-American males.
2. *CPS high schools differ dramatically in the proportion of their students attending college, four-year colleges and selective colleges.* Four of CPS's high schools sent more than 80% of their graduates to college. At the low end, seven CPS high schools sent 35% of their graduates to college.
3. *Few high schools have students that graduate with access to four-year and selective colleges.* In only 19 of 69 non-charter high schools were more than 50 percent of graduates qualified to attend the majority of four-year public universities in Illinois. In only 14 of 69 non-charter high schools were more than 20 percent of graduates qualified to attend selective four-year universities such as University of Illinois at Chicago.
4. *Only 35 percent of CPS graduates who enrolled full-time in a four-year college in the year after high school graduated with a four year degree within 6 years.* If we take into account high school drop outs, only about 6% of CPS students earn a four-year college degree by the time they are 25. For African-American males, this number is around 2%.

5. *CPS college graduation rates are low when compared with national rates.* Nationally, 46% of African-American students and 47% of Latino students who began college in 1995 graduated in 6 years. In comparison, only about one-third of female African-American and Latino CPS graduates completed a degree within 6 years. For African Americans, just over one-fifth graduated within 6 years.
6. *Attending a high school with a strong college going culture shapes students' participation in the college-going process.* Across the analyses in the study, the single most consistent predictor of whether students took steps toward college enrollment was whether their teachers reported that the high school had a strong college climate, that is, they and their colleagues pushed students to go to college, and worked to ensure that students would be prepared.
7. *Having strong connections to teachers is particularly important in shaping the likelihood of enrolling in a school that matches a student's qualifications.* Meaningful connections between students and teachers was essential to students choosing the most competitive post-secondary institutions for which students were qualified given their test scores, grades and preparation.

Reflections and Recommendations for Project Exploration Program Improvement

1. Project Exploration targets low-income, minority students. Approximately 85% of PE participants come from low-income families who are predominantly African-American or Latino (REA, p. 2). Consortium research has demonstrated that these students need additional supports and attention to increase college-going rates. Project Exploration has the opportunity to create a college-going focus in their programming. A more explicit focus on college going and persistence might be integrated into PE's goals to contribute to students who are not in high schools with a college going culture.
2. While not an explicit goal of PE, the programs have the opportunity to create a college-going culture among its participants that mirrors the culture, expectations and foci of successful high schools. The REA evaluation report reveals that PE alumni perceive the program provided supports for college going (REA, pp. 21-28) and increased skills in science to improve college performance (REA, pp. 21-28).
3. PE is creating strong connections between adults and young people through engagement around science. These relationships have the potential to have positive effects on students as they engage in the college search, application and decision process (REA, pp. 3, 21-28).

4. The evaluation report includes a recommendation for a more systematic connection to alumni as they continue into college. Such a relationship would enable PE to create a comprehensive data base of alumni that could enable a more rigorous evaluation of the impact and influence of PE.

Passing through Science

This study examines the effects of increasing science course requirements in the Chicago Public Schools (Montgomery et al, 2010). In 1997, CPS mandated that all entering ninth-graders take a college-preparatory curriculum in high school, including three years of science coursework. The previous CPS coursework policy required just one science credit; the new policy required students to take a minimum of the following courses: earth science or environment science, biology or life science, and chemistry or physics. To examine the impact of this curriculum policy, researchers compared outcomes for cohorts of students in Chicago before and after the enactment of the 1997 policy.

Relevant Findings

1. *Despite large increases in course-taking, there were few improvements in student learning or engagement in science.* Though the new policy substantially changed the science courses students took, most students earned low grades in these classes, suggesting they were minimally engaged and learned little.
2. *College outcomes did not improve.* Despite large increases in students' college-preparatory coursework across multiple subjects, there were no improvements in college outcomes. College enrollment did not increase; moreover those students who attended college were no more likely to stay in college for at least two years than students were prior to the policy change. In later years, college-going actually declined.
3. *High school drop-out rates limited the potential impact of new science requirements.* Though about 90 percent of CPS graduates completed the science courses, many students did not benefit from the requirement because they dropped out before completing high school.

Reflections and Recommendations for Project Exploration Program Improvement

1. The REA evaluation report demonstrates a high level of student engagement is being built by PE around science (REA, pp. 5-10, 30-37). Project Exploration has the potential to fill a great need in increasing engagement in science and scientific knowledge among

Chicago Public Schools' students. School district initiatives around increasing engagement and knowledge of science at scale have not yet been successful.

2. The REA evaluation report demonstrates the PE commitment and focus to serving low-income, minority CPS students (REA, p. 2). PE is targeting students who are likely taking more science courses than they were prior to the new science requirement policy and may be at risk for low achievement in those courses. As such, PE has the opportunity to improve the outcomes of those students in coursework critical to improved achievement and successful college admissions.
3. Project Exploration might consider more explicit partnership opportunities with Chicago Public Schools. Given the Consortium findings, PE could integrate work into science course requirements in high schools. Or, PE could advise Chicago Public Schools in ways to improve science engagement and achievement, particularly for the students who are at-risk.
4. Continuing support and programming for alumni through college may help to improve college outcomes for CPS graduates. Evidence suggests that college graduation outcomes have not improved as a result of changes in science course requirements. Continued science education and engagement could provide first generation college goers from CPS with a connection to high quality content and social capital critical to success.

Social Capital Research

In a national study, Bedford, Colby and Doctor (2006) found that “the best-prepared students from the lowest socioeconomic quartile have the same chance of attending college as the least-prepared students from the highest quartile.” In essence, academic preparation alone does not ensure that low-income students will enroll in or graduate from college. Students’ success in high school and college is also influenced by relationships with adults-- at school, at home, and in the community-- and relationships with friends who plan to attend college. Low-income students who have access to such social capital are more likely to stay on the path to higher education. Researchers have established a relationship between social and cultural capital and student persistence (Wells, 2008).

The presence of at least one supportive and caring adult has been demonstrated to contribute to academic success, college attendance, and graduation (Pianta & Walsh, 1996). The researchers discovered that social capital combined with the connectedness of students to teachers cut dropout rates in half. There was a more significant influence on students from

socially disadvantaged backgrounds and those with academic challenges (Croninger & Lee, 2001).

Relevant Findings

1. *Social capital improves the outcomes of young people.* The connection to a caring adult is critical for student success in terms of grades, attendance, and achievement on standardized tests. It is also particularly important for low-income, minority students undertaking the college search, application and selection process.
2. *Social capital is most powerful when focused on a shared cause or activity.* Building networks of adults or peers for students is most effective when the relationship is focused on something: completing a task, learning a subject, deepening knowledge. For instance, low income, minority students who are first generation college-goers benefit tremendously from social networks that include adults who are knowledgeable about the college application process and the likely barriers students will encounter in college selection and success.
3. *Positive social capital has the chance to improve confidence and self-image.* Young people who are connected to a set of peers or adults with positive outlook on life and confidence in the future are more likely to take on that outlook. This applies to belief in ability to succeed in high school, college, relationships, jobs, careers, etc.

Reflections and Recommendations for Project Exploration Program Improvement

1. PE is engaging young adults in communities of practice in which youth are welcomed and encouraged to learn and do science. “This community of practice, present in their PE experiences, was a powerful support for participants.” (citation?) In this respect, PE is building social capital critical to the success of disadvantaged youth focused on learning and engagement in science (REA, pp. 3, 21-28). PE should consider making the building of social capital an explicit goal of the programming to improve these efforts. Drawing on research on social capital, PE could more intentionally design programming to develop social capital among peers and between students and adults.
2. PE is built around a model of social capital with two levels: one focused on a community of peers learning science together, and one that connects youth with adults who are educators and professionals in science (REA pp. 3, 21-28). This represents a powerful model of creating a supportive network for youth development.

3. Based on social capital research, there is reason to believe that PE can contribute to improved outcomes for at-risk participants, in high school, as well as in the college search process and in college.
4. PE could consider a focus on improved school outcomes as a sub-goal of its programs. Drawing a stronger connection between PE's programs and in-school outcomes could make more explicit links between in and out of school efforts to improve student outcomes.

Resiliency Research

Another body of literature examines why some individuals facing challenges succeed while others in the same circumstances do not. This is often described as "resiliency" traits that allow certain individuals to be successful despite such challenges (Masten et al, 1990). Resiliency "...refers to those factors and processes that limit negative behaviors associated with stress and result in adaptive outcomes even in the presence of adversity" (Waxman et al, 2003). Research suggests that resiliency skills can be taught to students and provided in learning environments that support and foster academic achievement (Masten et al, 1990; Waxman et al, 2003).

Researchers have identified resiliency traits. For instance, McMillan lists: a sense of self-efficacy, goal-oriented behavior, a sense of personal responsibility, a sense of optimism, internal expectations, and coping strategies for dealing with personal stress (McMillan et al, 1993). Solberg et al point to: building confidence, making connections, setting goals, managing stress, increasing well-being, and understanding motivation (Solberg et al, 1998).

Importantly, researchers acknowledge that the development of a deep relationship between adults and students is more powerful in some respects than explicitly trying to instill resiliency traits in children. "A key finding from the resiliency research is that successful development and transformative power exist not necessarily in programmatic approaches but rather in deeper level relationships, beliefs, expectations, and a willingness to share power" (Waxman, 2003). In this respect, the research on resiliency and social capital are inextricably linked.

Relevant Findings

1. *Resiliency can be built.* While researchers do not all agree on the exact traits that define resiliency, they agree that resiliency can be built, through relationships and programs.
2. *Resiliency is most powerful when built through relationships.* Intersecting with the findings from research on social capital, resiliency research suggests that relationships are keys to building resiliency.

3. *Powerful programs that build self-efficacy and confidence help to build resiliency.* Resiliency is built, in part, through experiencing success on tasks and in topics that youth find to be relevant and challenging.

Reflections and Recommendations for Project Exploration Program Improvement

1. The external evaluation of Project Exploration has demonstrated a contribution to positive youth development (REA, pp. 3, 21-28). Graduates have reported increased self-confidence, improved verbal and written communication skills, working in a team, leadership, networking skills, and the desire to be mentored and to mentor others (REA, pp. 33-35).
2. According to REA, PE programs have are creating communities of practice and social capital (REA, pp. 3, 21-27). PE programs have the potential to build resiliency in youth due to the nature of the types of relationships that are being built between adults and students. Making this an explicit goal of the programming could improve these efforts.
3. PE programs have the potential to build resiliency in youth due to the use of challenging content and strong programming to engage youth in a way that could improve self-efficacy and confidence. Focusing PE programs more intentionally around resiliency traits--such as self-confidence, efficacy, optimism, a sense of responsibility—could deepen and expand opportunities to build resiliency in PE youth.

Recommendations for Extended Research and Evaluation on PE

The review of the REA evaluation report and of PE's programs raises some opportunities to begin to think about extending evaluation opportunities for PE. As PE builds toward program expansion and improvement, the following recommendations outline a pathway toward the collection and analysis of effectiveness data for PE:

1. The evaluation report includes a recommendation for a more systematic connection to alumni as they continue into college. Such a relationship would enable PE to create a comprehensive data base of alumni that could enable a more rigorous evaluation of the impact and influence of PE. Included in the database should be CPS student identification number for ongoing assessment of student outcomes.
2. The promising high school graduation and college admissions rates of PE participants suggests that the PE model might contribute to encouraging students to stay in high school and to perform better in science coursework. Further consideration of evidence of this fact and of program design to more directly support science engagement in school is warranted. In particular, PE should analyze incoming student on-track rates to

understand the extent to which the student population being served is high-achieving relative to other CPS peers. This will allow PE to undertake more systematic analysis of program impact.

3. Deeper research and evaluation is needed to understand the impact of engagement in science on PE student outcomes. For instance, how many of PE alumni come from high schools with low percentages of students going to college? How well do PE graduate qualifications “match” the colleges they attend? Can PE contribute by providing a college going culture and by making deep connections between students and adults with college-knowledge?
4. PE should follow graduates more intentionally to explore the pathways youth take after graduation and collect data to examine the relationship between PE programs and positive student outcomes.
5. Additional research and evaluation efforts are necessary to measure the extent to which PE is building resiliency in youth through programming. Drawing upon tools to measure resiliency traits, PE could build a stronger evidence base for programming.
6. Systematic surveys of youth that measure social capital, resiliency, science knowledge and science pathways before, throughout and after their participation in PE programs could provide a database to assess program impact.

Conclusion

The evaluation of PE revealed many positive outcomes that students associated with its programming. PE deepened participants’ understanding of and engagement with science. Participants reported they learned to think more scientifically, learned to understand more deeply the work of real scientists, better understand pathways to become a scientist, changed preconceived ideas of what science is and what scientists do. These outcomes are associated directly with PE’s goals for their programming, and it is commendable that they are achieving such goals.

In addition, PE created a community of support and high expectations for participants, nurtured youth relationships with adults around science, provided opportunities for youth to work with scientists and peers, deepened science knowledge and engagement, provided opportunities for youth to explore new educational and career options and allowed participants to lead.

Reflections on research provide insights into how to improve PE programming. Findings from CCSR’s study of the post-secondary transition for CPS students suggest that a focus on college readiness and college going culture may be beneficial to PE participants. Findings from CCSR’s

study of science course taking implies that there are spaces within the school district for PE to supplement and support CPS efforts to engage students in science. In the larger education literature, reflections using research on social capital and resiliency also have implications for PE. In short, there is evidence that PE may be contributing social capital and building resiliency traits that have been demonstrated to be critical in the success of disadvantaged youth. A more intentional focus on making these a part of PE goals may be beneficial.

As PE moves into expansion and building the next generation of programs, an explicit focus on building data bases and analyzing data to assess program impacts is at the forefront of work. In particular, using Chicago Public Schools' student identification numbers to connect students to achievement scores, on-track rates and high school survey results could allow for deeper analysis of PE programs. Constructing and conducting surveys to capture the extent to which PE is instilling resiliency and building social capital among its youth is another possibility for fruitful measurement of program impacts. Finally, building a more comprehensive data base of PE alumni will allow further exploration of long-term outcomes of PE alumni.

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