RESEARCH for *ACTION*

Executive Summary
Brief 1: Care + Inquiry = Science Leadership Academy
Brief 2: The First Graduating Class of the Science Leadership Academy
March 30, 2012

Introduction

The Science Leadership Academy (SLA) is a small, selective-admission Philadelphia high school created through a partnership between the Franklin Institute Science Museum and the School District of Philadelphia. The school distinguishes itself with its inquiry-driven and project-based pedagogy, its use of technology, and its partnership with The Franklin Institute (TFI), a Philadelphia-based science museum and educational center. SLA offers STEM-rich learning experiences but is not a STEM-only school. While SLA shares some characteristics with high schools around the country that are focused on Science, Technology, Engineering, and Math (STEM), SLA leadership strives to realize a broader vision in which inquiry is threaded through all content areas.

In the spring of 2011, TFI and SLA commissioned Research for Action (RFA) to conduct a pilot study of the school's activities. Two research briefs resulted:

1. ***Care + Inquiry = Science Leadership Academy*** examines elements of the SLA model to inform strategies for replication.

2. ***The First Graduating Class of the Science Leadership Academy*** reports on high school and first-year college outcomes for the Class of 2010.

Findings and recommendations from both briefs are summarized below.

SLA first opened its doors in fall 2006. In the five years since, the school has developed an ongoing partnership with TFI, a coherent instructional model, and a caring school climate that is highly regarded by students. Outcomes for the Class of 2010 suggest promising results. Findings reported in this executive summary are preliminary, as SLA's model continues to evolve in response to lessons learned in the school's first years.

SLA Model: The Intersection of Inquiry & Care

The SLA model is structured around three key components: the school's partnership with TFI, an inquiry-driven instructional model, and a caring school climate. Table 1 describes each component, as of the 2010-11 school year.

Table 1. Key Components of the SLA Model

Partnership with TFI
(1) **TFI provides learning resources that expand SLA's STEM curriculum.** A variety of programmatic efforts are in place including TFI mini-courses, opportunities to intern with TFI scientists, exposure to nationally recognized scientists outside of TFI, learning resources for teachers and a family membership for each student.
(2) **TFI serves as a reference point for students and parents.** According to parent reports, the credibility of TFI gives parents the confidence to enroll their child in SLA.
(3) **TFI functions as a champion for SLA in the School District of Philadelphia.** As a high-profile partner, TFI has assisted in negotiations with the SDP, including during the school's start-upand in the recent renewal of the memorandum of understanding, obtaining curricular autonomy, site selection of teachers, and other commitments from the SDP.

Inquiry-Driven Instructional Model
(1) **A coherent instructional framework and approach was reported by administrators, teachers, students and parents.** This includes consistent use of core values, grade-level themes, and the Understanding by Design[1] curriculum framework.
(2) **Two types of assessments are utilized.** Student projects are used as the primary form of assessment but, as of the 2010-11 school year, standards-based "mastery" tests are also utilized to gauge students' knowledge of key concepts.
(3) **Four-year advisory program is a primary way in which "care" is operationalized.** Faculty advisors work with a cohort of students—and parents—over the course of four years.
(4) **Technology infuses the SLA model.** This includes a 1:1 laptop program, an on-line course management system, and internal, network-based communication.
(5) **TFI provides exposure to the broader scholar community.** TFI brings prominent scientists to the school each year and provides students the opportunity to work with TFI scientists. In addition, they co-host and annual national conference, EduCon, with SLA.

Caring School Environment
(1) **Positive relationships characterize the school culture.** Students, teachers and parents all reported positive relationships among students, between students and teachers, and between students and the principal.
(2) **A focus on caring about students is a faculty norm.** Teachers reported that in faculty meetings as well as their individual relationships with students, the emphasis is on students *as people.* One teacher commented, it is *not just about what they are doing for the 65 minutes that they are in their classroom.*
(3) **High degree of teacher collaboration was reported.** Collaboration is supported by common planning time, professional learning communities, mentors for new teachers, and technology that enables communication.

The key components of SLA's model are necessarily supported by seven conditions outlined below. Replication of the SLA model requires implementation of the key components described above, as well

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[1] Understanding by Design is a framework for designing curriculum, instruction and assessment.
http://www.ubdexchange.org/web_resources/UbD_Overview/learn_more.cfm

as, importantly, close attention to the enabling conditions outlined in Table 2.

Table 2. Key Enabling Conditions

Enabling Condition	Description
Small size	SLA's size of less than 500 students and the low teacher-student ratio (1:19) support caring relationships with students.
Curricular autonomy	An agreement with the SDP allows SLA teachers to develop curriculum that aligns with the school's inquiry-driven approach.
School leader with a clear and consistent vision who models norms of caring	SLA's principal is critical to setting and maintaining the vision of the school. He does this internally—among students and staff—and externally, with TFI, the school's key external champion, and with the District. He also promotes a caring school climate by modeling caring relationships.
Talented faculty committed to the inquiry-driven vision, hired through a site-selection process	SLA has attracted a talented group of teachers committed to the vision of the school. In the site-selection process, candidates are interviewed by teams that include the principal, parents, and faculty members, using hiring criteria aligned with the school's vision and values. Once hired, high standards are set for teachers by colleagues as well as administration.
Distributed leadership model	With the cadre of dedicated faculty, the principal has fostered a distributed leadership structure in which teachers have the a role in developing school policies and practices, autonomy to create the curriculum and shape the school environment. This is formalized through committees.
Robust frameworks, tools and structures to support teachers	The supports and frameworks in place for teachers help sustain the inquiry-driven vision for the school by assisting new teachers, students, and parents to acclimate quickly to the school community. Supports include significant common planning time, professional learning communities, "buddy" teachers, and external professional development.
Shared language of teaching and learning	SLA has created a strong, well-articulated common language about the school's inquiry-driven and project-based curriculum, instruction, and assessment. This language is shared across grades, disciplines, and key constituencies (staff, students, and parents).

Five years after the school's founding, the SLA model shows promise. Data from SLA's first graduating class, the Class of 2010, point to a variety of positive outcomes for students.

Outcomes for the Class of 2010

In 2010, SLA's first cohort graduated, and the majority of these students transitioned into post-secondary schools. Aspects of SLA's educational model were still evolving while the Class of 2010 was enrolled. However, the school's overarching vision and commitment to inquiry-driven, project-based, and experiential learning have remained the same. Class of 2010 outcomes in high school and early college point to several notable successes:

High School Experience
Overall, alumni from the Class of 2010 reported having very positive experiences during their four years at SLA and expressed a strong fondness for the school.

- **Attendance rates were high for all students, including those in their senior year.** The fact that even as seniors, the Class of 2010 was attending school at the same rate as the ninth, tenth, and eleventh graders suggests that SLA student engagement remained high for all four years.

In focus groups and interviews, SLA alumni—as well as current students, parents and staff—articulated a range of outcomes beyond test scores.
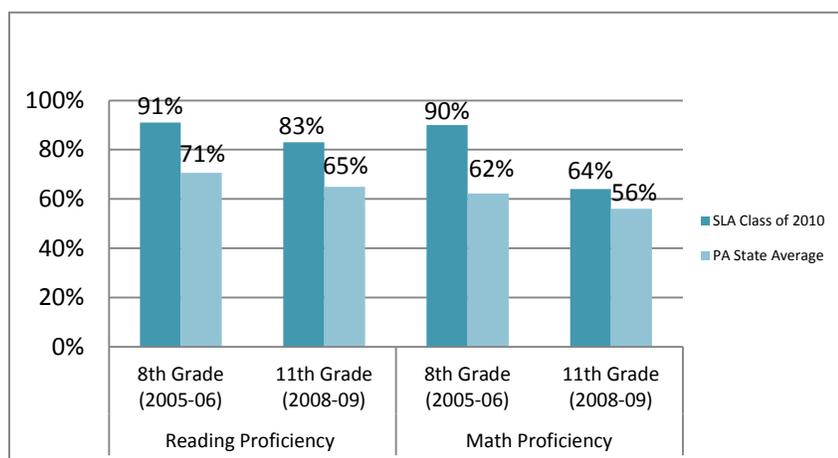
- **Alumni reported becoming more tolerant and confident** as a result of SLA's caring and accepting environment.
- **Alumni reported developing critical thinking skills** through the school's inquiry-based approach.
- **Many SLA alumni expressed clarity about their career paths** and described the independent and reflective learning experiences at SLA as helping them define their career aspirations.

High School Academic Outcomes

The Class of 2010 achieved promising outcomes on more traditional measures of academic performance.

- **The majority of the Class of 2010 scored proficient or above on the 11th grade PSSA in reading and math.** SLA's proficiency levels in both reading (83%) and math (64%) were higher than the Pennsylvania state averages (65% and 56% respectively), as shown in Figure 1.

Figure 1. PSSA 8th and 11th Grade Math and Reading Proficiency Levels for SLA Class of 2010 and Pennsylvania

- **A very high percentage (92%) of the Class of 2010 took the SAT,** and averaged a higher score than students at two similarly situated special admission high schools[2].
- **Overall, the Class of 2010 graduated with a cumulative GPA equivalent to a "B,"** with no gender difference and only slight variation across racial groups.
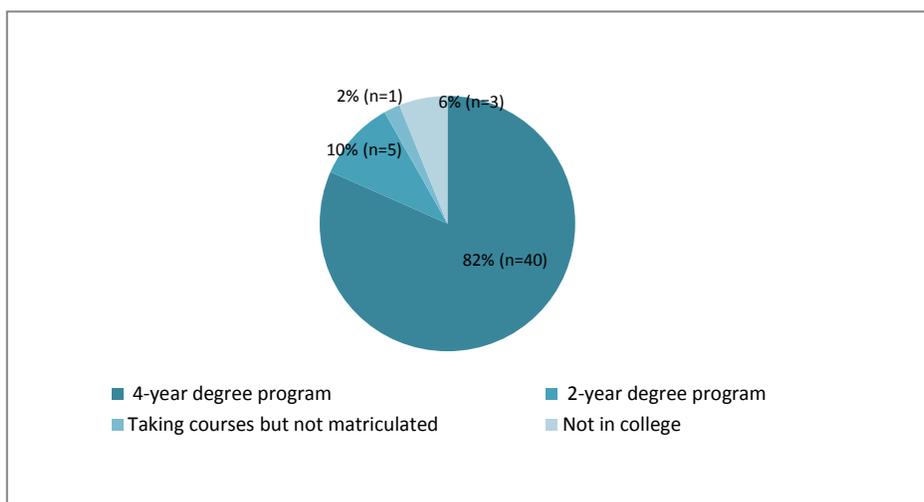
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[2] These schools were identified as peer schools based upon their common 2010 School Performance Index rankings as calculated by the School District of Philadelphia.

- **Just over half (54%) of the Class of 2010 graduated ready for STEM fields in college.** "STEM ready" SLA graduates mastered pre-calculus sufficiently to be placed into college-level calculus on a math placement exam.

College Enrollment

- **Nearly all alumni (92%) who responded to an alumni survey[3] enrolled in college,** and over half were first-generation college students. Figure 2 shows postsecondary enrollment status for all survey respondents.

Figure 2. Postsecondary Enrollment Status of SLA Class of 2010 (survey respondents n=49) in the Fall of 2010

2% (n=1)   6% (n=3)
10% (n=5)
82% (n=40)

■ 4-year degree program   ■ 2-year degree program
■ Taking courses but not matriculated   ■ Not in college

College Preparedness

In focus groups and across survey responses, members of the Class of 2010 reported that they had obtained skills at SLA that served them well in college, often noting that they were better prepared for certain elements of college life than their peers.

- **The Class of 2010 reported that SLA had prepared them for** (1) using technology, (2) relating across differences, and (3) participating in class discussions.
- **The Class of 2010 also reported that the project-based approach at SLA developed skills in:** (1) writing, (2) presentation, and (3) group-work that have been important in college.

- **The Class of 2010 reported that they were less prepared for (1) college lecture classes, (2)** college tests, and to a lesser extent, (3) organizing class notes.

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[3] 49 students from the Class of 2010 responded to the alumni survey.

Challenges and Recommendations

RFA's research on key elements of the SLA model and analysis of Class of 2010 outcomes point to many areas of strength but also reveal several points of concern. Table 3 outlines challenges and related recommendations.

Table 3. Challenges and Recommendations

Challenge	Recommendation
The school's success appears to rely heavily on SLA's founding principal, who plays a central role in maintaining the partnership with TFI, the instructional model, and the caring school climate.	TFI and SLA may consider developing a succession plan.
The programmatic component of the TFI-SLA partnership is conceptually ambitious. Given the difficulty of the task, it is not surprising that its potential has not yet been realized. Students reported inconsistent engagement in TFI activities. SLA faculty and TFI instructors reported limited communication.	The hiring of a liaison to facilitate the programmatic partnership is a step in the right direction. Attention to staff communication and curricular alignment between the two institutions could enhance STEM education for SLA students.
Black students and females in SLA's first cohort fared worse on 11th grade PSSAs than their counterparts in math and science.	Further mixed-method research is needed to identify the factors that are contributing to the gender and racial gaps in math and science.

Additional research relying on a broader sample of students, teachers and parents would provide further evidence of SLA's efficacy in terms of: student outcomes; the coherence of the school's model; and, the conditions enabling the model's success in supporting student learning and healthy adolescent development.