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# State of STEM in Out-of-School Time in Chicago

## EXECUTIVE SUMMARY

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# THE STATE OF SCIENCE, TECHNOLOGY, ENGINEERING AND MATH IN OUT-OF-SCHOOL TIME IN CHICAGO

## *EXECUTIVE SUMMARY*

### *June 2013*

#### **BACKGROUND**

Meaningful experiences with Science, Technology, Engineering and Math (STEM) enable young people to become critical and collaborative thinkers. High-quality experiences in school are necessary, but insufficient for young people to get involved with science and to be equipped with the skills necessary to pursue science and engineering beyond high school graduation. Without an intentional plan for how young people will get – and stay – involved with STEM, the status quo will remain the same:

- Chicago's diverse young people will fail to experience the wonders of discovery or fully explore the world around them.
- Student achievement in Chicago in STEM in school will remain sub-par.
- African Americans, Latinos and girls will remain underrepresented in STEM in out-of-school (OST) time programming, college majors and in careers.
- Investment by funders and policymakers in STEM education efforts will lack systemic impact.
- Area companies will not have the local talent pool they need.

#### **OVERVIEW**

The Chicago STEM Pathways Cooperative has produced the first comprehensive city-wide survey and analysis of STEM opportunities in out-of-school time. The "State of STEM in Out-of-School Time" report provides a set of recommendations and an action plan to enable diverse young people to get, and stay, involved with STEM experiences from kindergarten through college. The report, based on a year-long community-based survey and follow-up conference, was supported by the Noyce Foundation and the Chicago Foundation for Women.

A leadership team<sup>1</sup> of stakeholders from across Chicago's youth-development and STEM community came together to wrestle with critical questions about access and equity in STEM programming in out-of-school time: *Who is being served and who is not? How many opportunities are available, where and when, and what content is being offered? How can organizations cooperate to keep young people involved with science, technology, engineering and math? How can the City make it easier for young people from populations historically underrepresented in STEM professions to access STEM programs?*

The leadership team found Chicago's existing STEM and OST programming is diverse, energized and widespread. But, there are key areas of concern. STEM programming lacks coordination, a common

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<sup>1</sup> **Members of the Chicago STEM Pathways Cooperative Leadership Team:** Jennifer Axelrod, Deputy Commissioner for Youth Services at Department of Family and Support Services; Jim Cheshire, Executive Director, Chicago Allies; Cat Crowder, Special Projects Coordinator, Project Exploration; Mike Davis, Associate Vice Chancellor of STEM, Chicago City Colleges; Jerry Doyle, Vice Provost Student Access, Success and Diversity Initiatives, Illinois Institute of Technology; Dean Grosshandler, Research Assistant Professor at the University of Illinois at Chicago; Stephanie Levi, STEM Program Evaluation Specialist, YMCA of the USA; John Loehr, Senior Science Test Development Specialist, American Institutes for Research; Gabrielle Lyon, Co-founder and Senior Explorer, Project Exploration; Rabiah Mayas, Director of Science and Integrated Strategies, Museum of Science and Industry; Jeff McCarter, Executive Director, Free Spirit Media; Rafael Rosa, Vice President of Education at the Peggy Notebaert Nature Museum; David Sinski, Executive Director of the Heartland Human Care Services and Vice President of Heartland; Alliance; Tony Streit, Senior Project Director at the Education Development Center, Inc.; John Tolva, Chief Technology Officer, Office of the Mayor, City of Chicago.

language, and a clear set of goals. Of most concern, Latino students were underrepresented in programs relative to their population in Chicago Public Schools.

To broaden and deepen STEM's impact and secure its future, the leadership team recommended strategic collaboration in programming and funding among Chicago Public Schools, policymakers and funders. A citywide STEM and OST clearinghouse and a coordinator are crucial to establishing a well-defined, shared set of definitions for content, program goals and outcomes, the assessment of program quality, and strengthening youth-centered outcomes. Barriers to entry should be reduced through creation of multi-lingual programs, reduced fare public transportation on weekends, and, most crucially, greater use of public venues such as libraries and parks as programming sites, particularly in the summer.

The findings from the year-long study were presented at the "State of STEM in Out-of-School Time in Chicago Conference" in December, 2012 with support from Chicago HIVE Learning Network, Motorola Mobility Foundation, After School Matters, and the Illinois Institute of Technology.

The study culled data from city agencies (Chicago Public Schools, Department of Family Support Services, Chicago Public Library, Chicago Park District), the Chicago HIVE Learning Network and After School Matters. In addition, the leadership team created and administered a survey targeting organizations whose programs were likely not included in city-agency data sets, and collected additional data on program accessibility and sustainability. The initiative also reached out to individuals and networks of program providers involved with STEM education, workforce development and youth development to augment the survey data with feedback and recommendations.<sup>2</sup>

The full report, survey and raw data are available at: <http://stemchicago.wordpress.com>.

## KEY FINDINGS

The project team assessed STEM **program availability, access, participation and opportunity**. Among key findings:

- More than 2,032 STEM OST programs were run by more than 500 organizations in 2011, serving an estimated 88,576 students.
- The greatest number of programs were in middle schools (42%), followed by elementary school-age students (34%) and high school students (24%).
- Programs were generally available throughout most, but not all, Chicago neighborhoods.
- Programs served more girls than boys (56.2% and 43.8%, respectively).
- Latinos were underrepresented in programs compared to their representation in Chicago Public Schools – 28% of participants vs. 44% of CPS population.
- Programs were most likely to target low-income students (91.6%) and students with existing interest in STEM (63.3%).

In its analysis of **program characteristics**, the team reported these key findings:

- Significantly more programs operated during the school year than during summer months, and more than three-fourths operated in schools vs. other venues, such as parks or museums.

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<sup>2</sup> This study did not explore questions related to program quality, youth outcomes, curriculum, training or staff development.

- Content exposure and knowledge development were emphasized more frequently than technical skills or career readiness.
- Few programs provided mentoring or internships.

The team's findings, augmented by feedback and survey results gathered from the December, 2012 "State of STEM" Conference, found a series of challenges, underscored by a lack of coordination:

- The City of Chicago and CPS do not have an overarching STEM Pathways strategy or coordinating agency for young people grades K-12.
- Data is hard to access and sometimes doesn't exist, with no defined set of metrics and no channel for students to share insights and experiences.
- Latinos and undocumented students face the most challenges connecting to STEM programs.

## RECOMMENDATIONS

Chicago's STEM and OST programming is diverse, energized and widespread. However, it is relatively unorganized in terms of a shared agenda, investments or goals for youth outcomes. A data-driven approach suggests we will need different strategies if we are going to involve underrepresented and disenfranchised students and increase the numbers of students who not only participate in STEM out of school, but who also pursue STEM in college and careers after high school.

To ensure equitable, accessible programming in STEM in out- of-school time, and to deepen its impact on youth, the following actions are recommended:

- Create a citywide STEM OST clearinghouse and a coordinator to connect disparate STEM providers, communities, CPS, funders and policymakers through a public portal for young people, parents, educators and youth-advocates.
- Prioritize funding that enables organizations to collaborate and coordinate services and learning between and amongst youth organizations to help youth stay involved with STEM programming throughout their middle and high school experience.
- Establish a common language for describing goals and outcomes to facilitate collection of longitudinal data, program management and analysis of meaningful youth participation.
- Establish mechanisms that ensure structured, ongoing communication between CPS central office, individual schools and STEM OST providers.
- Use data about the current landscape to set priorities within organizations and across existing networks.
- Reduce barriers to entry to create multi-lingual programs, reduced-fare public transportation on weekends for high school students, and increased free and low-cost programs in public venues.
- Invest in building and strengthening relationships with parents, teachers and networks of program providers who can serve as allies. Focus on the most vulnerable students, and engage the most economically disadvantaged parents.
- Provide enhanced professional development.

Adoption of a city-wide STEM Pathways strategy could have a dramatic influence not only on the workforce development pipeline, but also ensure that the full spectrum of Chicago's young people have the opportunity to make discoveries about the world and themselves.

***For more information about STEM Chicago Pathways Cooperative Project visit <http://stemchicago.wordpress.com>.***