



STEM Starter Academy

Year 1 Report: January–December 2014

I. Introduction

The Science, Technology, Engineering and Mathematics (STEM) fields are a cornerstone of the Massachusetts innovation economy and represent a key differentiator of our workforce, nationally and globally. As the recession of recent years has drawn to a close and the Massachusetts economy has begun to accelerate once again, a talent shortage (or “skills gap”) has emerged. Large numbers of job-seekers do not have the competencies required for open job postings, leaving employers at a loss for a qualified, local applicant pool. In response to this situation, the Massachusetts Legislature called for the creation of a **STEM Starter Academy** (SSA) program to engage significantly more students in STEM programs at the Commonwealth’s 15 community colleges, leading to employment in “middle skill” jobs (requiring more than a high school education but less than a bachelor’s degree) and/or transfer to higher-level post-secondary STEM certificate and degree programs.

The Legislature approved \$4.75M in the Department of Higher Education’s (DHE) FY14 budget for the SSA program. The 15 community colleges submitted a joint proposal to DHE, which approved and disbursed funding in January 2014. The Year 1 spending authorization was extended through December 31, 2014. This report addresses the activities, actions and preliminary outcomes of the first year¹ of the SSA program.

The focus of the first year of implementation was to plan, design and launch the SSA program with a three-phase initiative: (1) **recruit students into spring and summer “bridge” programs** that would increase student awareness and interest in STEM, (2) **enhance the readiness of these students** through rigorous summer academic programming and (3) **support the success of these students** as they enrolled and persisted in STEM programs at the community college in the fall.

The University of Massachusetts Donahue Institute (UMDI) has been engaged as an independent program evaluator and submitted a comprehensive report, *STEM Starter Academy Annual Evaluation Report (January 2015)* (<http://tiny.cc/ssaeval14>), on the first year of implementation of the STEM Starter Academy program to inform the next phase of the SSA program design and implementation.

The DHE respectfully submits this summary report to the Massachusetts Legislature, drawing on the UMDI and campus reports, for the first year of implementation of the SSA.

II. Year 1 Student Participation

Year I participants in SSA programming represented a mix of individuals, some not enrolled in the community colleges, and others previously or newly enrolled in degree and certificate programs:

- Nearly 10,000 non-enrolled individuals, including high school students, adult learners and parents, were engaged in recruitment efforts comprising outreach activities and information-sharing about opportunities to explore STEM programs at the community colleges. One measure of the success of these recruitment efforts will be the number of newly enrolled community college students who are identified as past, non-

¹ Year 2 SSA activities began in July 2014, so there is some overlap between Year 1 and Year 2. Data collected during the fall of 2014 are not fully analyzed. Analysis of data collected during fall 2014 will continue during Year 2, and a complete analysis will be included in the Year 2 report.

enrolled participants in SSA programming. Campuses began collecting this data in summer 2014 and will begin reporting on these outcomes in fall 2015.

- Over 2,600 previously enrolled community college students participated in SSA programs in 2014. These included an initial cohort of 448 community college students in the spring semester and a cohort of 1,400 in the fall semester, as well as 786² students who participated in the most intensive, extended-duration “summer bridge” programs, exploring STEM research projects, completing developmental and college-credit mathematics, and building college readiness skills.
- Finally, at least 979³ additional students were newly enrolled in the community colleges in fall 2014 and participated in STEM Starter Academy activities. These new students entered college able to take advantage from the start of their studies of all academic supports provided by the Academy.

Through existing student data systems, the progress of enrolled community college students, including their retention and graduation rates from STEM degree and certificate programs, can be easily and comprehensively tracked. Reporting on their outcomes will begin in fall 2015. Also pulling from existing data systems, detailed reporting on race, ethnicity and gender of enrolled participants is available in the Findings section on page 9 of the [STEM Starter Academy Annual Evaluation Report](#).

III. Year 1 Programming

In their first year of implementation, most sites were intensely focused on developing SSA programs and supports. In spring 2014, most sites engaged in startup activities such as hiring staff, convening advisory committees, and developing outreach materials. They also began recruitment activities, most commonly aimed at high school seniors with an added emphasis on underrepresented or non-traditional students. Most sites developed or revised curricula during this time for their upcoming summer programs. In summer 2014, all sites implemented academic programs and related support services. The table and lists below summarize the major activities completed by colleges during the spring and summer. A more detailed description of these activities can be found in the [STEM Starter Academy Annual Evaluation Report](#).

SSA Activity Summary, Spring and Summer 2014		
N=15	Count	
Activity	Spring	Summer
Developed Outreach and Recruitment Materials	13	--
Held Outreach and Recruitment Events	12	--
Held Career Exploration Activities	7	14
Academic Programs and Curriculum Development	8	12
Mentoring, Advising, or Coaching	7	13
Orientation, Tutoring, and Test Prep	8	14
Dispersed Financial or Physical Resources	6	14
Planning, Professional Development, and Infrastructure Enhancements	12	10
Summer 2014, College Readiness	--	13
Summer 2014, Academic Programming	--	15

² Some summer SSA participants may in fact be newly enrolled community college students, but additional analysis is needed to segment this cohort. Future reporting will include this analysis.

³ This data collection cycle is still underway, so this number may increase in future reporting.

SSA implementation at *most* community college sites included some of the following practices:

- **Providing information about and exposure to STEM pathways**—e.g., connecting career possibilities to academic programs and emphasizing career prospects as a means of encouraging students to enroll in, persist in and complete their programs.
- **Offering financial support**—e.g., book vouchers, tuition and fee waivers and stipends.
- **Teaching college navigation and success skills**—e.g., time management, study skills, how to navigate college support services and understanding the expectations for college life.
- **Developing and revising curricula**—e.g., increasing content relevance through contextualization, modularization, co-requisite remediation and/or activity-based learning.
- **Enhancing or expanding student support services**—e.g., extra tutoring, classroom-embedded support, intrusive advising, career counseling and facilitated study opportunities.
- **Using hands-on strategies**—e.g., workshops or demonstrations to recruit prospective students to SSA.
- **Encouraging cohort interaction**—increasing a sense of connection among a group of students.
- **Engaging faculty in the initiative**—e.g., involvement in planning and design, recruitment or advising and mentoring.
- **Creating opportunities and incentives for faculty and staff** to collaborate across disciplines and divisions.

SSA implementation at *many* community college sites included some of the following practices:

- **Integrating instruction and student support services**—e.g., embedding supports such as advising and study skills into academic courses.
- **Clarifying criteria for progress and completion**—e.g., creating degree/transfer maps and guidelines and student course plans.
- **Involving parents and families** to facilitate recruitment and retention.
- **Developing peer mentorship programs.**
- **Helping students prepare for placement testing.**
- **Adapting programs to meet the needs of working students.**
- **Incorporating technology to advise and support students**—e.g., using software to enhance advising/mentoring/career counseling, e-portfolios, video tutorials, and social media.
- **Involving industry and alumni**—e.g., in mentorship, career exploration and transfer opportunity programming.

SSA implementation at a *few* community college sites included some of the following practices:

- **Building relationships between community colleges and high school faculty and staff**—e.g., curricular alignment to make it easier for high school students to move into STEM degree programs at community colleges.
- **Facilitating research-like opportunities** for students.
- **Working with four-year institutions on transfer alignment.**
- **Providing internship opportunities** to STEM students.
- **Fostering faculty-student relationships** through opportunities for informal interactions.

- **Involving current community college students** in recruitment activities.
- **Mandating some form of support service use.**
- **Offering financial literacy support.**
- **Creating physical study and support spaces** for STEM students.
- **Engaging community members in program design.**
- **Offering professional development for college faculty.**
- **Exposing students to role models** from underrepresented groups.
- **Incorporating a community service component** into the summer bridge program to help students apply their classroom learning to real-life situations.

IV. Identifying Successful Practices

While there are many examples of excellent STEM activities, courses, programs and support systems already in place across the community college system, Massachusetts needs a more robust, coherent and aligned system focused on building success across a broad spectrum of students. The priorities for the SSA are to: (1) identify successful STEM education practices, (2) build capacity and extend capabilities to address the needs of more students, (3) fill gaps in programs and activities through cross-campus collaboration and (4) codify best-practice models for student success.

As part of UMDI's technical assistance to DHE and to the SSA sites, UMDI prepared a resource document titled "STEM Starter Academy: Promising Practices for STEM Programs in Community Colleges" (<http://tiny.cc/ssapromising>). This document provides brief descriptions of practices highlighted by the literature that are intended to support community college student engagement, retention, progress, and graduation in STEM fields. DHE shared the "Promising Practices" document with SSA sites in the spring, and each site applied the most relevant strategies to the design of their SSA first-year implementation.

As the year continued, the campuses worked together and with DHE to refine their collective understanding of how these and other practices benefit students. Through this continuing collaboration, a common framework of best practices that undergird student progress will be built upon and codified across the 15 campuses.

When asked about best practices, many sites expressed an eagerness for the opportunity provided by the SSA initiative to learn from their own and other sites' experiences improving recruitment, retention, measurement and program design issues such as cohort development. Representatives of the 15 campuses were convened in June 2014 to share their early experiences from the spring program activities and to discuss the design and implementation of summer bridge programming. Over the summer months, DHE and UMDI conducted site visits and surveys to observe campus activities and collect data for analysis and reporting. Monthly conference calls to review progress, address challenges and share experiences among the campuses were conducted throughout the first year and continue into the second year. Finally, a convening of the campuses to assess what has been learned and begin to codify "best practices" will be held on March 30, 2015. (This was originally scheduled for February but was cancelled due to snow.) The results of this meeting will inform campus plans and designs for summer 2015 bridge programming.

As the implementation of the SSA initiative advances, a well articulated framework of student supports and complementary curriculum pathways—consistent in its components while allowing for local optimization—will be recognized and highly valued for predictable outcomes by students, their families, partner high schools and universities as well as employers and industry leaders. The SSA will yield a recognizable and high-value STEM "brand" across the community college system.

V. Additional References

UMDI Evaluation Report

- *STEM Starter Academy Annual Evaluation Report (January 2015)*
<http://tiny.cc/ssaeval14>
- Appendix L: “STEM Starter Academy: Promising Practices for STEM Programs in Community Colleges”
<http://tiny.cc/ssapromising>
- All Appendices
<http://tiny.cc/ssaeval14append>