



UMASS DONAHUE INSTITUTE • APPLIED RESEARCH & PROGRAM EVALUATION

STEM Starter Academy Year 2 Interim Evaluation Report September 2015

Prepared for the Massachusetts Department of Higher Education



Acknowledgements

The UMass Donahue Institute extends its sincere appreciation to the many people who supported and collaborated with us on this evaluation. In particular, we want to thank personnel from the Massachusetts Department of Higher Education and all fifteen community colleges from around the state who have supported this project.

STEM Starter Academy Interim Evaluation Report, September 2015

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Report Information

This report was prepared by the UMass Donahue Institute, the project evaluator, under contract with the Massachusetts Department of Higher Education.

About the Donahue Institute

The University of Massachusetts Donahue Institute (UMDI) is the public service, outreach, and economic development unit of the University of Massachusetts President's Office. Established in 1971, the Institute strives to connect the Commonwealth with the resources of the University through services that combine theory and innovation with public and private sector applications.

UMDI's Applied Research and Program Evaluation group specializes in applied social science research, including program evaluation, survey research, policy research, and needs assessment. The group has designed and implemented research and evaluation projects for diverse programs and clients in the areas of education, human services, economic development, and organizational development.

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Contents

Executive Summary	iv
Introduction.....	1
Findings.....	3
Participation Summary.....	3
Fall Site Visit Summary.....	7
Summer Site Visit Summary	8
Year 1 Review: Site Report and Fall Interview Summary.....	12
DHE Interview Summary	17
Methods.....	21
Technical Assistance	25
Strategic Considerations	27
Appendices.....	28
Appendix A: SSA Fall 2014 Site Visit “Snapshots”	
Appendix B: SSA Summer 2015 Site Visit “Snapshots”	
Appendix C: SSA Year 1 Site Report Analysis	
Appendix C1: SSA Year 1 Site Report Template	
Appendix C2: SSA Year 1 Site Report and survey “crosswalk”	
Appendix C3: SSA Year 1 Site Report Student Experience Highlights	
Appendix D: SSA Summer 2015 DHE Interview Protocol	
Appendix E: Data Dictionary STEM Starter Academy Primary Collection	
Appendix F: STEM Starter Academy Secondary Participant Collection	
Appendix G: Year 2 Evaluation Plan	
Appendix H: SSA Fall 2014 Phone or Site Visit Administrator Interview Protocol	
Appendix I: SSA Fall 2014 Site Visit Student Focus Group Questions	
Appendix J: SSA Fall 2014 Site Visit Observation Protocol	
Appendix K: SSA Summer 2015 Site Visit Administrator Interview Protocol	
Appendix L: SSA Summer 2015 Site Visit Student Focus Group Questions	
Appendix M: SSA Summer Site Visit Observation Protocol	
Appendix N: SSA Summer 2015 Activity Schedules	
Appendix O: March 30 Event Evaluation Feedback Survey Results	
Appendix P: SSA Grantee Phone and Working Group Meetings Summary	

Tables and Figures

Table 1: SSA Participants by Term, Year 1 and Year 2	v
Table 2: SSA Participants by Term, Year 1 and Year 2	4
Table 3: Primary Participants' Service Descriptions by Term, Year 1 and Year 2	6
Table 4: Secondary Participant and Event Count By Term, Year 1 and Year 2	6

Executive Summary

The Massachusetts Department of Higher Education (DHE) awarded STEM Starter Academy (SSA) grants to each of the 15 community colleges in Massachusetts for FY14, and renewed those awards for FY15. The SSA initiative is intended to support community colleges' efforts to **inform, engage, recruit, retain, and graduate** significantly more students and enhance their success in STEM pathway programs leading to job placements or college transfer. An additional priority of the initiative is for campuses to identify service and activity gaps in student support and/or capacity building opportunities that can be addressed through replication of currently available programs or through collaboration across campuses.

The UMass Donahue Institute (UMDI) is conducting the Year 2 evaluation of the SSA initiative.¹ The evaluation—and this interim report—has multiple purposes: (1) to provide formative feedback to DHE and to the community colleges relevant to grant activities, (2) to provide preliminary summative feedback by collecting and summarizing baseline data on SSA participants and their performance (e.g., number of students served, number of students retained), and (3) to provide technical assistance to support DHE's efforts to implement the initiative.

This interim report presents preliminary evaluation findings from Year 2. Key Year 2 data—including summer participation data and most data on the outcomes of Year 2 interventions—will not be available until late fall 2015. Analyses of these data will be included in a comprehensive Year 2 evaluation report that UMDI will submit to DHE at the end of January 2016. That comprehensive report will highlight trends in SSA activities across Year 1 and Year 2 and distill key pieces of learning from the perspectives of multiple stakeholders. Findings are anticipated to include:

- Current participation data, showing trends across the lifetime of the grant;
- Indicators of SSA student progress and completion including fall-to-fall retention, graduation and transfer rates, degrees and certificates awarded, and student participation and completion rates in mathematics interventions;
- SSA student characteristics including gender, enrollment and entry status, and race/ethnicity; and
- Examples and summaries of effective practices that reflect the SSA model.

With the descriptive data available, this interim report describes emerging trends, promising practices, and key lessons learned. This executive summary provides a brief overview of initial findings and strategic considerations.

Overview

Year 2 of SSA saw a general increase in program participation and the emergence of promising practices across sites related to recruitment, readiness, retention, and career awareness. An important Year 2 development was the specification of a program model for SSA, developed by DHE in collaboration with SSA sites. The model was used to guide Year 3 planning and also frames some of the reflections on Year 2 in this interim report.

Year 2 – Participation Summary

A summary of student participation in SSA during Years 1 and 2 is provided below in Table 1. Data from

¹ There was some funding overlap between Year 1 and Year 2. For simplicity, throughout this report, the time period from January through August 2014 will be referred to as Year 1 and from September 2014 through August 2015 as Year 2. Data collected during Year 1 were analyzed and presented in the Year 1 Annual Evaluation Report.

the summer of Year 2 will be collected during fall 2015, and a complete analysis of Year 2 participation data (including a summary of student outcomes) will be included in the annual report.

In the first two semesters of Year 2, SSA colleges served 5,365 primary participants and reached 6,759 secondary participants.² Participation numbers from Year 1 and Year 2 of SSA are not directly comparable because Year 1 involved many startup activities including hiring and program planning (e.g., only six sites had primary participants in spring 2014). Nevertheless, as can be seen in Table 1, the beginning of Year 2 was marked by a dramatic increase in the number of primary participants. This increase is likely due to several factors, including sites having more established program models and a decrease in the intensity of support for students between summer programming and academic year services. Fall 2014 data indicate that every site was engaged in recruiting for spring and summer SSA activities, supporting incoming and existing students with tutoring and other forms of academic and social support, and offering STEM career and STEM engagement activities.

Table 1: SSA Participants by Term, Year 1 and Year 2³

Year	Term	Primary Participants*	Secondary Participants
Year 1	Spring 2014	448	5,662
	Summer 2014	786	2,545
Year 2	Fall 2014	2,423	1,741
	Spring 2015	2,942	5,018
	Summer 2015**	Pending	Pending
Total		6,599	14,966

* Primary participants are community college students who participate in STEM Starter Academy grant funded programs/events/activities (i.e., participants who have an ID number assigned by their college). Secondary participants are individuals who are not currently enrolled at a community college and participate in STEM Starter Academy grant funded programs/events/activities (i.e., participants who do not have an ID number assigned by their college).

** Data from the summer 2015 collection were not available for this report, but will be included in the Year 2 Annual Evaluation Report.

The total number of secondary participants in the first two terms of Year 2 is lower than the total from Year 1. The reduced figures are at least in part an artifact of not-yet-available data from the summer term, which might have a higher intensity of engagement of secondary participants. They also likely reflect some reduction in recruitment activities in Year 2 due to 9c budget cuts. It is worth noting that many sites emphasized the importance of getting an earlier start to recruitment in Year 2, as indicated by the Fall 2014 secondary participant numbers. Thus recruitment activities might have been spread out across fall and spring terms in Year 2 in a way that was not possible in Year 1.

With primary participants, sites engaged in a range of promising practices to boost student retention, career awareness, and completion. These included:

- Expanding academic supports such as tutoring, supplemental instruction, learning specialists, and facilitated study groups.

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³ Totals include data collected from all campuses during the fall of 2014, and 14 of 15 campuses during the spring of 2015. UMDI and DHE expect to receive spring participation data from the site with missing information this fall, and participation figures will be updated in the annual report.

- Offering tuition-free STEM courses (most often mathematics classes), scholarships, or other financial supports (e.g., textbook lending).
- Having dedicated “point people” to whom students could turn with academic, career, or advising questions. At several sites, these individuals included peer mentors who supported other students while also reinforcing their own connections to their colleges and their programs.
- Offering STEM-themed clubs, speakers, and workshops focused on career and program awareness, professionalization, and building social support.
- Offering or facilitating student placement into research experiences and internships.
- Revising STEM curriculum to make it more engaging and better aligned both with K-12 and 4-year colleges to which students might transfer.
- Offering professional development opportunities to students and faculty, including facilitating mentorship by STEM professionals as well as supporting memberships in professional organizations and attendance at relevant conferences.

Secondary participants were mainly engaged through outreach and awareness activities. Promising practices for helping students develop relationships with colleges and build their awareness of STEM careers and programs included:

- Hosting college and career awareness events both at high schools and on the college campus. These often included contact with college students and faculty and hands-on activities.
- Developing relationships between community college staff and high school faculty and administrators.

DHE Interview

Given the continued variation in SSA program models across sites in Year 2, DHE staff cited the development and formalization of a more cohesive model near the end of Year 2—and the collaborative efforts of SSA grantees in working towards this model—as a notable successes. Other Year 2 successes cited by DHE included stakeholders’ improved understanding of what is being measured, sites’ flexibility and commitment, working group collaboration, and the additional involvement of DHE’s Executive Director of STEM (as of March 2015). Challenges noted by DHE included the preparation of the first legislative report, state budgetary issues impeding scale-up, understanding SSA’s connection to other campus programs and systems, and defining STEM majors. DHE noted the tension between integrating SSA into campus and state-level systems while also maintaining program boundaries, the current shift toward clarity and measurement in Year 3 planning, and sustainability concerns.

Promising Practices from Fall and Summer Site Visits

UMDI’s site visits to 9 of the 15 STEM Starter Academy sites in fall 2014 and summer 2015 surfaced several promising practices.

UMDI evaluators visited Berkshire, Bunker Hill, Massasoit, and MassBay Community Colleges in November and December 2014.

- Berkshire developed a new recruitment model—offering small stipends to high school faculty to act as SSA liaisons—that successfully brought more students to SSA from local high schools.
- Berkshire piloted a unique “fall engagement program” that offered spring semester scholarships to students who met a set of requirements – including meeting with faculty, attending workshops, and participating in regular cohort meetings.

- Bunker Hill, Massasoit and MassBay used different strategies to facilitate students' progress through developmental mathematics. Bunker Hill used a STEM-contextualized curriculum taught with a hands-on "growth mindset" pedagogy to help students pass accelerated coursework. Massasoit and MassBay used a computer-based, modular, and "self-paced" curriculum.
- Massasoit and MassBay supported internship programs to give students hands-on professionalization experiences. Massasoit developed a research-focused program and MassBay focused on Information Technology.
- MassBay piloted an industry mentorship program that paired current STEM students with professionals working in STEM industries.

UMDI evaluators visited Cape Cod, Mount Wachusett, Northern Essex, North Shore, and Roxbury Community Colleges in July and August 2015.

- Cape Cod created a centralized team of STEM student support staff—including an academic advisor, career counselor, and program director. Students were linked to these services through a STEM student club as well as through advising requirements for scholarships and summer bridge participation. The college was also focused on creating more engaging STEM curricula.
- Mount Wachusett ran a Summer Academy with a strong cohort model. Incoming students shared some common experiences—including field trips, speakers, workshops, a community service project, and sometimes courses—and thus built peer relationships, supports, and networks.
- Northern Essex expanded academic supports in Year 2—including tutoring, peer mentoring, and supplemental instruction—with a particular focus on its campus in the Lawrence community.
- North Shore developed and expanded their peer mentoring program—offering students both social and academic support.
- Roxbury hosted an experiential summer STEM "camp" for younger high school students, which included lab-intensive classes in multiple STEM disciplines, field trips, and team-based classroom projects such as a robotics competition.

Technical Assistance

In Year 2, UMDI provided technical assistance to DHE and SSA sites, including instrument development, assistance to sites with data collection, participation in DHE planning and review meetings, participation and note-taking at SSA grantee and working group meetings, and evaluation and feedback of the March 2015 grantee gathering.

Strategic Considerations (Each is explained in greater detail in the full report.)

- DHE may wish to consider strategies for promoting connections between SSA programs and other STEM initiatives at each campus.
- DHE may wish to consider additional technical assistance activities that foster communication among sites about best practices and lessons learned.
- DHE may wish to consider additional strategies to support the identification of promising practices.
- DHE may wish to consider ongoing refinement of the SSA model in order to more clearly define all core program components.
- DHE may wish to pursue further discussion about potential metrics and measurement approaches.

Introduction

The Massachusetts Department of Higher Education (DHE) awarded STEM Starter Academy (SSA) grants to each of the 15 community colleges in Massachusetts for FY14, and renewed those awards for FY15. The SSA initiative is intended to support community colleges' efforts to **inform, engage, recruit, retain, and graduate** significantly more students and enhance their success in STEM pathway programs leading to job placements or college transfer. An additional priority of the initiative is for campuses to identify service and activity gaps in student support and/or capacity building opportunities that can be addressed through replication of currently available programs or through collaboration across campuses.

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- SSA student characteristics including gender, enrollment and entry status, and race/ethnicity; and
- Examples and summaries of effective practices that reflect the SSA model.

With the descriptive data available, this interim report describes emerging trends, promising practices, and key lessons learned. This executive summary provides a brief overview of initial findings and strategic considerations.

Evaluation Questions

Programs and activities at SSA sites are diverse, and UMDI's primary role is to evaluate the SSA initiative as a whole. To that end, the process and outcome evaluation questions below offer a framework for understanding the line of inquiry that guided UMDI's evaluation of SSA activities during Year 2. These evaluation questions were developed during fall 2014. The evaluation questions established in this document reflect our current understanding of program implementation and available data, as well as our continued responsive development of the evaluation design.

⁴ There was some overlap between Year 1 and Year 2 in terms of funding. For simplicity, throughout this report the time period from January through August 2014 will be referred to as Year 1 and from September 2014 through August 2015 as Year 2. Data collected during Year 1 were analyzed and presented in the Year 1 Annual Evaluation Report.

Process Evaluation Questions

- P1. What are the major challenges to and facilitators of successful program implementation encountered by grantees? What midcourse corrections and attempts to overcome challenges have been undertaken? What additional steps are planned?
- P2. What are the major challenges to and facilitators of providing program support and facilitation encountered by DHE? How have challenges been overcome and midcourse corrections undertaken? What additional steps are planned?
- P3. How do key project stakeholders rate and explain the quality, relevance, and effectiveness of major program components and services?
- P4. What infrastructure, systems, and processes were put in place to aid program sustainability during and beyond the award period? What are the greatest challenges and barriers to creating sustainability? In what ways have STEM Starter Academy grantees integrated their programs with other STEM pipeline development and support efforts? How have grantees shared lessons learned and emerging best practices with others?

Outcome Evaluation Questions

- O1. What progress is being made toward the goals of informing, recruiting, retaining, and graduating/completing more students from STEM pathway programs?
- O2. Who is participating in SSA activities? Do observed changes differ across student characteristics such as gender and race/ethnicity?
- O3. To what extent are observed changes in student outcomes attributable to program activities (including combinations of program activities) versus contextual variables or non-SSA interventions?
- O4. What differences in program features, implementation, and contextual variables can be identified across programs whose progress or outcomes differ substantially?

Findings

This section presents preliminary findings drawn from multiple sources of data UMDI collected during Year 2 of SSA implementation. These data sources are described in the Methods section below. References to appendices have periodically been provided to direct the reader to more detailed information.

The findings presented here offer summaries of the data available at the time of this interim report. Key Year 2 data—including summer participation data and most data on the outcomes of Year 2 interventions—will not be available until late fall 2015. Analyses of these data will be included in a comprehensive Year 2 evaluation report that UMDI will submit to DHE at the end of January 2016.

Year 2 of SSA saw a general increase in program participation and the emergence of promising practices across sites related to recruitment, readiness, retention, and career awareness. These practices included expanding the availability of academic supports, facilitating social and academic connections between students and their colleges, and offering experiential opportunities to explore STEM career options. An important Year 2 development was the specification of a program model for SSA, developed by DHE in collaboration with SSA sites. The model was used to guide Year 3 planning and also frames some of the reflections on Year 2 in this interim report.

The findings are organized as follows: The first section provides an overview of student participation data from fall 2014 and spring 2015 and a sense of the kinds of activities in which SSA students participated. The second and third sections summarize findings from nine site visits in fall 2014 and summer 2015, respectively. The fourth section reviews fall 2014 SSA activities across campuses as well as promising practices, challenges, and cross-site considerations from Year 1 site reports and interviews conducted primarily during fall 2014. Finally, the fifth section summarizes findings from UMDI's interview with DHE representatives.

Participation Summary

A summary of student participation in SSA during Years 1 and 2 is provided below in Table 2.⁵ Data from the summer of Year 2 will be collected during fall 2015, and a complete analysis of Year 2 participation data (including a summary of student outcomes) will be included in the annual report.

Overview

In the first two semesters of Year 2, SSA colleges served 5,365 primary participants and reached 6,759 secondary participants.⁶ Participation numbers from Year 1 and Year 2 of SSA are not directly comparable because Year 1 involved many startup activities including hiring and program planning (e.g., only six sites had primary participants in spring 2014). Nevertheless, as shown in Table 2, the beginning of Year 2 was marked by a dramatic increase in the number of primary participants. This increase is likely due to several factors, including sites having more established program models and a decrease in the

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intensity of support for students between summer programming and academic year supports. Fall 2014 data indicate that every site was engaged in recruiting for spring and summer SSA activities, supporting incoming and existing students with tutoring and other forms of academic and social support, and offering STEM career and STEM engagement activities.

Table 2: SSA Participants by Term, Year 1 and Year 2

Year	Term	Primary Participants*	Secondary Participants
Year 1	Spring 2014	448	5,662
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	Summer 2015**	Pending	Pending
Total		6,599	14,966

* Primary participants are community college students who participate in STEM Starter Academy grant funded programs/events/activities (i.e., participants who have an ID number assigned by their college). Secondary participants are individuals who are not currently enrolled at a community college and participate in STEM Starter Academy grant funded programs/events/activities (i.e., participants who do not have an ID number assigned by their college).

** Data from the summer 2015 collection were not available for this report, but will be included in the Year 2 Annual Evaluation Report.

The total number of secondary participants in the first two terms of Year 2 is lower than the total from Year 1. These lower numbers are at least in part an artifact of not-yet-available data from the summer term, which might have a higher intensity of engagement of secondary participants. They also likely reflect some reduction in recruitment activities in Year 2 due to 9c budget cuts. It is worth noting that many sites emphasized the importance of getting an earlier start to recruitment in Year 2, as indicated by the Fall 2014 secondary participant numbers. Thus recruitment activities might have been spread out across fall and spring terms in Year 2 in a way that was not possible in Year 1.

With primary participants, sites engaged in a range of promising practices to boost student retention, career awareness, and completion. These included:

- Expanding academic supports such as tutoring, supplemental instruction, learning specialists, and facilitated study groups.
- Having dedicated “point people” to whom students could turn with academic, career, or advising questions. At several sites, these individuals included peer mentors who supported other students while also reinforcing their own connections to their colleges and their programs.
- Offering tuition-free STEM courses (most often mathematics classes), scholarships, or other financial supports (e.g., textbook lending).
- Offering STEM-themed clubs, speakers, and workshops focused on career and program awareness, professionalization, and building social support.
- Offering or facilitating student placement into research experience and internships.
- Revising STEM curriculum to make it more engaging and better aligned both with K-12 and 4-year colleges to which students might transfer.

- Offering professional development opportunities to students and faculty, including facilitating mentorship by STEM professionals as well as supporting memberships in professional organizations and attendance at relevant conferences.

Secondary participants were mainly engaged through outreach and awareness activities. Promising practices for helping students develop relationships with colleges and build their awareness of STEM careers and programs included:

- Hosting career and college awareness events both at high schools and on the college campus. These often include contact with college students and faculty and hands-on engagement activities.
- Developing relationships between community college staff and high school faculty and administrators.

Primary Participants – Services Received

Table 3 summarizes the number of primary participants by term, and the number of primary participants who received services in three basic categories. During the fall and spring of Year 2:

- 2,338 students received direct financial support from the SSA grant (e.g., grant, stipend, tuition or fee waiver);
- 3,585 students received extra or targeted supports (e.g., academic tutoring, peer mentoring); and
- 1,802 students received STEM pathways and/or STEM career counseling.

The difference between the spring term of Year 1 and spring of Year 2 is dramatic. The number of primary participants served across categories in spring 2015 (2,942) was more than six times that of spring 2014 (448). Between spring 2014 and spring 2015:

- the number of students receiving direct financial support from the SSA grant grew from 111 to 1,072,
- the number of students receiving “extra or targeted supports” such as tutoring or peer mentoring grew from 103 to 1,883, and
- The number of students receiving STEM pathway or career counseling grew from 101 to 935.

In each category of support, as noted above, fall 2014 marked the biggest jump as students returned to campus and were able to take advantage of newly available opportunities through SSA. Spring 2014 was during the startup phase of the initiative, so these numbers are more indicators of a rapid takeoff in program implementation rather than indicators of expected ongoing growth.

Table 3: Primary Participants' Service Descriptions by Term, Year 1 and Year 2

Year	Term	Number of primary participants*	Number of primary participants who received direct (SSA grant subsidized) financial support	Number of primary participants who received extra or targeted supports	Number of primary participants who received targeted STEM pathway and/or STEM career counseling
Year 1	Spring 2014	448	111	103	101
	Summer 2014	786	758	548	505
Year 2	Fall 2014	2,423	1,266	1,702	867
	Spring 2015	2,942	1,072	1,883	935
	Summer 2015**	Pending	Pending	Pending	Pending
Total		6,599	3,207	4,236	2,408

* Primary participants are community college students who participate in STEM Starter Academy grant funded programs/events/activities (i.e., participants who have an ID number assigned by their college).

** Data from the summer 2015 collection were not available for this report, but will be included in the Year 2 Annual Evaluation Report.

Secondary Participants – Events and Activities

Table 4 summarizes the number of secondary participants by term, as well as the number of events and activities that were facilitated by campuses for secondary participants. In total, during the fall and spring of Year 2, 6,759 students participated in secondary activities such as “college and career” days, open houses, and visits by SSA representatives to local high schools. Two hundred-twelve such events and activities were held. More thorough descriptions of these events and activities are included later in the findings section of this report. For comparison, in the spring of Year 1, sites reported 5,662 secondary participants and 173 events and activities.

Table 4: Secondary Participant and Event Count By Term, Year 1 and Year 2

Year	Term	Secondary Participants*	Number of events and activities
Year 1	Spring 2014	5,662	173
	Summer 2014	2,545	49
Year 2	Fall 2014	1,741	56
	Spring 2015	5,018	156
	Summer 2015*	Pending	Pending
Total		14,966	434

* Secondary participants are individuals who are not currently enrolled at a community college and participate in STEM Starter Academy grant funded programs/events/activities (i.e., participants who do not have an ID number assigned by their college).

** Data from the summer 2015 collection were not available for this report, but will be included in the Year 2 Annual Evaluation Report.

Fall Site Visit Summary

UMDI evaluators visited 4 of the 15 STEM Starter Academy sites in November and December 2014: Berkshire, Bunker Hill, Massasoit, and MassBay. This section summarizes data collected during those visits and is organized to reflect the structure of the current SSA Model. For more detailed summaries of each of the four sites, including student feedback, see Appendix A. For a complete description of site selection methods and data collection and analysis procedures, please see the Methods section of this report.

Overview

Fall programming at SSA sites reflected a dual focus: recruitment and readiness activities for a new cohort of students, and retention and completion supports for current SSA students. Although program models continued to vary across sites, by late fall site administrators had many reflections on which elements were showing promise for bringing students into and moving them through the community college STEM pipeline. Berkshire highlighted the success of a new recruitment model that brought more students to SSA from local high schools. Bunker Hill and Massasoit (using different strategies) highlighted their students' success in progressing through developmental mathematics. MassBay emphasized the impact of their industry mentorship and internship programs in preparing students to complete and move on to careers. The following sections briefly capture data about SSA activities at the four sites at the time of our visits.

Recruitment and readiness

Early recruitment and outreach. Every site was engaged in recruiting for SSA in fall 2014. Across the four sites, recruited populations included current high school students, incoming community college students, and current community college students.

Highlights

- Berkshire piloted a high school liaison program as a recruitment initiative in fall 2014 that involved offering stipends to high school staff and faculty to help recruit for SSA and report on recruiting numbers.
- Massasoit faculty taught developmental mathematics in area high schools using the modularized self-paced curriculum used in its summer bridge program. The initiative moved students toward readiness for college-level mathematics while improving the relationship between the college and area high schools.

Summer bridge programs. All four sites offered a free or low-cost summer bridge program focused on (1) boosting students' awareness and interest in STEM careers and programs, and/or (2) preparing students to enter STEM fields in college. These programs ranged in length from ten days to eight weeks. Three sites included accelerated coursework: two offered developmental mathematics and one offered engineering and digital imaging. The fourth site included placement test preparation in developmental mathematics. Two sites offered \$1,000 stipends to students who completed summer bridge activities; the other two did not offer stipends but provided free meals (and one of these charged a \$100 fee).

Highlight

- Bunker Hill followed its STEM-contextualized, group-work oriented, accelerated mathematics summer bridge program with a three to four day workshop designed to reunite student cohorts and prepare students for gateway STEM courses.

Retention and completion

Academic year engagement and support. All four sites used SSA funding to continue to engage and retain students through the academic year. Coordinators were a central support at each campus, maintaining contact with SSA students and connecting them to other resources. STEM-themed speakers, events, and workshops were also widely held.

Highlights

- Berkshire started a support program in the fall for students who had completed the summer bridge that included engagement and support activities, such as peer mentorship, seminars on college success and STEM careers, field trips, cohort meetings, and check-ins with faculty. Students who completed the requirements of the fall support program were offered a scholarship for the spring semester.
- Massasoit piloted a “STEM Scholars” program to engage SSA students in leadership activities and to encourage relationship building among STEM students and between students and faculty/staff.
- MassBay held a “STEM Expo” each semester during which current STEM students presented their final projects and interacted with other community college students, prospective students from local high schools, and local industry representatives.
- Bunker Hill offered free accelerated mathematics clusters and workshops to current STEM students with developmental mathematics placements in the fall and the spring.

Internships, research experiences, and mentorship. Two sites used SSA funding to offer experiential opportunities to connect students to and prepare them for STEM careers. Massasoit equipped a lab and started an ongoing research project that was supported by a rotating slate of adjunct faculty. Students were offered paid research internships during the summer and the academic year, working on either a genomics project, or a “native pollinators” project. MassBay supported two technology-based internship programs through SSA: one on-campus program through which students interned at the college’s technology help desk, and one off-campus program through which students attended interview preparation workshops (including resume preparation) before participating in a “speed networking” event with prospective internship sites.

Highlight

- MassBay piloted a mentorship program in fall 2014 that paired current STEM students with mentors who were professionals at a local biotechnology company.

Tutoring and academic support. Three sites invested SSA funds in additional tutoring and instructional support for STEM fields during the academic year, including classroom-embedded “learning specialists” and faculty who facilitated study groups.

Summer Site Visit Summary

UMDI evaluators visited 5 of the 15 STEM Starter Academy sites in July and August 2015: Cape Cod, Mount Wachusett, Northern Essex, North Shore, and Roxbury Community Colleges. The summer site visits differed from the fall 2014 visits in that they covered a considerably longer time span. While the fall visits reflected SSA programming in the summer and fall of 2014, the summer 2015 visits examined SSA programming over the course of fall 2014, spring 2015, and summer 2015. This section summarizes data

collected during four of those five visits and is organized to reflect the structure of the current SSA Model, which focuses on two goal areas: (1) recruitment and readiness, and (2) retention and completion.⁷ For more detailed summaries of each of the four sites, including student feedback, see Appendix B. For a complete description of site selection methods and data collection and analysis procedures, please see the Methods section of this report.

Overview

With the exception of Roxbury Community College, Year 2 programming at SSA sites demonstrated dual focuses on the recruitment and readiness of high school and/or incoming students, and the retention and completion of current community college students. Notably, Roxbury concentrated on its summer STEM camp which targeted 9th- and 10th-grade students. Administrators at all four institutions were positive about the overall trajectory of their SSA programming and identified standout accomplishments from the past year. Mount Wachusett highlighted the benefits of the strong cohort model of its Summer Academy, where incoming students share the same experiences—including field trips, speakers, workshops, a community service project, and sometimes courses—and thus build peer relationships, supports, and networks. Northern Essex and North Shore each emphasized the Year 2 expansion of their academic supports, which included tutoring, peer mentoring, and supplemental instruction. Roxbury highlighted the experiential nature of its summer STEM camp for younger high school students, which included lab-intensive classes in multiple STEM disciplines, several field trips, and team-based classroom projects such as a robotics competition. Program models continued to vary substantially across sites. The following section, however, identifies SSA activities among the four sites that were similar in spirit, intent, or design and highlights examples of these common program components.

Recruitment and readiness

High school student outreach and recruitment. Every site engaged in outreach and/or STEM awareness activities with local high school students. Some of these activities were designed to directly recruit high school students into specific SSA programs (e.g. Summer Academy, dual enrollment). Others were designed to more broadly promote awareness of STEM majors and careers and to communicate the advantages of community college education.

Highlights

- Mount Wachusett's STEM Awareness Day targeted high school seniors—as well as current MWCC general studies students—who had demonstrated an interest in STEM careers and majors. The event included STEM-career-centered presentations and a workshop addressing financial literacy and financial aid.
- Northern Essex implemented two SSA components designed to introduce local high schoolers to the college and STEM. The college offered an after-school program twice per week throughout the academic year for underserved local high school students that focused on technology-related activities. Northern Essex also held college-for-a-day events where high school students visited the college to tour the campus, observed STEM class lectures, spoke with current students and admissions staff, and sometimes engaged in course activities.
- North Shore offered STEM Career Days where industry professionals gave presentations about their businesses and their experiences in STEM fields to area high school students and some current college students.

⁷ Data collected during UMDI's site visit to Cape Cod Community College are not included in this analysis because the visit occurred close to the date of this report. Data from all site visits will be included in the Year 2 Annual Report.

- In Year 2, Roxbury expanded the target population for its Summer STEM Camp beyond its partnership with one local high school and aggressively recruited students from underrepresented populations throughout the Boston and Metrowest areas through direct contact with parents, churches, and other community institutions.

College and STEM readiness programming for high school students. In addition to general awareness and outreach activities, each site also implemented no-cost programming designed to prepare high school students for college, STEM majors, and STEM careers. These SSA program components varied in duration and intensity, and were offered at different points throughout the year. In addition to preparing students for college-level work, most components were also designed to give students the opportunity to become familiar with campus, classrooms, faculty, staff, and available academic supports at the colleges.

Highlights

- Mount Wachusett partnered with four area high schools to implement its Math Modeling program, where high school teachers use MWCC-developed developmental mathematics curriculum to get high school students ready for college mathematics. As part of the program, Mount Wachusett provides a dedicated mathematics professor who offers regular check-ins and as-needed assistance to high school instructors implementing the curriculum.
- Northern Essex offered a spring-semester bridge program for local high school seniors who had expressed great interest in STEM majors and careers, planned to attend community college in the fall, and who had underperformed on academic assessments. Participants received a college orientation, which included a visit to the campus, and took developmental coursework in mathematics and reading.
- North Shore developed its dual-enrollment program which enables local high school students to take free college STEM courses on campus during the fall, spring, and summer semesters. After attending a mandatory orientation, dual-enrollment students receive free textbooks and are supported through tutoring and peer mentors.
- Roxbury held a free summer STEM camp for over 70 younger high school students. The camp included non-credit courses in six STEM subjects taught in the college's labs and classrooms, as well as several field trips. The camp was designed to familiarize students with college-level academic expectations and with a variety of STEM fields and career pathways. Participants were also paid a modest stipend.

Retention and completion

Scholarships and other financial assistance. Administrators at the four sites stressed the importance of making community college education affordable and therefore accessible. Two of the sites used SSA funds to establish scholarships to help students pay for their classes and thus progress toward completing their degrees. Notably, Northern Essex also developed a lending library where students can obtain textbooks and access codes they could not otherwise afford.

Highlights

- In addition to its lending library, Northern Essex also offered STEM retention scholarships to currently enrolled students that can help cover the costs of tuition, fees, books, and supplies that exceed students' "free aid," such as Pell grants. These scholarships are awarded based on flexible need and merit criteria that focus on students' demonstrated interest in STEM,

academic promise, and the potential risk of the student dropping out if financial support is not provided.

- North Shore developed a competitive SSA scholarship program offered in the spring and summer semesters that targets students who are already signed up for nine credits in a semester and who want to add another four-credit STEM class to their course load.
- While Mount Wachusett did not use SSA money to fund a scholarship, the SSA recruiter, faculty, and administrators supported and encouraged participants in the college's STEM Starter Summer Academy to apply for an NSF-funded scholarship once they matriculate in the fall semester. Notably, even before the academy students are fully matriculated, Mount Wachusett endeavors to make college as affordable as possible by providing the credit-bearing summer academy courses at no-cost and offering a sizable stipend.

Tutoring, mentoring, and other academic support. Two of the four sites—Northern Essex and North Shore—made substantial expansions of their tutoring, peer mentoring, supplemental instruction, and other academic supports. Mount Wachusett incorporated more informal academic support and mentorship elements in their summer program components.

Highlights

- In Year 2, Northern Essex increased the number of STEM courses with supplemental instruction, added tutoring hours, and introduced targeted support for health professions students. Notably, the expanded supplemental instruction was implemented in classes that usually draw the most STEM majors.
- North Shore developed an extensive peer mentoring program. Peer mentors are assigned to a particular STEM program and group of students who they keep in touch with regularly and provide individualized support. Peer mentors provide general assistance in navigating academic issues as well as tutoring support. In Year 2, the college increased the overall amount of STEM peer and professional tutoring in its Lynn and Danvers tutoring centers. Of note, an SSA coordinator also provides considerable support to current college and dual-enrolled STEM students, for instance by overseeing the peer mentors and the college's STEM club.

Mount Wachusett does not offer formal academic-year supports to Summer Academy students who matriculate at the college. However, the academy is specifically designed to encourage students to form strong academic habits, such as seeking out tutoring and advising services. The academy also intentionally builds participant-faculty relationships and peer-to-peer supports which can be leveraged during the academic year.

Year 1 Review: Site Report and Fall Interview Summary

The information in this section comes from two data collection activities in fall 2014. First, SSA sites submitted reports summarizing and reflecting on their spring and summer Year 1 activities. Second, UMDI conducted interviews with SSA site administrators and coordinators focused on fall 2014 activities.

Year 1 of SSA yielded much learning for sites. This section summarizes reflections on promising practices, challenges, benefits, and cross-cutting considerations mentioned in grantee site reports or interviews. A brief summary of fall 2014 activities follows.⁸ For a complete analysis of the Year 1 site reports, see the Year 1 Site Report Analysis in Appendix C.

Benefits

In their Year 1 Site Reports, grantees were asked to describe the most significant benefits to their institutions as a result of SSA to date. Extra capacity was by far the most-mentioned benefit. In particular, site administrators commented on increased capacity to:

- develop and implement activities to engage, motivate, and retain students,
- coordinate and leverage resources both within a campus and between campuses and other institutions,
- develop sustainable infrastructure to support STEM programming, coursework, and pathways, and
- reduce barriers and provide support to students.

Reflections on Promising Practices from Year 1

Having seen SSA through its first fall semester, administrators at SSA sites highlighted practices that their experiences in Year 1 suggested were contributing to the SSA goals of recruitment, readiness, retention, and completion.

Recruitment

- Relationships built with high school partners during first year efforts (including both recruiting and teaching activities) were showing promise for recruiting second year cohorts.
- Involving community college faculty in recruiting efforts was engaging for prospective SSA participants.
- Current and former SSA participants are effective recruiters, both in deliberate recruiting interactions and in spreading word of mouth.

SSA Voices

*"Over the summer, we had to proactively search out research intern students. This fall ... they're already lining up for next semester. I'm getting tons of emails. So **word of mouth is working.**"*

Massasoit administrator



*"There are many students who had taken the developmental courses before, not passed them and then passed them in this format **When you look at the nation-wide data and then you look at a success rate of 93% in this cluster, it's staggering.**"*

Bunker Hill administrator



"Our students are integrated on this campus ... [they] are immersed ... in a way that we didn't anticipate."

STCC administrator

Promising Practices

Berkshire boosted their recruitment by offering small stipends to STEM teachers and guidance counselors at local high schools to help with recruitment efforts for SSA.

⁸ A detailed report of spring and summer 2014 activities was included in the Year 1 Annual Evaluation Report.

- Offering stipends to high school faculty and guidance counselors to act as liaisons for SSA boosted recruitment efforts.

Readiness

- Innovative curriculum and pedagogy in developmental mathematics, combined with expanded supports, helped students understand concepts, accelerate their progress, and build confidence.

Faculty also benefitted from curricular innovation by growing professionally and building relationships with their colleagues.

- A combination of support and experience prepared students for college and helped them feel integrated into their campus. Strategies included college skills workshops or classes, and credit-bearing coursework combined with intensive support from coaches, advisors, faculty, and tutors.
- Structured requirements created a foundation for student success.

Retention

- Connections to peers—built through intensive summer programs, STEM clubs, and community service projects—helped students stay academically engaged.
- Improved curriculum helped students feel successful and remain engaged.
- Strong networks of academic and social support, including tutoring, supplemental instruction, peer mentoring, STEM advising and coaching facilitated students' transition into and through the academic year.
- Relationships with specific “go-to people” created a sense among students of being looked after and facilitated students asking for help or advice.
- Informal advising by faculty during class helped students stay connected to opportunities.
- Using campus data systems to track student enrollment and performance allowed administrators to make data-linked decisions about their SSA programs and identify students who needed support before they were in danger of failing.
- Coordination between divisions and programs made it easier for students to access support.

SSA Voices

“SSA ... has solidified in the minds of a lot of the guidance counselors and faculty at the high schools that there is a defined [STEM] pathway through the community college ... either into a job or into a 4-year institution.”

Cape Cod administrator



“We find that students don't understand the significance of the transition from community college to that four-year institution. By exposing them earlier, it makes for a less traumatic change when they finally enter into a four-year program.”

STCC administrator



*“Instead of having everybody out doing different little things and then falling all over each other, now we go out and talk ... **it's intuitive, but without the funds, it probably would not have happened.**”*

Bristol administrator

Promising Practices

Bunker Hill developed accelerated, contextualized mathematics “clusters,” that incorporated “growth mindset” pedagogy. Students in these “clusters” passed at rates that far exceed national averages.

Completion

- Research experiences and job shadowing internships built student confidence and engaged them in thinking about STEM-field careers, all while teaching “soft skills” such as time management, self-regulation, and problem solving.
- Connecting students to mentors with STEM industry or disciplinary experience provided valuable opportunities for role modeling and helped students feel that a path to a STEM career was more realistic.
- Career-themed speakers helped students consider new fields and career possibilities.
- Designing curriculum with input from industry and transfer schools helped students learn industry-standard tools while easing the transition between community college and a career or four-year college.
- Maps of STEM pathways through the community college helped students plan ahead by specifying necessary courses and their sequences. Such maps were especially helpful when they included information about when courses were typically offered (term and sometimes time slot).

Challenges in Year 1

Timing and recruitment were the most commonly cited Year 1 challenges in the site reports and interviews. These challenges themselves were related, as most sites said timing was one of the primary challenges to recruitment in Year 1. Staff and administrators were faced with a very rapid program start-up, and students were faced with short timelines for testing and decision making.

Other timing-related challenges mentioned by sites included establishing infrastructure and systems; finding, hiring, and training staff; developing data tracking systems; and establishing stipend dispersal mechanisms. Most sites noted that these were start-up challenges that were not anticipated in Year 2.

Aside from timing and recruitment, sites raised several other challenges that are summarized below.

Resources

- The resource-intensive model is effective, but budget cuts and the uncertainty of funding make it difficult to sustain staff positions.
- A shortage of available physical space creates challenges for course scheduling. It is also difficult to identify space that can be set aside as study space for students.

SSA Voices

*“Only faculty who wanted to do this did it, volunteered if you will. That was before they knew I was going to pay them. So my faculty were doing this because it was **a mission of the heart.**”*

Roxbury administrator



*“[SSA] has made us **more purposeful** ... about coordinating recruiting across campus ... because we’ve been able to fund this coordinator to help with that. ... We now have someone who has the time not only to go out and do the recruiting, but also to call a meeting and ... think about what we’re going to do here.”*

Greenfield administrator



*“The group that is doing this work **continues to develop relationships.** It’s a crosswalk of the campus—every department, really.”*

Northern Essex administrator

Promising Practices

Greenfield expanded hours at its “Math Studio,” a learning space staffed by mathematics faculty where students can come to work together, use resources such as calculators and textbooks, or get help from faculty.

Relationships

- Negotiating differences between departments or divisions in terms of advising students about academic or career paths was challenging for some. For example, a couple sites noted that advisors would sometimes tell students to take a semester away from mathematics, which was the opposite of what many SSA administrators wanted for students. Another site noted that faculty advisors were sometimes reluctant to advise a student away from their department, even if that might be better for the student.
- It was a challenge at some sites to get some faculty to engage with new curricular or pedagogical initiatives that were key parts of an SSA program. Faculty sometimes felt they did not have the skills or the time and staffing resources to engage in a more experientially-oriented curriculum.

Recruiting

- Many sites found it difficult to recruit students for summer programs because of students' competing responsibilities (e.g., summer jobs, sports) or challenges (e.g., lack of transportation).
- Many sites found it challenging to develop relationships with high schools, where administrators had many other competing priorities and often did not prioritize community colleges.
- It was difficult to get current community college students to attend campus SSA events, partly because of competing schedules (especially with jobs), and also because many students do not spend time on campus outside of their class periods.

Measurement

- Sites found it difficult to know how to demonstrate the impact of their awareness and recruiting efforts.
- A few sites had problems either getting students to complete self-reports (e.g., by signing an attendance sheet at a tutoring session) or in trusting students' self-reports (e.g., asking students if they formerly participated in any secondary SSA activities).

Cross-Cutting Considerations

A few cross-cutting themes emerged from sites' reflections on their first year SSA implementations, many of which were captured in the UMDI SSA Year 1 Evaluation Report. These included reflections on recruitment strategies, program length and intensity, stipends and incentives, peer

SSA Voices

"[The internship] was a good way to see a different side of IT. The company was using a different platform than I was used to, so being able to figure out how to do that was something I couldn't learn in school."

MassBay student intern



*"You [would normally] lose the students between the developmental classes ... [whereas] in the self-paced class ... **we're not having that drop out between semesters** ... they actually ask to work over the summer, they ask to work over [the] breaks."*

MassBay faculty



"The ability to give students this [research] experience has been really positive because it teaches them that they have to be planful [and] they have to self-regulate. ... These are ... the things that employers, when they talk to us [say they are looking for]."

Massasoit administrator

Promising Practices

Middlesex supports their peer mentors by training faculty to support peer mentors, creating opportunities for regular check-ins, and setting up a blog where peer mentors can share their experiences with each other and with staff.

mentoring, sustainability, and working groups.⁹ Some reflections that emerged across site reports and fall interview data are highlighted here.

Strong relationships on and off campus were critical to programmatic success. On-campus relationships that supported success included faculty buy-in, administrative support, synergies with other grant-funded initiatives, and collaboration across divisions and departments. Off-campus relationships that supported success included cross-campus collaboration, relationships with high school faculty and staff, and relationships with community organizations, industry partners, and four-year colleges.

Stipends and incentives often motivated students, but needed to be carefully administered and were difficult to sustain. SSA sites had mixed sentiments about stipends, incentives, and other financial assistance to students.¹⁰ Many sites felt that stipends and in-kind incentives, such as textbook assistance and lunch stipends were effective motivators or even enablers of participation in SSA programs, but a few did not. Larger stipends required explicit systems of accountability that some sites had not fully prepared. A few sites planned to significantly reduce or eliminate their stipends, in the interest of sustainability, but worried about the effect of this change on the number or quality of participants they would be able to recruit in Year 2.

Credit, intensity and variety of coursework needed some adjustment. Several sites' experiences in Year 1 led them to reconsider the type of credit and non-credit coursework they offered as part of SSA. A few site representatives felt they had included too much content either into a single course (e.g., a college success course) or into the series of courses offered in a summer bridge (e.g., too many developmental subjects or too many college-credit courses). A couple sites decided to switch from a single-subject STEM course (e.g., engineering) to a survey course covering a range of STEM disciplines. Sites that ran summer programs with a rigorous single-subject mathematics focus generally reported that this rigorous focus was effective at accelerating students' progress.

Fall 2014 Activities Summary

In this section, we summarize the data on fall 2014 activities captured in interviews with SSA site administrators over the phone and during site visits in between November 2014 and March 2015. The fall 2014 term was a period of overlap in terms of the SSA initiative, because the deadline for expending FY14 funds was extended to December 31, 2014 but FY15 officially began on July 1, 2014. Detailed data about fall 2014 activities were not requested in the Year 1 site reports (see complete analysis in Appendix C). Also, because of reporting deadlines, data about fall 2014 SSA activities from interviews and site visits were captured only in brief in the UMDI Year 1 SSA Evaluation Report.

With some exceptions, sites had a much more similar range of activities in the fall than in the summer. Every site was engaged in recruiting for spring and summer SSA activities, supporting incoming and existing students with tutoring and other forms of academic and social support, and offering STEM career and STEM engagement activities. About half of the sites were engaged in curriculum development or professional development. Half offered some sort of coursework through SSA, most in developmental mathematics, and a few included high school students. Half continued to build infrastructure to support teaching or program development. A handful of sites developed peer mentoring programs; offered scholarships, tuition support, or textbook lending; or connected students with research experiences or internships. Selected illustrative examples and promising practices related to student support and STEM career engagement activities are included below.

⁹ Please see the Future Considerations and Lessons Learned sections of the UMDI Year 1 SSA Evaluation Report for greater detail (pp. 15 and 63, respectively).

¹⁰ Read more in the UMDI Year 1 SSA Evaluation Report Future Considerations and Next Steps section (p. 16).

Student support

- Most sites had coordinators, advisors, or coaches who maintained contact with summer SSA participants during the fall.
- Several sites ran peer mentoring programs. At North Shore, peer mentors actively reached out to students in their program at critical points in the semester. At Middlesex, peer mentors were mentored themselves by trained faculty.
- Most sites supported expanded STEM tutoring, supplemental instruction, learning specialists, or facilitated study groups.
- A few sites offered financial support through scholarships tied to program participation or credit accumulation, or through textbook-lending programs.
- Middlesex offered casual workshops on college success topics with free food.
- Berkshire offered a multi-element support program linking required participation in academic, career, and social support activities to a spring scholarship.

STEM career engagement activities

- MassBay started a mentorship program linking current STEM students to industry professionals.
- Most sites offered STEM-themed clubs, speakers, and workshops. Student clubs often presented leadership opportunities for participants. For example, at Bristol and Cape Cod, STEM club students led workshops for middle school students, and at Massasoit, students chose and invited the seminar speakers.
- Many sites held STEM career and college awareness events that targeted high school students.
- Some sites supported professionalization experiences. For instance, Springfield Technical sent students to a Society of Women Engineers conference, and Middlesex sponsored student memberships in professional scientific organizations.

DHE Interview Summary

On September 16, 2015, the UMDI project manager conducted an hour-long telephone interview with the DHE Associate Commissioner (hereafter, “the Associate Commissioner”) and the Executive Director of STEM for the Massachusetts Department of Higher Education (hereafter, “the Director”) who direct the STEM Starter Academy Initiative. The purpose of the interview was to explore the Associate Commissioner and Director’s perspectives on the successes and challenges of Year 2. See complete interview protocol in Appendix D. Key findings from that interview are summarized below.

Successes

This section summarizes the DHE interviewees’ reflections on the major successes of the second full year of program implementation. They cited the formalization of the SSA program model, improved understanding of what is measured, sites’ flexibility and commitment, working group collaboration, and the formalization of the Director’s role as the chief accomplishments in Year 2.

Formalization of the SSA program model. In Year 2 DHE and sites established a more consistent set of definitions and practices. This has provided greater clarity to sites regarding the

parameters and goals of the program. Greater clarity allowed sites to adhere more closely to the intention of the program while also allowing for local latitude and adaptation.

Improved understanding of what is being measured. Based on a model that codifies definitions and practices, DHE refined their understanding of what program components it is trying to measure. Common definition of program components allowed DHE to more thoughtfully connect measurements and outcomes with design.

Sites' flexibility and commitment. The Director noted that a successful facilitating factor in the formalization of a program model was sites' willingness engage in the conversation and to "stick with it" over the course of the year. She noted that instead of being resistant, sites were thoroughly engaged in creating a common understanding across the campuses and were accommodating as the program model evolved. The Associate Commissioner said that the high level of engagement was evident in monthly conference calls, in collaboration with UMDI on evaluation issues, and during the annual convening.

Working group collaboration. Collaboration between the Measurement Working Group and the Model Working Group was essential to the creation of the "reverse engineering document" that refined the structure, goals, metrics, and supporting strategies for the SSA initiative. The Director deemed this collaboration to be "fantastic" because it resulted in the identification of important program components, as well as the identification of strategies for measuring those components.

Formalization of the Director's role. Having the Director play a more prominent and formal role has been helpful, and her contributions to the program during Year 2 were manifold. She was integral in engaging sites around model development and pushed for increased consideration of measurement and outcomes. Her expanded role brought a greater level of leadership and time investment to the program. The Associate Commissioner noted that the Director's expanded role has allowed the Director to invest time in promoting sharing of best practices between the sites and facilitating other connections among the campuses.

Challenges

The following section summarizes the primary challenges encountered in Year 2 according to the DHE interviewees. Notable challenges included the preparation of the first legislative report, state budgetary issues impeding scale-up, understanding SSA's connection to other campus programs and systems, and defining STEM majors.

Preparation of the first annual legislative report. Preparation of the first annual report was complex and demanding because it required the synthesis of many elements, including the UMDI evaluation findings, site reports, and a summary report developed by DHE. In addition to compiling an extensive amount of information, DHE discovered it was challenging to balance the need to provide rich detail and depth that can inform future practice and research with the need to succinctly communicate the successes of the program to different audiences.

State budgetary challenges impeded scale-up efforts. Massachusetts' 9c cuts resulted in sites' retraction of their plans to expand student participation in Year 2. In addition to reducing the ability to reach more students, the cuts also affected DHE's understanding of the scale-up process—including potential barriers and facilitating factors.

Understanding SSA's connections to other campus programs and systems. DHE said they were uncertain about the degree to which SSA has become part of the "fabric" of the community college

campuses. More specifically, DHE would like to know more about how sites are communicating what SSA is to students, whether the sites view SSA as an “integral part of the way that they do business,” whether stakeholders—besides primary SSA program administrators—know about the program, and whether students, staff, and faculty come to learn about SSA through different, non-SSA avenues, departments, or offices.

Defining STEM majors. DHE observed that there was inconsistency in the way in which sites defined STEM majors. DHE said that some sites considered healthcare fields to be a part of STEM, and some did not. The Director noted that it is important to establish common definitions in order to allow for consistent measurement across campuses.

Emerging Best Practices

DHE interviewees were asked to reflect on promising or best practices that became apparent during Year 2 implementation. Interviewees indicated that fostering sharing opportunities and facilitating the reporting process was a positive practice that emerged.

Support for collaboration and reporting. The Director noted that sites were often able to grow and improve effectively when they could build on other sites’ successes. Providing opportunities for sites to share “in a rich way” and to “explore what [they] can do to have a similar experience” is critical to improvement. Current means of sharing have included conference calls, but most effectively take the form of one-on-one connections between stakeholders at different sites facilitated by the Director. She notes that sites often make these individual connections on their own as well. Facilitating reporting has also been important to improving DHE’s understanding of sites’ program components, challenges, and successes. This year, DHE implemented a common reporting structure to make the reporting process easier. The Director also notes that it has been very beneficial to conduct site visits where she can see programs in action and identify trends across the sites.

Other Reflections

DHE interviewees also offered general reflections on the Year 2 implementation process at the site and program levels. The interviewees discussed the tension between infusing SSA into campus systems while also maintaining program boundaries, the current shift toward clarity and measurement in Year 3 planning, sustainability concerns, and the lack of integration of SSA with other state-level STEM pipeline programs. These four topics are addressed individually below.

Embedding SSA in campus systems while maintaining program boundaries. As previously mentioned, DHE is interested in learning the extent to which SSA is integrated into the larger community college campuses. While DHE representatives want SSA to be interwoven into the campus environment, they realize there is a tension with their need to maintain clear boundaries between SSA and other programs and initiatives.

Requiring clearer and more measurable Year 3 plans. As a result of DHE’s shift to a greater focus on measurement and communicating successes, the sites are asked to draft clearer and more measurable Year 3 plans. The request for greater clarity and planning around measurement is intentional. It reflects the maturation of the program, as well as DHE’s prioritization of gauging outcomes and conveying successes and best practices.

Sustainability. Sustainability has continued to be an important topic among DHE and the sites. DHE identified a few program components that are at risk, including site coordinators or other staff

whose positions are supported by SSA funds, UMDI's program evaluation services, and stipends for participants. The Associate Commissioner noted that sites are aware of that the prospect of continuing to issue stipends is untenable and that he believes that many are already pulling away from that component.

Lack of integration of SSA with other STEM pipeline programs. While DHE is unclear as to the extent SSA is integrated into sites' greater college environment, the department has not "deeply" incorporated SSA into other STEM pipeline initiatives.

Next Steps

Finally, DHE interviewees discussed their vision for next steps in program implementation. They focused on the need to build on previous sharing of best practices, improve communication between sites, and improve dissemination of program successes.

Improve sharing across sites. Next year, DHE would like to increase and enhance the sharing of best practices across the sites and among stakeholders. The Associate Commissioner noted that DHE has not really connected similar sites for collaboration opportunities. Sites could potentially benefit from such activities if they are similar in terms of size and scope, not just location or region. There is no current forum or structure that allows sites to share their reports, and DHE could create a structure for this kind of communication. Sites reportedly want more face-to-face events, and DHE intends to provide them with additional opportunities—for example, by having two annual program-wide convenings. DHE would also like to facilitate field trips to different summer bridge programs for sites' SSA coordinators. Also, the Director noted that, going forward, she would like to support discussions of best practices that are based on data.

Methods

This report includes information collected through the following eight data collection and technical assistance activities.¹¹ Data from the Year 2 site reports (survey and narrative) are not included in this interim report, but will be included in the Year 2 Annual Evaluation Report.

Supplemental Participant Data Requests

At the conclusion of each term (fall 2014, spring 2015, summer 2015¹²), UMDI collected additional data about SSA participants from all grantees through a supplemental student data request, submitted through DHE. Each collection was in two parts: one for primary participants and one for secondary participants. Primary participants were defined as community college students who participated in programs, events, or activities funded by the STEM Starter Academy grant (i.e., participants who have an ID number assigned by the college). Secondary participants were defined as individuals who were not enrolled at a community college and participated in SSA-funded programs, events, or activities (i.e., participants who do not have an ID number assigned by the college).

Data collection instruments were designed in consultation with DHE and can be found in Appendix E and Appendix F. Data about secondary participants were collected in the aggregate. The instrument collected a count of SSA events and event participants. Individual identifying information was collected for primary participants. The collection included student identification number, campus, and term; an indicator of whether or not the participant had been previously reported as a secondary participant; and indicators of each participant's receipt of SSA-funded financial support, targeted support (such as tutoring or peer mentoring), and counseling about STEM pathways and careers.

Based on the activities and metrics included in the SSA model (developed during Year 2), two additional fields related to developmental mathematics were included in the summer 2015 primary participant collection. These fields were designed in consultation with DHE and grantees. One field indicated whether or not the student participated in an SSA-sponsored developmental mathematics intervention (e.g., developmental mathematics course, non-credit workshop) during the current reporting period (summer 2015). The second field indicated whether or not the student was a developmental mathematics intervention participant during the current reporting period and also fulfilled all developmental mathematics requirements for the institution by the end of the current reporting period.

Primary participant data were submitted by grantees directly to DHE. UMDI worked with DHE to access de-identified primary participant data that had been aligned with the HEIRS (Higher Education Information Resource System) outcome and enrollment data that are regularly submitted to DHE by each college.

Phone Interviews – Fall 2014 and Winter 2015

UMDI conducted one-hour telephone interviews with one to two individuals at each of 11 sites in fall 2014 and winter 2015. The remaining sites were visited (see below). Interviews were typically conducted with both the primary SSA administrator and an SSA coordinator (where such a position existed). The interview protocol was developed in collaboration with DHE and focused on fall SSA activities, reflections on SSA implementation to date, plans for program sustainability, and next steps in program

¹¹ For reference, the Year 2 SSA evaluation plan is included in Appendix G.

¹² Data from the summer 2015 collection were not available for this report, but will be included in the Year 2 Annual Evaluation Report.

implementation (see Appendix H for the complete protocol). At the time of the interviews, most sites were focused on implementing retention strategies for students who participated in SSA during summer 2014 while also recruiting and planning for summer 2015 programs. Interviews were digitally recorded with permission, summarized, and analyzed in NVivo10.

Selected Site Visits – Fall 2014

UMDI team members conducted site visits at four SSA grantee sites in November and December 2014: Berkshire, Bunker Hill, Massasoit, and MassBay. Site visit data collection instruments (interview, focus group, and observation protocols) were developed in collaboration with DHE and focused on transitioning students from summer to fall, fall retention activities, and plans for the spring and summer (see Appendix H, Appendix I, and Appendix J for protocols). Site visitors interviewed program staff using the same interview protocol as was used with the fall phone interviews.

In order to minimize the evaluation burden on grantees, UMDI did not revisit sites that had been visited over the summer. UMDI used data from the spring interviews and fall surveys to identify—from among the ten remaining sites—five that would reflect diverse program features, especially with regard to fall activities. Geographic variation was used as a tie-breaker criterion. Originally, Berkshire, Bunker Hill, Massasoit, MassBay, and Roxbury Community Colleges were selected for site visits, but a lack of response precluded UMDI from visiting Roxbury in the established timeframe.

UMDI evaluators visited each campus for up to four hours and invited sites to propose an agenda for the visit. UMDI requested that the visit include a focus group with SSA students, an interview with key SSA program staff, and an opportunity to observe SSA activities. At each of the four sites, the UMDI evaluator interviewed the primary SSA administrator and SSA coordinator. All but one visit included a student focus group. Observed SSA activities included courses, cohort / STEM club activities, and one SSA open house event.

Evaluators drafted field notes from the observations following each visit. Interviews and focus groups were digitally recorded, with permission, and these recordings were later transcribed. Observation notes were added to interview data to create site summary files, which were then analyzed in NVivo10.

Selected Site Visits – Summer 2015

UMDI team members conducted site visits at five SSA grantee sites in July and August 2015 (Cape Cod, Mount Wachusett, North Shore, Northern Essex, and Roxbury). In collaboration with DHE, site visit data collection instruments (interview, focus group, and observation protocols) were developed that focused on summer implementation while also asking sites to reflect on the past academic year (see Appendix K, Appendix L, and Appendix M for protocols). As part of the process of preparing for site visits, UMDI collected summer programming schedules from all fifteen sites (see Appendix N for a summary of these schedules).

The five sites that were visited in summer 2015 were selected from among the six sites that had not yet received an evaluation visit. In discussions about resource allocation, DHE and UMDI decided to limit the number of sites visited in favor of allocating greater evaluation resources to other priorities. Submission deadlines precluded the inclusion of data from UMDI's visit to Cape Cod in this report supplement, but these data will be included in the Year 2 Annual Evaluation Report. As with the previously conducted site visits, UMDI evaluators visited each campus for up to four hours and invited sites to propose an agenda for the visit. UMDI requested that the visit include a focus group with SSA students, an interview with key SSA program staff, and an opportunity to observe SSA activities. At four of the five sites, UMDI evaluators interviewed the primary SSA administrator and

various SSA coordinators. Student focus groups were conducted at all five sites, but students in the focus group at one site were minors, so data from that activity are not included in this analysis. Observed SSA activities included courses, leadership activities, and workshops. Evaluators drafted field notes from the observations following each visit. Interviews and focus groups were digitally recorded, with permission, and these recordings were later transcribed. Observation notes were added to interview data to create site summary files, which were then analyzed in NVivo10.

Year 1 Site Reports

All participating grantee institutions submitted Year 1 Site Reports in December 2014. The report template was developed by UMDI in collaboration with DHE. It contained primarily open-ended questions that asked sites to summarize their SSA activities from spring and summer 2014; to reflect on successes, challenges, and sustainability; and to describe their plans for FY15. See the Year 1 site report template in Appendix C1.

SSA site representatives had completed an online survey about their institutions' spring and summer 2014 SSA activities in October 2014. The survey contained some items relevant to the annual site reports. To facilitate the completion of the annual site reports and to ease the evaluation burden on the sites, UMDI repackaged each institution's responses to the survey and returned them to the sites along with a "crosswalk" document that outlined which portions of the survey responses might be relevant to each of the report sections.

To account for the overlap of Year 1 and Year 2 funding, DHE and UMDI asked sites to focus their reporting on their spring and summer 2014 SSA activities, and to only provide an overview of their fall 2014 activities to the extent it was practical.

The timing of annual site report submission was affected by 9c budget cuts to FY15 SSA funding. These cuts were announced to sites on a November 20 grantee conference call and required quick submission of revised budgets. With this additional deadline, DHE proposed that only the first section of the annual site reports (reflecting on Year 1) remain due on December 5, with the second section (describing planning for Year 2) due by the end of December.

DHE forwarded site reports to UMDI as they were submitted, and UMDI packaged these reports by lightly editing for typos and standardizing the formatting to increase readability. The content of the reports was otherwise unaltered. These repackaged reports were then returned to DHE for dissemination.

UMDI analyzed the Year 1 Site Reports using the NVivo 10 software, summarizing key themes across sites for each of the reports' sections. A complete analysis of these reports is contained in Appendix C.

Year 2 Site Reports

Not included in this interim report

During fall 2015, all participating sites will complete Year 2 Site Reports, which will include two components: an online survey and a narrative template. At the time of this report, these instruments are being developed by UMDI in collaboration with DHE and will be included in the appendix of the Year 2 Annual Evaluation Report.

Representatives from each site will receive a link to a single campus copy of the online survey. PDF copies will be provided for ease of collaboration and sharing. The narrative template will be distributed as a Word document. Both instruments will be distributed in October 2015 and be due in November 2015.

Online survey – The purpose of the online survey is to catalog and assess site-specific components of SSA implementation as they relate to the core elements of the SSA model (developed during Year 2). The survey focuses on topics that are of greatest interest to DHE and is comprised of close-ended items.

Narrative – The purpose of the narrative is to succinctly gather qualitative details from each site about SSA activities, successes and challenges, and student experiences. It gives sites the opportunity to describe their programs, explain the details of activities contained in the closed-ended survey responses, and provide descriptive elements that will add depth to programmatic and evaluative reporting.

Interview with DHE

On September 16, 2015, UMDI conducted a one-hour telephone interview with the DHE administrators of the STEM Starter Academy Initiative. The purpose of the interview was to explore the administrators' perspectives on the second year of SSA implementation and implications for Year 3 (complete protocol in Appendix D). The interview was digitally recorded with the administrators' permission. The recording was transcribed, analyzed, and summarized.

Participation in Technical Assistance Meeting

DHE convened a technical assistance meeting for SSA grantees on March 30, 2015. UMDI presented a summary of key data elements from the Year 1 Evaluation Report and facilitated a conversation around measurement and evaluation. UMDI evaluators also drafted a brief survey instrument to gather feedback on the meeting and took notes during the meeting. After the meeting, UMDI shared detailed meeting notes and a summary of the feedback data with DHE and the grantees (Appendix O).

Participation in Monthly Grantee Phone Meetings and Working Group Meetings

DHE hosted approximately monthly phone meetings with SSA grantee representatives. UMDI evaluators attended each call as observers and generated notes from each meeting for DHE to share with grantees. See Appendix P for a list of topics from each call.

UMDI evaluators also participated in the meetings of the Measurement Working Group, contributing technical assistance and taking notes. UMDI observed the Model and Sustainability Working Groups' meetings.

Technical Assistance

In Year 2, UMDI provided technical assistance to DHE and SSA sites including instrument development, assistance to sites with data collection efforts, participation in DHE planning and review meetings, participation and note taking at SSA grantee and working group meetings, and evaluation and feedback of the March 2015 grantee gathering.

Instrument Development

Over the course of Year 2, UMDI has worked with DHE to refine data collection instruments, particularly those for primary and secondary participant data collection. UMDI also participated in conversations with grantees regarding the development of future data collection instruments (e.g., a participant exit survey). Where feasible, UMDI provided document review for instruments developed and disseminated by DHE (e.g., Year 3 planning documents). At the time of this interim report, UMDI is working with DHE on developing Year 2 Site Report instruments, including an online survey and a narrative template (see Methods section for details).

Grantee Phone Meetings and Working Group Meetings

SSA grantees participated in seven hour-long conference calls between January and September 2015. The purpose of these calls was to share learning across sites, begin to outline a more uniform “model” of SSA implementation across sites, and disseminate information about budgeting and other implementation logistics. SSA coordinators or administrators joined the calls, which were facilitated by David Cedrone through April and by Allison Scheff thereafter. The primary topics of these calls were FY16 budget information, SSA Year 3 planning, and discussions around SSA model elements and measurement. See Appendix P for a list of topics by meeting. Grantees also met in person once, on March 30, for an all-day “technical assistance” gathering (see SSA Grantee Gathering Feedback section, below).

In addition to these eight all-site meetings, three SSA working groups (Measurement, Model, and Sustainability) began phone meetings in May, facilitated by Allison Scheff. The Sustainability Working Group discussed the sustainability of various elements of currently implemented SSA programs but decided to reconvene after a set of cross-campus model elements had been developed by the other two working groups. The Measurement and Model Working Groups focused on refining definitions, flagging elements as candidates for a cross-campus SSA model, and strategies for measuring those elements. At a joint, in-person meeting in July 2015, the Measurement and Model Working Groups, along with some campus representatives from offices of institutional research, reviewed and refined the emerging model elements and strategies for measuring them. Based on these various discussions, Allison Scheff drafted a “design document” that was sent to all sites for review and comment in early August.

UMDI evaluators participated in the Measurement Working Group meetings and observed the Model and Sustainability Working Group meetings. Our observations resulted in a few notable findings. First, we noted the value of Allison Scheff’s strategic facilitation of the Model Working Group in helping that group make decisions. A key issue hindering the identification of model elements at the initial meeting was a lack of clarity around the level of specificity of those elements. A focus on specific practices led site representatives to worry about how much flexibility they would have in implementation. At the second meeting, as the group discussed SSA activities included in the UMDI Year 1 Evaluation Report, Allison Scheff decided which activities were model elements and which were “promising practices” (to be nested below model elements). Although these distinctions were not well defined, this form of

facilitation allowed the group to move forward by keeping the discussion at a more general level, which created space for differentiation between sites.

UMDI's analysis of these meetings revealed that sites are not consistently defining the idea of a student "cohort." SSA grantees seem to use the term "cohort" to refer to both a socially connected group and to any group of students who started their participation in SSA at the same time, regardless of whether they have any social connection.

SSA Grantee Gathering

DHE convened a day-long meeting of SSA grantees in Southbridge on March 30, 2015. Representatives from 14 of the 15 community colleges attended. The agenda included whole-group morning and afternoon discussions of "cross-cutting topics," including recruitment, developmental mathematics, financial supports, and curriculum. UMDI provided a summary of key data elements from the Year 1 Evaluation Report and facilitated a conversation around measurement and evaluation. UMDI evaluators drafted a brief survey instrument to gather feedback on the meeting and took notes during the meeting. After the meeting, UMDI shared detailed meeting notes and a summary of the feedback data with DHE and the grantees.

The main topics covered in the day's discussion were recruiting methods and populations, approaches to mathematics, evaluation and measurement, sustainability, career preparation, financial supports, curriculum, and faculty professional development. The most extensive discussions focused on target populations for recruitment, measuring and defining a common SSA approach to mathematics interventions, and appropriate measures for evaluating and presenting a narrative about the initiative more broadly.

Participants' perceptions of the meeting were generally positive. Most respondents indicated that the meeting gave them valuable ideas and insights and provided an effective venue to share lessons learned and promising practices. Common concerns among respondents included uncertainty about FY16 funding and some unease around how the group would negotiate a more consistent framework across programs. A summary of feedback data is included in Appendix O.

Strategic Considerations

The following strategic considerations are based on the evaluation findings presented in this interim report. They are intended to facilitate action planning for SSA in Year 3.

- **DHE may wish to consider strategies for promoting connections between SSA programs and other STEM initiatives at each campus.** Cross-grant and cross-program collaboration at each site seemed to foster the identification of gaps, overlaps, and efficiencies in serving STEM/SSA students. DHE is well positioned to offer guidance and foster deliberation about the extent to which SSA can and should be integrated with other initiatives at each site.
- **DHE may wish to consider additional technical assistance activities that foster communication among sites about best practices and lessons learned.** Feedback from grantees suggests some sites have had difficulty in learning about other grantees' SSA programs. Strategies for streamlining communication and transparency might include sharing Year 3 planning documents and budgets, timely sharing of meeting notes or other documents with multi-site data, and/or concise and structured "report outs" during in-person or phone meetings. These strategies may also help the DHE engage with and highlight promising practices from less-vocal sites. DHE established a group website in Year 1, but grantees reported varying levels of familiarity and comfort with the site. Thus, sites might benefit from technical assistance regarding the use of the site, or the implementation of an alternative platform for sharing information.
- **DHE may wish to consider additional strategies to support the identification of promising practices.** Structured systems for sharing might facilitate the identification of promising practices, and DHE might then consider investing resources in investigating those practices and disseminating the findings.
 - For example, one site implemented developmental mathematics "clusters" that covered the content of two courses in a single term. The mathematics clusters combined contextualization, "growth mindset" pedagogy, and extensive academic support and resulted in 59 of 60 students completing their respective clusters. An investment in more thoroughly identifying, investigating, and communicating the practices that supported this type of success may foster systemic learning.
- **DHE may wish to consider ongoing refinement of the SSA model in order to more clearly define all core program components.** Sites continue to incorporate some common program components, such as peer support, student "cohorts," stipends, and program coordinators. DHE might consider refining the model to reflect the extent to which these practices are essential to the SSA initiative. Similarly, the initiative might benefit from more uniform definitions of some key elements, such as clarifying which fields are encompassed under "STEM."
- **DHE may wish to pursue further discussion about potential metrics and measurement approaches.** During Year 2, grantees discussed several potentially important metrics (e.g., those relevant to credit attainment or the impact of awareness and recruiting efforts) that might warrant further consideration. Additionally, sites may wish to further refine their internal systems for tracking data relevant to SSA recruitment, participation, programming, and outcomes. DHE may wish to facilitate opportunities for sites to learn from others' efforts to collect, manage, and summarize data relevant to their SSA activities.

Appendices

