



# STEM Starter Academy Annual Evaluation Report – Year 2 January 2016

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Prepared for the Massachusetts Department of Higher Education



## Acknowledgements

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### **STEM Starter Academy Annual Evaluation Report, January 2016**

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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.

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#### **About the Donahue Institute**

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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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## Executive Summary

The Massachusetts Department of Higher Education (DHE) awarded STEM Starter Academy (SSA) grants to each of the 15 community colleges in Massachusetts during FY14 and renewed those awards for FY15 and FY16.<sup>1</sup> 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 4-year college transfer. SSA sites have worked to address support service and activity gaps through extension of current programs, capacity building, or collaboration across campuses and to articulate these practices with current systems of student support. The UMass Donahue Institute (UMDI) is working with DHE to evaluate the SSA initiative, and this report presents findings from Year 2.<sup>2</sup>

An important Year 2 development was the specification of a program model for SSA, developed by DHE in collaboration with SSA sites. UMDI and DHE have collaborated to align measurement activities with the key outcomes and metrics outlined in the model. The model's goals and metrics were used to guide planning for Year 3 and also frame the reflections on Year 2 in this report.

Year 2 of SSA saw substantial participation in SSA programs across sites and the emergence of promising practices related to recruitment, readiness, retention, and completion. This report presents preliminary indicators of SSA initiative impacts, promising practices at SSA sites, and key lessons learned during Year 2. At the time of this report, no cohort of SSA participants (who joined as first-time, full-time freshman) has had the opportunity to complete (at least) two full years of courses. Thus, we do not yet have the data needed to address many questions regarding the impact of the SSA initiative on student outcomes. The executive summary provides a synopsis of Year 2 participation, outcomes, SSA strategies, and strategic considerations.

## Participation

**Key Finding:** SSA programs have served a diverse population of over 15,000 people during Year 2, and over 30,000 people since the inception of the initiative.

- ✓ **SSA-supported activities served 6,600 primary participants and 8,501 secondary participants in Year 2.**<sup>3</sup> To date, SSA has served 10,071 primary participants and 20,900 secondary participants.<sup>4</sup> SSA programs were subject to 9c funding cuts in Year 2, and these cuts may have impacted participation. Funding cuts appeared to primarily impact the number of secondary participants reached, which, over three terms in Year 2, was similar to the number reached over two terms in Year 1. Early data from Year 3 indicate that more than twice as many secondary participants were reached in Fall 2015 than had been reached in Fall 2014.
- ✓ **SSA programs continued to attract new participants in Year 2.** Over the course of the year, 5,161 primary participants were supported by SSA for the first time, about half of whom were new to their institutions and half who were continuing students. While the count of secondary participants is very high, preliminary evidence suggests that relatively few of them (4.2%) later

<sup>1</sup> Statewide 9c budget cuts reduced awards to colleges by half in FY15.

<sup>2</sup> For the purposes of this report, Year 1 includes Spring and Summer 2014 and Year 2 includes Fall 2014, Spring 2015, and Summer 2015.

<sup>3</sup> 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).

<sup>4</sup> These are counts of total participants across terms, which include duplicates.

become primary participants. This may present an opportunity to enhance recruitment efforts, and may also be a function of sites' limited ability to track recruitment efforts.

- ✓ **Primary participants reflect the diversity of the overall population of community college students.** For example, 12% of primary participants are Black or African American and 14% are Latino, while 12% of community college students are Black or African American and 16% are Latino. Similarly, 51% of SSA participants and 59% of community college students are female.

## Outcomes

**Key Finding: SSA has supported retention, full-time enrollment, and engagement with STEM – with 70% of SSA participants' degrees and certificates being completed in STEM fields.**

- ✓ **The majority of SSA primary participants who have—to date—earned degrees and certificates did so in STEM fields.** Overall, 70% of degrees and certificates completed by SSA participants were in STEM fields. This is much higher than the statewide total of 45% of below-bachelor's certificates and degrees granted in STEM fields.<sup>5</sup>
- ✓ **Fall 2014 to Fall 2015 retention rates for SSA participants are similar to—but slightly higher than—the overall retention rate for all Massachusetts community college students** (60% vs 58% for full-time, first-time degree seeking students). This is the first cohort of SSA participants for whom this data is available and this indicator will be one to watch in the future. Across all SSA primary participants in Year 1 and Year 2, 67.7% had completed a degree or certificate by July 2015, been retained to Fall 2015, or transferred to another Massachusetts public higher education institution. Directly comparable figures at the statewide level were not available for this report..
- ✓ **Full-time enrollment was 13 percentage points higher among SSA primary participants than among the general community college student population.** This is a positive initial indicator, as students enrolled full-time are more likely to retain and complete than their part-time peers.<sup>6</sup>

**Key Finding: SSA is accelerating engagement in and completion of developmental math, leading to participation in college level math.**

- ✓ **SSA participants who complete developmental math move on to college-level math classes.** Of the 197 SSA primary participants who engaged in a developmental math intervention (e.g., courses, workshops, and bootcamps) in Summer 2015, 80 (40%) fulfilled all developmental math requirements for their institution by the end of that term and 60 (75%) of those subsequently enrolled in a college-level math class for Fall 2015. Statewide, only 20% of community college students who complete developmental math coursework go on to complete a college level math course within two years, so the high rate of college-level math enrollment among SSA participants is a positive initial indicator.<sup>7</sup>

## SSA Strategies

**Key Finding: The array of strategies most widely implemented in Year 2 (summarized in Figure 1) reflects the SSA model's focus on recruitment, readiness, retention, and completion.**

- ✓ **Year 2 strategies reflected the SSA model; sites refined their recruitment and readiness strategies, and began to develop and implement retention and completion strategies.** The

<sup>5</sup> This figure includes both public and private schools in 2013. *2015 Massachusetts STEM Data Dashboard*, <http://www.mass.edu/stem/documents/2015%20STEM%20Data%20Dashboard%20FINAL.pdf>

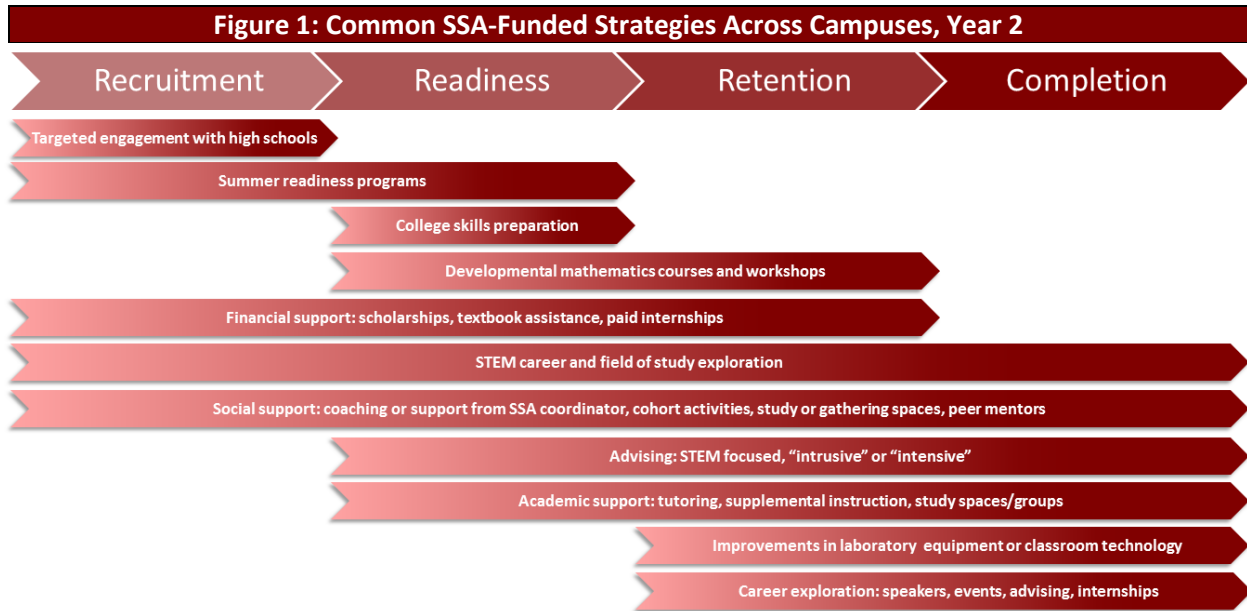
<sup>6</sup> Complete College America, *Time is the Enemy*, 2011, [http://completecollege.org/docs/Time\\_Is\\_the\\_Enemy.pdf](http://completecollege.org/docs/Time_Is_the_Enemy.pdf)

<sup>7</sup> Vision Project, *Final Report from the Task Force on Transforming Developmental Math Education*, October 2013

strategies most widely implemented with SSA support in Year 2 spanned the SSA model from recruitment to completion. More than two-thirds of sites implemented each of these strategies.

**Key Finding:** While SSA model priorities are consistently represented, there is substantial variation in implementation, reflecting adaptation to local needs.

- ✓ **The SSA model emerged late in Year 2 and sites had only begun to develop and adapt programs and supports in ways that aligned with the model by the end of that program year.** A review of similarities and differences across campuses revealed substantial variation in programming. When identifying key components of their SSA programs, only one element (summer programming) was identified as a key component by more than half of the sites. Sites using similar strategies sometimes differed in their use of SSA funds to support these strategies.



## Strategic Considerations

After the progress of Year 2, DHE and the campuses are well positioned to continue to refine the SSA model and identify and scale promising practices and key strategies. The following are some strategic opportunities for consideration by DHE.

- ✓ **Consider updating the SSA program model to represent emergent consensus regarding what its core practices should be.** Sites differ in their understanding of what constitutes a key component of SSA, and there is substantial variation in practice. Additionally, several practices that are not currently mentioned as key to the model may warrant further consideration. These include collaboration, recruitment or support of traditionally underrepresented groups, and dropout re-engagement.
- ✓ **Provide technical assistance to foster system-wide communication and resource sharing, particularly in regard to best practices and lessons learned.** Sites have benefitted from cross-campus information sharing, but continue to lack systematic information about other SSA sites' strategies. DHE might consider gathering feedback from sites about this issue and discussing strategies that would facilitate sites' sharing of key SSA strategies.
- ✓ **Continue efforts to strengthen sites' sustainability planning.** Some campuses are beginning to seek ways to diversify their funding and to enhance the sustainability and institutionalization of



SSA programs. This may be an area in which continued technical assistance and sharing is particularly important.

- ✓ **Engage campuses in aligning evaluation activities with what they locally identify as key indicators of participant progress and outcomes.** 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.
- ✓ **Consider strategies for promoting connections between SSA programs and other STEM initiatives at each campus.** Campuses offer an array of programs to promote engagement and success in STEM, and SSA is an important part of that support structure. Moving toward a thoughtful integration of these initiatives may yield substantial efficiencies and positive results.



## Introduction

The Massachusetts Department of Higher Education (DHE) awarded STEM Starter Academy (SSA) grants to each of the 15 community colleges in Massachusetts during FY14 and renewed those awards for FY15 and FY16.<sup>8</sup> 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 4-year college transfer.<sup>9</sup> Additional priorities of the initiative include campus identification of student support service and activity gaps that can be addressed through extension of current programs, capacity building, or collaboration across campuses and to articulate these practices with current systems of student support.

The UMass Donahue Institute (UMDI) has worked with DHE to evaluate the SSA initiative since the inception of the program, and this report presents findings from Year 2.<sup>10</sup> The evaluation—and this report—addresses multiple purposes: (1) to provide preliminary summative feedback about SSA student progress and outcomes relevant to the program model developed in Year 2, (2) to provide formative feedback to DHE and to the community colleges relevant to grant activities, and (3) to provide technical assistance to support DHE's efforts to implement the initiative.

This report presents preliminary indicators of SSA initiative impacts, promising practices at SSA sites, and key lessons learned in Year 2.

## 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.

### 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?

<sup>8</sup> Statewide 9c budget cuts reduced awards to colleges by half in FY15.

<sup>9</sup> SSA uses the STEM subject/employment areas that are used for the Data Dashboard: (1) Agriculture, Conservation, and Natural Resources, (2) Architecture, (3) Biological and Biomedical Sciences, (4) Computer and Information Sciences, (5) Engineering and Engineering Technologies/Technicians, (6) Health Professions and Clinical Sciences, (7) Mathematics and Statistics, (8) Mechanic and Repair Technologies/Technicians, (9) Military Technologies/Technicians, (10) Physical Sciences, (11) Precision Production, and (12) Science Technologies/Technicians.

<sup>10</sup> For the purposes of this report, Year 1 includes Spring and Summer 2014 and Year 2 includes Fall 2014, Spring 2015, and Summer 2015.

- 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?

## SSA Model Overview

Year 2 of SSA saw substantial participation in SSA programs across sites and the emergence of promising practices related to recruitment, readiness, retention, and completion. 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 contains four major components—recruitment, readiness, retention, and completion—organized into two major goals, each with related metrics and supporting strategies.<sup>11</sup> See Figure 2 for a summary of the model. UMDI and DHE have collaborated to align measurement activities with the key outcomes and metrics outlined in the model.

The model's goals and metrics were also used to guide planning for Year 3 and frame the reflections on Year 2 in this report. The SSA model emerged late in Year 2 and sites had only begun to develop and adapt programs and supports in ways that aligned with the model by the end of that program year.

**Figure 2: Summary of SSA Model Goals, Metrics, and Strategies**

|                           |  |   |
|---------------------------|--|---|
| <b>Goal</b>               | <b>Primary:</b> To increase the number of STEM graduates and certificate holders produced by the community colleges and transfer to a 4-year university or obtain STEM employment.   | <b>Secondary:</b> To increase the number of students entering STEM programs at the community colleges.  |
| <b>Metrics Include</b>    | Student retention rates, completion indicators (e.g., STEM degrees and certificates earned, transfer rates to 4-year institutions, rates of obtaining STEM employment), and measures of SSA impact on student experiences. | STEM program enrollment, program application and participation rates, developmental math enrollment, transfer rates into STEM programs of study, and changes in STEM interest following participation in SSA programs.                  |
| <b>Strategies Include</b> | Advising; academic, social, and financial support; guidance and practical experiences related to career exploration; and transfer guidance.  | Recruitment of existing community college students into STEM programs and recruitment of non-enrolled potential SSA participants (including high school students and adult populations) to the community colleges and to STEM programs. |

<sup>11</sup> The SSA model is available from DHE upon request.

## Participation

This section presents a summary of SSA participation to date. The information presented in this section comes from primary and secondary participant data submitted by sites to DHE and from DHE's Higher Education Information Resource System (HEIRS). For more detailed data on SSA primary and secondary participants, including institution-specific data, please see Appendix D.

### *Summary of Key Findings*

**Key Finding: SSA programs have served a diverse population of over 15,000 people during Year 2, and over 30,000 people since the inception of the initiative.**

- ✓ **SSA-supported activities served 6,600 primary participants and 8,501 secondary participants in Year 2.**<sup>12</sup> To date, SSA has served 10,071 primary participants and 20,900 secondary participants.<sup>13</sup> SSA programs were subject to 9c funding cuts in Year 2, and these cuts may have impacted participation. Funding cuts appeared to primarily impact the number of secondary participants reached, which, over three terms in Year 2, was similar to the number reached over two terms in Year 1. Early data from Year 3 indicate continued strong engagement as more than twice as many secondary participants were reached in Fall 2015 than had been reached in Fall 2014.
- ✓ **Primary participants reflect the diversity of the overall population of community college students.** For example, 12% of primary participants are Black or African American and 14% are Latino, while 12% of community college students are Black or African American and 16% are Latino. Similarly, 51% of SSA participants and 59% of community college students are female.

## Participation Patterns

To date, campuses report having served 10,071 primary SSA participants and 20,900 secondary SSA participants.<sup>14</sup> A summary of participation, by term, is provided in Table 1.

- ✓ 6,600 primary participants were supported by SSA in Year 2 with programs such as summer bridge and college readiness initiatives, developmental math preparation, additional tutoring and academic support, scholarships and tuition waivers, STEM career exploration and preparation, and academic advising.
- ✓ 8,501 secondary participants were engaged by SSA in Year 2 with activities that included recruitment events targeted to high school students (e.g., presentations or visits at high schools, STEM exploration activities at the college campus, meetings with prospective participants), after-school hands-on STEM workshops, guest speakers, and STEM career exploration events.

Participation numbers for Year 1 and Year 2 are not directly comparable. Year 1 started in January of 2014 (midway through the academic year). Many sites piloted program activities, hired program staff, and completed program planning in that first term, but only six sites had primary participants in Spring 2014. Dramatic differences in participation between Spring 2014 and the subsequent terms reflect this startup or "pilot phase" of the initiative and are unlikely to be indicators of expected or ongoing growth. Strong

<sup>12</sup> 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).

<sup>13</sup> These are counts of total participants across terms, which include duplicates.

<sup>14</sup> This is a duplicated count. See Table 1 for further detail.

primary participant numbers in Year 2 are likely the result of colleges' abilities to engage students at the beginning of the academic year as well as the scale up of activities planned during Year 1.

Major funding cuts to the SSA initiative in Year 2 (i.e., SSA site budgets were cut in half as a result of 9c cuts) also likely impacted program participation. With limited resources, sites appeared to prioritize supports for primary participants over engagement with secondary participants. While the average number of secondary participants per term dipped notably in Year 2, the average number of primary participants grew and remained steady into Year 3.

At nearly all sites, the number of both primary and secondary participants was higher during the academic year than during the summer, reflecting different program activities and program intensities during these two periods (i.e., summer activities are typically more intensive than those that occur during the academic year). The increase in secondary participation from Fall 2014 to Fall 2015 may in part reflect sites' efforts to begin the recruitment process earlier in the academic year.

**Table 1: SSA Participants by Term and Year**

|   | <u>Year 1 (Pilot)</u>  |                        | <u>Year 2 (Phase 1)</u> |                        |                        | <u>Year 3</u>        | <b>Totals</b> |
|---|------------------------|------------------------|-------------------------|------------------------|------------------------|----------------------|---------------|
|   | <b>Spring<br/>2014</b> | <b>Summer<br/>2014</b> | <b>Fall<br/>2014</b>    | <b>Spring<br/>2015</b> | <b>Summer<br/>2015</b> | <b>Fall<br/>2015</b> |               |
| <b>Number of primary participants*</b>              | 448                    | 786                    | 2,769                   | 2,949                  | 882                    | 2,237                | 10,071        |
| <b>Number of secondary participants<sup>†</sup></b> | 5,662                  | 2,545                  | 1,741                   | 5,018                  | 1,742                  | 4,192                | 20,900        |

\* 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).

<sup>†</sup> 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).

## Participating Populations

During Year 2, all sites served current community college students, and all but one site served incoming community college students. Most sites (12) also indicated that high school seniors were among their Year 2 SSA participants. Participant populations served by about half of sites included high school freshmen, sophomores, and juniors; veterans; and adult populations with high school equivalency or in Adult Basic Education programs.

Table 2 summarizes the student status of SSA primary participants who were first supported by SSA in Fall 2014 and Fall 2015. Of all the participants who were new to SSA in these two terms, 39% were continuing students during the term they were first reported as a primary participant, 29% were first-time freshmen, 5% were transfer students, 3% were dually enrolled, 2% were readmitted or reactivated, and 1% were non-degree seekers.

In Table 2, most of the students with "indeterminate status" were reported by Mt. Wachusett Community College (312 students in Fall 2014 and 350 students in Fall 2015). These students likely participated in that institution's Math Modeling Program, in which several hundred high school seniors enrolled in the college's MAT092 developmental math course (but were not part of a dual-enrollment program and therefore did not have a status in the DHE's HEIRS data system).

Table 2: Student Status at Point of Entry to SSA, Fall 2014 and Fall 2015

| Student status at point of entry to SSA | Fall 2014    |             | Fall 2015    |             | Total        |             |
|---|--------------|-------------|--------------|-------------|--------------|-------------|
|   | #            | %           | #            | %           | #            | %           |
| Continuing                              | 1,037        | 40.2%       | 626          | 36.5%       | 1,663        | 38.7%       |
| First-time freshman                     | 784          | 30.4%       | 458          | 26.7%       | 1,242        | 28.9%       |
| Transfer                                | 111          | 4.3%        | 92           | 5.4%        | 203          | 4.7%        |
| Dually-enrolled                         | 92           | 3.6%        | 49           | 2.9%        | 141          | 3.3%        |
| Readmitted/reactivated                  | 67           | 2.6%        | 29           | 1.7%        | 96           | 2.2%        |
| Non-degree                              | 33           | 1.3%        | 27           | 1.6%        | 60           | 1.4%        |
| Indeterminate status <sup>†</sup>       | 456          | 17.7%       | 432          | 25.2%       | 888          | 20.7%       |
| <b>Total</b>                            | <b>2,580</b> | <b>100%</b> | <b>1,713</b> | <b>100%</b> | <b>4,293</b> | <b>100%</b> |

<sup>†</sup>This includes those who do not have a SSN, and those who have been assigned a student ID number (for tracking *within* an institution) but have not registered for a course.

Racially, SSA primary participants generally reflect the diversity of the overall population of community college students. For example, 14% of primary participants are Black or African American, 16% are Latino and 47% are White, while 13% of community college students are Black or African American, 18% are Latino and 54% are White.<sup>15</sup> The racial makeup of the SSA and general student population varied by site. The sites serving the highest proportion of Black or African American students were Roxbury, Massasoit, Bunker Hill and Springfield Technical. The sites serving the highest proportion of Latino or Hispanic students were Northern Essex, Holyoke, Roxbury, and Bunker Hill.

SSA primary participants are somewhat more likely to be male than the general community college population. 51% of SSA primary participants are female and 49% are male while 59% of community college students are female and 41% are male. There was some variation across sites. Five sites have SSA primary participant gender compositions that are more than 50% female (Northern Essex, Middlesex, Massasoit, Holyoke, and Cape Cod).

SSA participants' gender compositions might compare more favorably to STEM students than to the general community college student population; however current data about the gender composition of STEM students at Massachusetts community colleges were not available for this report. Research on women's underrepresentation in STEM fields at community colleges suggests that the SSA participation numbers are a positive initial indicator.<sup>16</sup> At Massachusetts community colleges, as nationally, men have earned the majority of certificates and associates degrees in almost every STEM field (exceptions are health professions, science technologies and biological and biomedical sciences). When health professions are excluded, 77% of STEM associates degrees and 80% of STEM certificates earned at Massachusetts community colleges are awarded to men.<sup>17,18</sup>

<sup>15</sup> Percentages are calculated out of the students who have race/ethnicity data included in HEIRS (including those whose race/ethnicity was reported as "unknown")

<sup>16</sup> See, for example Gatta. 2015. *A Review of the Current Research on Women in Community College STEM Programs*. Wider Opportunities for Women. <http://www.wowonline.org/wp-content/uploads/2015/03/Women-in-CC-STEM-Programs-Brief-FINAL.pdf>

<sup>17</sup> National Center for Education Statistics, Integrated Postsecondary Education Data System, 2008-2009.

<sup>18</sup> Note that SSA includes health professions among STEM fields, see footnote 9, above.

## Primary Participant Service Descriptions

Table 3 below displays primary participant service descriptions by year and term, and the number of primary participants who received services falling into three basic categories: direct financial support, extra or targeted supports (e.g., tutoring, peer mentoring), and targeted STEM pathway and/or STEM career counseling. The service categories are not mutually exclusive and individual primary participants could receive all three types of services in the same term.

The high percentage of total primary participants receiving each of these supports during summer (64-73%) compared with the academic year (33-63%) reflects an elevated intensity of service provision during summer programming. With the dramatic increase in the number of primary participants in Fall 2014, the number of students receiving each of these supports rose considerably, however the intensity of supports decreased in some categories. Direct financial support fell from 96% of SSA primary participants in Summer 2014 to 48% in the Fall. Targeted STEM pathway or STEM career counseling fell from 64% of SSA primary participants in Summer 2014 to 33% in the Fall. During the same period, the percent of SSA primary participants receiving extra or targeted supports grew slightly from 70% to 72%. This growth likely reflects a shift during the academic year toward engagement with program elements—such as tutoring—that can serve larger student populations.

Of the three tracked categories of services, extra or targeted supports—such as tutoring or peer mentoring—was most common during the academic year. Direct financial support was most common in the summer, when many sites offer stipends or other participation incentives to students.

**Table 3: Primary Participants' Service Descriptions by Term and Year**

| 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 (Pilot) | Spring 2014 | 448                             | 111   | 103  | 101   |
|                | Summer 2014 | 786                             | 758   | 548  | 505   |
| Year 2         | Fall 2014   | 2,769                           | 1,341   | 2,002  | 913   |
|                | Spring 2015 | 2,949                           | 1,079   | 1,890  | 942   |
|                | Summer 2015 | 882                             | 455   | 618  | 559   |
| Year 3         | Fall 2015   | 2,237                           | 819   | 1,338  | 805   |
| <b>Total</b>   |             | 10,071                          | 4,563   | 6,499  | 3,825   |

\* 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).



## Outcomes

This section presents data relevant to the *metrics* under each of the model's two goals. The first section summarizes findings relevant to completion and retention metrics (SSA model primary goal) and the second section focuses on recruitment and readiness metrics (SSA model secondary goal).

Data for this section come predominantly from primary and secondary participant data submitted by sites to DHE and combined with campus-level data from DHE's Higher Education Information Resource System (HEIRS). For more detailed data on SSA primary and secondary participants, including institution-specific data, please see Appendix D.

The results presented here are preliminary. To date, no cohort of SSA participants (who are first-time, full-time freshman in the Fall) has had the opportunity to complete (at least) two full years of courses. In other words, we would not expect many SSA participants to have graduated at this point and thus, further assessment of the program completion rates than what is presented here would be premature at this time.

Many of the indicators suggest positive trends, but are not directly comparable to figures available at the statewide level and are thus presented as baseline measures to be used to track change over time. Where direct comparisons are available to indicate outcomes for SSA participants compared to other Massachusetts community college students, these are noted. In other cases, the most relevant state-level data are presented, however it is important to note that these data are often *not* directly comparable to the metrics presented. Finally, the results presented here show trends in the data, but do not reflect the application of experimental or quasi-experimental design (i.e., we are not making claims about causality, significance, or effect size). More rigorous designs will be applied during Year 3 to examine the effect of SSA on relevant student outcomes.

## Completion and Retention Metrics

*SSA Model Goal: To increase the number of STEM graduates and certificate holders produced by the community colleges and transfer to a 4-year university or obtain STEM employment.*

### Summary of Key Findings

**Key Finding: SSA has supported retention, full-time enrollment, and engagement with STEM; 70% of SSA participants' degrees and certificates were completed in STEM fields.**

- ✓ **The majority of SSA primary participants who have—to date—earned degrees and certificates did so in STEM fields.** Overall, 70% of degrees and certificates completed by SSA participants were in STEM fields. This is much higher than the statewide total of 45% of below-bachelor's certificates and degrees granted in STEM fields.<sup>19</sup>
- ✓ **Fall 2014 to Fall 2015 retention rates for SSA participants are similar to—but slightly higher than—the overall retention rate for all Massachusetts community college students** (60% vs 58% for full-time, first-time degree seeking students). This is the first cohort of SSA participants for whom this data is available and this indicator will be one to watch in the future. Across all SSA primary participants in Year 1 and Year 2, 67.7% had completed a degree or certificate by July 2015, been retained to Fall 2015, or transferred to another Massachusetts public higher education institution. Directly comparable figures at the statewide level were not available for this report.
- ✓ **Full-time enrollment was 13 percentage points higher among SSA primary participants than among the general community college student population.** This is a positive initial indication of SSA impact, as students enrolled full-time are more likely to retain and complete than their part-time peers.

Data from Year 2 indicate that SSA has supported retention, full-time enrollment, and engagement with STEM. The indicators presented below reflect metrics outlined in the SSA model for student success outcomes. They highlight findings that are detailed in Tables 4-6.

### Completion (Degree, Certificate, or Transfer)

- The observed trends in program completion, transfer, and indeterminate status rates (which are higher for older cohorts and lower for newer cohorts) were as anticipated, as was the trend for rates of student retention (which was lower for older cohorts and higher for newer cohorts). See Table 4.
- As of Fall 2015, 425 degrees and certificates had been awarded to SSA students, and of these 70% were in STEM fields (see Table 5). According to the Massachusetts STEM Data Dashboard, 45% of below-bachelor's certificates and degrees are granted in STEM fields statewide.<sup>20</sup>
- In total, 61% of primary participants from Year 1 and 69% of primary participants from Year 2 have completed a degree or certificate, been retained to Fall 2015, or transferred to another Massachusetts public higher education institution (see Table 4).

<sup>19</sup> This figure includes both public and private schools in 2013. *2015 Massachusetts STEM Data Dashboard*, <http://www.mass.edu/stem/documents/2015%20STEM%20Data%20Dashboard%20FINAL.pdf>

<sup>20</sup> This figure includes both public and private schools in 2013. *2015 Massachusetts STEM Data Dashboard*, <http://www.mass.edu/stem/documents/2015%20STEM%20Data%20Dashboard%20FINAL.pdf>

- By Summer 2015, 5.8% of SSA primary participants across the 15 community colleges had completed a degree or certificate (see Table 4). These numbers are not directly comparable to state-level data. However, the most relevant data include typical on-time (2-year) completion rates for degree-seeking community college students in Massachusetts: 4.4% for full-time students and 1% for part-time students.<sup>21</sup>
- As of Fall 2015, 4.7% of SSA primary participants had transferred to a public 4-year school (see Table 4). These numbers are not directly comparable to state-level data. Transfer rates to private and out-of-state colleges and universities are not yet available. However, the most relevant data include the percent of Massachusetts community college students who enroll in a 4-year college within three years of their starting term: 12.8% for full-time students and 4.1% for part-time students.
- Transfer rates of SSA students who had full-time, first-time degree seeking status in Fall 2014 were slightly lower than for all community college students (3.6% vs. 4.6%). See Table 6.

### Retention

- 80.5% of SSA primary participants who were new to SSA in Summer 2015 continued at their community college in Fall 2015 (see Table 4). Directly comparable figures at the statewide level were not available for this report.
- 52% of SSA primary participants who were new to SSA in Fall 2014 remained enrolled at their college in Fall 2015 (see Table 4). Directly comparable numbers are only available for full-time, first-time degree seeking students – see next bullet.
- When considering full-time, first-time degree seeking students, Fall 2014 to Fall 2015 retention rates for SSA participants are similar to—but slightly higher than—the overall retention rate for all Massachusetts community college students (60% vs 58%). See Table 6.

*Insight:* What is not known at this time is how similar or dissimilar SSA students are from the general student population. Further analyses are needed to determine if—and to what extent—SSA programs are impacting rates of student retention. These analyses (e.g., mixed-effect logistic regression) are planned for the next phase of analysis, and results will be included in the Year 3 evaluation report.

<sup>21</sup> Complete College America, *Time is the Enemy*, 2011, [http://completecollege.org/docs/Time\\_Is\\_the\\_Energy.pdf](http://completecollege.org/docs/Time_Is_the_Energy.pdf)

**Table 4 : Fall 2015 Progress and Completion Rates for SSA Primary Participants, by Starting Term**

|                                    | <u>Year 1 (Pilot)</u> |                    | <u>Year 2</u>    |                    |                    | <u>Year 3</u>    | <b>Total</b> |
|------------------------------------|-----------------------|--------------------|------------------|--------------------|--------------------|------------------|--------------|
|                                    | <b>Spring 2014</b>    | <b>Summer 2014</b> | <b>Fall 2014</b> | <b>Spring 2015</b> | <b>Summer 2015</b> | <b>Fall 2015</b> |              |
| <b>Completed*</b>                  | 14.6%                 | 7.2%               | 5.2%             | 4.4%               | -                  | -                | 4.2%         |
| <b>Retained to Fall 2015*</b>      | 30.4%                 | 50.8%              | 51.7%            | 63.3%              | 80.5%              | 98.7%            | 64.7%        |
| <b>Transferred*</b>                | 10.0%                 | 6.3%               | 6.4%             | 4.2%               | 4.4%               | 0.2%             | 4.7%         |
| <b>Indeterminate status*</b>       | 45.0%                 | 35.8%              | 36.7%            | 28.0%              | 15.1%              | 1.2%             | 26.4%        |
| <b>Trackable total<sup>†</sup></b> | <b>349</b>            | <b>654</b>         | <b>2281</b>      | <b>1705</b>        | <b>563</b>         | <b>1299</b>      | <b>6851</b>  |
| Unduplicated total                 | 448                   | 762                | 2580             | 1937               | 644                | 1713             | 8084         |

\*Completed indicates students who earned a certificate or degree prior to July 1, 2015. Retained indicates students who were retained to Fall 2015 at the same institution. Transferred indicates students who enrolled at another in a public institution of higher education in Massachusetts in Fall 2015. (Transfer rates to private institutions and institutions outside of Massachusetts were not available at the time of this report). Indeterminate Status indicates students who had not earned a certificate or degree by July 1, 2015, nor were retained to Fall 2015 in a public institution of higher education in Massachusetts.

<sup>†</sup>Some primary participants are not trackable (i.e., are not found in HEIRS). This includes those who do not have a SSN, and those who have been assigned a student ID number (for tracking *within* an institution) but have not registered for a course. Percentages in this table are calculated from the trackable total.

**Table 5: Number of SSA Students Earning Degrees and Certificates by Year**

| <b>Year</b>               | <b>Total SSA Students</b> | <b>Students earning degrees</b> |      | <b>Students earning certificates</b> |      |
|---------------------------|---------------------------|---------------------------------|------|--------------------------------------|------|
|                           |                           | All                             | STEM | All                                  | STEM |
| <b>Year 1 (Pilot)</b>     | 1,234                     | 83                              | 57   | 32                                   | 31   |
| <b>Year 2</b>             | 6,600                     | 245                             | 150  | 55                                   | 51   |
| <b>Year 3 (Fall only)</b> | 2,237                     | 7                               | 6    | 3                                    | 3    |
| <b>Total</b>              | 10,071                    | 335                             | 213  | 90                                   | 85   |

**Table 6: Fall 2014 to Fall 2015 Retention of Full-Time, First-Time Degree Seeking Students  
SSA Students and Community College Students**

| <b>Number of full-time, first-time degree seeking students (Fall 2014)</b> |        | <b>Retained to Fall 2015 at institution</b> |          | <b>Transferred to another institution (MA public only)</b> |          |
|--|--------|---|----------|--|----------|
|  |        | <b>#</b>                                    | <b>%</b> | <b>#</b>   | <b>%</b> |
| <b>SSA Students</b>  | 646    | 388   | 60.1%    | 23   | 3.6%     |
| <b>All Students</b>  | 11,352 | 6,566                                       | 57.8%    | 524  | 4.6%     |

## Recruitment and Readiness Metrics

*SSA Model Goal: To increase the number of students entering STEM programs at the community colleges.*

### Summary of Key Findings

#### **Key Finding: SSA continues to attract new participants.**

- ✓ **SSA programs continued to attract new participants in Year 2.** Over the course of the year, 5,161 primary participants were supported by SSA for the first time, about half of whom were new to their institutions and half who were continuing students. While the count of secondary participants is high, preliminary evidence suggests that relatively few of them (4.2%) later become primary participants. This may present an opportunity to enhance recruitment efforts, and may also be a function of sites' limited ability to track recruitment efforts.

#### **Key Finding: SSA is accelerating engagement in and completion of developmental math, leading to participation in college level math.**

- ✓ **SSA participants who complete developmental math move on to college-level math classes.** Of the 197 SSA primary participants who engaged in a developmental math intervention (e.g., courses, workshops, and bootcamps) in Summer 2015, 80 (40%) fulfilled all developmental math requirements for their institution by the end of that term and 60 (75%) of those subsequently enrolled in a college-level math class for Fall 2015. Statewide, only 20% of community college students who complete developmental math coursework go on to complete a college level math course within two years, so the high rate of college-level math enrollment among SSA participants is a positive initial indicator.<sup>22</sup>

The indicators presented below reflect metrics outlined in the SSA model. They summarize findings that are detailed in Tables 7-9. For more detailed data, including institution-specific findings, please see Appendix D.

### Recruitment

- Each term 65-93% of SSA primary participants were new to the intervention and 5,161 primary participants were supported by SSA for the first time in Year 2.
- 8,501 secondary participants were reached in Year 2 through activities and events such as open houses, STEM career and college events, visits to high schools, and hands-on career exploration days. 252 total events were held in Year 2. The average number of participants per event was similar in Year2 to Year 1 (33.7 in Year2 and 37.0 in Year 1). See Table 7.

*Insight:* 9c funding cuts likely impacted recruitment efforts in Year 2. The number of secondary participants, averaged across terms, is distinctly lower in Year 2 than in Year1 and also lower than preliminarily indicated by one term of Year 3.

- Across all sites and terms, 699 primary participants were reported as former secondary participants. These represent 4.2% of all secondary participants (through Summer 2015) and 7% of all primary participants.

*Insight:* These low yields, despite the relatively high rates of new participation cited above, suggest issues with measurement in addition to or instead of issues with recruitment. Sites commented on the difficulty of identifying former secondary participants (about whom individual

<sup>22</sup> Vision Project, *Final Report from the Task Force on Transforming Developmental Math Education*, October 2013

data is often impractical to collect) when they first receive SSA supports as primary participants. The low proportions reported here might be an indication of low recruitment effectiveness, but might also suggest that sites are struggling to measure and track their recruitment yields. Future evaluation efforts will provide more information about these issues.

- Between Fall 2014 and Fall 2015, there was a sharp increase in the number of secondary participants and the number of events and activities available to these students (See Table 7). This may reflect sites' efforts to recruit students earlier in the year, and/or the continuation of outreach mechanisms into Year 3 that had been established during Year 2.

**Table 7: Secondary Participant and Event Count by Term and Year**

| Year           | Term        | Number of secondary participants* | Number of events and activities |
|----------------|-------------|-----------------------------------|---------------------------------|
| Year 1 (Pilot) | Spring 2014 | 5,662                             | 173                             |
|                | Summer 2014 | 2,545                             | 49                              |
| Year 2         | Fall 2014   | 1,741                             | 56                              |
|                | Spring 2015 | 5,018                             | 156                             |
|                | Summer 2015 | 1,742                             | 40                              |
| Year 3         | Fall 2015   | 4,192                             | 100                             |
| <b>Total</b>   |             | <b>20,900</b>                     | <b>574</b>                      |

\* 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).

## Readiness

- In Summer and Fall 2015 1,260 SSA primary participants took part in an SSA-sponsored developmental math intervention (including coursework and workshop or booster programs). Overall, 25% of those participants fulfilled all developmental math requirements for their institution in the same term (see Table 8).
- 22.3% (197) of Summer 2015 primary participants participated in an SSA-sponsored developmental math intervention that term. 41% (80) of those students fulfilled all developmental math requirements for their institution during that term. Of the students who had fulfilled their developmental math requirements, 75% (60) subsequently enrolled in a college-credit level math course (see Table 8).

*Insight:* Data on completion rates for these courses is not yet available. Statewide, only 20% of community college students who complete developmental math coursework go on to complete a college level math course within two years, so the high rate of college-level math *enrollment* is a positive initial indicator.<sup>23</sup>

- In Fall 2015, 48% (1,063) of SSA primary participants engaged in an SSA developmental math intervention and 22% (238) of those students fulfilled all developmental math requirements for their institution by the end of the term (see Table 8).

<sup>23</sup> Vision Project, *Final Report from the Task Force on Transforming Developmental Math Education*, October 2013

*Insight:* Directly comparable figures are not available, but statewide figures indicate that the percentage of incoming community college students who require developmental math education is 53%.<sup>24</sup>

- Among freshmen first-time enrollees in Fall 2014, new SSA participants had rates of enrollment in developmental math that were much higher than for Massachusetts community college students more generally (88% vs. 46%). See Table 9. However, these numbers are largely driven by just three sites (MassBay, Massasoit, and Northern Essex). Thus, the figures in Table 8 are more representative of SSA (see the previous bullets in this section).

*Insight:* 75% of the SSA participants noted above who were enrolled in developmental math in Fall 2014 came from just three sites, each of which supported tutoring and supplemental instruction targeted to developmental math students with SSA funds. Only half of sites had any freshmen, first-time enrollees who were new to SSA in Fall 2014 and enrolled in developmental math that term.

- Among freshmen first-time enrollees in Fall 2014, new SSA participants completed developmental math courses at rates similar to their community college student peers (see Table 9). These data are very preliminary, reflecting a single term of SSA support at only a few institutions (see previous bullet).

*Insight:* Looking at data by site (see Appendix D) indicates that only 4 sites had rates of developmental math completion among the SSA group that were lower than or equal to those for the college group. The three sites contributing the majority of participants to the participation figures above were among these sites. This might indicate that these sites were targeting their support to the most needy group of students, that one semester of SSA support was not enough to improve these outcomes, or that these interventions are not having a significant impact. Additional data and analyses would be required to adjudicate between these options.

**Table 8: SSA Primary Participants' Mathematics Participation and Outcomes, 2015<sup>†</sup>**

| Term         | Total number of primary participants* | Primary participants who participated in a SSA-sponsored developmental math intervention ... |              | ... and fulfilled all developmental math requirements for their institution by the end of the term |              | Primary participants who completed developmental math and subsequently enrolled in a college-credit-level math course |             |
|--------------|---------------------------------------|--|--------------|--|--------------|---|-------------|
|              |                                       | #  | %            | #  | %            | #   | %           |
| Summer 2015  | 882                                   | 197  | 22.3%        | 80   | 9.1%         | 60  | 6.8%        |
| Fall 2015    | 2,237                                 | 1,063  | 47.5%        | 238  | 10.6%        | —   | --          |
| <b>Total</b> | <b>3,119</b>                          | <b>1,260</b>   | <b>40.3%</b> | <b>318</b>   | <b>10.2%</b> | <b>60</b>   | <b>6.8%</b> |

\* 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).

<sup>†</sup> These items were added to the primary participant data collection in Summer 2015, therefore data for these indicators are not available for previous terms

<sup>24</sup> Vision Project, *Final Report from the Task Force on Transforming Developmental Math Education*, October 2013



**Table 9: Freshmen, First-Time Enrollees' Progress in Developmental Mathematics Coursework, Fall 2014**

|                           | Number of freshmen, first-time enrollees | Students <i>enrolled</i> in a developmental math course during current term |       | Students <i>completing</i> a developmental math course during the current term |       |
|---------------------------|--|---|-------|--|-------|
|                           |  | #   | %     | #  | %     |
| SSA Primary Participants* | 784                                      | 688   | 87.8% | 451  | 65.6% |
| Full College              | 18,911                                   | 8,644   | 45.7% | 5,801  | 67.1% |

\* 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).

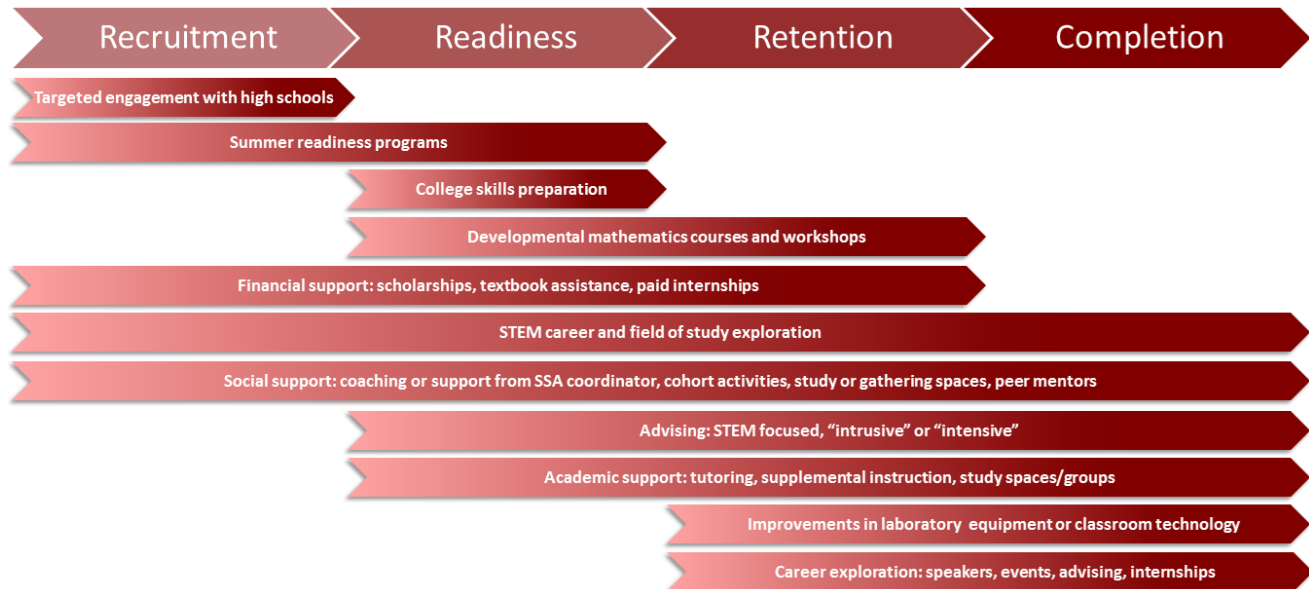
## Program Practices

This section reflects the *strategies* outlined in the SSA model to support each of its two goals. The first subsection offers a review of SSA campuses' strategies that support recruitment and readiness (SSA model secondary goal). The second subsection summarizes strategies focused on retention and completion (SSA model primary goal). This order reflects the expected progression of participants from recruitment to completion.

Data for this section of the report come primarily from survey and narrative data submitted in year-end site reports by SSA administrators and coordinators. These data are supplemented with data from Year 2 interviews and site visits. Please see the Methods section for detailed descriptions of these data collection activities and the protocols, which are also included in Appendix A and B. Summarized data from the survey portion of the Year 2 site reports, including site specific data, can be found in Appendix C and site report narratives are available from DHE, upon request.

The strategies most widely implemented with SSA support in Year 2 spanned the SSA model from recruitment to completion and are outlined in Figure 3. More than two-thirds of sites implemented each of these strategies, reflecting the capacity to engage students at multiple points during their community college experience. At the same time, there was also a substantial degree of variation in implementation strategies in Year 2 as sites adapted model elements to meet their local needs. The SSA model emerged late in Year 2 and sites had only begun to develop and adapt programs and supports in ways that aligned with the model by the end of that program year. These patterns of similarity and difference across sites will be explored in greater detail in this section.

**Figure 3: Common SSA-Funded Strategies Across Campuses, Year 2**



## Recruitment and Readiness Strategies

This section reviews strategies reported by sites (in Year 2 site report surveys and narratives) that align with the recruitment and readiness aspects of the SSA model and thus relate to the secondary goal of increasing the number of students entering STEM programs at the community colleges. More detailed data on survey responses is available in Appendix C. Findings in this section also come from thematic analysis of Year 2 Site Report narratives, including participation data and open ended responses about strategies. These narratives are available from DHE upon request.

### Summary of Key Findings

- ✓ **Recruitment was both a success and a challenge for sites.** Sites were about evenly divided in terms of whether they experienced recruitment as a success or a challenge, suggesting an opportunity for resource and practice sharing.
- ✓ **Activities designed to engage students in STEM—from recruitment to completion—were among the most widely implemented SSA activities in Year 2.** Boosting awareness of STEM careers and paths to those careers through community colleges was a clear focus of SSA sites in Year 2 and reflect promising practices identified in the literature. Sites reported engaging 1,512 primary and secondary participants in a variety of these activities, including workshops, demonstrations, lectures, and science expos.
- ✓ **Every SSA site continued to invest in preparing incoming students for college, and for STEM courses in particular.** Research suggests that practices that ease students' transition into college can support retention. Common strategies included summer readiness programs, college success courses or workshops, STEM coursework, and developmental mathematics interventions. Sites reported 682 students participated in college success courses and workshops in Year 2.

Site-reported data from Year 2 suggest that SSA campuses implemented a variety of recruitment strategies with mixed success and were widely implementing readiness strategies to prepare students for college and STEM courses in particular.

### Recruitment and Outreach

Sites had mixed experiences with recruitment of SSA participants in Year 2. Three or four sites each named recruitment as either a success or a challenge and five other sites named recruitment as both a success *and* a challenge.<sup>25</sup>

- The most **widely implemented recruitment activities** included outreach by community college faculty, high school visits, events at the community college, and targeted emails or letters.
- SSA campuses listed a range of **recruitment strategies** they felt had been most successful in Year 2, reflecting the diverse circumstances of these colleges and the array of SSA programs they are offering. Commonly cited strategies included relationship building and engagement with high school staff and STEM exploration activities.
- **Recruitment challenges** were varied, but included losing participants to competing opportunities and limited staff time to

Berkshire reported that their new recruiting strategy for Year 2—including an SSA Liaison program at local high schools—yielded an 80% increase in applications and a 52% increase in enrollment over Year 1.

Roxbury reported that enrollment in their summer STEM academy tripled between Year 1 and Year 2.

<sup>25</sup> For detailed data about recruitment and outreach strategies see Tables 1-4 in Appendix C and individual site report narratives.

dedicate toward recruiting.

- **The number of sites that engaged current community college students in SSA outreach efforts increased between Year 1 and Year 2** (from 5 to 12 sites, respectively). This is at least

in part due to the fact that Year 1 SSA participants were available in Year 2 to help recruit for the program, but is also potentially an indicator of student interest in and satisfaction with their SSA programs.

North Shore reported a well-received breakfast event for local high school guidance counselors that included a student panel of SSA participants.

- **STEM exploration activities were often part of sites' recruitment strategies and were some of the most widely implemented SSA activities in Year 2.** Sites reported at least 1,512 students participated in a variety of STEM exploration activities supported by SSA in Year 2. These included workshops, demonstrations, lectures, and science expos.

- The most **commonly reported recruited populations for SSA** were high school seniors (14 sites), current community college students (13 sites), and incoming community college students (12 sites). Eight sites recruited either high school freshmen, sophomores, and juniors or veterans. Fewer than half of the sites indicated that they directed their recruitment efforts towards Adult Basic Education participants, adults with a high school equivalency, and/or community members.

Quinsigamond reported that enrollment in their STEM programs increased 7% from Fall 2014 to Fall 2015 and 7 of the top 10 programs that saw enrollment growth were STEM programs.

- Sites were about evenly divided regarding whether or not they made explicit **efforts to recruit groups who are traditionally underrepresented in STEM** for SSA.
  - Of the sites that did not specifically target these groups, four noted that the populations of students typically served by their institutions already fall into categories generally considered underrepresented.
  - Sites that did target their recruitment efforts to a variety of underrepresented groups used a range of strategies, including partnering with local community organizations or campus initiatives (e.g., TRIO, LSAMP, Veterans Services, Adult Basic Education programs) that serve these groups, presenting or recruiting at events with high attendance of underrepresented groups, asking faculty to refer members of these groups specifically, and including people from underrepresented backgrounds in recruiting materials and as program representatives.
- In their narratives, about a third of sites reported either **increases in applications and enrollments** for their SSA programs or increases in STEM enrollments at their colleges.

Greenfield reported that enrollment in their Math/Science option increased by 40% between 2014 and 2015.

### College and STEM Readiness

In Year 2 SSA sites continued the efforts begun in Year 1 to prepare incoming students for college and for STEM courses in particular. The most common strategies implemented by sites were summer readiness programs, college success courses or workshops, STEM coursework (primarily mathematics), and developmental mathematics interventions. Many sites reported improvements in student readiness for college and STEM, especially progress in developmental mathematics.

Every campus reported offering some form of readiness intervention in Summer 2015. At 2/3 of sites these interventions included a combination of college readiness, STEM skills preparation (courses or preparation workshops), STEM field exploration, and social support.

Many sites revised their implementation of these readiness strategies in Year 2 based on learning from Year 1. These revisions included changing the timing of programs (e.g., the length of the day, the timing during the term, or the order of the elements offered), the populations served, the incentive structure (e.g., offering credit), and the curriculum, as well as making some portions of the program mandatory.

Campuses reported high rates of transition from Summer programs into Fall matriculation at the college, and primary participant data indicate 80.5% of primary participants who were new to SSA in Summer 2015 retained to Fall 2015 (see Table 4). SSA sites also reported student feedback that indicates increases in confidence after readiness programs and high levels of satisfaction with these programs.

Springfield Technical reported that 100% of their summer bridge students passed their summer math courses, including 20% who completed their developmental math requirements and 45% who completed a college-level math course.

### College skills preparation<sup>26</sup>

- Most sites offered some sort of college skills preparation through SSA (e.g., college skills-focused events or speakers, college success courses, college readiness programs).
- In Year 2, sites reported 682 students participated in these types of activities, the majority of which were offered in combination with other STEM-focused academic preparation (with for example, STEM exploration workshops, mathematics preparation workshops or courses, or as part of summer bridge programs).<sup>27</sup>
- Twice as many sites used SSA funding to support college skills preparation activities during the summer (12 sites) as during the academic year (6 sites), although these activities were just as common in both periods, suggesting a gap in student support being filled through SSA.<sup>28</sup>

### Developmental mathematics interventions<sup>29</sup>

- Every site implemented some sort of developmental mathematics intervention as part of its SSA readiness strategies (e.g., courses, bootcamps, prep programs, tutoring, supplemental instruction). In Year 2, 10 sites supported developmental mathematics courses through SSA and 10 offered mathematics placement test refresher or booster programs. Sites reported 308 students participated in mathematics preparation programs, “boot camps,” or “boosters” through SSA in Year 2.
- Many sites also used SSA funding to expand academic support for mathematics – often funding supplemental instructors, additional tutoring, facilitated study group availability, or sometimes study spaces (see tutoring and academic support section below).

Mt. Wachusett reported that 63% of high school seniors enrolled in their Math Modeling program placed out of the college’s basic algebra developmental math class.

<sup>26</sup> For detailed survey data about college skills preparation activities, see Tables 5-8 in Appendix C and individual site report narratives.

<sup>27</sup> Participation numbers were reported by sites in their narratives and have been summarized here.

<sup>28</sup> Surveys asked SSA site representatives to indicate 1) whether or not a practice happened in the specified period (academic year 2014-15 or summer 2015) and 2) whether implemented practices were supported with SSA funding. These two pieces of information help to provide a more contextualized picture of SSA across institutions.

<sup>29</sup> For detailed data about developmental mathematics interventions, see survey data in Tables 5-8 in Appendix C and individual site report narratives.

- Many sites reported student progress in developmental mathematics after these interventions, measured in terms of placement scores or completion of modules. Administrators suggested that this progress could save students both time and money; many of these interventions are taught in an accelerated format, allowing students to make progress in a compressed time and complete a semester or year of coursework in one intensive session, therefore saving on tuition. See Recruitment and Readiness Metrics section above for metrics related to developmental mathematics participation and progress.

Bunker Hill reported that over 92% of their summer SSA participants completed all developmental math requirements and 73% subsequently enrolled in a college-level math course.

### STEM Coursework

- Sites' readiness strategies also included offering college-level mathematics courses, dual enrollment courses in STEM, and a range of science courses including new STEM introductory courses designed during Year 1 with SSA funding.
- Seven sites supported STEM coursework for the pre-college pipeline through SSA in Year 2, either courses taught at local high schools or dual-enrollment courses.
- Half of sites offered STEM introductory courses with SSA support in Year 2. A few supported advanced STEM courses through SSA.

Holyoke reported that 100% of their SSA summer academy students completed a college-credit STEM Foundations course and enrolled at the college in fall 2015.

## Retention and Completion Strategies

This section reviews strategies reported by sites (in Year 2 site report surveys and narratives) that align with the retention and completion aspects of the SSA model and thus relate to the primary goal of increasing “the number of STEM graduates and certificate holders produced by the community colleges and transfer to a 4-year university or obtain STEM employment.” More detailed data on survey responses is available in Appendix C. Findings in this section also come from thematic analysis of Year 2 Site Report narratives, including participation data and open ended responses about strategies. These narratives are available from DHE upon request.

### *Summary of Key Findings*

- ✓ **Advising, tutoring, and financial and social support were widely implemented retention strategies in Year 2.** Implementation of these practices align with recommendations in the literature, however, variations across sites suggest areas for further refinement of the SSA model.
- ✓ **Strategies to prepare students for post-graduation were less coherent across sites than were strategies that support readiness or retention.** Sites implemented an array of strategies including career exploration events, internships, research experiences, transfer-focused programming (e.g., field trips and advising), and/or preparation for job searching (e.g., mock interviews and resume review). SSA primary participant data indicate that only 37% of these students received targeted STEM pathway and/or STEM career counseling in Year 2.



## Retention Strategies

Sites indicated in their reports that many of the features of their readiness interventions were carried forward and also served as retention strategies that helped to engage students while also providing ongoing support. Common SSA-supported retention strategies included advising, academic support (e.g., tutoring or facilitated study groups), social support (e.g., cohort activities, peer mentors), and financial support.

### Advising<sup>30</sup>

- All SSA sites indicated in their surveys that they implemented some form of STEM-focused advising in Year 2, the majority (12) of which used SSA funds to support at least one of these activities.
- More than two-thirds of SSA sites listed advising interventions as key retention strategies in their narratives, and the number of sites implementing advising-related activities increased in Year 2, according to surveys.
- About half of sites described an advising strategy in their narratives that they characterized as intrusive or proactive. Typically, this involved pushing services and opportunities to students or requiring participation rather than offering supports via passive provision.

Berkshire reported that 70% of their Year 1 cohort persisted into Year 2. Their SSA fall support program linked participation in activities such as workshops, mentoring, and cohort meetings to a scholarship for the Spring semester.

#### *Examples:*

- A few sites had data tracking systems in place that allowed faculty or advisors to check in with students about specific benchmarks related to course and degree progress.
- Other sites helped students identify and apply for scholarships and other opportunities.
- A few sites created proactive engagement opportunities by requiring some form of participation (e.g., in workshops, courses, or advising sessions) in order for students to receive an incentive (e.g., membership in a club, or a scholarship or stipend).

Quinsigamond reported that students using the new Starfish advising system indicated that the feedback they received motivated them to do better, helped them to realize their academic potential, boosted their confidence, helped them stay on track and encouraged them to participate more in class.

### Tutoring and academic support<sup>31</sup>

- Every site used SSA funding to expand a range of existing tutoring services, including one-on-one tutoring, drop-in staffed study spaces, group study sessions, course-linked supplemental instruction, and other similar models.
- According to primary participant data, over 4,500 students received targeted supports such as peer mentoring or tutoring in Year 2. This category of support was the most commonly received among SSA primary participants, with 64-72% of

At Greenfield, additional hours of SSA-funded staffing support in the "Math Studio" provided 500 student contacts in one month. During the summer, Math studio staffing was entirely supported with SSA funding and administrators reported higher passing rates in mathematics classes than in previous summers.

<sup>30</sup> For detailed data about advising strategies, see survey data in Tables 9 and 10 in Appendix C and individual site report narratives.

<sup>31</sup> For detailed primary participant data, please see Appendix D For site report data on tutoring and academic support, see tables 11-12 in Appendix C and individual site report narratives.



primary participants receiving such supports through SSA each term (see Table 3).

- Almost 2/3 of sites used SSA funding to support supplemental instruction or facilitated study groups in Year 2.

**Social support.**<sup>32</sup> Every site offered some form of social support through SSA during Year 2, including cohort-based meetings and activities, peer mentors, coaching or support from SSA coordinators, and providing studying or gathering space for SSA or STEM students. Unlike other aspects of SSA programs, which were often more common during the summer, many of these strategies were almost equally as common in the academic year and the summer of Year 2. This suggests that sites might have used social support elements as a way of creating continuity between summer and the academic year in the connections students had to their colleges and SSA programs.

North Shore developed and expanded their peer mentoring program in Year 2—offering over 350 students both social and academic support.

- Coaching or support from SSA coordinators was the most common SSA-funded activity in this category (implemented at 13 sites). Many sites commented that funding these coordinator positions was central to their SSA programs, but also difficult to sustain beyond grant funding.
- Cohort-related supports were also common in Year 2 with 12 sites offering cohort meetings or cohort-based activities with SSA funding.
- Twice as many SSA sites were able to provide studying or gathering space to SSA or STEM students in Year 2 as in Year 1. Nine sites used SSA funds to provide this kind of space during Year 2.
- More than a third of SSA sites supported peer mentor programs with SSA funding, using a variety of models.

The peer mentor program at Middlesex continued to receive praise in Year 2, with college staff commenting on students' "transformation" as a result of the program.

**Financial support.**<sup>33</sup> Every SSA site offered some form of financial support in Year 2, but the percentage of primary participants receiving direct financial support has declined over the course of SSA. This shift is likely the result of sites' concerns about sustainability, and an increased focus on the consistent application of all components of the SSA model. Nearly all primary participants received direct financial support in Summer 2014 (96.4%), but only about half (51.6%) received such support in Summer 2015 (see Table 3 above).

Mt. Wachusett reported trying to make college as affordable as possible by providing the credit-bearing summer academy courses at no-cost and offering a sizable stipend.

- Book vouchers or textbook lending were the most widely offered type of financial support in Year 2, supported with SSA funds at 11 sites.
- Scholarships or participation stipends were about equally common in Year 2, offered with SSA funding by eight or nine sites. Six sites offered both scholarships and participation stipends with SSA funding.
- Paid internships funded through SSA were uncommon, offered by four sites in Year 2.

Northern Essex offered retention scholarships and lending library support to students through SSA. The college reported 87.5% of students who were awarded retention scholarships either graduated or re-enrolled for another semester.

<sup>32</sup> For detailed data about social support, see survey data in Tables 13-14 in Appendix C and individual site report narratives.

<sup>33</sup> For detailed primary participant data, please see Appendix D. For site report data on financial support, see Tables 15-16 in Appendix C and individual site report narratives.

### Supporting and improving coursework<sup>34</sup>

- About a third of sites used SSA funding in Year 2 to revise STEM curriculum or pedagogy, the same as in Year 1. These efforts often aimed to create more engaging and better-aligned courses to prepare, retain, and transition students into STEM careers.
- In Year 2, a few sites (3–4) provided professional development to STEM faculty through SSA (a marginal decrease from the 6 sites that supported this kind of professional development in the summer of Year 1).

### Infrastructure investments<sup>35</sup>

- Most sites (13) used SSA funding to purchase equipment or build infrastructure during Year 2, largely focusing on lab equipment and classroom technology. A third of SSA sites named improvements in infrastructure, equipment, or staff capacity as primary successes of Year 2 in their site report narratives.
- A third of the campuses used SSA funds to make software-related investments in Year 2, including self-paced mathematics, engineering, and statistical software packages.
- Other investments included a solar panel array at Berkshire, graphing calculators at Bunker Hill, WebEx video conferencing capability at Cape Cod, and a renovation of the STEM student support center at Middlesex.

### Completion Strategies

Strategies to prepare students for post-graduation were less coherent across sites than were strategies that support readiness or retention. **Many sites indicated that these strategies would be the subject of increased attention in Year 3.** Sites implemented an array of strategies including career exploration events, internships, research experiences, transfer-focused programming (e.g., field trips and advising), and/or preparation for job searching (e.g., mock interviews and resume review). SSA primary participant data indicate that only 37% of these students received targeted STEM pathway and/or STEM career counseling in Year 2.

**Career exploration.**<sup>36</sup> Career exploration activities were widely implemented in Year 2, with some form of these activities offered with SSA funding at every site.

- According to site report narratives, 1,977 students participated in a variety of career exploration activities through SSA in Year 2, including talks by industry professionals, field trips, career fairs, career exploration workshops, job application support and preparation, and opportunities to network or interview and present work. About 200 students engaged in these activities as part of a summer bridge program.
- The most common career exploration activities implemented with SSA funding were career-exploration oriented speakers or event. Over the course of Year 2, these types of events were offered to current students at 14 sites, to high school students at 10 sites, and to incoming students at 7 sites, all using SSA funding.

Middlesex offered hands-on research-focused workshops and paid summer STEM research internships where students worked with faculty and graduate students at local 4-year universities.

<sup>34</sup> For detailed data on coursework, see tables 5-6 in Appendix C and individual site report narratives.

<sup>35</sup> For detailed data on equipment and infrastructure investments, see tables 17-18 in Appendix C and individual site report narratives.

<sup>36</sup> For detailed data about career exploration, see tables 19-20 in Appendix C and individual site report narratives.

- 2/3 of sites offered career-specific advising through SSA, although such advising was implemented without SSA support at nearly every site.
- Eight sites offered research opportunities or internships with SSA funding in Year 2.
- Eight sites offered professional development for STEM students with SSA funding during Year 2, including professional mentorship, trips to professional conferences, opportunities to present work, networking events, and mock interviews.

Berkshire's collaboration in the 413 STEM Ready program provided both an aspirational next step for SSA participants (the program targets second year STEM students) and peer mentorship (provided by 413 STEM Ready participants).

### Transfer exploration<sup>37</sup>

- All sites offered some form of transfer-focused events, activities (including field trips), or speakers and about half used SSA funding to support these activities.
- Every site offered transfer-specific advising during Year 2, although most sites (9) did not use SSA funding to support these activities. The prevalence of these practices despite the relatively low proportion of sites using SSA funding suggests the possibility of this as a potentially sustainable practice.

Massasoit reported that 100% of research internship program participants were either retained or transferred to 4-year colleges.

**Industry Engagement.**<sup>38</sup> Engagement with industry was fairly widespread among SSA sites, but largely carried out without SSA funding. Thirteen sites implemented at least one form of industry engagement (e.g., speakers, curriculum development, advisory boards, and internships).

- In interviews and site report narratives, sites emphasized the importance of SSA support in building relationships with employers from STEM industries, which included inviting representatives to participate in career fairs or as guest speakers; involving industry representatives in shaping curriculum, often through advisory boards; and facilitating field trips and internship or job shadowing placements at industry sites.
- Eleven sites used SSA funding to host industry speakers or instructors over the course of Year 2, an increase from nine sites in Year 1.
- In the survey, two sites reported that they used other types of industry engagement as part of their SSA programming—a career fair (Middlesex) and an industry-based STEM mentorship program (Mass Bay), both supported with SSA funding.
- Three types of activities were commonly implemented without SSA funding. Industry-aligned curriculum development and industry advisory boards were fairly widespread, carried out by 10 sites each over the course of Year 2 (but supported with SSA at only one site). Also, the majority of sites (12) offered industry-based internships during Year 2, but two used SSA funding.

SSA at Cape Cod built strong relationships with industry – including designing academic programs with industry input, placing students in industry internships, and hiring faculty with industry experience.

**Developing a workforce pipeline.** Although the STEM-field proportion of degrees and certificates awarded to SSA students is notably higher than statewide averages (see Table 5 and Completion and Retention Metrics section above), across SSA sites, there did not appear to be a

<sup>37</sup> For detailed data on transfer exploration, see tables 21-22 in Appendix C and individual site report narratives.

<sup>38</sup> For detailed data about industry engagement, see tables 23-24 in Appendix C and individual site report narratives.

consistent implementation or articulation of an SSA strategy to support a pipeline to entry into the STEM workforce.

In site report narratives, two strategies related to developing a workforce pipeline were the most commonly cited, both mentioned by 9 sites: career-focused events and practical experiences. Several sites indicated that they planned to begin efforts in this vein in Year 3.

- Career-focused events included career exploration workshops, guest speakers, career fairs, and field trips to STEM employers.
- Practical experience focused on helping students transition toward a career or further education. These included research opportunities, internships, professional mentorships, networking events, and skills-based job application workshops (focusing on, for example, resume development, cover letters, and mock interviewing).

MassBay reported 95% of participants in their professional mentorship program (that matched students with industry mentors) either completed or were retained.

## Formative Feedback on SSA

A major purpose of this report is to provide formative feedback to DHE and to community colleges relevant to SSA grant activities. This section summarizes feedback about the process of SSA implementation and grant activities based on site reflections in their Year 2 reports and UMDI's interviews with DHE representatives. The first section summarizes promising practices, identified in the literature, that are reflected in SSA activities. The second section summarizes sites' reflections on SSA from their Year 2 reports including successes, challenges, messaging, sustainability and measurement. A third section captures findings from UMDI's interviews with DHE representatives regarding Year 2 of SSA. The final section offers a brief glance ahead to what might be learned about SSA in Year 3.

### Summary of Key Findings

**Key Finding:** The array of strategies most widely implemented in Year 2 (summarized in Figure 3) reflect the SSA model's focus on recruitment, readiness, retention, and completion.

- ✓ **Year 2 strategies reflected the SSA model; sites refined their recruitment and readiness strategies, and implemented and further developed retention and completion strategies.** The strategies most widely implemented with SSA support in Year 2 are captured in Figure 3 and spanned the SSA model from recruitment to completion. More than two-thirds of sites implemented each of these strategies.

**Key Finding:** While SSA model priorities are consistently represented, there is substantial variation in implementation, reflecting adaptation to local needs.

- ✓ **The SSA model emerged late in Year 2 and sites had only begun to develop and adapt programs and supports in ways that aligned with the model by the end of that program year.** A review of similarities and differences across campuses revealed substantial variation in programming. When identifying key components of their SSA programs, only one element (summer programming) was identified as a key component by more than half of the sites. Sites using similar strategies sometimes differed in their use of SSA funds to support these strategies.

## Promising Practices

The following list summarizes strategies noted by sites or observed by evaluators that reflect promising practices suggested by the literature to support student recruitment, readiness, retention, and completion.<sup>39</sup> This list is meant to provide preliminary feedback and is not meant to be prescriptive. Promising practices included:

- Building relationships with high schools and high school students and engaging current community college students in outreach efforts.
- Easing students' transition into college by teaching college navigation skills, and supporting students' completion of developmental coursework.
- Increasing students' sense of socio-academic integration by routing academic and social support through a central person; creating opportunities for cohort-based meetings and activities; supporting relationships with peer mentors; and providing studying and gathering spaces for STEM students.

<sup>39</sup> For a selected summary of these practices, please see STEM Starter Academy: Promising Practices for STEM Program in Community Colleges (<http://www.mass.edu/stem/documents/STEM%20Starter%20Academy/SSAPromisingPractices4-29-14UMDI.pdf>)

- Bolstering academic success through the expansion of supports such as tutoring, supplemental instruction, and learning specialists, and providing collaborative and non-stigmatizing options such as group study spaces, peer tutors and facilitated study groups.
- Reducing financial barriers by offering tuition-free STEM courses (most often mathematics classes), scholarships, or other financial supports (e.g., textbook lending or book vouchers).
- Supporting students' persistence in STEM through STEM-specific, sustained, and proactive or "intrusive" advising strategies.
- Boosting STEM engagement and career awareness by offering STEM-themed activities and events including clubs, speakers, career fairs, and workshops focused on career and program exploration and readiness.
- Encouraging student engagement and success in STEM coursework through revised and contextualized curriculum, improved classroom technology, and professional development for STEM faculty.
- Smoothing transfer pathways for students by aligning STEM curriculum, creating articulation agreements, fostering collaboration with 4-year institutions, and offering transfer-specific advising and events.
- Facilitating student professionalization by offering research experiences and internships, aligning STEM curriculum to industry standards, linking students to professional mentors, teaching soft skills, and supporting student participation in professional organizations and attendance at disciplinary conferences.

## Site Reflections on SSA

Year 2 of SSA saw a refinement of recruitment and readiness strategies that were a primary focus in Year 1, and a growing engagement with retention and completion strategies. This broadened focus is reflected in sites' messages to stakeholders about their programs, where support for retention and completion was the most common theme, followed by building interest, awareness, or confidence in STEM fields and support for career or transfer preparedness. The strategies most widely implemented with SSA support are illustrated in Figure 3.

Looking at the key components of SSA programs, as named by sites in their reports, it is evident that sites continue to adapt the broader SSA program model to meet their local needs. A review of similarities and differences across campuses revealed substantial variation in programming. For example, only one element was identified as a key component by more than half of the sites: summer programming (named by 9 sites), and these types of programs differed considerably from site to site. About half of the sites identified academic support (e.g., tutoring), advising, and career-related initiatives as key components. Four sites identified one or more of the following as key components: outreach or recruitment activities, developmental mathematics initiatives, and STEM exploration activities. While some sites used similar strategies, their use of SSA funds to support these strategies sometimes differed.

### Successes

Compared to Year 1, when increased capacity and building internal collaborative structures were top themes among successes named by campuses, Year 2 successes were more implementation focused. In particular, sites emphasized their increased ability to deliver services to students through the capacity and structures built out in Year 1. This shift reflects an expected progression the development of the SSA initiative from recruitment to readiness to retention.



Site report narratives and interviews indicated that sites felt they were able to attract students to their colleges, interest them in STEM fields, engage them in coursework, and promote their academic progress with supports such as tutoring, supplemental instruction, and study centers. Recruitment was cited as one of the primary challenges in Year 1. In Year 2, SSA colleges indicated that the increased lead time, practical experience from the first year, and increased awareness of SSA programs helped them to build more successful recruiting systems.

## Benefits

Site report and interview responses revealed patterns of agreement across college campuses about the benefits of SSA for their institutions. Increased capacity and improved visibility were the most commonly named benefits, each referenced by two-thirds of sites in their reports.

According to campuses, SSA funds created capacity to:

- Coordinate on- and off-campus efforts to recruit and support students, and develop STEM programs (including leveraging SSA dollars to obtain additional grants);
- Improve classroom experiences with technological tools, updated equipment, and curricular innovation;
- Provide students with improved study spaces, financial access, and support programs; and
- Provide experiential opportunities for students such as internships, professional mentorships, or research experiences.

SSA sites' comments on the benefits of the initiative also included the role of SSA in raising the visibility of STEM fields both on and off campus, and in enhancing the profile of community colleges and their STEM programs with local communities and external partners. Other benefits cited included improved student performance and a more diverse STEM student population.

## Challenges

In site report narratives, campuses reported fewer challenges in Year 2 than they did in Year 1. The challenges most frequently cited by campuses included recruitment, 9c budget cuts, and campus resource limitations. A summary of common challenges is presented below.

- More than half of the campuses cited recruiting challenges. Some sites found that students chose competing opportunities, some sites struggled with limited staff time (due to budget limitations) to engage in recruiting, and a small number of campuses' recruiting efforts were affected by winter weather.
- Half of the campuses commented that the 9c budget cuts were a challenge, necessitating the elimination, modification, or scaling back of some planned interventions. Many sites scaled back funding for staff, reduced the size of their supported populations, or reduced the number of planned support services.
- Lack of resources—particularly human resources in the form of staff time—was a challenge cited by about half of the SSA campuses in their narratives. These limitations circumscribed sites' abilities to secure internships and other opportunities for SSA students, actively engage with struggling students, track and report data, and coordinate program components.
- Other reported challenges included learning and implementing new systems of data collection, managing reporting for the grant, responding to changes in curriculum or staffing, coming to agreement about the definition of STEM fields, helping students transition from one area of



guidance and support to another, helping college staff understand and detangle the role of SSA compared to other STEM-focused initiatives, and adapting campus plans to the SSA model that emerged during Year 2.

### Messaging to Stakeholders

A thematic analysis of survey responses and site report narratives showed that sites typically communicated messages that would be expected, largely aligned with the SSA model. Analysis shows, however, less consistency of messaging about SSA across sites than was expected. The most common themes are summarized here, in decreasing order of inclusion by sites in their reported messages to stakeholders.

- **Expanding campus supports for retention and completion** (11 sites). Among these supports were a wide range of specifically named strategies, including tutoring or facilitated study groups, advising, stipends and scholarships, revised or new curriculum and teaching strategies, mentorship, and skills-based workshops. A few sites characterized these supports as “intensive,” “high touch,” or “high impact.”
- **Building awareness of or interest in STEM fields** of study and increasing students’ confidence in pursuing those fields (8 sites).
- **Preparing students for transfer to 4-year schools or careers** by focusing on professional education or development, transfer and career specific advising, or training on current industry technologies (7 sites).
- **Supporting students’ readiness for college and STEM** by providing support for mathematics remediation, a “head start” of free coursework, or simply confidence in mathematics and science (6 sites).
- **Recruiting students to the community college’s STEM programs** (6 sites).

### Sustainability

Sites’ took more concrete steps to sustain SSA programming in Year 2 than they did in Year 1. The two most common strategies reported in narratives (each mentioned by about two-thirds of sites) were (1) seeking external funding for parts of SSA programming and (2) plans to integrate SSA programs or staff into other campus-wide initiatives.

**Seeking external funding.** At least five of the sites that explicitly mentioned searching for external funding had already received some funding. Several of these sites had leveraged SSA programs to apply for external funding. Some of them had received funding from organizations with which SSA coordinators had built or strengthened relationships.

**Integrating SSA into other campus initiatives.** Plans to integrate SSA programs or staff into other campus-wide initiatives varied.

- At some sites, SSA roles were reorganized to be absorbed into institutionalized positions or programs. For example, some sites integrated their STEM advising, recruiting, or even coordination—efforts started with SSA funds—into the larger college-supported structure.
- At other sites, collaborations with college offices, programs, or other grants were used to embed SSA strategies at the campus. For example, one site developed an employer outreach program in collaboration with various programs and offices on campus that will help to sustain the kinds of

career-focused activities that are part of the SSA model. Some sites were working with their college foundations to sustain elements such as scholarships.

**Overlap between SSA and other initiatives.** In addition to what sites reported regarding their general sustainability strategies for SSA, they were also asked specifically to address the ways their SSA programs overlapped with other college- or grant-funded initiatives at their institution. Collaborations and cross-referrals were the most common means by which SSA overlapped with other initiatives.

- For example, SSA program staff might collaborate with another initiative to develop a program (e.g., a STEM Career Days event or a STEM foundations course) or a program might be supported by several different streams of funding, including SSA.
- In other instances, students participating in SSA might be referred to a non-SSA initiative (e.g., a TAACCCT 4–supported mathematics placement refresher workshop) or receive referrals from those initiatives (e.g., advising and career services).
- About half of sites mentioned some sort of overlap at an administrative or staffing level, in some cases where staff from multiple initiatives, including SSA, report to the same administrator, some cases where an SSA staff member has responsibilities on multiple initiatives, and some cases where SSA staff are part of committees or serve in advisory capacities for related initiatives at the campus.

**Building sustainable capacity.** About a third of campuses indicated that they built sustainable capacity through SSA by investing in infrastructure, program and curriculum development, and relationship building that would continue to serve SSA and STEM programs in the future. Sites upgraded labs, built or expanded study and support spaces, and designed and redesigned curriculum. SSA program staff also built relationships with industry partners and other organizations that would continue to serve as sources of career and internship opportunities.

**Reducing services and supports offered to SSA students.** About a third of sites described reductions in student supports as a sustainability strategy. This included offering a limited stipend, no stipend, or switching to in-kind incentives as an alternative. Sites also discussed suspending or scaling back resource intensive programs and services such as summer bridge programs.

**No sustainability strategy.** About a third of sites responded that they did not have a strategy to sustain at least certain elements of their SSA programs. These sites commented that staff and programs would not be sustainable without outside funding or that they would need to look for or are still exploring sources of outside funding. Staff positions were noted as one of the more difficult pieces to sustain.

## Measurement

In their narratives, sites reported on their strategies for tracking student data relevant to SSA. These reports revealed a range of strategies that varied in complexity and detail, suggesting that measurement might be an area where sites would benefit from practice or resource sharing. For example, access to student-level data varied by site. Program manager or coordinator access seemed to depend both on the types of data management systems being used at the site and also the organization of SSA within the larger institutional administrative structure.

Sites were primarily concerned with collecting data about student performance and outcomes (likely influenced by UMDI and DHE data reporting requirements) and secondarily about student experiences.

- SSA coordinators at about half the sites appeared to be the data managers, pulling information from institutional databases or individual student contacts to monitor student progress.
- At the other half of sites, SSA coordinators seemed primarily responsible for flagging SSA primary participants in campus data systems while institutional research personnel managed and analyzed student data. A few sites mentioned gaining the ability to label or tag SSA participants in their institutional databases during Year 2.
- Five sites reported collecting self-reported student experience data through focus groups, surveys, and one-on-one contact. Collected data included indicators of students' knowledge of and interest in STEM fields and careers, general feedback on program or activity quality, recruitment information, post-college plans, internship experiences, and work conflicts.

Bristol used a range of data and tracking strategies (e.g., early alert systems, tutor tracking, and focus groups) to understand how SSA impacts students.

**Additional measurement priorities.** When sites were asked in their narratives if they had any measurement priorities or plans beyond what UMDI and DHE are tracking at the state level, twelve sites described additional priorities.

- About half the sites (7) reported measuring some form of **student performance data**—for instance, grades, graduation rates, time to graduation/transfer, retention, completion of developmental math requirements, college credits earned, matriculation rates, and progress toward degree completion. One site planned to identify and reach out to students who had completed a college-level STEM mathematics course but who had not decided on a program or career focus.
- A third of sites (5) reported measuring **students' experiences in SSA**, including factors that influenced their decisions to participate, their perceptions of the quality of SSA programming and its alignment with their needs, and their interest in STEM careers and programs.
- One site sought to understand how the message of SSA was being received at local high schools and planned to measure **high school students' perceptions of SSA**.
- Finally, two sites listed **measurement priorities tied to other grants or initiatives**, including those from NSF, GPSTEM, Complete College America, Boston Foundation, Achieving the Dream, and Vision Project.

### Feedback About the Initiative

About two-thirds of sites offered feedback about the SSA initiative in the comments and technical assistance sections of the site reports. Four main themes emerged: appreciation of the flexibility of the SSA model, appreciation of DHE's and UMDI's responsiveness, concerns about measurement, and requests for assistance in accessing other data.

- Several sites expressed appreciation for the “overall nonprescriptive funding philosophy” of SSA, which allows sites to tailor their programs to the needs of their own students.
- About a third of the sites expressed concerns about measurement, including the desire for greater clarity around measurement elements, a concern that current measurement processes do not account for unique but valuable pieces of sites' SSA programs, and a need for greater resources to mitigate the burden of data collection and reporting.
- A few sites requested technical assistance. One site requested the additional support of DHE in providing centralized advertising for summer bridge programs. One site requested help accessing a repository of STEM-specific articulation agreements from which they could develop their own

or a statewide agreement. One site requested assistance accessing state and national data to better track students as they leave the community college.

- A few sites expressed appreciation for the support and responsiveness from DHE and UMDI.

## DHE Reflections on Year 2

On September 16, 2015, the UMDI project manager conducted an hour-long telephone interview with the two DHE personnel who guide the STEM Starter Academy Initiative at the statewide level: the DHE Associate Commissioner for Economic and Workforce Development (hereafter, “the Associate Commissioner”) and the DHE Executive Director of STEM (hereafter, “the Director”). The purpose of the interview was to explore the Associate Commissioner and Director’s perspectives on the successes and challenges of Year 2. On January 19, 2016, the UMDI project manager conducted another interview with the same parties, which primarily focused on Year 3, but included additional reflections on Year 2 that have been incorporated here. See complete interview protocols in Appendix E and F. Key findings from these interviews are summarized below.

### Successes

DHE representatives’ reflections on the major successes of the second full year of program implementation included the formalization of the SSA program model, improved understanding of measurement strategies, sites’ flexibility and commitment, working group collaboration, and the formalization of the Director’s role.

**Formalization of the SSA program model.** The collaborative work in Year 2 to establish a more consistent set of definitions and practices for the SSA initiative was seen as a key success. DHE representatives felt that this model provided greater clarity to sites and other stakeholders regarding the parameters and goals of the program, allowing campuses to align their strategies with overall model goals while also allowing for local latitude and adaptation. The Director felt that the agreement around a program model facilitated communication and advocacy with stakeholders. At the same time, DHE representatives viewed local variations that enabled adaptation to diverse environments as contributing to the initiative’s success.

**Improved understanding of measurement strategies.** The development of a program model that codifies goals and metrics facilitated DHE personnel and campuses’ understandings and engagement with the design of measurement strategies. Common definitions of program components allowed DHE to better align measurements and outcomes with program design.

**Sites’ flexibility and commitment.** The Director observed that a key facilitating factor in the successful formalization of a program model was sites’ willingness to engage in collaboration and to “stick with it” over the course of the Year 2. 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 within and between campus representatives in the Measurement Working Group and the Model Working Group was seen as essential to refining the structure, goals, metrics, and supporting strategies for the SSA model. The process resulted in the identification of key program components as well as the identification of strategies for measuring those components.

**Formalization of the Director’s role.** The expansion and formalization of the Director’s role in SSA was credited with bringing a greater level of leadership and time investment that has had many benefits for the initiative. The Associate Commissioner noted that the Director’s expanded role facilitated

the sharing of best practices between campuses and promoted other campus connections. The Director played a leadership role in engaging sites around model development and pushing for increased consideration of measurement and outcomes. The Director noted that her role allowed DHE to be a partner to sites in their implementations of their programs while maintaining a sense of campus ownership of the initiative.

## Challenges

The primary challenges encountered in Year 2, according to the DHE interviewees, 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.** The synthesis of an extensive amount of information into a legislative report was a notable challenge for DHE interviewees. Particularly challenging was the task of balancing the importance of providing rich detail and depth that can inform future practice with the importance of succinctly communicating the successes of the program to different audiences.

**State budgetary challenges impeded scale-up efforts.** Massachusetts' 9c cuts resulted in a need for sites' to reconfigure 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 mitigating factors.

**Understanding SSA's connections to other campus programs and systems.** DHE representatives were uncertain about the degree to which SSA has become part of the "fabric" of the community college campuses. More specifically, they sought a clearer understanding of 1) how sites are communicating what SSA is to students, 2) if sites view SSA as an "integral part of the way that they do business," 3) whether and what stakeholders—besides primary SSA program administrators—know about the program, and 4) if 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

When asked to reflect on promising or best practices that emerged during Year 2 SSA implementation, DHE representatives cited fostering opportunities for sites to share information and facilitating the reporting process as positive practices.

**Facilitation of collaboration.** 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.

**Development of common reporting structures and systems.** The refinement of a common reporting structure in Year 2 improved DHE's understanding of individual sites' program components,



challenges, and successes. In addition to the Director's deeper engagement with SSA sites (including participating in Year 2 site visits) this understanding put DHE in a better position to facilitate information sharing across sites. However, both DHE interviewees noted that they had not yet created a structure that would facilitate cross-campus sharing of the best practices identified through the reports, but had plans to do so in Year 3.

**Engaging in data-driven decision making.** The Director was pleased with SSA institutions' level of engagement with initiative-level data through the model-building process. She expressed confidence that cross-site collaboration would be enhanced by the availability of more substantial outcome data, which will become available as the initiative progresses. She expected that campuses would be motivated to collaborate around particular strategies once the success of those strategies is more established..

### Other Reflections

DHE interviewees' general reflections on the Year 2 implementation process at the site and program levels included a consideration of 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 integration of SSA with other state-level STEM pipeline programs.

**Embedding SSA in campus systems while maintaining program boundaries.** As previously mentioned, DHE representatives are interested in learning the extent to which SSA is integrated into the larger community college campuses. While they want SSA to be interwoven into the campus environment, they realize that is in tension with their need to delineate clear boundaries around SSA in order to understand the unique contributions of the initiative.

**Requiring clearer and more measurable Year 3 plans.** As part of DHE's shift to a greater focus on measurement and communicating successes, the Director developed common systems for sites to report on their Year 3 plans. Sites were asked to summarize their institution's SSA program, delineate measurable objectives, outline their sustainability plans, and clarify how they might use data to refine their strategies. The increased clarity reflects the maturation of the program, as well as DHE's priorities of gauging outcomes and conveying successes and best practices.

**Sustainability.** Sustainability has continued to be an important topic for 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.

**Need for greater clarity around integration of SSA with other STEM pipeline programs.** At the end of Year 2, DHE representatives indicated that they did not have a clear understanding of the extent to which SSA was integrated into sites' broader college environment. Additionally, the Associate Commissioner felt that the department had not made targeted efforts to "deeply" incorporate SSA into other STEM pipeline initiatives.

### Next Steps

DHE representatives' vision for next steps in program implementation included a focus on the need to increase cross-site communication and collaboration, including sharing of best practices and dissemination of program successes.



**Improve sharing across sites.** In Year 3, 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 regional site visits among campuses. The Director also intended to support cross-campus discussions of best practices based on program data.

### Looking Ahead: Year 3

Developments in the SSA initiative during Year 2 shaped plans for evaluation of the initiative in Year 3. The establishment of the SSA model was a guiding development, and will allow the evaluation team to continue our efforts to align measurement activities with key outcomes and metrics outlined in the model.

Informed by the priorities of DHE and SSA sites, data collection activities have been revised to include measures of developmental math participation and completion. Through this data collection activity we will improve our understanding of whether and to what extent SSA interventions increase the rate at which students complete developmental mathematics and move on to the college-level mathematics coursework that is often a prerequisite for STEM programs.

Sites' interest in students' experiences in SSA programs led to the development of a new instrument to collect these data in Year 3. This instrument will facilitate the gathering of student-level perspectives on how SSA interventions impact their college experiences, including their interest and self-efficacy in STEM fields. Likewise, another new instrument developed for Year 3, an exit survey, reflects sites' and DHE's interest in understanding students' trajectories after they exit SSA programs. This instrument will facilitate systemic learning about how student experiences in SSA programs impact career and educational trajectories after students leave the community college.

The measurement strategies used throughout the life of the grant will also yield increasingly relevant data in Year 3, as students who began their participation with SSA during the pilot phase enter the mid-points of their programs. Evaluation strategies will continue to be focused on initiative-level measurement while also responding to campus feedback about the local relevance of various evaluation activities. This reflects DHE and sites' interest in using data both to guide understanding of the initiative-wide impacts on students and the STEM pipeline and also to refine program models and reflect unique successes.

## Methods

This report includes information collected through the following eight data collection and technical assistance activities.<sup>40</sup>

### Supplemental Participant Data Requests

At the conclusion of each term (Fall 2014, Spring 2015, Summer 2015), 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).

Primary and Secondary data collection instruments were designed in consultation with DHE and can be found in Appendix H and Appendix I. Data about secondary participants were collected in the aggregate. The instrument collected a count of SSA events and event participants. 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 primary participant collections beginning with Summer 2015. These fields were designed in consultation with DHE and grantees. One field indicates 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. A second field indicates 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 outcome and enrollment data that are regularly submitted to DHE by each college through HEIRS (Higher Education Information Resource System).

### Phone Interviews – Fall 2014 and Winter 2015

UMDI conducted one-hour telephone interviews with one or 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 2014 SSA activities, reflections on SSA implementation to date, plans for program sustainability, and next steps in program implementation (see Appendix J 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

<sup>40</sup> For reference, the Year 2 SSA evaluation plan is included in Appendix G.

while also recruiting and planning for Summer 2015 programs. Interviews were digitally recorded with permission, summarized, and analyzed in NVivo.

### **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 strategies for transitioning students from Summer to Fall, Fall retention activities, and plans for the Spring and Summer of 2015 (see Appendix J, Appendix K, and Appendix L for protocols). Site visitors interviewed program staff using the same interview protocol as was used with the fall and winter phone interviews.

In order to minimize the evaluation burden on grantees, UMDI did not revisit sites that had been visited during Summer 2014. UMDI used data from the Spring 2014 interviews and Fall 2014 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 (who were 18-years-old or older), 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 NVivo. For a summary of the Fall 2014 site visits and “snapshots” of individual sites that were visited, please see Appendix M.

### **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). Site visit data collection instruments (interview, focus group, and observation protocols) were developed in collaboration with DHE and focused on summer 2015 implementation and reflections on the past academic year (see Appendices N, O, and P for protocols). As part of the process of preparing for site visits, UMDI collected summer programming schedules from all fifteen sites (see Appendix Q 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. 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 (who were 18-years-old or older), 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. SSA coordinators were interviewed at every site. 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 NVivo. For a summary of the Summer 2015 site visits and “snapshots” of individual sites that were visited, please see Appendix R.

## Year 2 Site Reports

In Fall 2015, all participating sites completed Year 2 Site Reports, which included two components: an online survey and a narrative template. These instruments were developed by UMDI in collaboration with DHE and are included in Appendices A and B. Summarized data from the survey are available in Appendix C. Compiled narrative portions of the reports submitted by sites are available from DHE upon request.

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

**Online survey** – The purpose of the online survey was to catalog and assess site-specific components of SSA implementation as they relate to the core elements of the SSA model. The survey focused on topics that were of greatest interest to DHE and was comprised of close-ended items.

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

## Interviews 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 E). The interview was digitally recorded with the administrators’ permission. The recording was transcribed, analyzed, and summarized.

The UMDI project manager conducted another interview with the same parties on January 19, 2016, which primarily focused on Year 3, but included additional reflections on Year 2 that have been incorporated into this report. See complete interview protocol in Appendix F. Key findings from the Year 3 portion of the interview will be summarized in the interim Year 3 report.

## Participation in Technical Assistance Meeting

DHE convened a technical assistance meeting for SSA grantees on March 30, 2015. At that meeting, 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 S).

## 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 T 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 worked with DHE to refine evaluation strategies in ways that align with the SSA model and meet grantee needs. This refinement was often reflected in changes to existing data collection instruments or development of new instruments.

UMDI worked with DHE to adapt site report instruments to better reflect understandings of SSA implementations in Year 2. These Year 2 Site Report instruments included an online survey and narrative template (see Methods section for details). Likewise informed by the priorities of DHE and SSA sites, the supplemental student data request was revised to include measures of developmental math participation and completion in summer 2015.

Based on sites' interest in students' experiences in SSA programs, UMDI initiated development of a new instrument, a student experience survey, to collect these data in Year 3. Another new instrument that UMDI began to develop in Year 2 for implementation in Year 3 was an exit survey that reflects sites' and DHE's interest in understanding students' trajectories after SSA. UMDI worked with grantees and with DHE to develop these instruments.

Where feasible, UMDI also provided document review for instruments developed and disseminated by DHE (e.g., Year 3 planning documents).

### 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, to 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 the Associate Commissioner through April and by the Director 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 T 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 section, below).

In addition to these eight all-site meetings, three SSA working groups (Measurement, Model, and Sustainability) began phone meetings in May 2015, facilitated by the Director. The Sustainability Working Group, which met first, 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, the Director drafted a preliminary version of the SSA model 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 the Director'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, the Director 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 S.



## Strategic Considerations

After the progress of Year 2, DHE and the campuses are in a strong position to continue to refine the SSA model and identify and scale promising practices and key strategies that are emerging. The following are some strategic opportunities for consideration by DHE.

1. **Consider updating the SSA program model to represent emergent consensus regarding what its core practices should be.** Sites differ in their understanding of what constitutes a key component of SSA, and there is substantial variation in practice. The initiative might benefit from more uniform definitions of some key elements, such as summer bridge or summer readiness programs. Additionally, several practices that are not currently mentioned as key to the model may warrant further consideration. These include:
  - **Collaboration.** Collaboration across institutions was a key goal of STEM Starter Academy as it was originally proposed by DHE and by the community colleges. However, collaboration does not currently appear in the SSA model.
  - **Recruitment or support of groups who are traditionally underrepresented in STEM fields.** Eight sites reported that they explicitly recruited groups underrepresented in STEM, and another four sites said that the populations of students they typically serve already fall into categories generally considered underrepresented with their SSA recruitment efforts. However, seven sites did not specifically target these groups.
  - **Dropout re-engagement.** Approximately 2% of primary participants who were new to the intervention in Fall 2014 and Fall 2015 were re-admitted or re-activated students. Neither sites nor DHE have prioritized the issue of re-engaging dropouts, and this issue may warrant closer consideration.
  
2. **Provide technical assistance to foster system-wide communication and resource sharing, particularly in regard to best practices and lessons learned.** Sites have benefitted from cross-campus information sharing, but continue to lack systematic information about other SSA sites' strategies. DHE might consider gathering feedback from sites about this issue and discussing strategies that would facilitate sites' sharing of key SSA practices.
  - **Feedback from grantees suggests some sites have had difficulty in learning about other grantees' SSA programs.** Current methods to facilitate this sharing among sites have resulted in unsystematic and uneven information sharing.
  - **Facilitate opportunities for sites to learn from others' efforts to collect, manage, and summarize data relevant to their SSA activities.** Site reporting on their strategies for tracking student data relevant to SSA revealed a range of practices that varied in complexity and detail, suggesting that measurement might be an area where sites would benefit from practice or resource sharing.
 

DHE might also consider making space for a conversation across sites about the evaluation burden they experience and their strategies for mitigating this burden. Differing perceptions of the difficulty of data collection might be due to sites' different institutional capacities or to different systems used by sites for collecting, tracking, processing and understanding data.
  - **There may be an opportunity for strategic practice sharing between sites that have been able to extensively engage industry with minimal SSA funding and those that have not.** The vast majority of industry engagement work happening at SSA sites was not supported by

SSA funding in Year 2. Industry engagement is also an area for growth in the initiative moving forward, as the focus shifts to completion and transfer or job placement.

3. **Continue efforts to strengthen sites' sustainability planning.** Some campuses are beginning to seek ways to diversify their funding and to enhance the sustainability and institutionalization of SSA programs. This may be an area in which continued technical assistance and sharing is particularly important.
  - **In site report narratives, about a third of sites responded that they did not have a strategy to sustain at least certain elements of their SSA programs.** In interviews, DHE representatives indicated that staffing was one of the pieces of SSA that might be more readily absorbed by institutions. However, one-third of sites noted in their annual reports that staff positions would be difficult to sustain. Further discussion is warranted.
4. **Engage campuses in aligning evaluation activities with what they locally identify as key indicators of participant progress and outcomes.** 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.
5. **Consider strategies for promoting connections between SSA programs and other STEM initiatives at each campus.** Campuses offer an array of programs to promote engagement and success in STEM, and SSA is an important part of that support structure. Moving toward a thoughtful integration of these initiatives may yield substantial efficiencies and positive results.
  - ✓ 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.

# Appendices

