

STEM Starter Academy Year 4 Interim Report

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UMASS DONAHUE INSTITUTE
Applied Research &
Program Evaluation

STEM Starter Academy Year 4 Interim Report

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Report Information

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

About the Donahue Institute

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Executive Summary

Introduction

The STEM Starter Academy (SSA) is a Massachusetts Department of Higher Education (DHE) initiative to inform, engage, recruit, retain, and graduate significantly more students through STEM pathway programs that result in job placement within STEM fields or transfer to university STEM programs. The initiative was launched system-wide at all 15 Massachusetts community colleges in January 2014. From its inception, the SSA initiative has focused on affecting system-level change through at-scale implementation.

SSA promotes the identification and replication of best practices from existing community college projects, fosters integration and alignment of existing STEM-student support services, and complements and extends curriculum pathway programs at each campus. Implementation varies across the campuses, but often includes support for students who are interested and prepared to pursue STEM at the community college as well as outreach to prospective students who previously may not have considered STEM careers. Common strategies include exploratory courses and activities that engage and inform students about career opportunities in STEM fields, summer bridge programs that prepare incoming students for success in STEM coursework, and an array of services intended to support higher student retention rates and program completion.

The UMass Donahue Institute (UMDI) has worked with DHE as an external evaluator of the SSA initiative since the inception of the program. This report presents interim findings from Year 4.¹ The report serves multiple purposes: (1) to provide formative feedback to DHE and to the community colleges relevant to the continuous improvement of grant activities, (2) to provide initial quantitative and qualitative feedback about SSA student participation, and (3) to provide technical assistance to support DHE's efforts to implement the initiative.

The preliminary evaluation findings in this report are based on data from Year 4 that were available at the time of the writing of this report (Fall 2016 and Spring 2017). Site visit data collected during Summer 2017 are not yet fully analyzed; as such, this report presents an initial summary of those data. Complete findings from Year 4 will be presented in the Year 4 Annual Evaluation Report, which will be submitted to DHE in April 2018.

Participation

Overall participation in SSA programs continues to be strong. SSA-supported activities served 6,736 primary participants and 10,428 secondary participants in the first part of Year 4 (Fall 2016 and Spring

¹ SSA Year 4 includes Fall 2016, Spring 2017, and Summer 2017, and this report includes findings from the first two terms.

2017).² As of Spring 2017, SSA had served 21,801 primary participants and 39,726 secondary participants.³

Data from the first two terms of Year 4 indicate a growth in primary participant numbers from Year 3 to Year 4 and a slight decrease in secondary participant numbers during that period. From Fall 2016 to Spring 2017 there was a 61% increase in the number of primary participants, led by five sites.⁴

The total the number of events and activities to engage SSA secondary participants grew significantly in Year 4 compared to Year 3. Averaged across sites, this growth was more moderate (14% Fall 2015–16 and 4% Spring 2016–17).⁵ The total number of secondary *participants* engaged by SSA in the fall and spring of Year 4 was similar to the number that had been engaged during those terms in Year 3, with a moderate increase from fall to fall (457 participants, 11%) and a moderate decrease from spring to spring (382 participants, 6%). In other words, it seemed that campuses shifted some of their engagement with secondary participants earlier in the school year, from spring into fall.

Of the 6,736 primary participants served with SSA-related supports in Year 4 so far, 64% (4,212 students) received extra or targeted supports (e.g., tutoring, peer mentoring), 9% (603 students) received direct financial support, and 39% (2,611 students) received targeted STEM pathway and/or STEM career counseling.

Campus Reflections on SSA Practice

Promising practices – stakeholder assessments and priorities

Based on preliminary analysis of available Year 4 data, Figure 1 presents an updated illustration of the common SSA strategies and practices emphasized as promising or effective by campus stakeholders (SSA staff, administrators, and participants).

The elements of SSA site-level implementation remained fairly consistent from Year 3 into Year 4; however, there were some shifts in administrators' assessments of the effectiveness or importance of

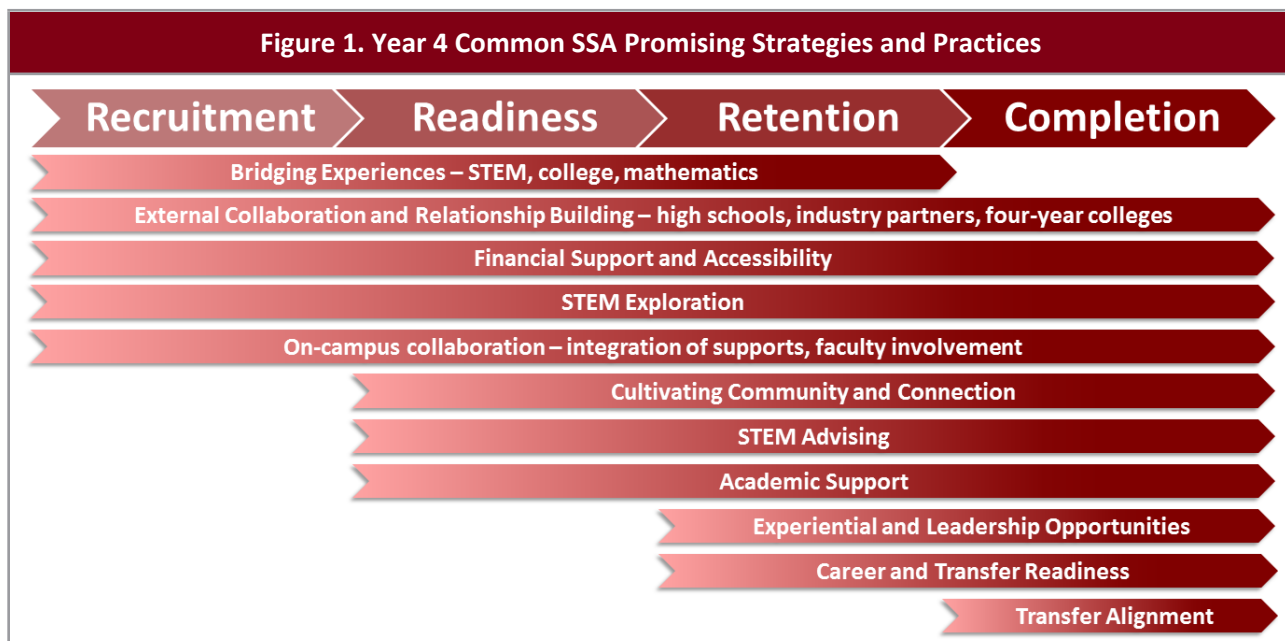
² Primary participants are community college students who participate in STEM Starter Academy grant funded programs/events/activities (i.e., participants who have an ID number assigned by their college). Secondary participants are individuals who are not currently enrolled at a community college and participate in STEM Starter Academy grant funded programs/events/activities (i.e., participants who do not have an ID number assigned by their college).

³ These are counts of total participation across terms, which includes duplicates.

⁴ This increase may be due to changes in programming or changes in data reporting or collection practices. Additional details will be provided in the Year 4 Annual Evaluation Report.

⁵ Two campuses drove a 200% increase in events from Fall 2015 to Fall 2016 and five sites led a 32% increase in events from Spring 2016 to Spring 2017.

particular strategies between the two years.⁶ For example, there was increased alignment, in Year 4 as compared to previous years, between the specific strategies used by sites and sites' perceptions of what was effective, such that practices that were widely implemented—such as Cultivating Community, On-campus Collaboration, and Career and Transfer Readiness—were also widely seen as successful.⁷



- The practice categories of Cultivating Community and On-campus Collaboration had previously been emphasized as promising or effective by campus administrators and they maintained this status or even gained emphasis in Year 4.
- Career and Transfer Readiness, although widely seen as an important strategy in previous years, had not been widely cited as effective or promising (likely because insufficient time had passed since their implementation to assess them). Thus, the emphasis across many sites on the effectiveness of these strategies was a notable change in Year 4.
- Student leadership opportunities—which had been part of SSA programs at a few sites in the past—gained emphasis among SSA administrators in Year 4 as promising and effective strategies.⁸

⁶ Data on Year 4 site-level student outcomes, which could be used to evaluate campus-level perceptions of effective practices, are not yet available and will be included in the Year 4 Evaluation Report.

⁷ These strategies are described in greater detail in the Promising Practices section of this report.

⁸ This category of practice was not explicitly included in the analytic framework presented to sites, but it will be considered for future inclusion in one of the existing categories or as an additional category.

- In general, strategies within each of the categories of practice continued to be widely implemented at SSA sites while the emphasis on each of the categories varied across sites.⁹ This potentially reflects local differences in the needs of student populations, different relationships between campuses and their surrounding communities, and differences in the service or support gaps that SSA funding is used to bolster.

Promising practices – student feedback

Two of the most commonly praised elements of SSA programs by students in Year 4 site visit focus groups were 1) feeling a sense of belonging or community and 2) appreciating the helpfulness and support received from SSA program staff and faculty.

Practices that sites emphasized as ways of cultivating community included building connections among students through:

- peer leadership (tutors, mentors, interns);
- creating a sense of membership in a cohort where students move together through a series of courses or activities;
- group work or group interaction during workshops, courses, clubs or other activities; and
- engagement outside of the classroom.

These practices also included building relationships between students and faculty or staff by:

- having a central or consistent person or group of people who serve as a human connection and source of help for students (these might be program coordinators, faculty, advisors, etc.);
- demonstrating “a big heart for helping students” or that “we care about them;” and
- providing opportunities for students to interact with faculty outside of classrooms, such as pre-semester workshops or informal lunches.

Students at 13 sites emphasized the value and benefits of feeling connected to their peers, to faculty and staff, and to a STEM identity through their participation in SSA.¹⁰ Examples of these benefits included:

- Feeling more comfortable starting the fall semester having met peers and feeling known by faculty and

⁹ Changes in administrator focus on certain activity areas do not necessarily reflect patterns of implementation of these practices at SSA sites, only patterns of emphasis among administrators who were asked to highlight their campus’ most promising or effective SSA practice areas.

¹⁰ Students who participated in focus groups during SSA site visits were not necessarily a representative sample of SSA participants.

- Staying motivated and feeling increased confidence through greater engagement with campus life, being affiliated with STEM fields, and feeling camaraderie with other students who had similar motivations and aspirations.

Students at 11 sites emphasized the importance and helpfulness of dedicated STEM coordinators and SSA staff and faculty. Many talked about feeling a sense of security and comfort knowing they could turn to someone they trusted if they were struggling. Several students told stories of having a coordinator proactively check in with them when they were struggling and having that sense of being cared about motivate them to return to their studies.

Reflections on Year 4

Challenges: sustainability and institutionalization

The most-noted challenges in Year 4 revolved around issues of program sustainability and institutionalization. Concerns included:

- Uncertain ability to maintain certain SSA activities (e.g., summer bridge, research programs, SI programs) after funding for SSA ends, especially given tight college budgets, and
- Difficulty in hiring and retaining administrators or coordinators given funding uncertainty.

Lessons learned: relationships and people

The themes that emerged from administrator reflections on lessons learned in Year 4 echoed those emphasized in the Promising Practices section, suggesting that a handful of strategic areas of focus have begun to emerge for SSA campuses. These themes included:

- the importance of building and maintaining external (off-campus) and internal (on-campus) relationships;
- the added value of STEM-specific personnel;
- the importance of STEM-specific advising; and
- the benefits of connecting students to peers, faculty, and staff.

Measurement: differentiating participants and impacts

As a follow-up to conversations that started at the May SSA Retreat, during the nine summer site visits, administrators were asked to broadly group their SSA participants based on different types of participation or levels of engagement and distinguish the measureable outcomes of SSA participation they might expect for those groups.

While the expected outcomes varied slightly at each campus, overall most sites predicted higher rates of graduation and transfer for those students that were *most* involved with SSA (e.g., research interns, participants in intensive programs or other cohort-based groups, students receiving mentorship, students in leadership roles). For those groups of students that received the lowest amount of support

or were not interested in STEM, most sites expected more immediate/short term outcomes (e.g., better performance in a course) that would not necessarily translate into completion of a STEM degree.

Feedback for DHE: organization, flexibility, and responsiveness welcome; additional clarity and cross-campus learning opportunities sought

Across sites, SSA administrators expressed appreciation for the organization and responsiveness of DHE during Year 4. They also appreciated the level of flexibility they felt they had been given to experiment and tailor the SSA initiative to their institution's and population's needs. Some sites expressed an appreciation for ongoing DHE communication with all 15 campuses.

Looking to the future, SSA administrators requested the DHE continue to facilitate opportunities for sites to learn from each other's practices and success. They also sought clarification regarding emerging initiative elements, specifically early college programming and STEM redefinition.

Strategic Considerations

The following strategic considerations are based on the findings presented in this report. They are intended to facilitate action planning for SSA in Year 5. Consider strategies to:

Support SSA programming:

- Refine the SSA program model to represent emergent consensus regarding what its core practices should be, and identify ways to more closely align program efforts with the goals of the initiative.
- Support SSA administrators' efforts to solidify the position of SSA on their campuses.

Enhance the quality of communication:

- Support and facilitate campus efforts to raise the profile of their SSA work and accomplishments.
- Consider strategies for enhancing interaction among campuses.

Refine measurement and reporting practices:

- Continue efforts to refine the definition of STEM to better reflect the work happening in the field, and to more accurately assess the impact of the SSA initiative.
- Support the collection, review, and sharing of data at the campus level.

Introduction

The STEM Starter Academy (SSA) is a Massachusetts Department of Higher Education (DHE) initiative to inform, engage, recruit, retain, and graduate significantly more students through STEM Pathway programs that result in job placement within STEM fields or transfer to university STEM programs. The initiative was launched system-wide at all 15 Massachusetts community colleges in January 2014. From its inception, the SSA initiative has focused on affecting system-level change through at-scale implementation.

SSA promotes the identification, innovation, and replication of best practices for recruiting and advancing community college students through STEM programs, fosters integration and alignment of existing STEM-student support services, and complements and extends curriculum pathway programs at each campus. Implementation varies across the campuses, but often includes support for students who are interested and prepared to pursue STEM at the community college as well as outreach to prospective students who previously may not have considered STEM careers. Common strategies include exploratory courses and activities that engage and inform students about career opportunities in STEM fields, summer bridge programs that prepare incoming students for success in STEM coursework, and an array of services intended to support higher student retention rates and program completion.

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The preliminary evaluation findings in this report are based on data from Year 4 that were available at the time of the writing of this report (Fall 2016 and Spring 2017). Site visit data collected during summer 2017 are not yet fully analyzed; as such, this report presents an initial summary of those data.

In addition to descriptive data about SSA participation in Fall 2016 and Spring 2017, this report presents findings from interviews with key SSA program administrators conducted during that same spring, as well as findings from site visits conducted during Fall 2016 and Summer 2017 and an interview with DHE administrators from February 2017. Summaries of these findings are presented in two main sections. The first section presents trends in the number of students participating in SSA-supported activities and the broad categories of support received by those students. The second section summarizes administrator and student reflections on SSA implementation from interviews and site visits conducted during Year 4. These findings include promising practices discussed by campus administrators and students, challenges to implementation, lessons learned, and feedback about grant facilitation.

¹¹ SSA Year 4 includes Fall 2016, Spring 2017, and Summer 2017, and this report includes findings from the first two terms.

Key Year 4 data—including summer participation data and most data on the impacts and outcomes of the SSA initiative—will not be available until January 2018. Analyses of these data will be included in a comprehensive Year 4 evaluation report that UMDI will submit to DHE in April 2018. That comprehensive report will provide analyses of the impacts that SSA has had on students' success in persisting in STEM and graduating with STEM-field degrees and certificates. That report is also anticipated to include analyses of the impacts of SSA on different populations of students and the broad elements of SSA programming that are correlated with student success.

Guiding Evaluation Questions

Evaluation of the SSA initiative continues to encompass data collection and analysis to facilitate both process and outcome evaluation. In Year 4, more resources were dedicated to addressing outcome-focused questions. Nevertheless, process questions remain relevant to understanding and explaining the contexts in which effective programs are developed and sustained. The evaluation questions outlined below guided the Year 4 evaluation.

Process evaluation questions

- P1. What are the major challenges to and facilitators of successful program implementation that have been encountered by grantees? How have challenges been addressed or overcome?
- P2. What are the major challenges to and facilitators of advancing SSA implementation and initiative development that have been encountered by DHE? How have challenges been addressed or overcome?
- P3. How do key project stakeholders (e.g., SSA students, administrators, coordinators) rate and explain the quality, relevance, and effectiveness of major SSA model components and services?
- P4. What infrastructure, systems, and processes are being put in place to aid program sustainability during and beyond the grant period? What are the greatest challenges to and facilitators of creating sustainability?

Outcome evaluation questions

- O1. What progress is being made toward the goals of recruiting, preparing, retaining, and graduating/completing more students from STEM pathway programs?
- O2. Who is participating in SSA activities? Do observed changes in progress and outcomes differ across student characteristics such as gender and race/ethnicity?
- O3. To what extent are observed changes in student outcomes attributable to initiative activities (including combinations of program activities) versus contextual variables or non-SSA interventions?¹²

¹² Although direct attribution to SSA is difficult to validate, the evaluation seeks to improve stakeholders' understandings of the connection between SSA program activities and student outcomes.

O4. What differences in program features, implementation strategies, and contextual variables can be identified across institutions whose student progress or outcomes differ substantially?¹³

SSA Model

The SSA model contains four major components—recruitment, readiness, retention, and completion—organized into two major goals, each with related metrics and supporting strategies.¹⁴ See Figure 2 and Figure 3 for a summary of the model goals, metrics, and strategies.

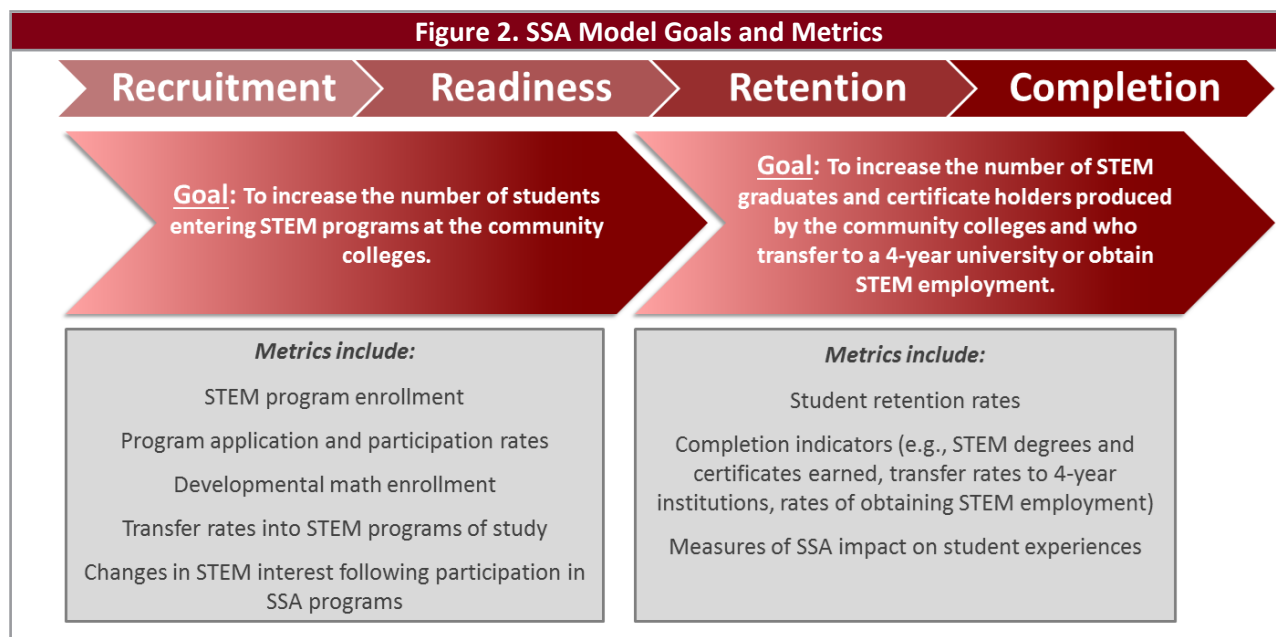
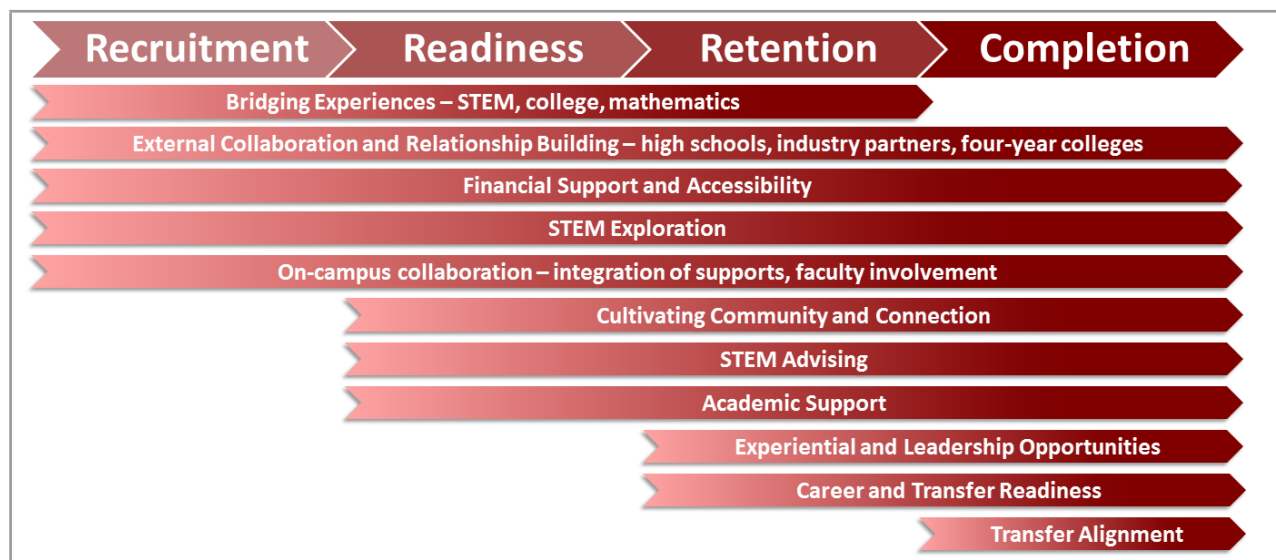


Figure 3. Year 4 Common SSA Promising Strategies and Practices

¹³ UMDI and DHE agree that addressing Outcome Question 4 is a long term goal which will not be fully addressed through evaluation analysis and reporting activities in Year 4. The evaluation team will continue to work with DHE to collect data that are relevant to this question.

¹⁴ The SSA model is available from DHE upon request.



Findings: Participation

This section presents a summary of SSA participation through Spring 2017. The information presented in this section comes from primary and secondary participant data submitted by campuses to DHE.

SSA-supported activities served 6,736 primary participants and 10,428 secondary participants in the first part of Year 4 (Fall 2016 and Spring 2017).¹⁵ As of Spring 2017, SSA had served 21,801 primary participants and 39,726 secondary participants.¹⁶ A summary of participation, by term, is provided in Table 1. Institutional-level data can be found in Appendix A, Table 1A.

Table 1. SSA Participants by Term and Year			
		Primary participants*	Secondary participants†
	Fall 2013	NA	NA
Year 1 (Pilot)	Spring 2014	448	5,662
	Summer 2014	786	2,545
Year 2	Fall 2014	2,769	1,741
	Spring 2015	2,949	5,018
	Summer 2015	941	1,742
Year 3	Fall 2015	2,430	4,192
	Spring 2016	2,984	6,161
	Summer 2016	1,758	2,237
Year 4	Fall 2016	2,585	4,649
	Spring 2017	4,151	5,779
	Summer 2017	Data Pending	
Total		21,801	39,726

* 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).

Differences in participation numbers across terms reflect general patterns of SSA implementation across sites. These patterns include spring recruitment activities with secondary participants, intensive summer

¹⁵ 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).

¹⁶ These are counts of total participation across terms, which includes duplicates.

programming with a focused group of primary participants, and ongoing academic year supports for primary participants. A thorough analysis of participation trends will be included in the Year 4 Annual Report, once all Year 4 data are available.

Data from the first two terms of Year 4 indicate a growth in primary participant numbers from Year 3 to Year 4 and a slight decrease in secondary participant numbers during that period. From Fall 2016 to Spring 2017 there was a 61% increase in the number of primary participants, with Cape Cod, Mass Bay, Quinsigamond, Middlesex, and North Shore all reporting significant increases during that time. The number of primary participants at Cape Cod increased from 364 students to 464 students, while participation at Mass Bay increased from 303 to 432 students, and participation at Quinsigamond increased from 215 to 434 students. Middlesex reported an even steeper increase from 120 to 656 students. Likewise, participation at North Shore increased from 199 to 728 students. UMDI is still in the process of collecting site-level information that will contribute to interpreting these shifts.

Three times as many events or activities targeted to secondary participants were held in the fall of Year 4 (305 events) than in the fall of Year 3 (100 events), but the vast majority of this increase came from two sites. On average, across sites, the Fall 2015 to Fall 2016 growth in events targeted to secondary participants was 14%. From Spring 2016 to Spring 2017 the number of events or activities that engaged secondary students grew by 31%, from 187 to 246 (4% growth averaged across sites).

The total number of secondary participants engaged by SSA in the fall and spring of Year 4 was similar to the number that had been engaged during those terms in Year 3, with a moderate increase from fall to fall (457 participants, 11%) and a moderate decrease from spring to spring (382 participants, 6%). In other words, it seemed that campuses shifted some of their engagement with secondary participants earlier in the school year, from spring into fall. See Table 2 for secondary participants and event counts by term, and Appendix A, Table 2A for a summary of these data by institution.

Table 2. Secondary Participant and Event Count by Term and Year

	Term	Number of secondary participants*	Number of events and activities
	Fall 2013	NA	NA
Year 1	Spring 2014	5,662	173
	Summer 2014	2,545	49
Year 2	Fall 2014	1,741	56
	Spring 2015	5,018	156
	Summer 2015	1,742	40
Year 3	Fall 2015	4,192	100
	Spring 2016	6,161	187
	Summer 2016	2,237	76
Year 4	Fall 2016	4,649	305
	Spring 2017	5,779	246
	Summer 2017	Data Pending	
Total		39,726	1,388

* 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).

Primary Participant Service Descriptions

Of the 6,736 primary participants served with SSA-related supports in Year 4 so far, 64% (4,212 students) received extra or targeted supports (e.g., tutoring, peer mentoring), 9% (603 students) received direct financial support, and 39% (2,611 students) received targeted STEM pathway and/or STEM career counseling (see Table 3; institution-level data are available in Appendix A, Table 3A).¹⁷ These broad categories of support were identified at the beginning of the initiative by UMDI in consultation with DHE and are based on the student success model laid out in the original RFP. They are meant to capture three key categories of student support that likely impact student outcomes, but are not meant to encompass all forms of support provided to students through SSA. Thus, some primary participants are supported by SSA and receive supports that do not fall into these service categories.

The percentages of primary participants served by each of these three categories of support in the Fall and Spring of Year 4 have generally decreased as compared to percentages from the Fall and Spring of Year 3, with one exception. From Spring 2016 to Spring 2017, the percent of primary participants receiving targeted STEM pathway and/or STEM career counseling increased from 33% to 44%. However,

¹⁷ These service categories are not mutually exclusive and individual primary participants could receive all three types of services in the same term.

from Fall 2015 to Fall 2016, the percent of primary participants receiving direct financial support decreased substantially from 34% to 9% and the percent receiving extra or targeted supports decreased from 71% to 60%.¹⁸ From Spring 2016 to Spring 2017, the percent of primary participants receiving extra or targeted supports also decreased from 75% to 63%.

The number of sites reporting primary participants who received these types of supports grew in two of the three categories from Fall 2016 to Spring 2017. The number of campuses reporting primary participants who received direct financial supports grew from 11 in Fall 2016 to 12 in Spring 2017. Likewise, 10 sites reported primary participants who received targeted STEM pathway and/or STEM career counseling in Fall 2016 and 13 sites did so in Spring 2017. The one support area where the number of campuses reporting primary participants receiving that support decreased was extra or targeted supports (e.g., tutoring or mentoring). Every campus reported primary participants who received extra or targeted supports in Fall 2016, and 11 campuses did so in Spring 2017 (See Table 3A in Appendix A). Further analysis to be included in the Year 4 Evaluation Report will help tease apart whether these differences are the result of differences in implementation by term or broader trends indicating similarities or differences in site-level program models.

Figure 4 provides a sense of how SSA programs combine or integrate support services for students. It features data from Spring 2017 because that is the most recent data available. The figure illustrates the number of primary participants that receive support in more than one category of these SSA-supported services that are considered important for student success.

Most SSA primary participants in Spring 2017 (84%, 3,496 out of 4,151) received support in at least one of the categories captured in Table 3. Those primary participants who received supports in more than one of the categories listed were, at most, a quarter of participants. The most common overlap was among students who received both targeted counseling and extra/targeted supports: 26% (1,065 students) of primary participants. This is an increase from the 14% of primary participants who received both of these supports in Spring 2016. However, from Spring 2016 to Spring 2017 there was a decrease in the percent of primary participants that received both financial support and extra supports (31% to 1% of primary participants) and primary participants that received both targeted counseling and financial support (4% to 1% of primary participants).¹⁹ Finally, 2% (95 students) of primary participants received all three types of supports in Spring 2017.

¹⁸ Some campuses have discussed decreasing direct financial support as a move toward sustainability.

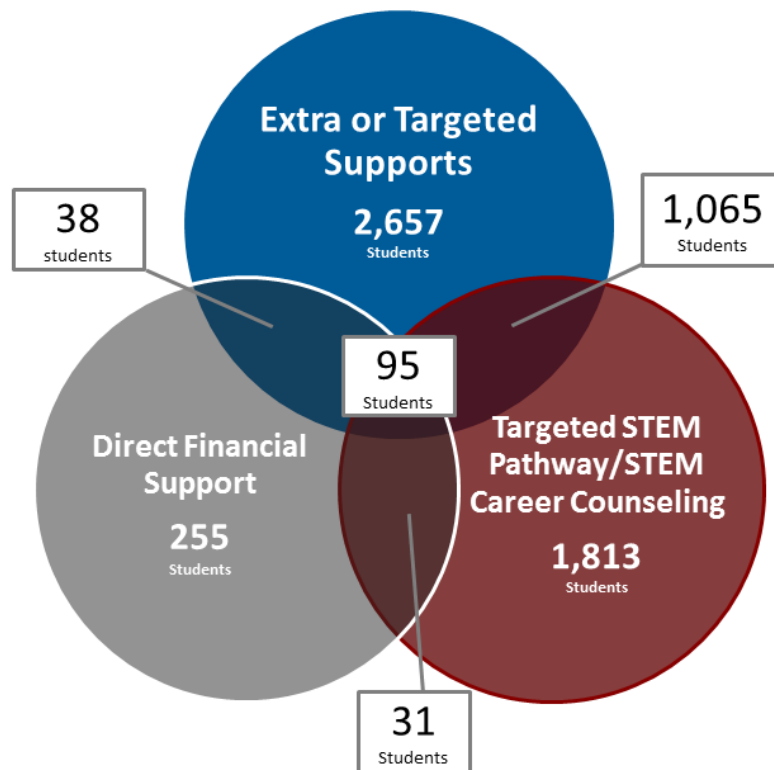
¹⁹ For comparable Year 3 numbers please see Figure 1 in the STEM Starter Academy Evaluation Report Supplement, September 2016

Table 3. Primary Participant Service Descriptions by Term and 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
	Fall 2013	NA	NA	NA	NA
Year 1	Spring 2014	448	111	103	101
	Summer 2014	786	758	548	553
Year 2	Fall 2014	2,769	1,341	2,002	913
	Spring 2015	2,949	1,079	1,890	958
	Summer 2015	941	507	618	575
Year 3	Fall 2015	2,430	766	1,591	896
	Spring 2016	2,984	1,045	2,240	983
	Summer 2016	1,758	991	864	858
Year 4	Fall 2016	2,585	348	1,555	798
	Spring 2017	4,151	255	2,657	1,813
	Summer 2017	Data Pending			
Total		21,549	7,201	14,068	8,448

* 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).

Figure 4. Primary Participant Service Descriptions and Overlaps, Spring 2017, N=4,151



Findings: Campus Reflections on SSA Practice in Year 4

The following campus reflections on SSA practice in Year 4 come from four data collection activities in Year 4:

- Administrator interviews with all 15 SSA campuses during Year 4 site visits in Fall 2016 or Summer 2017,
- Student focus groups with SSA participants at 14 campuses during Year 4 site visits in Fall 2016 or Summer 2017,
- Administrator phone interviews with all 15 SSA campuses in Spring 2017, and
- Student Experience Survey data from Fall 2016 and Spring 2017.²⁰

During these data collection activities, SSA administrators and participants were asked to reflect on the practices or strategies that seemed most effective or held the most promise for facilitating student entry into, progress through, and completion of STEM programs. This section summarizes and distills those responses.

In Year 4, our qualitative data collection intentionally focused on understanding the strategies or practices thought of by SSA campus administrators as the most promising or effective in terms of SSA initiative goals. During previous years, qualitative data collections had included site-level stakeholder reflections but had primarily focused on cataloging and describing the elements of implementation at SSA campuses. Closing the fourth year of the initiative, changes in SSA programming at most sites were concentrated on ongoing improvements and refinements—rather than larger-scale structural changes—making descriptive cataloging less necessary. Thus, against the backdrop of our previous reporting on the characteristics of the intervention, the intention of this analysis is to continue to refine the list of practices and strategies that SSA campuses feel are impacting student progress toward initiative goals (as defined by the SSA model).

This section contains two major parts. The first part—Promising Practices—describes administrator and student feedback about effective or promising SSA strategies. It is organized around a set of analytical categories that emerged from analyses of data for the SSA Year 3 Evaluation Report. The second part—Reflections on Year 4—summarizes other administrator and student reflections relevant to the SSA Year 4 implementation.

²⁰ Each of these data collection activities is further described in the Methodology Section.

Promising Practices – Analytic Clusters

Analysis of site-reported qualitative data for the Year 3 Evaluation Report suggested seven broad categories into which strategies that sites considered most promising could be clustered:

- Cultivating Community (e.g., STEM identity, connection to peers and faculty)
- Career and Transfer Readiness
- Bridging Experiences (e.g., to STEM, college, math)
- On-Campus Collaboration (e.g., cross-campus integration, faculty involvement)
- External Collaboration (e.g., with industry, high schools, four-year institutions)
- Academic Support
- STEM Advising

We used these categories to guide our analysis of SSA administrator feedback about promising SSA strategies in Year 4.²¹ During the nine Summer 2017 site visits, UMDI solicited administrator feedback on the applicability of these categories to their campus SSA implementation. However, the categories had not been fully developed in time for the Spring 2017 phone interviews or the Fall 2016 site visits. Consequently, while in some cases we were able to get direct administrator feedback on the fit of these categories with their campus SSA implementations, in other cases we used these categories primarily as an analytical framework when reviewing data collected from sites.

Of the nine sites to which we presented this framework during Summer 2017 site visits, all found it to be reasonably comprehensive in capturing, in broad strokes, the key categories of SSA practice and strategy. As we reviewed Year 4 data (fall site visits and spring administrator interviews) from the sites to which we had not presented this framework, we found that most strategies highlighted by sites could comfortably fit within these categories, suggesting a good fit between this broad framework and SSA practice.

Promising Practices – Stakeholder Assessments and Priorities

Although the components of SSA site-level practice remained fairly consistent from Year 3 into Year 4, there were some shifts in the specific practices or strategies that administrators considered strong or successful between the two years. Additionally, while strategies within each of the categories of practice listed above were widely implemented at SSA sites, the emphasis on each of the categories varied across sites, reflecting different campus-level contexts and priorities.

In some categories of practice there was increased alignment, compared to previous years, between the specific strategies used by sites and sites' perceptions of what was effective, such that some practices that were widely implemented—such as *cultivating community*, *on-campus collaboration*, and *career*

²¹ SSA Year 4 ran from Fall 2016 through Summer 2017.

and transfer readiness—were also widely seen as successful.²² The practice categories of *cultivating community* and *on-campus collaboration* had previously been emphasized as promising or effective by campus administrators and they maintained this status or even gained emphasis in Year 4. *Career and transfer readiness*, although widely seen as an important strategy in previous years, had not been widely cited as effective or promising (likely because insufficient time had passed since their implementation to assess them). Thus, the emphasis across many sites on the effectiveness of these strategies was a notable change in Year 4. Finally, an emerging set of practices—student leadership opportunities—gained emphasis among SSA administrators in Year 4 as promising and effective strategies.²³

While we have separated these categories for the purposes of reporting, we understand that these are analytic tools and that practices often fall into several of these categories simultaneously. For example, *bridging experiences* often include aspects of all of the other clusters. However, teasing apart campus priorities and practices both across and within each cluster helps us to create a fuller picture of how SSA has developed over the past four years at the initiative level.

The following summaries of campus stakeholder reflections on these categories of practice are organized in descending order of emphasis, with those that were highlighted for their effectiveness or promise by the most sites listed first.

Cultivating community

Practices that sites emphasized in the *cultivating community* category included building connections among students through:

- peer leadership (tutors, mentors, interns);
- creating a sense of membership in a cohort where students move together through a series of courses or activities;
- group work or group interaction during workshops, courses, clubs or other activities; and
- engagement outside of the classroom.

These practices also included building relationships between students and faculty or staff by:

- having a central or consistent person or group of people who serve as a human connection and source of help for students (these might be program coordinators, faculty, advisors, etc.);
- demonstrating “a big heart for helping students” or that “we care about them;” and
- providing opportunities for students to interact with faculty outside of classrooms, such as pre-semester workshops or informal lunches.

²² Data on Year 4 site-level student outcomes, which could be used to evaluate campus-level perceptions of effective practices, are not yet available and will be included in the Year 4 Evaluation Report.

²³ This category of practice was not explicitly included in the analytic framework presented to sites, but will be considered for future inclusion in one of the existing categories or as an additional category.

Many sites have been working to foster a sense of community and pride around being involved in STEM. Some sites see this as fostering a culture shift within their programs to keep students consistently engaged with the college and each other during the academic year.

Student feedback suggests that these efforts are having an impact. Two of the most commonly praised elements of SSA programs by students in Year 4 site visit focus groups related to this theme: 1) feeling a sense of belonging or community and 2) appreciating the helpfulness and support received from SSA program staff and faculty.

North Shore has worked to cultivate a “STEM is awesome” culture in which students take pride in their STEM club and are excited to be a part of the community. According to the administrators this sense of community has helped shift the mentality from seeing community college as just a place to “hang out at until you find out what you are doing” or “just a place that you take a remedial course” to one where students want to be at college and are filled with a sense of pride.

Student feedback: feeling connected

Students at 13 sites talked about the value and benefits of feeling connected to their peers, to faculty and staff, and to a STEM identity through their participation in SSA.²⁴ Those in summer bridge activities discussed feeling more comfortable starting the fall semester having met peers and feeling known by faculty. Students also noted that a sense of camaraderie kept them motivated and boosted their confidence. Likewise, knowing others and feeling known helped students be more engaged in campus life—a few students talked about how, before being engaged with SSA, they would leave campus as soon as their classes ended. Through SSA, a new sense of connection to their peers and to faculty and staff kept them on campus to study, join a club, or otherwise be involved. Specifically, connecting to others in STEM was a positive shift for many students—they felt a part of a special group with similar interests and aspirations—and boosted their confidence and motivation. One unique piece of feedback came from Springfield Technical students who particularly appreciated having a faculty member of color teaching their college success course.

“Through STEM you get to work directly with the same people [over and] over again, and you make friends with similar goals.”—Cape Cod student

“Gave me a sense of belonging and relating with people”—Berkshire student

“Being in a STEM environment... It's like you're in the clubhouse.”—MassBay student

“It has made me more excited about my major because I have met people that are also excited about the same things as me.”—Springfield Technical student

²⁴ Literature on student retention suggests that students who feel connected to others at their institution (e.g., peers, faculty, and staff) are more likely to persist in their programs of study (e.g., Strayhorn, 2012; Karp, Hughes, and O’Gara 2008; Karp, 2011; Deil-Amen, 2011).

Student feedback: helpful people

Students at 11 sites emphasized the importance and helpfulness of dedicated STEM coordinators and SSA staff and faculty. Many talked about feeling a sense of security and comfort knowing they could turn to someone they trusted if they were struggling. Several students told stories of having a coordinator proactively check in with them when they were struggling. They commented that feeling cared about motivate them to return to their studies.

“She cares about all of us.” ❖ “You have somebody to fall back on if you have a problem.”—Berkshire students

“There are people that will find you the answers or find you people that will find you the answers.” ❖ “We all know that we can go to her for anything.”—Bristol students

“I can trust [the STEM advisor] to look after my best interests.”—Cape Cod student

“She will not stop at anything until she sees you succeed.... I kind of disappeared and she called me and she was like, ‘hey, I was just wondering what happened to you. Are you okay?’ That alone gave me the motivation.”—MassBay student

“[SSA-affiliated staff] were keeping track with how I was doing in the classes and that is really cool because no one was asking how you are doing in the classes.”—Middlesex student

“A lot of faculty and teachers want you to do well beyond college.”—Mount Wachusett student

“They are always ... there to help.”—North Shore

“He wouldn't leave anyone behind.”—Quinsigamond student

“I have always been bad about asking for help, but they are always there to help.... I found out it was OK to ask for help.”—Springfield Technical student

On-campus collaboration

Practices that were noted by sites as related to effective *on-campus collaboration* involved building relationships between divisions, programs, grants, or offices on campus in such a way that:

- students perceived an integrated sense of campus-community support;

- other campus entities would facilitate student connections to SSA or STEM programs (e.g., through referrals, combined outreach); and/or
- faculty and administrators recognized SSA contributions or felt a sense of buy-in to core SSA practices or strategies.

Campuses worked to improve the frequency and transparency of communication between SSA and other programs and divisions on campus. Some engaged advisory groups with faculty and administrators from different divisions and levels of administration. A few campuses (Quinsigamond, Roxbury, and MassBay) infused SSA resources across their STEM student body and STEM pipeline.

SSA administrators and staff also emphasized that continued efforts to collaborate with various other STEM-related grants on their campuses was a key strategy to supplement SSA activities and work towards sustainability.

Career and transfer readiness

Career and transfer readiness, although widely seen as an important category of SSA strategy by SSA administrators in previous years, had not been widely cited as effective or promising. Thus, the clear emphasis across many sites on the effectiveness of this group of strategies in Year 4 was a notable change. This change likely reflects program maturity and the duration of the initiative (and therefore, the ability to see the outcomes of such endeavors), as well as programmatic learning. Effective strategies noted by campuses included:

- campus-level work to develop transfer pathways and articulation agreements;
- opportunities for students to engage in professional skill development, experiential learning, or mentorship (e.g., through internship or research opportunities); and
- exposure to STEM career possibilities.

Student feedback: STEM exposure and professional readiness

Feedback from focus groups indicated that students appreciated both the exposure to new STEM fields of study and careers and the experiential preparation for job searching and professional life provided through SSA.

Introduction and exposure to fields of study and career options they had not considered was noted as a benefit of SSA programs and activities by students at 11 sites. Students appreciated the expanded sense of their own options and the ability to imagine a career at the end of their academic paths. Many had not realized the range of STEM pathways available to them and embraced the opportunity to explore.

MassBay reports success with their STEM Mentor program. At the end of Year 3 they had 63 mentors (working STEM professionals) and 71 student mentees. MassBay reported that 81% of mentees were retained from Fall 2016 to Spring 2017 compared with 73% of STEM students who were not in the mentor program (during the same time period).

"You don't think of Massachusetts as a major STEM state.... It's really surprising how many STEM jobs are available in Massachusetts.... It's kind of cool that I could stay home and have a job."—Berkshire student

In addition to exposing them to potential STEM fields and careers, students at seven sites felt that participation in SSA helped to increase their professional readiness through opportunities such as research experiences, internships, networking opportunities, and preparation workshops (e.g., resume review and mock interviews). A couple of students recounted experiences working with teams to present at a conference or enter a competition, noting their excitement at working with similarly-interested students from other institutions.

Greenfield has started to allocate a small amount of their funding towards internships and sees this as a growing and promising program. During Year 3 they had 60 students take advantage of these internships, and they predict that their numbers will continue to grow in Year 4.

"Usually by the time they do research at UMass Boston, they are juniors and seniors and grad students, but we get it in our first and second year of college so you have a head start."—Massasoit student

"[The career specialist] is pretty direct with what the expectations are and what the job market is like. He has helped me with my resume which has got me jobs.... It has helped me professionally." ❖ "I got to meet a bunch of different employers that were hiring within the ... field and it helped me adjust what the classes were that I wanted to take ... so not just take classes that would satisfy a requirement but may not be helpful in the job market."—Middlesex students

Bridging experiences

Bridging experiences were noted by about half of SSA sites as among their most effective strategies for achieving SSA goals. These often included coursework or readiness programming in mathematics, college skills, or STEM fields, as well as relationship building among students and between students and faculty or staff. These experiences are often supplemented with various STEM-exploration events (e.g., speakers or panels) to help increase awareness of various STEM fields and pathways. SSA administrators credited bridging experiences with helping to better prepare students for the academic year and fostering community during students' first contact with the campus.

As in previous years, most sites highlighted the importance of their summer program in helping introduce students to the college experience and facilitating the transition into the fall semester. At most sites, these programs have evolved over the

During Year 4, Northern Essex expanded their non-credit "boot camp" offerings to include Anatomy and Physiology, Engineering, and CIS. They believe these smaller group environments allow faculty to more readily make connections and work more closely with students. With the added subjects they hope to reach a larger group of students with different needs.



past four years to better reflect the needs of their students and the priorities of the initiative.

Student feedback: college readiness, self-efficacy, academic progress

In focus groups, students who participated in bridging-type experiences corroborated administrator perceptions—describing feelings of increased readiness for college and reduced anxiety about starting the academic year. Students also described increased feelings of self-efficacy that emerged through the help and support received during bridging experiences and the sense of belonging and enhanced confidence they felt by being involved with STEM fields. Finally, students who were able to complete coursework over the summer appreciated the ability to “get a head start” or improve their academic progress.

College readiness

At nine sites, students described how participating in various SSA programs (primarily summer-bridge-type programs, but also college skills courses or workshops) increased their readiness for college. Many students who participated in summer activities talked about getting a kind of social or emotional head start—gaining familiarity with people, with campus, and with support resources before the intensity of the fall term. Some reported feeling more at ease or less overwhelmed because of this familiarity. Others said they learned time management, study, or organizational skills that would serve them during the academic year. Incoming students who took credit-bearing coursework through SSA in the summer felt better prepared for the rigors and expectations of college-level work. Those who had been away from school for a while were grateful for the opportunity get “back into the homework, and study, and review mindset.”

Bunker Hill hosts a 3-day non-credit STEM prep workshop before the semester—taught by STEM faculty—that focuses on building relationships among students and between students and faculty in order to “ease the fear of doing college level science.”

“Getting to know [the professors] ahead of time and knowing their expectations—that is pretty valuable.”—Bunker Hill student

“[The summer] STEM program gets the ball rolling for people that want to come in the fall. If it wasn't for SSA I may not have enrolled full time for the fall to be honest. I had reservations about going back to school.” ❖ “It has helped me not be as worried about the fall because I kind of know what it is going on.”—Greenfield students

“Gives me a head start. I am going here in the fall so I get familiarity with the people and the buildings and it gives me an idea of the workload, gives me that college experience early. I see the difference between high school and college and I now feel much more prepared.”—Mount Wachusett student

*"It was helpful with getting to know the college and what it is about and what the difference is between college and high school. This place where you can fit in."—
Quinsigamond student*

*"Academically it is a crash course so you are already ahead when you come in the fall. You know where to go find help if you need to and you know a lot of the professors." ❖
"Adjusting to the workload was tough but this program prepares you for the hard workload of college.... It is more like you step up or you just leave and this is teaching you to step up."—Springfield Technical students*

Self-efficacy

Students at nine sites explained that participating in SSA boosted their confidence as students, generally, and as STEM students in particular. Supportive interactions with SSA-affiliated coordinators and faculty helped students feel simultaneously capable and supported. This theme overlaps with student feedback about individuals who help them "feel so important" or "think that [they] can do it." At the same time, some students appreciated being treated "like an adult," helped to "get there on [their] own," and "not be told how to do everything."

Being affiliated with STEM, itself, changed many students' self-concepts, boosting their confidence and bolstering their motivation. A MassBay student who participated in an SSA-supported computer science club that won a competition described his experience meeting the executives of a local tech firm at the award dinner: "It's a huge confidence booster to see that companies around here are interested in me. ... I never expected to come here and meet all those people. I never quite expected that sort of networking."

Middlesex hosts Math Booster programs in which high school, incoming, and current community college students take credit bearing, self-paced courses together.

"I think going into STEM alone is a huge confidence booster. ... Deciding that ... you're already giving yourself so much credit ... your own perception of yourself changes because you're like, 'I am a STEM person.'"—MassBay student

"Being eligible for the program makes you feel special and it gives you that motivation to keep doing well."—Mount Wachusett student

"STEM has done so many things for me. I didn't like solving equations, but now I like solving equations more than reading."—North Shore student

"Now that I am actually there and learning it I feel like you can do it yourself, too. So, it makes you realize that and it also gives you motivation to want to pursue more education and want to pursue a higher job."—Massasoit student

Academic progress

The ability to make academic progress over the summer was seen as a major benefit of SSA by students at nine sites. For many of these students, being able to move through coursework over the summer allowed them to get or stay on track with their programmatic pathways during the academic year. Making progress in math was particularly helpful for many students, whether through a non-credit refresher or boot camp or free summer coursework. Other students appreciated the ability to take STEM courses or pre-requisites that might be difficult to schedule in during the academic year. It was an added bonus for students that these programs were free and sometimes even stipended.

Holyoke's summer academy provides free introductory STEM courses and developmental math to introduce students to STEM and prepare them for the fall semester.

"[Being able to] condense two semesters of math into a summer is invaluable ... I got to get two classes out of the way and get that much closer to starting college level math and getting on the degree track and start progressing."—Bunker Hill student

"I saw the flyer and was like, 'wait a minute, they're going to pay me to refresh my math skills? And I could also place into a higher math class?' So that's what ended up happening. I placed into pre-calc which saved me six months and \$900 and I got paid for it."—MassBay student

"With this [math refresher] I had a whole week of class and then took the exam and placed in a higher math, so ... I will be able to start Calc 1 in fall which takes a whole year off."—Springfield Technical student

"Math Bootcamp helped me get through Math 100.... [Now] I am in an accelerated math course so I can finish my major in time."—Quinsigamond student

"I took [the math boot camp] because I was nervous about studying for my advanced trig class. They separated us and focused specifically with trig concepts [we needed to learn]... They helped me figure out how to use the calculator ... and stuff like that. It was so helpful."—Northern Essex student

Advising

About half of the sites noted *advising* strategies as particular strengths of their SSA implementations. SSA-related advising strategies that were perceived as campus strengths varied more widely than did other practices. They included:

- dedicated STEM advisors,
- proactive early or high-touch advising practices,

- informal and formal peer advising, and
- clarification of pathways or prerequisites for STEM degrees.

Student feedback: finding a timely and affordable path to transfer or graduation

SSA participants at 10 sites indicated that receiving some sort of STEM-specific advising, whether from faculty, from a STEM or SSA coordinator, or from a dedicated STEM advisor was helpful in deciding on an academic path and figuring out a timely and affordable route to graduation or transfer. They were grateful to be advised by people who could help them make decisions based on knowledge of STEM fields and careers and who were familiar with the content of STEM courses and the intricacies of credit transferability. At about half of those sites, students expressed appreciation for receiving STEM-specific advising in contrast with what they felt were less-than-helpful experiences with general advising. Many students felt like they did not have time or money to waste on courses that were not on a path to 4-year transfer or that did not align with a specific career trajectory, and they consequently appreciated advising that helped them streamline their academic trajectories.

In order to make registration more accessible to students, Bristol SSA administrators collaborated with their advising department (involving both staff and department heads) to set up three STEM-specific registration days.

“She makes you think that you can do it and she won't stop until you find your path—you can get that from the other advisors but she cares.” ❖ “She makes sure that you understand what you are getting into.”—Cape Cod students

“I prefer to go to STEM advisors because they actually tell you what you need to take and what you don't need to take to transfer.”—North Shore student

Emerging practice: student leadership opportunities

Student leadership is an emerging emphasis at many SSA sites, with nearly two-thirds of sites describing such practices as among their most promising or effective SSA strategies. Sites reported practices that included:

- peer tutors, supplemental instructors, and mentors;
- student interns, teaching assistants or outreach assistants;
- opportunities for alumni to return and serve as tutors or mentors; or
- students supported through clubs or competitions.

Site administrators noted the double benefit of these strategies: contributing to the retention and engagement of the students who participated in leadership opportunities as well as helping to support and retain students served by their peers.

Student feedback: leadership opportunities inspire and motivate



Students who had participated in leadership roles reported that they were inspired and motivated by helping their peers, working with younger students, or taking on additional responsibility. Students who served as tutors or peer mentors talked about how these roles helped solidify their own knowledge or decisions about a STEM pathway. Some reported that serving in leadership roles helped them realize a love for teaching. One student, who had formerly struggled in her coursework, felt that the opportunity to serve in a peer leadership role was a vote of confidence from faculty and staff that she could “turn [her]self around.”

In their SSA Summer Academy, Mt. Wachusett includes a leadership program designed to cultivate student engagement and relationships outside of the classroom while also assuring that students have a central touch point person they can turn to when they return in the fall.

“Even though you know the material it just revamps the things I know and put into practice daily, and in my daily life when I am around my friends I will use the information that I remember and give it to them as advice.”—Middlesex student

*“To see students get motivated, that motivates me to keep doing things for myself and to keep growing as a student and as a person and to keep helping more people.”—
MassBay student*

“It is great to inspire them.”—Massasoit student

Pockets of practice

Unlike the strategies summarized above, some strategies in Year 4 were widely implemented by SSA sites, but not as widely emphasized by SSA administrators as being particularly promising or effective. In other words, many SSA sites were engaged in practices that fit into these categories—which include *academic support* and *external collaboration*—but only a handful of sites emphasized these categories of practice among their site’s most promising or effective. This potentially reflects local differences in the needs of student populations, different relationships between campuses and their surrounding communities, and differences in the service or support gaps that SSA funding is used to bolster.

External collaboration

External collaboration practices were highlighted by about a third of sites as particularly effective strategies. These sites emphasized their efforts to build relationships with local high schools, community organizations, and industry partners. Their practices included proactive outreach and relationship building, on-campus coordination to leverage resources and avoid duplicating outreach efforts, and inviting and engaging local community members and organizations in STEM and SSA programming. Administrators who emphasized these practices reported that their STEM programs had “become known” in their communities, increasing the visibility of community college STEM options for those in their catchment areas.

Academic support

Although many sites included *academic support* among their SSA-supported strategies, only a few sites highlighted these practices among those that were particular strengths. Among the sites that did highlight these practices, most named some form of tutoring, supplemental instruction, or study support (whether peer or professional) as the strategies having the greatest impact. Greenfield, for example considers their faculty-facilitated tutoring space or “Math Studio” among their high-impact practices. Roxbury highlighted their SSA-supported co-requisite remediation model for math and science as a particularly effective SSA strategy.

Academic supports may have received less attention in administrator interviews because sites often collaborate with other programs, offices, or grants on campus to expand their tutoring supports. In other words, academic supports are among the practice areas where SSA funding is often used to infuse resources into existing programming that is perceived as effective rather than creating or adapting programming run by SSA. North Shore, for example, reported efforts to create a seamless stream of support for students—promoting “STEM synergy” on their campus—in hopes of reaching as many students as possible. Roxbury views SSA support for these efforts as means to help strengthen the entire STEM pipeline at their institution.

Student feedback: translating math; feeling supported

Students at seven sites reported finding a variety of academic supports to be a helpful part of SSA. These supports included tutoring (course-embedded, drop-in, peer, and professional) and course structure (small class size or small group work, discussion-based courses). Course-embedded tutors were appreciated for their ability to understand how the course was taught and where students had been getting stuck. Peer tutors were appreciated for being able to translate “both math and slang terminology” and for creating a feeling of community support. Students also seemed to feel that tutors were both non-judgmental and genuinely interested in helping.

“It doesn't matter your level, they are always going to help you.”—North Shore student

“Drop-in tutoring is the best thing you can ask for.... We spend hours in there. Without this, we wouldn't pass our classes.”—Bristol student

“If you have a question they will sit with you and ask you why and explain why it happens.”—Middlesex student

“They did a great job focusing on helping us with what we needed help on but in a group setting.”—Northern Essex student

Financial help or financial accessibility

Financial support strategies were highlighted as effective by SSA administrators at just a few sites (potentially because many viewed these as unsustainable without additional funding). These strategies

included scholarships, textbook grants or lending, and free meals. They are included here, in part, because *students* at nine sites emphasized the importance of financial help or financial accessibility in their SSA experiences.

Student feedback: the importance of affordability

Students told evaluators that the financial accessibility of SSA programs was a major benefit, whether it was in the form of a stipend, a scholarship, free credits, in-kind support (e.g., an iPad), or simply the affordability of community college. Some students said that, without SSA support, they wouldn't have been able to afford to accelerate their academic progress over the summer because of cost and the inability to use federal aid in that term. Students who received stipends or in-kind aid talked about being motivated to do well so they could keep those benefits. A couple of students talked about the dual benefit of an affordable education combined with a focus on STEM fields where students feel they have prospects for good jobs.

"We're brought up thinking, 'you're going to have 20 years of college debt.' [At a community college], as long as I save up, I can pay it off as I go. That's a pretty amazing feeling."—MassBay student

"It also helped that they were free because over the summer you can't use federal aid or payment plan so that was a huge help to get a couple of prerequisites out of the way and get some more credits."—Bunker Hill student

Reflections on Year 4 – Lessons Learned

The themes that emerged from administrator reflections on lessons learned in Year 4 echoed those emphasized in the Promising Practices section, suggesting that a handful of strategic areas of focus have begun to emerge for SSA campuses. These themes included:

- the importance of building and maintaining external (off-campus) and internal (on-campus) relationships;
- the added value of STEM-specific personnel;
- the importance of STEM-specific advising; and
- the benefits of connecting students to peers, faculty, and staff.

External and internal relationships support recruitment, sustainability and effectiveness of SSA programming

As highlighted in the Promising Practices section, the importance of developing and maintaining both internal and external relationships continued to be a valuable lesson from SSA implementation (mentioned by seven sites). Administrators emphasized the importance of developing strong relationships with feeder schools as a way of increasing the visibility of their SSA and STEM programs. At the same time, they noted the difficulties they had had growing these relationships due to those

schools' lack of interest in community colleges or lack of understanding of the benefits of SSA activities for their students.

Relationships within institutions were also perceived as valuable. Getting “buy-in” from other campus entities—by involving faculty and coordinating with support services and outreach that already exist at the college—administrators reported, supported the recruitment, sustainability, and effectiveness of SSA programming.

STEM-specific personnel ease administrative burden and build connections with students

Administrators at five sites reported learning that STEM-specific personnel (e.g. STEM career counselors, SSA coordinators, STEM coaches) had the much needed capacity to fill service gaps and that they facilitated student connections to supports as well as collaborative connections between campus offices and programs. Several administrators expressed regret at not hiring such personnel sooner, noting the year-to-year funding uncertainty as the main reason for not doing so. Some are looking into additional external grants to help maintain hired staff.

Advising: connecting with students

Lessons about how to connect students to advising in ways that would increase retention and completion were among those mentioned by SSA administrators at five sites. Bristol administrators found that a pilot model of connecting general studies majors to specific advisors who focus on moving them through developmental coursework and onto degree pathways was having success. They hoped that demonstrating evidence of success would engage full-time and faculty advisors in scaling up the model. Quinsigamond created specialized STEM-specific advising positions after learning that STEM students had had problems connecting with advising. Cape Cod reported that student engagement and retention improve with a higher-touch, more “intrusive” or “proactive” advising model. Their STEM advisor makes about six appointments per semester with each student, actively reaches out to engage students who have lost touch, and regularly hosts non-advising community-building events to build relationships with students. MassBay was already using a similar high-touch strategy when they reported learning from peer institutions that more full engagement—including full-time status—improves student success. They have begun to encourage high levels of engagement as part of their advising strategy and content. In contrast to the other four sites, Holyoke learned from their students that they were sufficiently supported by existing connections to campus advising systems and that SSA funding could be used to support other priorities.

Exploring ways to connect students to peers and faculty

Campuses generally agree that students who feel connected to their peers, faculty, and their institutions are more likely to persist in their studies and possibly complete their degree.²⁵ When asked about lessons learned, administrators at five sites highlighted their learning about building structures that support these kinds of connections (although, as reported in the Promising Practices section, these types of practices are widespread at SSA campuses). Bristol created summer “Learning Communities” that placed small groups of students into paired developmental mathematics and college readiness courses, creating an environment where students built connections while also preparing them to enter a STEM pathway in the fall semester. Northern Essex administrators reframed their new student orientation as an “accepted student event” with activities that focus explicitly on helping students form connections to peers, faculty, and administrators before the semester begins.

Reflections on Year 4 – Challenges

Sustainability and institutionalization

The biggest challenge in Year 4, cited in both the spring administrator interview and the administrator interviews during site visits at 8 out of 15 sites, revolved around issues of sustainability and institutionalization. Most sites expressed concern with their ability to maintain certain SSA activities (e.g., summer bridge, research programs, SI programs) after funding for SSA ends. As a result of this concern, many sites had begun to look for additional support to keep some of these programs running; however, because budgets at the colleges are already tight, this support will in most cases likely need to come from outside the colleges (e.g., NSF grants, research companies). The issue of sustainability also impacts some sites’ ability to hire administrators or coordinators, and, even when coordinators are hired, it can be difficult to hire individuals for more than half time or sustain them without the grant’s funding.

Recruitment

Beyond concerns with sustainability, a small number of sites (4 out of 15) expressed continued concern with recruitment. One site noted a difficulty in recruiting non-traditional students because those students were more likely to have external commitments that make it difficult to schedule activities or create cohesive cohorts/learning communities. Another recruitment issue had to do with the difficulty of developing relationships with high schools, which in turn makes it difficult to recruit students for summer bridge and early college programs.

Funding cycle

A few sites (3 out of 15) also relayed the challenge of the funding cycle and the tight time frames for RFPs, and few sites (3 out of 15) expressed their continued challenge with data and data collection. Part

²⁵ Literature on student retention suggests that students who feel connected to others at their institution (e.g., peers, faculty, and staff) are more likely to persist in their programs of study (e.g., Strayhorn, 2012; Karp, Hughes, and O’Gara 2008; Karp, 2011; Deil-Amen, 2011).

of the challenge with data came from capacity limitations: overburdened IR offices or SSA staff without the time or experience to collect and analyze data efficiently. Some sites also expressed the difficulty in tracking and reporting on low dose students.

Reflections on Year 4: Data Collection Processes and Preliminary Outcomes

Data collection processes

Data continues to inform sites' understanding of their programs' successes. When asked about the kinds of data that show indicators of success, site administrators commonly named retention rates, GPA, enrollment, transfer, and outreach. For example, a Middlesex administrator explained that, through tracking traffic data, they saw a growth in traffic at their STEM student center from 10 students a month coming in for various SSA-supported services (tutoring, career readiness support, informal advising, study space) at the beginning of SSA to 80 students a month by spring of 2017. Springfield Technical highlighted gender and race/ethnicity data showing the diversity of their SSA group as an indicator of success.

Compiled data from Years 1–3 has helped sites to see where they should focus their programming efforts in addition to highlighting areas of success. For example, several sites found that courses with Supplemental Instructor-type embedded tutors tended to have higher retention and completion rates. Many sites discussed using data about course completion rates for students participating in various supports as well as semester to semester retention to make decisions about future practices and investments. Furthermore, in order to understand students' experiences with specific courses and activities, several sites administered site-specific surveys, which helped them measure success and inform next steps in certain areas of their programs. For example, Greenfield used survey data to determine when their tutoring center should be open and staffed to best meet student needs.

Most sites indicated the importance of fostering a relationship with their IR department and noted that there is sometimes a need to have SSA coordinators work with IR in collecting and analyzing data. A couple of sites have moved from manually collecting data to electronic collections, such as a Banner system that tracks students at sites throughout the college. This has made not only the collection of data but also the process of analysis much easier.

Student outcomes

During the nine summer site visits, SSA administrators were asked to differentiate anticipated outcomes for the different groups of SSA participants or different intensities of experiences in their program. While the expected outcomes varied slightly at each campus, overall most sites predicted higher rates of graduation and transfer in STEM fields for those students that were most involved with SSA. This “most involved” group included students who participate in high-touch programs such as summer bridge, mentorship, intensive boot camps, or extended “scholar” programs with required activities throughout the semester. Some campuses described this group as having a defined STEM interest.

A middle group was described by sites as “STEM-ish” or “students who want to dip their toes” into STEM fields. Sites felt that the expected outcomes for this group depended on students’ educational and post-graduation goals and whether or not they chose to join a STEM major during their time at the college. Administrators suggested that outcomes for this group might include progress in coursework, the choice of a STEM major, stronger retention, and possibly increased completion rates (whether or not in a STEM field).

The least engaged group included students who attended one or a few STEM events, took a math class with SSA-supported tutoring or embedded supports, those who are not STEM interested but want to get math credits out of the way, or those “touched peripherally” by SSA supports. Most sites expected more immediate/short term outcomes for these groups of students that received the lowest amount of support. It was often expected that those students would do better in the course in which they were receiving help, but that this outcome would not necessarily translate to completion of a STEM degree.

A few campuses emphasized that similar successes might be possible for those students that were not the “most involved.” One site explained that, while non-traditional students (those with jobs, families, etc.) had other obligations that made their track less linear, they were just as motivated as traditional students, so even if it took longer for them to graduate, they might have similar outcomes. This campus also suggested that STEM exposure should be considered a success even if it did not result, ultimately, in a STEM degree. One site said their goal is to retain all groups of students regardless of their engagement level with SSA supports.

Reflections on Year 4: Feedback for DHE

Positive feedback

Across sites, SSA administrators expressed appreciation for the organization and responsiveness of DHE during Year 4. They also appreciated the level of flexibility they felt they had been given to experiment and tailor the SSA initiative to their institution’s and population’s needs. In particular, positive feedback about DHE’s facilitation of the initiative included the following:

- **Responsive and supportive:** Site administrators appreciated DHE support and advocacy for the work.
- **Flexibility:** Site administrators appreciated DHE’s flexibility in allowing individual campuses to adapt SSA to address their particular needs. This flexibility has been cited as helpful especially as campuses attempt to institutionalize their programs.
- **State-level communication, support, and collaboration:** Some sites have expressed their appreciation for DHE maintaining communication with all 15 campuses and have continued to appreciate the monthly phone calls and retreats. The increased interaction and connection with other community colleges that has developed out of this grant has been cited as a helpful result.

Constructive feedback

Feedback for DHE specifically related to facilitation of the initiative included the following:



- **More opportunities to learn from each other.** Sites are glad to have the all-campus meetings, but did not find the structure of the May 2017 meeting beneficial. Administrators felt that the space was not conducive to allowing them to speak to different campus coordinators and were hoping for more hands on activities. Administrators were interested in more opportunities to learn from one another, potentially through regional STEM group meetings or more half day group meetings.
- **More clarification about metrics, expectations, and timelines.** Site administrators felt that the changing metrics and measurements have made certain elements of the programming difficult. Specifically, some sites expressed confusion on early college expectations and the way STEM has been defined. A couple of sites expressed a need to move away from measuring success based on a model used for 4-year colleges since community college culture and student experience differ from that of 4-year colleges. Some sites also expressed having difficulty in planning their activities given annual funding uncertainty and sometimes very tight timelines for planning. They noted that their programming would have been structured differently if they knew that the grant would last this long (e.g., they would have hired a coordinator at the beginning).

Reflections on Year 4: Student Experience Survey

The Student Experience Survey was developed in Year 3 to provide a student perspective on SSA programs and initiatives that is comparable across campuses. The instrument consists of seven questions and was administered by SSA campus representatives either online or on paper.²⁶ Two questions ask students to rate the impact of SSA programming/supports on their:

- knowledge of STEM fields, careers, majors, or employment opportunities;
- awareness of academic supports and resources;
- connections with faculty or peers; and
- feelings of confidence or self-efficacy in STEM.

Two questions ask students to rate the helpfulness of various supports received or activities participated in. One question asks students how well they were able to form connections with peers in their SSA or STEM program. Finally, the survey requests open-ended feedback about program strengths and needed improvements.

The survey was administered by each of the 15 community colleges, and aggregated anonymous results were sent to UMDI. The number of respondents, the supports they received, and the types of activities they participated in varied substantially across sites and responses are presented unweighted. Thus, the survey results are not representative of all sites or all SSA activities or supports. The purpose of this summary is to provide a general impression of student feedback across SSA sites and activities.

²⁶ The instrument is in Appendix B.

The following summarizes Student Experience Survey data from Fall 2016 and Spring 2017. The number of responses varied by question and counts are provided in the subsections below. Tables and figures of aggregate (cross-campus) data from each of these collections are available in Appendix C.

Impacts of participation

Students were asked to rate the overall impact of their participation in SSA programs or activities. Across both terms, 70% or more of respondents (n=~1,400) indicated that their SSA participation resulted in:

- better knowledge of available academic supports/resources,
- improved performance and/or achievement in courses, or
- stronger connections with other students.²⁷

More than 50% of respondents indicated that their SSA participation resulted in at least one of the following:

- stronger connections with faculty
- expanded knowledge of transfer process and transfer options
- expanded knowledge of STEM fields and careers
- expanded knowledge of STEM majors
- improved employability in desired career or field
- greater knowledge about job openings and employment opportunities

Students were also asked to what extent they were able to form connections to other students in their SSA or STEM programs. Across both terms, 89% of respondents said they had formed connections with their peers (33% of students chose “to a great extent” and another 56% chose “to some extent”). Only 11% chose “not at all.”

STEM self-efficacy

Students were asked to assess their self-efficacy after participating in SSA programs/activities/supports. Eighty percent of respondents (across both terms, n=~1,400) indicated that they felt they could “better understand the content in a STEM course.” More than 70% of respondents either agreed or strongly agreed with the following statements:

- I feel more confident about asking questions in my STEM courses.
- I feel more confident that I will be able to use STEM-related knowledge and skills in my future career when needed.
- I feel more confident when using STEM knowledge and skills outside of school.
- I am more confident that I can give a correct answer during a STEM course.

80% of respondents felt they could

²⁷ This percentage and the one in the following paragraph refer to the combined total of students who selected “agree” or “strongly agree” from statements in this section.

“better understand the content in a STEM course”



More than half of respondents either agreed or strongly agreed with the following statements:

- I am more likely to do well on a test in a STEM course.
- I feel more confident that I can think like a mathematician, scientist, engineer, and/or other STEM professional.
- I am more likely to get an “A” when I am in a STEM course.

Helpfulness of supports and activities

Questions about the helpfulness of particular supports and activities (see complete list in the instrument in Appendix B) asked participating or directly-affected students to rate helpfulness on a three-point scale (not at all helpful, somewhat helpful, very helpful). Because these questions targeted only students who received or participated in particular services, they received fewer responses than the other questions and the number of responses varied across activity or support. In Spring 2017, participant responses for STEM-related *supports* ranged from about 100 to 450, depending on the support sub-type, and between 100 to 350 responses for STEM *activities* (again varying by sub-type).²⁸

The activity that was rated as “very helpful” by the largest proportion of students was internships (72% of 101 participating students). Research, field trips, and speakers and presentations garnered the next-highest share of support with 59% of students from each of these groups separately indicating these activities were “very helpful.”²⁹

The highest-rated supports asked about in the survey were:

- scholarships (84% rated “very helpful”; 118/140 participants),
- free textbooks or access codes (73% rated “very helpful”; 97/132 participants),
- stipends (70% rated “very helpful”; 67/96 participants), and
- assistance with finding internships (70% rated “very helpful”; 110/158 participants).

Program strengths: people, career preparation, college readiness

Students were asked to list the top three strengths of the SSA-related programs they had participated in. There were 1,527 responses from 12 sites for Fall 2016 and 1,755 responses from 14 sites for Spring 2017. Responses were typically brief—between a single word and a short phrase or sentence. Response rates, program elements, and survey administration varied considerably across campuses.

²⁸ Irregularities in the Fall 2016 data from these questions makes them difficult to interpret so those data are not presented here.

²⁹ Activities and supports with the same proportion of students giving the most favorable rating had different underlying participation levels. For example, 71 of 121 students rated the research activity as “very helpful” while almost three times as many students gave the same rating to field trips (209 of 356 students). Coincidentally, the same share (110 of 185 students) rated speakers and presentations as “very helpful.” Please see Appendix C for details.

In preliminary analysis, the following themes emerged:

- **People:** students reported that faculty and staff were helpful, supportive, encouraging, accessible, and knowledgeable. They appreciated advising and mentorship.
- **Career preparation:** students felt they had increased their knowledge of STEM fields and careers, had made networking connections, developed professional skills, and had been helped finding opportunities such as internships.
- **College readiness:** students appreciated an introduction to campus and campus resources. They also valued an academic head start to college in terms of academic preparation (particularly in math) or credit accumulation.
- **Academic strategies and supports:** students appreciated course content and structure (e.g., group work teaching style), tutoring, and small class sizes.

Program improvements: increase scale

Student feedback regarding potential program improvements focused on having more opportunities similar to those that were already offered, including more tutoring, more STEM exploration (e.g., hands-on activities and field trips), more faculty and staff availability, and more course subjects.

Strategic Considerations

The following strategic considerations are based on the findings presented in this report. They are intended to facilitate action planning for SSA in Year 5. Consider strategies to:

Support SSA Programming

- **Refine the SSA program model to represent emergent consensus regarding what its core practices should be, and identify ways to more closely align program efforts with the goals of the initiative.**

Sites differ in their assessment of what constitutes key components of SSA, and there continues to be substantial variation in institutional practice. At least one site has indicated that the system-level metrics do not adequately capture the progress/success of their students. SSA activities at all sites should be aligned with the goals of the initiative (which are primary building blocks on which the system-level evaluation is built). Additionally, refining the SSA Model may enhance the evaluability of the intervention.

- Campuses report positive outcomes, but system-level impacts have not been detected. If campuses believe that SSA is positively impacting student outcomes at some locations, then **campuses should consider sharing evidence-based best practices and implement the practices that are having the greatest impact.** DHE and the campuses should use the strong network built through SSA collaboration to share knowledge and identify and scale what they have established.
- **Consider the challenges sites are facing in designing programming that fits with SSA model but is also sustainable.** For example, many sites have pointed out that their bridge programs are not financially sustainable once SSA funding ends.
- **Support SSA administrators' efforts to solidify the position of SSA on their campuses.**

Engage with campus leadership to enhance awareness of the SSA initiative, support for campus-level implementation and collaboration among initiatives.
- **Work with sites to think through strategies for sustainability.** Campuses are seeking to diversify their funding and to enhance the sustainability and institutionalization of SSA program elements. This may be an area in which continued technical assistance and cross-campus sharing of information and strategies is particularly important.

Enhance the Quality of Communication

- **Support and facilitate campus efforts to raise the profile of their SSA work and accomplishments.**

For example, DHE could consider strategies such as adding links to new web content created by sites, or sending a photographer to key campus events.

- **Consider strategies for enhancing interaction among campuses.**

Administrators mentioned:

- Consider using software to allow “hand raising” during conference calls.
- Consider facilitating a session where each campus is given an opportunity to talk about their most promising practice, and/or strategies they use to gather, analyze, and present data that have been helpful to them.
- Consider facilitating cross-site sharing of best practice through campus site visits, which allow campuses to gather ideas and gain a better understanding of the existing range of SSA programming.

Refine Measurement and Reporting Practices

- **Continue efforts to refine the definition of STEM to better reflect the work happening in the field, and to more accurately assess the impact of the SSA initiative.**

At the beginning of the initiative, DHE adopted a definition of “STEM” for SSA that included the twelve fields of study used to define STEM for the STEM Data Dashboard.³⁰ UMDI found, in the course of analysis, that many liberal arts programs related to these fields of study were not included in the CIP (program) codes attached to those original STEM Data Dashboard fields. Therefore, students enrolled in or completing these liberal arts programs were not counted as part of the STEM pipeline in the SSA evaluation. These liberal arts programs include many STEM concentrations like mathematics, pre-engineering, biology, chemistry, and pre-nursing. Hundreds of students earn degrees or certificates from community colleges in these concentrations each year. In Year 4, DHE and UMDI began work with campuses to refine the list of programs to be included in the definition of STEM for the SSA evaluation.

- **Support the collection, review, and sharing of data at the campus level.**

SSA administrators with access to student data are better able to make programmatic decisions based on student performance. Additionally, during Year 4, UMDI observed that inconsistent communication between program personnel, Offices of Institutional Research, and others on campus resulted in an uneven understanding of submitted data. Efforts to collect accurate data and report outcomes (aligned with initiative goals) at the campus level are emerging as an increasingly important strategy for assessing the effectiveness of SSA.

³⁰ SSA originally used 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.

Methodology

This report includes information collected through the data collection activities described below.³¹

Supplemental Participant Data Requests

At the conclusion of each term (Fall 2016, Spring 2017, Summer 2017), UMDI collected data about SSA participants from all grantees through a supplemental student data request submitted through DHE. Each term, the collections included three parts:

- primary participant collection,
- secondary participant collection, and
- student experience survey collection (described below).

In the Fall and Spring terms, a fourth collection was included: the Participant Exit Survey (for primary participants who had exited the college and not enrolled that term, described below).

Primary participants are 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 are 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 participant data were submitted by grantees directly to DHE. Through a data sharing agreement, DHE granted UMDI access to primary participant data as well as individual-level student data regularly submitted to DHE by each college through HEIRS (Higher Education Information Resource System).

Data collection instruments were designed in consultation with DHE. The Spring 2017 instruments are included, as representative examples, and can be found in Appendix E and Appendix F. Data about secondary participants were collected in the aggregate (a count of SSA events and event participants), while individual identifying information was collected for primary participants. The primary participant 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.

Beginning with summer 2015, two additional fields related to developmental mathematics were included in the primary participant collections (designed in consultation with DHE and grantees). One field indicates whether or not the student participated in an SSA-sponsored developmental mathematics

³¹ For reference, the Year 4 SSA evaluation plan is included in Appendix D.

intervention (e.g., developmental mathematics course, non-credit workshop) during the current reporting period. The other 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.

A new “Low-Dose Participant” field was introduced in the Fall 2016 primary participant collection and was piloted by four SSA sites who had helped to design the measure. The field indicates whether or not the student participated in fewer than 6 hours of SSA-related activities during the current reporting period. The field was required of all SSA sites beginning with the Spring 2017 data collection.

Student Experience Survey

The Student Experience Survey, developed in Year 3 by UMDI in consultation with DHE and SSA campuses, provides a student perspective on SSA programs and initiatives that is comparable across campuses. Data from this instrument were collected by sites for the first time in Summer 2016 and have been collected in each subsequent term (with an update in Spring 2017). The instrument asks SSA primary participants for feedback on how SSA participation impacted them as students. Topics include students’ self-efficacy and knowledge of STEM topics, their feelings of connection to peers and faculty, their perceptions of the helpfulness of SSA supports and activities, and their thoughts about program strengths and weaknesses. Sites collect and organize data from their own SSA participants and report aggregate data to UMDI. The most recent version of the instrument (from the Spring 2017 update) can be found in Appendix B, and a summary of the data from the Fall 2016 and Spring 2017 collections is in Appendix C.

Participant Exit Survey

The purpose of the Exit Survey is to gather information from outgoing or former SSA participants relevant to key metrics of the SSA initiative (e.g., job placement, transfer status, STEM engagement). During Year 3, UMDI worked with DHE and SSA sites to develop an instrument and protocol for gathering data from primary SSA participants who have left their professional or degree programs for any reason, including dropout, transfer, completion, and job placement (see Appendix F for instrument). Campuses collect and organize data from their own exiting program participants and submit these data via DHE’s HEIRS system. The first Participant Exit Survey data collection included Summer 2016 primary participants who did not return to their institutions in Fall 2016 (submitted with the Fall 2016 data collection). An analysis of Year 4 Exit Survey data will be included in the Year 4 Annual Report.

Phone Interviews – Spring 2017

UMDI conducted thirty-minute telephone interviews with one to two individuals at each site during Spring 2017. 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 promising practices, lessons learned, reflections on data collection capacity and strategies, challenges, and thoughts about the future of SSA at the campus (see Appendix G for the complete protocol). At the time of the interviews, most sites were focused on implementing Year 4

strategies for Spring 2017 participants while also recruiting and planning for Summer 2017 programs. Interviews were digitally recorded with permission, summarized, and analyzed in NVivo11.

Selected Site Visits – Fall 2016

UMDI team members conducted site visits at 6 SSA sites in October, November, and December 2016: Bristol, Bunker Hill, Cape Cod, Massasoit, Middlesex, and Quinsigamond. Site visit data collection instruments (interview, focus group, and observation protocols) were developed in collaboration with DHE and focused on:

- the key elements of Year 4 SSA implementation at the campus,
- reflections on program sustainability,
- signature practices or SSA Model areas for the campus,
- evidence of success,
- successes and challenges,
- lessons learned or planned changes, and
- feedback about grant facilitation by DHE.³²

UMDI evaluators visited each campus for up to four hours and invited sites to propose an agenda for the visit. UMDI requested that the visit include a focus group with SSA students, an interview with key SSA program staff, and an opportunity to observe SSA activities. At each of the sites, the UMDI evaluator interviewed the primary SSA administrator and/or SSA coordinator. Observed SSA activities included a STEM career panel, a transfer workshop for a STEM club, a STEM community building event, a research poster presentation, and workshops on interviewing and resumes.

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. Data were analyzed in NVivo11.

Selected Site Visits – Summer 2017

UMDI team members conducted site visits at nine SSA grantee sites in July and August 2017: Berkshire, Greenfield, Holyoke, MassBay, Mt. Wachusett, Northern Essex, North Shore, Roxbury, and Springfield Technical. UMDI developed site visit data collection instruments in collaboration with DHE (interview, focus group, and observation protocols).³³ The observation protocol focused on details of program implementation and the focus group protocol gathered student feedback on how SSA impacted their experiences. The administrator interview protocol included site-level reflections about:

- categorizing subgroups of SSA participants and measuring their progress and outcomes,

³² See Appendix H for Fall 2016 site visit protocols

³³ See Appendix I for Summer 2017 site visit protocols.

- trends in data about SSA programming collected at the campus level,
- clusters of SSA strategies that emerged during analysis of data for the Year 3 Evaluation Report,
- priorities and promising practices,
- successes, challenges, and lessons learned,
- grant facilitation by DHE, and
- grant evaluation by UMDI.

As part of the process of preparing for site visits, UMDI collected Summer 2017 programming schedules from all fifteen sites (see Appendix J for a summary of these schedules).

As with the previously conducted site visits, UMDI evaluators visited each campus for up to four hours and invited sites to propose an agenda for the visit. UMDI requested that the visit include a focus group with SSA students, an interview with key SSA program staff, and an opportunity to observe SSA activities. At all sites, UMDI evaluators interviewed the primary SSA administrator and sometimes various SSA coordinators. Student focus groups were conducted at 8 sites (there was no focus group at Roxbury). 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. Data were analyzed in NVivo 11.

Interview with DHE

On February 14, 2017 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' visions for the initiative moving forward and their reflections on the initiative to date (complete protocol in Appendix K and findings from this interview are in Appendix L). The interview was digitally recorded with the administrators' permission. The recording was transcribed, analyzed, and summarized.

Technical Assistance

In Year 4, 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 participation and material development for presentations of the SSA Year 3 Evaluation Report to various audiences.

Instrument Development

In Year 4, UMDI worked with DHE and SSA grantee sites to refine the design of several data collection instruments.

In consultation with DHE, UMDI updated all supplemental student data request instruments for the Fall 2016, Spring 2017, and Summer 2017 data collections, including:

- Primary Participant collections,
- Secondary Participant collections,
- Student Experience Survey collections, and
- Participant Exit Survey collections.

The Fall 2016 collection included a new “low-dose” participant measure and UMDI offered technical support to DHE in evaluating initial pilot test and supporting the roll-out of the new required field to all sites in Spring 2017. Two questions in the Student Experience Survey were updated in Spring 2017 to collect more valid and reliable data.

As in previous years, UMDI worked with DHE to adapt site report instruments to reflect SSA implementations in Year 4 and DHE’s reporting goals. These Year 4 Site Report instruments included an online survey and narrative template (these instruments will be available in the Year 4 Evaluation Report).

Support for Data Submission

UMDI worked with DHE and site representatives to facilitate data submission in Year 4. As in previous years, UMDI drafted instructions and documentation to clarify data collection procedures and provided ongoing technical assistance to individual sites regarding data submission. With increased access to site and individual level data in Year 4 (due to a data-sharing agreement), UMDI’s technical assistance to DHE and SSA sites on data submission included working with individual campus representatives to resolve irregularities in data submissions.

Dissemination of Findings

Throughout Year 4, UMDI met with DHE representatives approximately once a month to provide technical assistance. In addition to providing updates on data collection, data analysis, and preliminary findings (in advance of the Year 3 Evaluation Report), this assistance included support for:

- dissemination of evaluation findings,
- proposal and conference presentation development, and
- facilitating site-level understanding of evaluation and findings.

UMDI presented or co-presented findings (with DHE) from the Year 3 Evaluation Report:

- to SSA administrators and coordinators at the grantee May 2017 retreat,
- to DHE Commissioner Santiago and senior staff on May 17, 2017, and
- to Massachusetts Community College Chief Academic Officers on June 9.

Refining the Definition of STEM

As UMDI completed quantitative analyses for the Year 3 Annual Evaluation Report, it determined that several programs of study (e.g., Liberal Arts – Biology) were potentially related to fields designated STEM for SSA, but were not being “counted” as STEM for the purposes of the SSA evaluation. During Year 4, UMDI and DHE initiated a process to review and refine the list of programs considered STEM for the purposes of the SSA evaluation.

Grantees were invited to a call on August 17, 2017 to discuss a process for refining the list of programs considered STEM for the SSA evaluation. The call focused on framing the issue, clarifying action steps and information needed from each site, and discussing timelines and roles. Following the call, UMDI shared a set of documents to facilitate campus review of their programs (see Appendix M for these documents, which provide a more detailed description of the issue and next steps).

Participation in Grantee Meetings

Grantee phone meetings

DHE hosted phone meetings with SSA grantee representatives approximately once per month during Year 4. SSA grantees participated in nine hour-long conference calls between September 2016 and September 2017 (see Table 4, below, for a list of topics by meeting). Calls were facilitated by DHE’s Executive Director of STEM, Allison Little and the Associate Commissioner for Workforce Development and STEM (and Chief of Strategy and Operations), David Cedrone. Agenda items included updates from discussions of measurement and evaluation findings, implementation updates from grantees, conversations about budgeting and planning, and discussions of Refining the Definition of STEM. UMDI evaluators attended each call as observers, provided evaluation updates and generated notes from each meeting for DHE to share with grantees.

Technical assistance meetings or “retreats”

DHE convened technical assistance meetings for SSA grantees on October 21, 2016 and May 1, 2017. UMDI took notes (which were shared with DHE and sites) and observed at both meetings. At the October meeting, UMDI presented a summary of key data elements from the September 2016 Evaluation Report Supplement and an overview of the goals and anticipated contents of the Year 3 Annual Evaluation Report. At the May meeting, UMDI presented a summary of the main findings of the Year 3 Annual Evaluation Report and worked with DHE to facilitate discussion and understanding of the report’s findings.

Table 4. SSA Grantee Monthly Phone Meetings Summary – Year 4

Date	Topics Discussed
9-8-2016	<ul style="list-style-type: none"> • Year 4 planning • Planning for October retreat • Working group updates <ul style="list-style-type: none"> ○ High-low participation group: definition of “low dose” as fewer than 6 hours of participation per semester ○ Industry partner group: identification of skills to be identified with SSA • Site summer Share Out • SSA Early College 2016-17: will be competitive, interest from Executive Office of Education, criteria and RFP are being developed. • Evaluation: upcoming data collections, fall site visits, Year 3 site report materials disseminated, Student Experience Survey and Exit Survey check in.
10-21-2016	Fall Retreat <ul style="list-style-type: none"> • Early College RFP • Evaluation Update: Anticipating Year 3 Evaluation Report • Campus “Speed Dating” • Year 5 Planning • Recruitment and Sustainability
12-15-16	<ul style="list-style-type: none"> • Year 3 Interim Report • CCOPS Meeting <ul style="list-style-type: none"> ○ Met with CC Presidents at end of November • Early College RFP • BioScann <ul style="list-style-type: none"> ○ Guest group from Tufts Medical Center • Evaluation <ul style="list-style-type: none"> ○ Updates on the September Evaluation report ○ Fall Collection due date and reminders
1-4-17	<ul style="list-style-type: none"> • RFP Conference Call <ul style="list-style-type: none"> ○ Budget Questions ○ Background and Context ○ Sustainability

Table 4. SSA Grantee Monthly Phone Meetings Summary – Year 4

1-17-17	<ul style="list-style-type: none"> • Early College RFP • Spring 2017 overview <ul style="list-style-type: none"> ○ End of Year Event ○ Pkal Conference • Evaluation Updates
2-16-17	<ul style="list-style-type: none"> • Campus Updates • Spring Updates <ul style="list-style-type: none"> ○ Spring Retreat ○ Early College • Evaluation Updates
4-20-17	<ul style="list-style-type: none"> • SSA Spring Retreat • FY18 Budget Update <ul style="list-style-type: none"> ○ Early College Discussion • Year 4 Reporting and Year 5 Planning Document • Evaluation Report • DHE STEM Summit Application
5-1-2017	Spring Retreat <ul style="list-style-type: none"> • Year 3 Evaluation Report: aligning initiative level data with campus-level experiences • Populations: different populations with different outcomes, who should SSA be serving? • Communicating SSA story, staying true to SSA model and mission • Looking at institutional data: illuminating success, making evidence based decisions • Planning for Year 5
8-8-17	<ul style="list-style-type: none"> • Year 5 Evaluation Plan • Site Visit Feedback • Site Evaluation Activities • Refining the Definition of STEM
8-17-17	<ul style="list-style-type: none"> • Refining the Definition of STEM • Year 5 Evaluation and budget
9-14-17	<ul style="list-style-type: none"> • Year 4 Wrap Up • Year 5 Contracting Update • Fall Event • Early College

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Appendices
