Massachusetts Department of Higher Education

STEM Starter Academy

Impact and Value

July 2020
The **STEM Starter Academy** (SSA) is a Massachusetts Department of Higher Education (DHE) initiative to **recruit, ready, retain, and complete** significantly more students through **community college STEM pathway programs** that result in job placement within STEM professions or transfer to university STEM programs.

**Focused on STEM, Advancing Equity**
- Meets a growing need for a diverse population of STEM-skilled graduates
- Recognizes the untapped potential of under-served and underrepresented populations
- Supports differentiated approaches to increase equity in access and outcomes

**At-Scale Implementation, Local Contextualization**
- Facilitates transformation across the community college system
- Enhances and extends existing STEM pathways at each institution
- Allows local adaptation to address regional markets, build institutional capacity, and develop wrap-around supports

SSA launched simultaneously at all fifteen public community colleges in 2014.

**Best Practices**
- Identifies, innovates, and curates effective practices to advance community college students through STEM programs
- Cultivates collaborative learning community—across and within institutions—in order to adapt and replicate best practices

**SSA: Key Features & Approaches**

**SSA promotes student success through a curated program of learning experiences that are sequenced from recruitment to completion**

SSA serves a diverse range of student needs, ensuring that participants are accessing:
- rigorous academic curriculum;
- campus, peer, and industry relationships; and
- wrap-around supports.

Through these practices, SSA advances students toward the goal of a career in the STEM workforce.

**Recruitment**
- Awareness & access to STEM programs of study and career opportunities

- 30,964 Students served

**Readiness**
- Preparedness & knowledge of STEM pathway programs

- 15,587 received targeted SSA supports

**Retention**
- STEM-focused relationships & social networks support persistence and academic success

- 5,580 transferred to 4-year institutions

- 66% Retain, transfer, or complete after one year

**Completion**
- Achievement of credentials and transitions into STEM workforce or additional education

- 6,436 earned degrees or certificates
Who is served by SSA?

From 2014 to 2019...

<table>
<thead>
<tr>
<th>SSA has directly served</th>
<th>More than Half women</th>
<th>Half Students of color</th>
</tr>
</thead>
<tbody>
<tr>
<td>30,964 students</td>
<td>(54%)</td>
<td>(51%)</td>
</tr>
<tr>
<td>8,137 students served in the 2018-2019 academic year</td>
<td></td>
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</tbody>
</table>

Reflecting Institutional Diversity

SSA participants reflect the racial/ethnic diversity of the overall population of community college students.

SSA promotes increased recruitment and retention of students from diverse backgrounds and who have been traditionally underrepresented in STEM professions.

STEM and Potential STEM Students

SSA serves students with a range of STEM interests and preparation through a variety of strategies.

Building awareness and success among students who had not considered STEM fields

- 25% of SSA participants are undeclared majors when they first participate

Supporting students who are already interested in STEM but need extra preparation

- 48% of SSA participants are STEM majors when they first participate

Benefiting students who are in non-STEM fields through events and academic supports

- 27% of SSA participants are non-STEM majors when they first participate

"I go to my class and I'm either the only female or we are two. So, it was kind of like 'No, it's a male thing.' And then [SSA] started this Women in STEM program. There, we fortified each other. You know you're probably the only one in your class, but then you have a huge network outside."

—Quinsigamond CC Student

SSA Participants: Fast Facts

| 25+ | 33% of participants were 25 years old or older when they first joined SSA |
| 46% | 46% of participants were part-time students when they first joined SSA |
| 67% | 67% of those assessed were not ready for college-level math when they entered their institutions |
| 30% | 30% of participants were actively engaged with SSA for 2 or more terms |
**Student Outcomes**

**SSA Students Fare Better Than Their Peers**

**Overall**

- SSA participants were **more likely to have a positive outcome after two years**

- **1.8x**

**Latinx students**

- Latinx participants were **more likely to have a positive outcome after two years**

- **1.7x**

**African American students**

- African American or Black SSA participants were **even more likely to have a positive outcome after two years**

- **2.2x**

*Positive outcomes include graduation, retention, transfer, or STEM employment. SSA participants, Latinx and African American/Black SSA participants from 2014–2019 were compared to similar non-participants.*

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**SSA Students Advance Toward Earning a Degree**

**Progress Builds Years After Initial Participation**

- **Completed Degree or Certificate**
- **Transferred to 4-year***

<table>
<thead>
<tr>
<th>Year After Joining SSA</th>
<th>Completed Degree or Certificate</th>
<th>Transferred to 4-year*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One year</strong></td>
<td>19%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td><strong>Two years</strong></td>
<td>32%</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>31%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Three years</strong></td>
<td>41%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>47%</td>
<td>37%</td>
</tr>
<tr>
<td><strong>Four years</strong></td>
<td>47%</td>
<td>38%</td>
</tr>
<tr>
<td><strong>Five years</strong></td>
<td>47%</td>
<td>9%</td>
</tr>
</tbody>
</table>

*Note: Five-year outcomes are only available for one cohort, those who started SSA in 2014 (N=2,955). Similarly, four-year outcomes include cohorts starting in 2014 or 2015 (N=6,789), three-year outcomes include cohorts starting in 2014, 2015, or 2016 (N=11,769), two-year outcomes include cohorts starting in 2014, 2015, 2016, or 2017 (N=16,990), and one-year outcomes include cohorts starting in 2014, 2015, 2016, 2017, or 2018 (N=21,897).*

*Students who transferred without completing a degree or certificate at the community college.*
Impacts on Students

From 2014 to 2019...

- **6,436** SSA participants earned degrees or certificates
- **3,724** SSA participants earned credentials in STEM fields
- **3,760** Completed developmental math after participating in an SSA sponsored intervention that term
- **5,580** SSA participants transferred to 4-year institutions

"Before I met [the STEM advisor] I wasn’t thinking science or math. ... I didn’t have a direction. Now I have something that I can say I want to do 20 years down the road."

—Cape Cod CC Student

Students participating in SSA report positive experiences

**Improved knowledge/performance and stronger connections**

- **83%** Better knowledge of academic supports and resources (n=3,117)
- **75%** Improved performance / achievement in courses (n=2,836)
- **75%** Stronger connections to other students (n=2,825)
- **72%** Stronger connections with faculty (n=2,737)

**Greater confidence and self-efficacy in STEM**

- **80%** I can better understand the concepts in a STEM course (n=2,973)
- **77%** I feel more confident about asking questions in my STEM courses (n=2,889)
- **76%** I feel more confident that I can think like a mathematician, scientist, engineer, and/or other STEM professional (n=2,858)
- **76%** I feel more confident that I will be able to use STEM-related knowledge and skills in my future career when needed (n=2,857)

Percentage of surveyed students who agreed or strongly agreed that these resulted from their participation in SSA.

Percentage of surveyed students who agreed or strongly agreed with each statement.
Impacts on Institutions

Facilitating Change
Across the community college system, SSA initiates and sustains changes that benefit institutions*

**Capacity**
SSA-affiliated staff and faculty collaborate with offices of admissions, advising, academic support, and career/transfer counseling to integrate supports for STEM students.

**STEM Pathways**
SSA facilitates access to STEM pathways by supporting changes to advising or academic programs.

**Community**
SSA cultivates a collaborative STEM learning community across institutions. SSA staff and programming have also become central hubs of STEM relationships and activity within many colleges.

**Innovation**
SSA programs serve as models that spur innovation and replication beyond STEM departments.

**Connections**
SSA encourages collaboration across STEM departments—building networks and making STEM more visible to students, staff, and faculty.

**Perceptions**
SSA participants serve as visible examples of the success that community college students can have in STEM—fueling interest from peers, high school students, and the broader community.

*Data from interviews with SSA and institutional administrators

Supporting the STEM Pipeline
While overall enrollment in community colleges has decreased since 2014, the proportion of students that enroll in STEM programs has increased.

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<thead>
<tr>
<th></th>
<th>Fall 2014</th>
<th>Fall 2019</th>
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<tbody>
<tr>
<td>Overall enrollment</td>
<td>97,783</td>
<td>72,760</td>
</tr>
<tr>
<td>STEM enrollment</td>
<td>26,456</td>
<td>22,350</td>
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</tbody>
</table>

27% 31%
Building Relationships
that connect students to support and opportunity

Through SSA, many community colleges have built stronger connections with their peer institutions, high schools, 4-year colleges, and STEM employers—creating linkages that enhance students' awareness of STEM, readiness for rigorous study, and planning for careers in the STEM workforce.

Many SSA programs offer STEM-focused early college activities and courses where high school students are taught by college faculty.

SSA participants also serve as ambassadors for their colleges, returning to their high schools to recruit participants and serve as role models for other students.

SSA staff have built relationships on and off campus, fostering awareness and interest in community college STEM programs among high school, 4-year college, community organization, and industry stakeholders.

Relationships with industry and community partners—initiated or supported by SSA funding—provide mentorship, internship, and career opportunities while also supporting curriculum development and STEM career readiness and awareness.

Advancing Students Toward Careers in the STEM Workforce
Through industry and community partnerships

"We're all working on this. Faculty, administrators, and professional staff are all looking at long-term sustainability, for example, by going to meetings, conferences, and building long-term relationships."
—Roxbury Internship Coordinator

"Going through the mentor program made me realize this is something I can do and want to do. And [it] helped me narrow down what field... environmental engineering with a minor in chemistry."
—MassBay CC Student

130+
SSA participants placed in internships with industry partners (2018–2019)

300+
Industry partnerships developed through SSA

Career Exploration

Personal relationships

Professional mentorship

STEM-related work experiences