

STEM Foundational Session Notes

Disciplinary Sector Leaders

Community Colleges: JoDe Lavine
State Universities: Darcy Boellstorff
University of Massachusetts: Bruce Byers

Attendees

Bridgewater State University	Darcy Boellstorff	dboellstorff@bridgew.edu
Bunker Hill Community College	JoDe Lavine	jmlavine@bhcc.mass.edu
Cape Cod Community College	Hemant Chikarmane	hchikarmane@capecod.edu
Cape Cod Community College	Bob Cody	rcody@capecod.edu
Cape Cod Community College	Colleen Coughlin	ccoughlin@capecod.edu
Fitchburg State University	Chris Cratsley	ccratsley@fitchburgstate.edu
Fitchburg State University	Mel Govindan	mgovindan@fitchburgstate.edu
Greenfield Community College	Mary Ellen Fydenkevez	Fydenkevez@gcc.mass.edu
Holyoke Community College	Pam Baran	pbaran@hcc.edu
Mass Bay Community College	Chitra Javdekar	chitra.javdekar@gmail.com
Massasoit Community College	Doug Brown	dbrown@massasoit.mass.edu
Middlesex Community College	John Smith	smithjo@middlesex.mass.edu
Mt. Wachusett Community College	Heather Conn	hconn@mwcc.mass.edu
North Shore Community College	Nancy Alberto	nalberto@northshore.edu
Northern Essex Community College	Ken Thomas	kthomas@necc.mass.edu
Quinsigamond Community College	Leslie Bolinger-Horton	lhorton@qcc.mass.edu
Quinsigamond Community College	Jacob Longacre	jlongacre@qcc.mass.edu
Roxbury Community College	Monireh Esfahani	mesfah@rcc.mass.edu
Roxbury Community College	Kimberly Steiglitz	kastieglitz@rcc.mass.edu
Salem State University	Ryan Fisher	rfisher@salemstate.edu
Springfield Technical Community College	Zahi Haddad	ZHaddad@stcc.edu
University of Massachusetts Amherst	Bruce Byers	bbyers@bio.umass.edu
University of Massachusetts Boston	Marietta Schwartz	marietta.schwartz@umb.edu
University of Massachusetts Lowell	David Kazmer	David_Kazmer@uml.edu
Westfield State University	Buzz Hoagland	bhoagland@westfield.ma.edu

The segmental leaders began by presenting the assembled group with its assigned task: To develop a Science Education Block consisting of a set of courses appropriate for community college students interested in the natural and physical sciences, but not yet decided on which specific major to pursue after transferring to a four-year institution.

The initial round of discussion focused on the overall viability of the concept. Participants were generally supportive but identified a number of potential complications. The discussion was very wide-ranging, but a few themes emerged that were shared at least reasonably widely in the group:

- It might not be possible to identify a single set of courses that would prepare a student to transfer into any major from among the natural and physical sciences. If such a single set

were identified, it would probably include so many courses that it would not be possible for most students to finish in two years. Thus, to ensure seamless transfer into STEM majors, it might be necessary to have different tracks within a science block.

- A course block that includes enough courses to prepare a student for a range of different science majors might not allow enough room for exploration of different STEM disciplines, and such exploration seems essential for science students undecided about their future focus.
- A science course block suitable for transfer does not seem able to accommodate the needs of students who enter community college needing remedial work, especially in math. If such students are to be able to take advantage of such a program at all, time to transfer would be longer than for calculus-ready students, as any realistic science block would assume that participants are calculus-ready or nearly so.
- Although we were not directed to discuss the Mass Transfer Block, there was much interest in discussing it. There was a strong consensus that the current Mass Transfer Block system has serious drawbacks for transfer students in STEM majors. Chief among these drawbacks is that MTB students have no general education courses to complete after transfer, and therefore often feel pressured to pursue course loads consisting exclusively of science and math courses, a choice that commonly leads to negative consequences for the students. There was a widely shared desire for some kind of STEM Transfer Block that would be an alternative to MTB, with different course requirements and perhaps somewhat different "payoffs" to students who complete it.

In the second round of discussions, the group agreed to focus on developing a list of specific courses, to see if would be possible to develop ideas for a workable course block, given the concerns raised in the first round of discussions. The group prefaced the discussion by agreeing to table for now the issue of not-college-ready students, and focus on devising a program for students who enter community college as college-ready, or who have taken courses to reach that point.

To facilitate discussion and ensure that all voices would be heard, session attendees broke into four groups to work on courses lists. Each group reported out its conclusions. Although the group ran out of time before they could come to a session-wide consensus, there was a remarkable degree of overlap in the conclusions of the different groups.

- All groups settled on a structure that included a set of core of courses that would be required of all participants, complemented by a second set of courses from which participants would choose a subset. The groups came up with different versions of which courses would be in each component, but in all cases the core (required) list included Biol 1, Chem 1, Physics 1, and Calc 1, and most versions included the second semester of at least some of those courses. All of the lists of "choose from this group" courses included Organic Chem 1 and 2, along with a range of other courses. Some of the lists were especially flexible, with a larger menu of options (e.g., including environmental science, statistics, earth science, intro to engineering, etc.) or general instructions, such as "take an additional lab science".
- The groups were divided with respect to calculus-based physics versus algebra-based physics. One group suggested requiring calc-based physics to prepare for the widest range of possible future majors; the other groups recommended algebra-based or giving each student the option to choose.

- Most groups favored the idea of including features to mandate or encourage exploration of different STEM fields. However, the group did not have time to reach consensus on the preferred method for accomplishing this. Options broached and favorably received included developing a special course or seminar designed for exploration (some campuses already have such courses), or simply including a wide range of subjects in the "choose from this list" part of the block.
- All groups agreed that having flexible programs that encourage exploration will require excellent advising support to help students navigate the block effectively.
- Most groups specified that they envisioned their course lists as the basis of an alternative "STEM Transfer Block." As such, these models all included two semesters of composition in addition to the block of required and optional science and math courses, and allowed for the possibility that some other non-science requirements or electives might also be included.
- One group developed a model that would focus on exploration and foundation-building, built around a STEM survey course and a small set of core courses, that would be completed during the first year. In the second year, students would choose a concentration/pathway aimed at a particular major. This idea was met with general approval, and could coexist with a more extensive "STEM Transfer Block" approach.