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**STEM Collaborative Action Plan (STEMCAP)
Recruitment/Retention Group Webinar
March 7, 2007**

Attendees:

Vicki Conner, Strategic Vitality
Jamie Foster, CSA
Deb Hirsh, CSEWI
Daphne Dador, CSEWI (recorder)
Fran Kennedy, California Labor and Workforce Development Agency
Carey Kopay, UC Davis
Diane Siri, ARCHES
Dennis Galligani, ARCHES
Jane Zinner, Cuneo/Zinner Group
Victoria Martinez, El Camino College
Tamika Lang, Boeing
Christine Purcell, CSA
Donna Reardon, Caltech
Debashee Raychaudhuri, CSU LA
Marshall Gartenlab

Agenda

10:00 a.m.

Welcome

Deborah Hirsh, Executive Director, CSEWI

Orientation to Webinar Etiquette/Webinar Technology Notes

Jamie Foster, COO, California Space Authority

Deborah Hirsh (DH): Introduced STEMCAP. She noted STEMCAP's high-level participants including government representatives, award winning math/scientists, industry representatives, esteemed educators and so forth.

DH also described dealing with issues of the new century including the need to pull together all we could find that is meaningful for STEM and to increase support to STEM teachers and students throughout state and corridor. She also noted the importance of finding "best practices" and to stop reinventing wheels. By doing this we'll find ways to create synergy and leverage.

10:05 a.m.

**Refinement of the Recruitment/Retention Working Group Goal,
Steering Committee inputs**

*Vicki Conner, Principal
Strategic Vitality, LLC/WIRED and STEMCAP Partner*

Vicki Connor (VC) reviewed the three working groups and their goal statements to show attendants where the other groups have arrived with their goals.

Victoria Martinez, El Camino College (VM): Commented on the transition group slide.

Every student in the corridor/State will be motivated, academically prepared and realize potential in STEM academic areas and will have the opportunity to participate in the STEM professional workforce upon completion of elementary, middle, high school, certificate, AA, transfer, BS and graduate degree.

Recommendation: She noted that "AA" should say: "associate degree." [Change was noted].

VC explained the Recruitment/Retention statement: On Dec. 9, our group did not wordsmith our statement, but brainstormed what should be in it. There were a couple things that we should consider in our original goal statement that should be moved to recommendations/implementation. This statement is a shortened version after receiving input from the Steering Committee:

Increase number of STEM graduates and educators by creating a positive image of the STEM worker and, using all available resources (public and private), build awareness of all California students, teachers and parents of the breadth, scope and quality of life benefits of STEM-related careers.

Daphne Dador (DD) asked what the difference was between the transition and retention/recruitment statement.

VC responded: "The way I look at it, the difference is that recruitment/retention is mainly awareness building." **VC Recommended:** "*Retention' could be addressed stronger in the goal statement and could be more specific.*"

Dennis Galligani (DG): Responded by noting that all the working groups build upon each other. He also emphasized that "Retention/recruitment" could be stronger whereas more academic preparation for transition should be what the Transition group should focus on.

VC noted the important to avoid similarities and to strengthen recruitment/retention in statement. "Especially retention - needs to be more specific."

Debashee Raychaudhuri (DR): Asked/suggested that the 4 STEMCAP categories: inspire, engage, educate, employ be incorporated into the statement. VC: responded that the four categories are discussed in the paper, but further discussion on it appearing on the goal statement could happen.

VC pointed out that the bullet: *Ensure challenging, relevant, hands-on STEM-related activities capitalizing on the excitement of experiential learning and the satisfaction of project-based methods of study* possibly overlaps with the curriculum group.

Marshall Gartenlab: Suggested adding “life long learning.” He doesn’t see anything pointing to lifelong learning or continuous learning. Noted that technologies rapidly. Noted that retention should mention about keeping students/adults current... “Learning how to learn”

VC: Life long learning might be beyond STEMCAP goal... pointed increase students and development – didn’t talk about updating students in original goal... A good comment, might not be in the scope.

VC: Asked about discussion about retention aspect and how it might differ from curriculum?

Should retention be in our group or moved to another group.

Carey Kopay (CK): Is this focused on students or setting apart by focusing on teachers?

VC: It’s both, students, graduates, teachers, mentors... A little complicated by addressing recruitment/retention of both students and teachers...

VM: Recruitment should be the main focus, retention falls under curriculum, seems like the goal is to first recruit students/teachers into the field.

DR: I disagree, attrition is highly prevalent in new STEM teachers. We need to have retention on the agenda.

VC: Trying to determine whether we keep retention in the WG discussed that retention aspect seems to apply to a person already in a program and that might be a better match for curriculum. Can it work here?

JZ: Suggested on talking with curriculum group later on today on this issue.

Donna Reardon (Donna): These are interesting goals, what is the product? Will this be a document with recommendations or actual programs?

VC: Facilitators are meeting about this at end of month. Product will have 3 pieces: narrative piece, inventory, dissemination plan – what is the narrative piece? We will discuss whether that will be principles/recommendations of the areas or a “this is what we’re going to do” section. We haven’t made a decision yet, we’ll probably show model programs and how to proceed, but not suggesting where to go.

DG: Recommended that final product should show best practices and where these practices are best utilized

VC: It’s hard to mandate to people if they don’t agree on principles, so we should show common principles and pathways, not mandate specific programs for specific levels

Donna: I was confused about whether goals showed a desired state or whether STEMCAP was attempting to develop curricula... the end product is really going to be a multifaceted document for many audiences VC: For practitioners, policymakers, funders... many audiences

10:30 a.m.

**Refinement: Suggested R/R Strategies
in Context of Inspire, Engage, Educate, Employ**

Vicki Conner

VC: Inspire, engage, educate, employ.... "On Dec. 9th, we decided these categories might provided an architecture - organizing principle, and we agreed that all these areas might apply to all WG.

For the next discussion, VC requested that participants identify whether the points on the slides for each of the four categories where: in appropriate category, whether it belongs in this WG, and does it have any interface with the criteria. Is it a good fallout for the goal (on hold since goal not finalized...)

INSPIRE section

For slide one:

Address bi-lingual and gender issues in following:

- *Bring all resources to table: education, industry, informal science*
- *Show relevance to 21st C issues-e.g. global warming*
- *Counter perceived/real difficulty of STEM study with image-breaking fun-looking STEM work*
- *Introduce teachers, parents, students to breadth of STEM careers, not just lab scientist*
-Show fieldwork, labwork, space work, enviro-variety

CK: Recommended: Add attention to counselors in schools, I would really target counselors

VM: Recommended: I would also include demonstrations, students enjoy seeing these and hands on activities

Tamika Lang: Recommended: Add to 21st C, add 21st C Technology (might be a separate bullet), e.g. using interactive media to engage students

Christine Purcell (CP): Recommended: Health is something else that gets students into "it" ... Girls love cosmetics - it is a STEM career - think out of the box for STEM careers

DS: Discussed a curriculum on cell phone technology, how text message works, iPods, video downloads... VC: Recommended that to inspire it's important to: Connect students STEM learning to everyday life

DH: LAUSD, used cell phone bills to teach algebra class. Recommended that we add these stories to to the STEM Inventory.... Possible promising practices

CP: Liked High-tech = High Wage bullet. Good way to connect students.

ENGAGE section:

DR: Felt that the first bullet “•Employ project-based/experiential learning” more for curriculum group .VC: tried to explain how it might stay in the R/R WG with an example from a Cerritos recruitment program that interested kids by using 3D models to go to school, in this case it’s recruitment .vs if it’s a program in actual the classroom

CK: Tried to distinguish as well, discussed how action oriented projects vs. teaching....or Action oriented = experiencing vs. learning. Action oriented projects can be used for recruitment. VC: In her summation of the differences: “Distinction is that one project concentrates on orientation activities while projects with “learning aspects” goes to the curriculum group”

DS: Recommended and stressed that the groups should be looking at the linkage between one another, so all WG goals are complimentary

VM: Asked whether it was possible to separate out students and teacher recruitment (VC: We’ll try and do that for May 19 session)

Donna: Questioned the meaning of the bullet about Capitalize on pre-service teaching opps? VC: Answered that pre-service teachers can explore internship opportunities at the informal science sites. It would be an opportunity for teachers to interact with students in learning situations before they enter the classroom.

VM: Recommended: Include internship opportunities for College and HS schools to experience companies and industries

VC: On another bullet, VC asked about teacher communities – keep teachers motivated, anything like this going on?

DR: There are teacher communities on our campus, we keep our STEM teachers together... Math and Science Teacher Initiatives and we try to build community for them.

CP: Discussed a “Teacher Research Academy” – where teachers study with Lawrence Livermore research scientists to give teachers experience as researchers...

VC: Good idea, this helps elevate perception of teachers and their careers (makes it more attractive)

DS: Having student teachers involved in research helps them have a better understanding of being a research engineer/scientists... and is a good example of what kind of professional development teachers are able to get while in the classroom. Mentioned a summer program where middle and high school teachers are placed in industrial sections. This is good; it helps teachers remain part of science/tech community

VC: Yes and makes them feel in S&T community and attracts them to teach

VM: At El Camino we have Space and Science Days, as recruitment days. She also mentioned the First Robotics competition in connection with the bullet point for Lego League competition, **she recommended adding the “First” program**

EDUCATE slides

First slide:

- *Apply business/HR research on job satisfaction*
- *3 aspects for STEM success – build into curric*
 - *Technical*
 - *Business*
 - *Real world (experiential) understanding*
- *Increase societal value of STEM*
 - *Mirror for one year the pedagogy/paradigm shift*
 - *U.S. views/teaches science as absolute, not applied*
 - *Stop and reverse decline in grads*

VC: Reminded people to look out for duplication with curriculum folks
She suggested/recommended that Bullet 2 could go into curriculum group

DR: Asked: Is there an order with the bullets? VC: No order, the bullets are not prioritized.

DS: Really liked the bullet on “paradigm shift.” Discussed that over 60 percent of workers are highly skilled nowadays and this indicates change and what is needed today in terms of skills

Donna: Concerned about second bullet, unless things can be done about curriculums at state level this bullet won’t go away... She suggested that: “This one might be futile”... **She suggested/recommended that WG focus on supplemental activities rather than goal of getting into classroom curricula**

CP: **Suggested/recommended: We have biggest opportunities in Voc Ed and CTE**, these courses give us the biggest chance to change and integrate STEM education, biotech classes are good examples. Voc Ed is outside of testing and can be well-funded

VC: Likes all the suggestions, made the connection that: Awareness and fostering of STEM success can show teachers about getting real world into the classroom

CK: Suggested/recommended: Necessary to determine who determines curriculum and how standards correspond – find the pressure points, this where can we make changes

Educate Slide 2 had a couple questions:

- *Saturday and after-school programs*
 - *Example: El Camino Space and Science Day*
- *First Robotics*
- *Families invited*

- *Ombudsman to translate*
- *Different strategies for different audiences*
- *15 scans/CDE standards*
- *Clarification: no mandated minutes except P.E.*
- *Identify potential STEM students early*
- *Build awareness of Leg/Gov for STEM criticality*

VC: Questioned • *Ombudsman to translate* Bullet 2 ---? DS: Suggests that this bullet is about how students are retained in classroom – further discussion with curriculum group

VC: Questioned • *15 scans/CDE standards* Bullet

VM: From her notes responded that she things “Scan skills” are what employers are looking for in students, she connected 2+2+2 program (develop pathways between HS, CC and UCs...) and having engineering academies

VC: Suggested that these programs might fit into transition group

DR: From her notes explained that 15 scans refers to leverage and restrictions that are presented under 15 scans and standards

EMPLOY section

First slide:

- *Outreach to and orient counselors/grad advisors*
- *Apply HR research to retention, examples:*
 - *Relevance, do they know how they fit into “big picture”?*
 - *Confidence in leadership of organization?*
 - *“Do I feel valued, are they investing in me?”*
- *Support new STEM pros w/new pro groups, mentors, activities*
- *Address issue of STEM major “drop-outs” (esp. at Univ level), attracting them to other STEM majors or technician pathways*
- *Offer incentives to teach in tough districts*

VC: Explained that the Second bullet is from a HR questionnaire based on inputs from employees on how they decided to stay with a company.

CP: Suggested/recommended the use models from HR questions to use on teachers to see how we can retain them

DS: Discussed a useful study on “Future teachers.” She explained that the SRI did report on teacher satisfaction with job and why they left their jobs (though not specifically STEM teachers). Could be a very useful resource.

VM: Suggested/recommended that the first bullet go under inspire or engage

10:55 a.m.

Review of Criteria for Selection of Best Practices/Model Programs

Discussion of “Promising Practices”

Vicki Conner

VC: We have an inventory online for “nominees” for best practices/programs, and will determine which ones to include in our STEMCAP. We just need to get input on criteria to determine which ones to include in the report.

Slide one:

- *Use “SMART”*
 - *Specific*
 - *Means*
 - *Achievable*
 - *Relevant*
 - *Time-Based*
- *Leverage of resources*
- *Hands-on*
- *Experiential*

Donna: Suggested/recommended: Add another ‘a’ – assessment? VC: don’t know if we can change “SMART” – it’s a term already defined and in use

DS: Discussed that ARCHES has a great impact on looking at regional aspect, but there are some restrictions e.g. rural areas vs. city. **She recommended that it would be good to include something that takes into account geographical differences in the criteria.** VC: Might fit into ‘replicability’ DG: Differences in region aspect – **recommended that criteria could be does program meet local needs?**

VM: Pointed out that M in “SMART” should be “measurable”; T = tasks?

Slide: Best practices criteria....

- *Accountability*
- *Contribution to deep understanding*
- *Demonstrated value*
- *21st Century workforce relevance*
- *Collaboration – beyond mere partnering*
- *Appropriateness*
- *Sustainability*
- *Systemic*
- *Scalability*

VC: Systemic, is there a restriction with this word?

DG: It wouldn’t exclude ...

Donna: If you use that word, I would define it for our purposes

VC: Explained that SME = Subject matter expert

CP: In discussing differences between “replicability vs. transferability” CP came up with the following: “transfer” refers to keeping core the same but adapting for different uses, replicable = cookie cutting it

PROMISING PRACTICES

VC: Asked whether it was “Valuable to talk about promising or limit to best?”

VM: Suggested that these are typically combined, everything is under best, including model and proven programs

Donna: Took an opposite view. Best is based on criteria that we just reviewed. Promising programs might be eliminated because couldn’t meet criteria just discussed. On the other hand don’t want to discourage promising programs....

VC: Criteria for promising practices.... **Suggested that their criteria is based on Recommendation from leading authorities**

Donna: Recommended that to show “promising practices” they could be shown on a matrix with the best practices criteria, the matrix will show where promising falls short of being a best practice and where they fit, thus it shows what the program can do to be a “best”

MEASURE OF OUTCOMES section

Slide:

- *Long-Term STEM progress in California*
- *Increase in number/quality of STEM workers*
- *CSU, reduced req’d number of units thru articulation*
- *Increased number of STEM program options, pathways at community colleges, universities*
- *Legislative “wins”*
- *California headcounts: grads, students, teachers*
- *Other?*

DG: CSU, reduced req’d... what is this? Possibly students transferring from community colleges to 4 year inst. VC: to make sure that matriculation occurs between CC to UC, so CC are sure they are meeting requirements to get into UC system

DR: I think bullet means cutting GE units and focus STEM rather than spreading courses all over, so they graduate faster

CK: Recommended that a measured outcome would be to ask about HS career tech programs and growth of those, look at increase in career tech programs at high schools in engineering, biotech or science

CK: Teacher retention, that’s a hard one to measure... headcounts don’t accurately reflect.... depends on how teachers are counted for example they can teach both STEM or English could teach all subjects but how are they counted?

CK?: discussed CALTIDES a system to track teachers throughout their careers, where teachers are going how long, where are they are going (based on SB.12) VC:
Suggested/recommended that STEMCAP might incorporate recommendations with the CALTIDES tracking system

11:40 a.m.

May 19th STEMCAP Forum

Deborah Hirsh (presenters confirmed/invited)

Vicki Conner (working group activity)

DS: Asked what the program will be like.

DH: Explained that it will be similar to last one. But there will be more time for WG to work together.

DG: Discussed further what WG will see at the STEMCAP meeting. He noted, “we need enough time at the session to finalize inputs.” WG will complete first phase at end of May 19. VC: In April, facilitators will brainstorm the agenda and get back to everyone with detail.

DH: Speakers will be provided with bullets to connect their priorities with our priorities.

VC: Generally speakers speak about what they want to...

DR: Recommended: It would be useful to hear from the speakers what they need from an effort like STEMCAP.

11:50 a.m.

Final Working Group Inputs/Next Steps

Vicki Conner

VC: Everyone is encouraged to attend the May 19 meeting and continue discourse.