STEM Project Internal Evaluation Plan

Goal:

To provide evidence in illustrating if a pathway from K12 through university has been created to increase participation and prepare Hispanic and other under-represented students transfer in STEM Majors.

Research Questions:

- Is participation in STEM programs associated with increased course success and retention?
- Is participation in STEM programs associated with increased likelihood of transfer in STEM fields?
- Which aspects of STEM programs are most important to the success of STEM students?

Qualitative Components:

- Activities
  - Site visits and observations of various programs
  - Interviewing with students and program personnel
  - Focus group interviews with students and program personnel

- Methodologies
  - Case study or Ethnographic Research: focusing on a group of students to investigate how they utilize the help from the STEM programs and overcome the obstacles on their way to become a STEM major

- Reported results
  - Program personnel’s perspective: how the programs contributing the recruitment and transfer of STEM students. For example, the increase of content and pedagogical knowledge
  - Students’ perspective: how the programs increase their confidence and knowledge in entering the STEM fields. For example, the students feel more optimistic in entering the STEM fields because of the role models (e.g. the math and science faculty members and the university student tutors) and even want to be a STEM teacher.

Quantitative Components:

- Design surveys to investigate the important factors affecting STEM students’ achievement: Such as student-faculty interaction, and peer interactions, students’ aspirations, college
Collecting new Longitudinal data and combining it with the existing data

Some suggestions are:

- Course success rates. For example, Math 029, Math 130, Math 150, BIO 105, and BIO 220.

- Improvement Rate toward Math 151 using the STEM programs:
  Students who successfully completed the initial Math29 course were then followed across two academic years (including the year and term of the initial course). The outcome of interest was that the group of students who successfully completed a higher-level or college-level Math course (e.g. Math 151) within two academic years of completing the initial Math29 course as Math 151 is a good indicator of STEM majors

- Program evaluations*:
  - Supplemental Instruction programs such as the ones offered for BIO 105 and BIO 220.
  - Math tutoring programs. For example, the Math Success Center
  - STEM Center. For example, the amount of students who used the center and the resulted improvement rates
  - Calculus Enrichment Workshops
  - Learning Community programs

*Since the program evaluations are not in a truly experimental setting. Longitudinal trend data will be provide to add the validity of the compared results. For example, the course success rate for BIO 105 has been stabilized around a specific percentage over the years. However, an increase of success rate for BIO 105 is observed after implementing the SI program. Therefore, we are at a better situation to show the merits of these programs.

- The number of students who declare their STEM major intention when they first enroll in citrus college and the number of students transfer to four-year universities as a STEM major
  - The numbers will be compared to the previous years to see there is an increase in either the student enrollment or transfer rate
Some questions for the internal evaluation team:

1. Establishing the cohort

2. The timeline for achieving the research objectives

3. CI-Tracker Log-out Issue

Credited Time for Winter 09

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>117</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>176.38</td>
</tr>
<tr>
<td>Median</td>
<td>96.00</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>203.136</td>
</tr>
<tr>
<td>Range</td>
<td>1091</td>
</tr>
<tr>
<td>Minimum</td>
<td>2</td>
</tr>
<tr>
<td>Maximum</td>
<td>1093</td>
</tr>
</tbody>
</table>
STEM Pathway Curriculum

1. STEM Majors
   a. Biology
   b. Chemistry
   c. Physics
   d. Math
   e. Computer Science
   f. Environmental Science

2. Good Indicator Courses
   
   1) Math Courses
      i. Math 150 (Turning point, there is high repetition rate in this course and Math 130)
      ii. Math 151 (Good indicator of students going for STEM major)
      iii. Math 175
      iv. Math 190
      v. Math 191
      vi. Math 210
      vii. Math 211

      Students who take these courses are more likely to be STEM major. Typically, students take both 190 and 191 and at least 190.

   2) Biology Courses
      i. BIO 124
      ii. BIO 125

   3) Chemistry Courses
      i. CHEM111
      ii. CHEM112
      iii. CHEM210
      iv. CHEM211
      v. CHEM220

   4) Computer Science Courses
      i. CSIS225
      ii. CSIS140

   5) Physics Courses
      i. PHYS201
      ii. PHYS202
      iii. PHYS203

   6) English Courses
      i. ENGL101
      ii. ENGL103
STEM Pathway Curriculum Articulation – Discussion with Michelle Plug
March 25th, 2009, 9:00 am - 10:00 am

iii. ENGL104

7) Philosophy Courses
   i. PHIL110 (transfer to CSU as critical thinking course)
STEM Interview Discussion with Eleanor
April 23rd AD201 11:00 – 12:00

Documents:

- End –of –Term Supplemental Instruction Survey
- Instructions for summary Report
- Supplemental Instruction
- Sample Interview Sheet

Suggested timeline for schedule the interviews:

- Interview Dates: Last week of May and the beginning week of June (May 26th – June 5th)
- Length of the interviews: 20 minutes
- Give Eleanor of the sign-up sheets at around May 11th.

Reading Notes:

<Supplemental Instruction>

- Criteria: high-risk courses, those classes with a 30 percent rate of grades of D, F, and Withdraws; Open to all the students

- Three key persons (Qualitative components)
  - SI supervisor
  - Faculty members
  - SI leader

- Three claims of SI effectiveness (after controlling for ethnicity and prior academic achievement, e.g. previous college GPA, standardized entrance test scores, high school rank ) (Quantitative components)
  - SI students earn higher mean final course grades
  - Succeed at a higher rate (withdraw at a lower rate and receive a lower percentage of D or F final course grades)
  - Persist at the institution (reenrolling and graduating) at a higher rates

Interview Questions:

For students:

For staff: