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STEM Talent Expansion Program (STEP)
Science Technology Engineering Mathematics (STEM)

<http://avalon.unomaha.edu/step>

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Focus

The goal of this Program is to use innovative ways to recruit and retain STEM majors. The primary focus is on strengthening the collaboration between the University of Nebraska at Omaha (UNO) and Metropolitan Community College (MCC). The resources provided by the grant support expansion and adaptation of currently successful activities within and between the two institutions as well as the implementation of new activities. Measurements so far, indicate that we are on target to meet our goals.

“STEPping” together MCC and UNO will:

- develop agreements between MCC and UNO in STEM disciplines to support the completion of STEM degrees
- increase the opportunity for students to train in STEM disciplines through new STEM degree/certificate options
- improve experiential education opportunities and student support services in STEM disciplines by coordinating efforts
- attract and retain students, particularly under-represented students, in STEM disciplines at both institutions through the use of scholarships
- increase outreach and recruitment activities

Challenges Faced

- Establishing a good working relationship between UNO and MCC. *The different cultures of the two institutions means a relationship is not automatic and must be developed.*
- Encouraging MCC students to continue their education at UNO.
- Uneven success in Early Undergraduate Research (EUR).
- Letting the world know what we are doing.

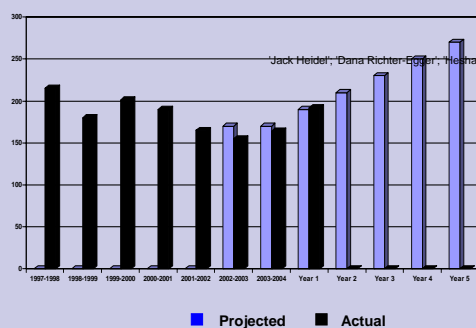
Achievements Through Partnerships

- New programs of study
 - Five new pre-STEM Associate of Science Degrees have been created at MCC
 - Pre-Biology
 - Pre-Biotechnology
 - Pre-Chemistry
 - Pre-Mathematics
 - Pre-Physics
 - One pre-STEM Associate of Science Degree is currently under development
 - Pre-Bioinformatics
 - The Computer Science Associate of Science Degree was modified from an Applied Sciences Degree
 - Computer Science
- All pre-STEM Associate of Science Degrees have been articulated with UNO to facilitate transition from a 2-year to a 4-year institution in pursuit of a STEM degree.
- MCC is attracting students with academic interests in the STEM disciplines
 - Academic Year 2005 – 40 students with STEM interests submitted ACT scores to MCC
 - Academic Year 2006 – 138 students with STEM interests submitted ACT scores to MCC
- Addition of interdisciplinary degree tracks at UNO
 - Information assurance
 - Medicinal chemistry
 - Neuroscience

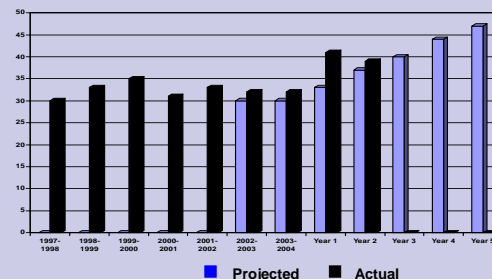
Measures and Metrics

- Social Climate Assessment
 - Initial Social Climate Assessment was conducted to assess majors' and non-majors' perceptions, beliefs, and experiences in STEM courses.
 - One purpose was to determine whether the STEP goals of inclusiveness and diversity are permeating beyond the specific students who are directly affected through STEP scholarships and EUR support.
 - Results suggest that the social climate in STEM courses and departments is remarkably positive.
 - The results were surprising given literature suggesting that a negative social climate may be at least partly responsible for a lack of interest in STEM majors.
- Degree Data Form
 - Data indicates that the STEP grant has been successful so far. UNO STEM graduates, UNO STEM minority graduates, and MCC transfers (to UNO) have increased and exceeded target numbers, of the initial proposal, since implementing STEP.

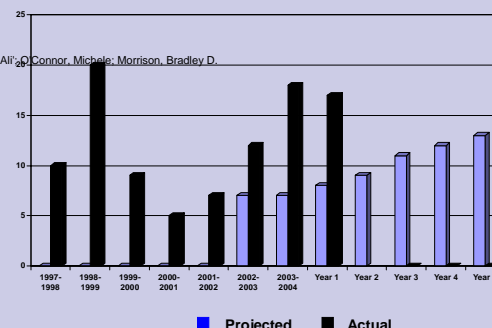
UNO STEM Graduates



MCC STEM Transfers



UNO STEM Minority Graduates



Integration of Program Activities

- Mathematics/Physics Walk-in Tutoring
 - The Mathematics Department has staffed a walk-in tutoring room for several years. Under STEP this tutoring has expanded to include Physics, and discussions are underway to add Chemistry.
- Bioinformatics
 - The UNO Bioinformatics undergraduate degree is an interdisciplinary program between Computer Science (in the College of Information and Technology) and Biology (in the College of Arts and Sciences). It is one of only a few such programs in the U.S. and, in only a year and a half, has 37 majors. Many students in the program are involved in interdisciplinary research activities supported either by STEP or the NIH INBRE program.
- MCC STEP Coordinator
 - The STEP Coordinator spends much time at area high schools and community events distributing STEP literature for both UNO and MCC STEM programs. The effort provides prospective students and their families a broad view of STEM educational opportunities.

Impact Beyond Intended Goals

- New UNO/MCC Graduate Teaching Assistant Positions
 - UNO graduate students teach at MCC which reimburses teaching salary to UNO
 - Four graduate mathematics students currently supported
 - Other departments encourage to participate
- Interdisciplinary Research Inquires – Chemistry and Geology students participate in study of lead contamination study around an EPA superfund site in Omaha
 - Geology students collect soil samples in designated area
 - Chemistry students analyze samples using new ICP-MS instrument
 - Self-selected geology and chemistry students do further analysis and interpretation of the aggregate data
 - Activity is repeated each fall and spring semester
- Short-term Research Experience- “Taking Science for a Test Drive”
 - CCLI proposal by Biology and Chemistry faculty
 - Targets MCC students and UNO pre-service teachers and general non-STEM majors
 - Sixty students per year, in groups of ten, will participate in two-week research experiences during summer

What We Have Learned

- Be Broad Based and Inclusive
 - The greatest strength of the UNO/MCC STEP grant is its breadth. It includes six UNO departments in two different colleges and two different educational institutions.
- Cast a Wide Net
 - There are many dynamic connections between the UNO academic areas that make up the STEM disciplines (biology, chemistry, computer science, geology, mathematics, and physics); how they will develop and grow is impossible to predict.
- Reach Out to All Potential, As Well As Actual, STEM Majors
 - Science has a great intrinsic appeal. It takes some students longer than others to come to this realization; they may need extra encouragement in the meantime.
- By All Indications -- Success
 - Success is attributed to both the generality of the approach and to the interest and enthusiasm of the participants.
 - The sharing of “Best Practices” will assist institutions regardless of their level of experience in STEP.

Number of Students Impacted

- UNO STEP Scholarships
 - Fall 2004 – 16 Scholarships awarded
 - Fifteen scholarships were renewed for the second year
 - Fall 2005 – 18 Scholarships awarded
 - One MCC student currently receiving a UNO Bridge Scholarship
 - Fall 2006 – Recruitment currently underway
 - Seven MCC students have applied
- Early Undergraduate Research (EUR)
 - Academic Year 2004-2005
 - 37 students participated in EUR activities, most received 3 semester hours of tuition waivers
 - Academic Year 2005-2006
 - 24 students participated in EUR activities
 - 54 of 61 EUR students are still pursuing STEM degrees
- MCC STEP Scholarships
 - Academic Year 2004-2005
 - 4 students (4 males / 1 Hispanic student)
 - Academic Year 2005-2006
 - 16 students (13 males / 3 Minority males. 3 females)

Sustainability

- Science/Mathematics Learning Center
 - The College of Arts & Science is developing support for a Science/Mathematics Learning Center as a funding priority. The Center will assist science faculty in course improvement by offering entry level tutoring, specialized instruction and course modules, and assessment of general science education effectiveness. STEP and the Center will work to institutionalize STEP activities.
- Biology and Chemistry CCLI Proposal
 - “Taking Science for a Test Drive” is one way for the STEP EUR activity to be continued, expanded, and institutionalized.
- Substantial Scholarship Program
 - The STEP (Goodrich), MCC and UNO Bridge, Adult Learner Access Scholarships, and EUR tuition grants totaling approximately \$100,000 per year make this component of STEP the most difficult to sustain.
 - Private support for STEP scholarship endowments is being actively pursued by the Principal Investigator and the Arts & Sciences Dean in conjunction with the Nebraska University Foundation.