



Jack Heidel – Department of Mathematics Chair
Hesham Ali – Dean of Information Science and Technology
Dana Richter-Egger – Department of Chemistry
Carey Ryan – Department of Psychology

Bradley Morrison – Dean of Mathematics and Natural Sciences
David Reyes – STEP Outreach Liaison

<http://unomaha.edu/step>
March 20, 2007

FOCUS

The main goal of STEP is to use innovative ways to recruit and retain STEM majors. A primary focus of the grant is accomplishing this goal by 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 UNO and MCC will:

- develop agreements between UNO and MCC 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
- increase outreach and recruitment activities
- attract and retain students, particularly under-represented students, in STEM disciplines at both institutions through the use of scholarships

Challenges Faced / Initiatives Taken

- Establishing a good working relationship between UNO and MCC
 - Monthly STEP PI meetings between UNO / MCC representatives
 - Expanded articulation coordination
- Uneven success in Early Undergraduate Research (EUR)
 - Expanded contact with MCC staff to promote EUR faculty and student opportunities
 - MCC participating in EUR with physics project
- Encourage MCC students to continue their education at UNO
 - Provide more interaction between UNO and MCC students
 - Invitations extended to participate in each other's STEM clubs
- Encourage UNO / MCC students to select a STEM major
 - Identify student interest
 - Provide career information

Achievements Through Partnerships

- Five new Pre-STEM Associate of Science Degrees created
 - In science -- Pre-Biology, Pre-Biotechnology, Pre-Chemistry, and Pre-Physics
 - In mathematics -- Pre-Mathematics
 - Two computer science related degrees
 - Computer Science Technology revised from Associate of Applied Science to Associate of Science
 - Bioinformatics under revision
- 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 attracting students with academic interest in STEM disciplines as demonstrated by students submitting ACT test scores to MCC

Graduation Year	2005	2006	2007
Number of Students	40	138	172

- Addition of interdisciplinary degree tracks at UNO
 - Information assurance
 - Medicinal chemistry
 - Neuroscience

Measures and Metrics

- Social Climate Assessment**
A second Social Climate Assessment was conducted to assess majors' and non-majors' perceptions, beliefs, and experiences in STEM courses.
Overall, students' perceptions were quite positive; however, the results suggested areas that will be targeted for review and improvement
 - Ethnic minority and female STEM majors felt more isolated in their majors with respect to other STEM students
 - STEM majors rated their mentoring experiences less positively than did non-STEM majors. Mentor ratings did not differ as a function of ethnicity or gender.
- Degree Data Form**
Data indicates that the STEP Grant is having success. UNO STEM graduates and MCC STEM transfers (to UNO) have increased.

MCC STEM Majors by Academic Year

Disciplines	2004 – 05	2005 – 06	2006 – 07
Biology / Biotechnology	23	42	50
Computer Science	69	76	98
Chemistry	5	6	12
Mathematics	5	7	10
Physics	3	6	4
Engineering	59	80	69
MCC STEM Totals	164	217	243

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 more recently Chemistry. Now these Walk-in Tutor Rooms are being expanded into a Math/Science Learning Center modeled after three such centers already existing in the different MCC Campuses. Arrangements are made periodically for UNO STEM students to receive tutoring help at the MCC Centers which have expanded hours.
- 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 & Sciences). It is one of only a few such programs in the U.S. and, in four years the program has 48 majors and three graduates. Many students in the program are involved in interdisciplinary research activities supported either by STEP or the NIH INBRE program.

Acad Year	2003 – 04	2004 – 05	2005 – 06	2006 - 07
Majors	1	25	39	48

- 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. In addition, the Coordinator is a facilitator for MCC STEM students issues as they prepare for transition to UNO

UNO STEM Graduates by Academic Year

Disciplines	2002 – 03	2003 – 04	2004 – 05	2005 – 06
Biology / Biotech	66	83	80	117
Chemistry	3	4	7	6
CSci / Bioinfo	63	67	64	61
Env Science	15	14	9	8
Geology	4	3	1	4
Mathematics	20	18	27	19
MIS	78	77	90	68
Physics / Eng Phys	2	1	0	4
UNO STEM Graduates	251	267	281	287

UNO STEM Graduates Who Transferred From MCC

	2002 – 03	2003 – 04	2004 – 05	2005 – 06
Biology, Biotech	4	5	7	8
Chemistry	0	0	1	0
CSci, Bioinformatics	2	4	3	4
Engineering	3	1	1	9
Environmental Sci	1	1	0	1
Mathematics	2	0	1	0
MIS	7	5	11	6
Physics	1	0	0	0
Totals	20	16	24	28

Number of Students Impacted

UNO STEP Scholarships by Academic Year

	2004 – 05	2005 – 06	2006 – 07
UNO Bridge (MCC)		1	7
UNO STEP	18	18	20
Renewals from Prior Yr		15	18
Total	18	34	45

Early Undergraduate Research (EUR) by Academic Year

	2004 – 05	2005 – 06	2006 – 07
Participants	37	24	40

EUR which has been carried out successfully at UNO for three years (93 of 101 participating students have remained in STEM disciplines), is now expanding to MCC. An MCC Physics Instructor is planning for a group of students to participate in the Cosmic Ray Observatory Project.

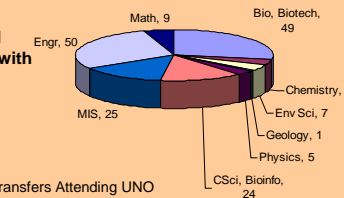
MCC STEP Scholarships by Academic Year

	2004 – 05	2005 – 06	2006 – 07
*Scholarships Awarded	4	15	22

*Note: There are no repeat recipients

- Adult Learner Access Scholarships (ALAS)**
 - Out of 153 academically qualified (GPA of 3.0+), adults (24+ years of age) UNO STEM majors, fifty (50) students are receiving \$400 ALAS tuition waivers in Spring 2007

Spring 2007 UNO STEM Majors Transferred from MCC (with 25+ MCC Hours)



Impact Beyond Intended Goals

- New UNO / MCC Graduate Teaching Assistant Positions**
 - UNO graduate students teach at MCC which reimburses teaching salary to UNO. Six graduate mathematics students have been supported in this area of the program. Three UNO biology and mathematics graduates have been hired as adjuncts by MCC.
- 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

Sustainability

- Science/Mathematics Learning Center**
The College of Arts & Sciences has funded a Science/Mathematics Learning Center. 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. The Center will work to institutionalize STEP activities.
- Substantial Scholarship Program**
 - The STEP (Goodrich), MCC / UNO Bridge, Adult Learner Access Scholarships, and EUR tuition grants totaling approx \$100,000 per year make this STEP component the most difficult to sustain.
 - 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.
 - Finally, S-STEM funding is being sought for scholarship support.

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.