

2010

Annual Report – Year Three

SEEC: Student Enrollment and Engagement
through Connections

Report Period: 1 July 2009 – 30 June 2010

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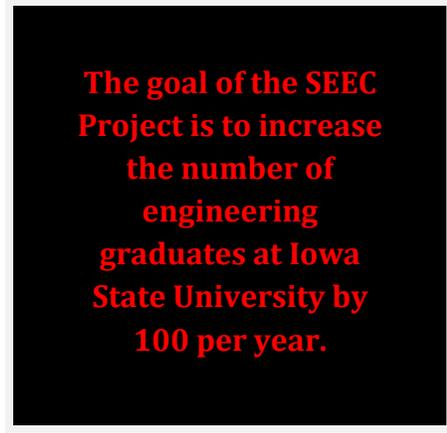
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0. SEEC Data Update

The goal of the SEEC Project is to increase the number of engineering graduates at Iowa State University by 100 per year. More specifically the numeric goals of SEEC are as follows:

- Increase in graduates (degrees) per year: 100 (12.5% increase compared to baseline)
- Total graduates per year: approximately 900
This total would place ISU back in the ASEE top 10 list of schools by degrees awarded. ISU is currently 12th. Our goal is to stay in the top 10.
- Increase in diversity of graduates per year: increase the number of minority graduates by a minimum of 20 (to 75) and women graduates by a minimum of 45 (to 175)



As a graduate baseline number for the project, we used an average of the American Society for Engineering Education (ASEE) 2001-2006 degree data, as shown in Table 0.1 below.

The ASEE 2005 and 2006 degree data represent a peak, resulting from record enrollments in 2001 and 2002. The additional graduates represent an increase of about 12.5% over the total number of engineering degrees awarded at ISU compared to the baseline.

Table 0.1
Number of B.S. Degrees in Engineering for Iowa State University (ASEE)

Year	African-American	Asian-American	Hispanic	Native-American	Foreign	Caucasian	Other	Men	Women	Total
2001	6	28	9	0	93	555	0	574	117	691
2002	12	31	11	1	68	594	0	607	110	717
2003	9	27	8	1	94	711	0	696	154	850
2004	11	23	14	1	89	668	0	662	144	806
2005	18	32	24	1	83	672	38	741	127	868
2006	28	38	11	4	61	684	36	723	139	862
Avg.*	14	30	13	1	81	647	12	667	132	799
2007	14	32	15	2	31	663	37	668	126	794
2008	21	25	19	4	45	637	39	672	118	790
2009	6	25	14	2	55	546	21	568	113	735

*Baseline data – average of 2001 to 2006 data

Note: Data in this table (2006, Avg., 2007, 2008, and 2009) have been revised from the SEEC annual reports for year 1 and year 2.

Of the 900 total graduates, we continue to aim for a minimum of 175 women and 75 minority graduates. These represent the following percentages of total graduates.

Percentage of women in 2006 graduates:	16.1%	Minority students in 2006 graduates:	9.4%
Percentage of women in baseline data:	16.5%	Minority students in baseline data:	7.3%
Percentage of women in SEEC graduates:	19.4%	Minority students in SEEC graduates:	8.3%

Year 3 Data – Where are we at now?

Simply, to increase ISU engineering graduates, enrollment numbers (new freshmen and transfer students) as well as retention numbers need to increase. Just as the 2001-2002 incoming enrollments led to the 2005/2006 peak graduating classes, the 2007-2008 enrollments should lead to the 2012 graduating class, which is the first target class for SEEC. Table 0.2 shows ISU enrollment numbers for these pivotal years.

Table 0.2
Engineering Fall Enrollment for Iowa State University

Fall Enrollment	Fr	So	Jr	Sr	Sp	Total	New Fr	New Tr	New Enrollment (Fr + Tr)
2001	1566	920	1060	1277	53	4876	1264	216	1523
2002	1371	1112	952	1472	56	4963	1107	207	1361
01, 02 Average	1469	1016	1006	1375	55	4920	1186	212	1442
2007	1344	928	939	1369	20	4600	1200	206	1423
2008	1383	965	989	1312	27	4676	1231	215	1469
07, 08 Average	1364	947	964	1341	24	4638	1216	211	1446
2009	1506	1076	1005	1475	23	5085	1304	252	1575

The fall 2009 new student enrollment in engineering at ISU is 1575 students. Of these new students, 57.5% are residents and 42.4% non-residents; 16.0% are transfers, and 82.8% new freshmen. For additional background on enrollment data and graduation rates at ISU, see the ISU website under Enrollment Statistics and Fact Book (refer to the Index). One of the SEEC project goals is to increase transfer student enrollment in the engineering. Review of DMACC students enrolled at ISU in fall 2009 showed a total 1358 students compared with 2008 enrollment of 1242 and 2007 of 1142. Of those 1358 enrolled, 453 were in STEM majors, including 123 in engineering majors. This compares with 2008 figures of 393 and 103 in STEM and engineering, respectively. One hundred fifty-two (152) new transfers from DMACC were admitted in fall 2009 in STEM majors, and of these 47 in engineering. See table 0.3 below for a more detailed comparison of 2007-2009 enrollment numbers.

152 new transfers from DMACC were admitted in fall 2009 in STEM majors, and of these, 47 in engineering.

Table 0.3
DMACC Relevant Enrollment for Iowa State University

Year	New Enrollment in Engineering	Total DMACC Students Enrolled at ISU	Former DMACC students in ISU STEM majors	Former DMACC Students in ISU Engineering Majors	New DMACC transfers to ISU STEM majors	DMACC transfers to ISU Engineering majors
2007	1423	1144	310	94	97	31
2008	1469	1242	393	103	130	42
2009	1575	1358	453	123	152	47

Further review of 2007-2009 enrollment numbers for freshmen and transfer students by ethnic minority and gender can be seen in Table 0.4

Table 0.4
Engineering Enrollment at ISU for Freshmen and Transfer Students by Ethnic Minority and Gender

Enrollment	TOTALS		
	2007	2008	2009
American Indian/Alaskan Native	12	10	20
African American	101	77	119
Asian or Pacific Islander	155	154	187
Hispanic	120	113	124
Total Ethnic Minority	388	354	450
Male	3935	3995	4324
Female	665	681	761
Total	4600	4676	5085

These data reflect the need for continuing emphasis on diversity recruitment and retention activities. New enrollment data for fall 2009 indicate progress in recruitment with estimates of 16% women and 10% minority students.

Key Programs in Retention and Recruitment

Two ISU programs have been a major focus of SEEC project efforts to enhance recruitment and retention efforts in the College of Engineering. The learning community program has existed for some time in the College of Engineering, but through SEEC project efforts new learning communities have been added and participation rates have increased over the last three years to expand the concept of the learning village. A learning community specific to engineering transfer students was added this past year. Learning community participation in engineering and other colleges at ISU is shown in the graph below. Figure 0.1 shows an increasing participation trend from fall 2003 to fall 2009 for the College of Engineering.

Learning Community Participants

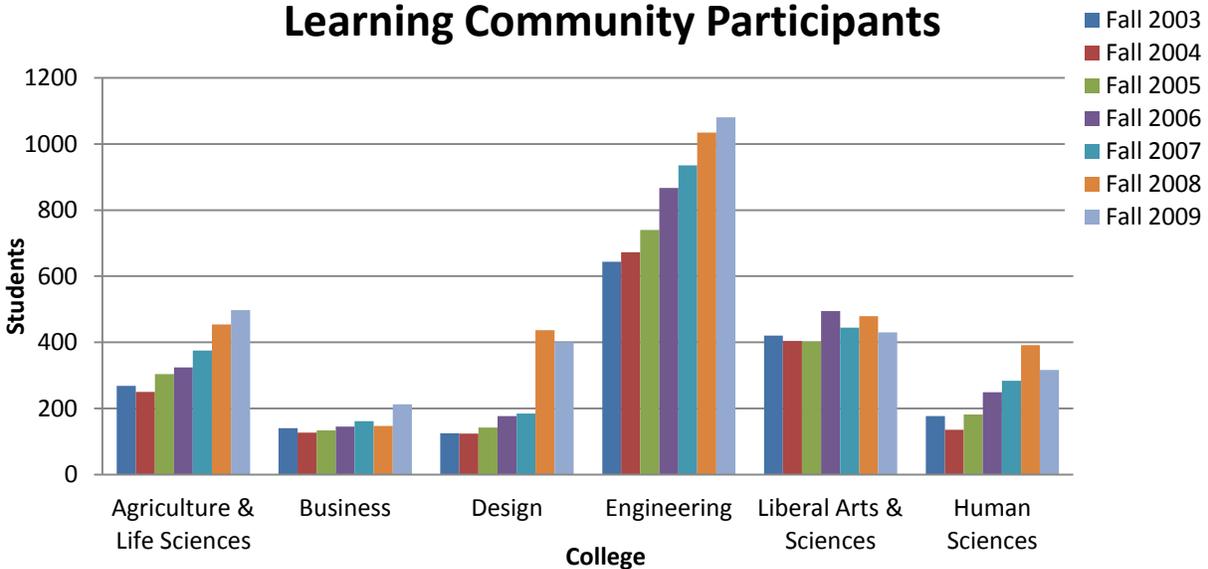


Figure 0.1. ISU Learning Community Participation, Fall 2003 to Fall 2009

A second ISU program successfully utilized by the SEEC project is the Admissions Partnership Program (APP). SEEC project personnel tailored the APP to focus specifically on pre-engineering students and developed the Engineering – Admissions Partnership Program (E-APP)

<http://www.eng.iastate.edu/transfer/APP/EAPPBrochure.pdf> (For a copy of the E-APP brochure see Appendix A). This program has helped potential students engage with advisors in ISU’s College of Engineering thus helping to facilitate a more successful transfer to ISU’s College of Engineering. Table 0.5 reports enrollment demographics for E-APP student in the academic year 2009-2010.

Table 0.5

Enrollment Demographics for E-APP Students, July 1, 2009 – June 20, 2010

	Female	Male	American Indian or Alaska Native	Asian or Pacific Islander	Black (Not Hispanic)	Hispanic	International	Unknown	White (Not Hispanic)
Current E-APP	4	61		2	2	2	1	2	56
Withdrew from E-APP	3	21	1	1	2		1	1	18
Previous ISU Enroll		1							1
Current ISU Enroll	3	49	1	2	2		3	2	42
Total	10	132	2	5	6	2	5	5	117

Note:

“Current E-APP” means they are currently in the E-APP program and have not yet come to ISU.

“Current ISU Enroll” means they came to ISU at some point and their last registered term is Fall 09, Spring 10, or Summer 10.

“Withdrew from E-APP” means they were in the E-APP program at one time and withdrew without ever coming to ISU during this period of time.

“Prev ISU Enroll” means they came to ISU prior to the 09-10 academic year but did not stay through to the 09-10 academic year.

Figure 0.2 illustrates the E-APP demographic data in table 0.5. Of the 142 students identified in the table, 52 are now at ISU, 1 previously enrolled at ISU, 24 left the E-APP program, and 65 are still in the E-APP program.

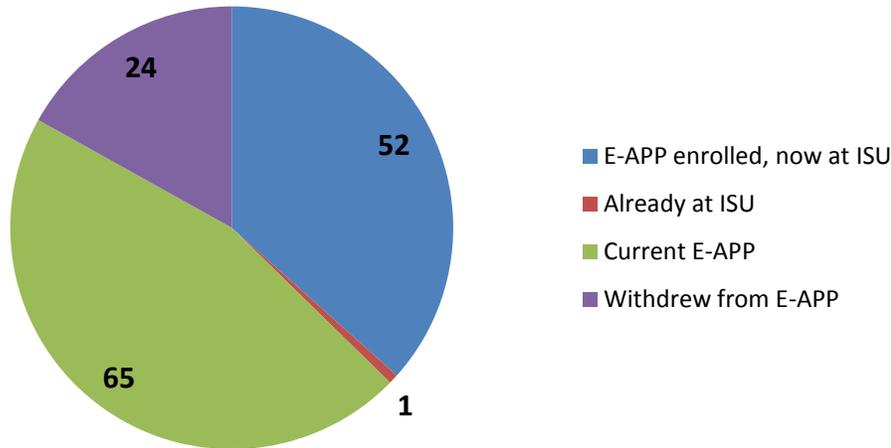


Figure 0.2. E-APP Participation Rates as of June 30, 2010

1. Project Background

The STEM Student Enrollment and Engagement through Connections (SEEC) project, pronounced “seek,” does what its name implies – seeks students and connections. The goal of the SEEC project is to increase the number of engineering graduates at Iowa State by 100 per year to approximately 900 graduates annually. Included with this goal are increases in the percentages of women and minority graduates in engineering at ISU and the number of pre-engineering students at Des Moines Area Community College. The means to this end are connections rooted in community: learning communities, community colleges, and Iowa communities. The project is collaborative between Iowa State University (ISU) and Des Moines Area Community College (DMACC). The cornerstone of SEEC is the success of learning communities for recruitment and retention, and the project builds upon ISU’s established learning community infrastructure, leadership, and expertise. Retention at DMACC and ISU will be increased by a new learning community model, called a learning village or meta-community. First-year and gateway engineering courses are being reviewed to engage students more effectively, to provide flexibility, and to support transfer students. Working with DMACC and the STEM Pathway project, student-centered advising is being coordinated to broaden the diversity of students enrolled in engineering and to make students aware of the various paths to successfully completing an engineering degree, including transfer from a community college. Students are being advised on the range of STEM disciplines. Interestingly, in this day and age of high-tech communications, the SEEC project employs a recruiting approach using one of the oldest services of a land-grant institution. With ISU Extension, we are seeking to improve the

public awareness and understanding of engineering, especially among students and their parents. The methods of the project will serve ISU and DMACC in several contexts and will be adaptable (scalable and portable) to other institutions.

ISU, chartered in 1858 as Iowa Agricultural College and Model Farm became the nation's first land-grant institution, and was renamed Iowa State University of Science and Technology in 1959. Today, ISU is a broad-based public university of international stature with more than 26,000 students from all 50 states and nearly 120 other nations. ISU, a Carnegie Doctoral/Research-Extensive university, has led the development of several fields of study that are central to the land-grant movement, including engineering, agriculture, family and consumer sciences, statistics, and veterinary medicine. Today, ISU is a recognized leader in many areas of science and technology, including plant and animal genomics, materials sciences, analytical chemistry, behavioral studies, physics, computer science, and many areas of engineering, with new initiatives in food safety and food security, human/computer interaction, combinatorial chemistry, and bioeconomy.

DMACC is a publicly supported two-year institution serving the Des Moines metropolitan area and surrounding counties and enrolling over 16,000 students in credit courses. It is Iowa's largest two-year college. Approximately 25% of the state's population resides within the area served by DMACC's six campuses, including all or major portions of Audubon, Boone, Carroll, Dallas, Guthrie, Jasper, Madison, Marion, Polk, Story, and Warren counties and parts of adjacent counties. College transfer curricula meet the requirements of four-year colleges and universities. In 2005, DMACC began delivering technical education at its new Story County Career Academy – Hunziker Center in Ames, seven minutes from the ISU campus. About 60% of new undergraduate transfer students to ISU are from Iowa area community colleges, of which over one-third are from DMACC.

1.1 Project Organization and Goals

There are six main objectives of the SEEC Project:

- O1. **Learning Village.** To build a Learning Village that enhances student engagement and creates ISU connections for community college pre-engineering transfer students.
- O2. **Connected Curriculum.** To redesign the first-year engineering curriculum to enable flexibility and commonality across LCs; and to make selected engineering gateway courses available to DMACC students.
- O3. **Student-centered Advising.** To develop and enhance academic advising and mentoring programs for precollege, community college, and university students.
- O4. **Coordinated Networking.** To establish a recruiting and outreach network across Iowa and with alumni using ISU Extension, DMACC, and involving parents and teachers; to tap into diverse communities of students; and to improve the awareness and understanding of engineering among those who influence student choices.
- O5. **Evaluation.** To evaluate project effectiveness and improve project activities.
- O6. **Dissemination.** To share best practices on campus in other areas of STEM, with other community colleges in Iowa, with other institutions in the Big 12 consortium, and at national meetings.

Each of the objectives O1 – O4 is related to recruitment and retention, and hence to increasing the number of graduates in engineering and other STEM fields. The recruitment and retention methods in the SEEC Project represent a combination of both proven and new approaches. The objectives are tied to recommended practices of effective recruitment, retention, and engagement, including: inclusiveness, engaged faculty, mentoring, peer support, experiential learning, student development, community involvement, relevant curricula, pre-college student/adult relationships, encouragement to consider engineering, and the influence of parents, peers, teachers/counselors, and the media.

1.2 Project Strategy

The objectives of the SEEC project are being addressed through a set of recruitment, retention, and engagement activities associated with developing the community, curriculum, advising, and networking components of the project. Both recruitment and retention goals are supported by project components related to objectives O1-O3 (community, curriculum, and advising). Recruitment goals are primarily supported by the networking component of objective O4.

Key project objectives and related activities are identified below. Specific activities conducted toward meeting the project objectives for the year 2009-2010 are discussed in section 4 of this report.

Learning Village

- A1. Build Admissions Partnership Program (APP)-Engineering .
- A2. Enhance /expand learning community model at DMACC and ISU.
- A3. Develop ISU faculty visits, webinars, video activities.

Curriculum

- A1. Apply outcomes-based design to first-year engineering courses and identify multiple tracks to achieve outcomes that fit within the learning village. Emphasize the following attributes of the first-year curriculum: student engagement and success, academic rigor, and classroom climate. Understand curricular and co-curricular factors that affect 2nd and 3rd year retention, and expand opportunities for student professional development, interdisciplinary service-learning projects, and undergraduate research projects as part of LC programming for 2nd and 3rd year students
- A2. Develop and implement the ACCESS program, Academic Courses for Community Colleges in Engineering Study, an initiative to offer selected gateway courses in engineering to community college students.

Advising

- A1. Develop a data system which informs program development towards pathway of success in engineering.
- A2. Provide Professional Development to community college pre-engineering advisors and faculty.
- A3. Develop and implement communications and transfer advising materials for CC audiences.
- A4. Develop and implement a mentoring and transfer intervention program.

Networking

- A1. Identify and execute recruitment strategies targeting academically-able or promising Math or Science high school populations. Focus on programs or strategies that are currently deemed promising, but under-developed.
- A2. Collaborate with ISU Extension to implement programs to improve awareness, understanding, and interest in engineering in every county in Iowa. Establish a network to encourage student interest.
- A3. Collaborate with DMACC personnel, alumni, and other existing ISU outreach and recruitment network personnel implementing programs to improve awareness, understanding, and interest in engineering. Establish a coordinated network to encourage and facilitate student interest.
- A4. Collaborated with ISU Extension, ISU Admissions, and DMACC SEEC team on diversity recruiting across Iowa, seeking to develop cohort groups within clustered counties/schools/service areas and emphasizing participation of ethnic minority and female populations (i.e., E-TEC Recruitment – Engineering Talent in Every County). Offered scholarships through Extension, DMACC, and existing recruitment networks, in coordination with the College of Engineering scholarship program.
- A5. Develop recruiting kits for use by various stakeholders, including Extension, Admissions, the Alumni Association, College of Engineering faculty, students and staff, and interested others (PERK, Personal Engineering Recruiting Kit; or PRKS, Personal Recruiting Kit for STEM).

Evaluation

- A1. Apply quantitative and qualitative evaluation methods, both formative and summative.
- A2. Create and use internal and external advisory groups.

Dissemination

- A1. Coordinate activities and share practices with related efforts on the ISU and DMACC campuses. Transition results to other STEM disciplines and community college partnerships.
- A2. Create an active network of Big 12 institutions to advance STEM recruiting and retention in the central United States. Organize regional forums on best practices in STEM involving the Big 12, including sharing project outcomes among institutions having NSF STEP grants.
- A3. Document and publish project results, and participate in national meetings.

2. Project Participants

Table 2.0.1 lists SEEC project participants for 2009-2010, along with their project role, time involvement, and objective team involvement.

The NSF Fastlane Reporting System limits reporting to 25 project participants. Appendix B provides a more detailed list of project participants for year three (2009-2010) and their roles within each of the objective teams.

Table 2.0.1

*SEEC Project Participants, Year Three (2009-2010)**

Participant	Institution	Project Role(s)	> 160 Hours	Objective Teams				
				L	C	A	N	E
Diane Rover	ISU	Principal Investigator	Yes		LE			
Harry McMaken~	DMACC	Principal Investigator	Yes	CO	CO			
Monica Bruning~	ISU	Co-Principal Investigator	Yes				LE	
Frankie Laanan~	ISU	Co-Principal Investigator	No			LE		
Kim Linduska	DMACC	Co-Principal Investigator	No					
Steve Mickelson~	ISU	Co-Principal Investigator	Yes	LE	CO			
Mack Shelley~	ISU	Co-Principal Investigator	Yes					LE
Mary Darrow~	ISU	Senior Personnel	Yes	CO	CO	LE	CO	
Mary Goodwin~	ISU	Senior Personnel	Yes	CO	CO	LE		
RM Cooper~	ISU	Senior Personnel	Yes					CO
Mani Mina~	ISU	Senior Personnel	No	CO	CO			
Derrick Rollins	ISU	Senior Personnel	No		CO			
Loren Zachary	ISU	Senior Personnel	No		CO			
Karen Zunkel~	ISU	Senior Personnel	No		CO			
Jackie Baughman	ISU	Graduate Assistant	YES	CO				
Paul Castleberry	ISU	Other – collaborator	No	CO	CO			
Kevin Saunders	ISU	Other – collaborator	No	CO	CO			
Randall Jedele	DMACC	Other – collaborator	No	CO				
Doug Beck	ISU	Other – collaborator	No			CO	CO	
Anne Howsare	DMACC	Other – collaborator	No			CO		
Ahmed Ageyman	DMACC	Other – collaborator	No			CO		
Randy Mead	DMACC	Other – collaborator	No				CO	
Michael Lentsch	DMACC	Other – collaborator	No				CO	
Jay Staker	ISU	Other – collaborator	No				CO	
Carol Heaverlo	ISU	Other – collaborator	No				CO	
Lora-Leigh Crystal	ISU	Other – collaborator	No	CO				

*Maximum of 25 participants are allowed to be entered into NSF Fastlane System

~Received grant funds

Note: L=Learning Village, C=Curriculum, A=Advising, N=Networking, E=Evaluation; LE=Leader, CO=Contributor/Collaborator

2.1 Partnering Organizations

Currently, DMACC is the only external organization partnering and participating in the SEEC grant with ISU.

2.2 Additional Collaborators

The SEEC project collaborates with a number of ISU internal organizations and departments outside of the College of Engineering as well as a few industry partners. Specific collaborations and activities with SEEC project partners are listed under each of the O-Team activity areas. SEEC partners include:

- E-SET (ISU Extension)
- Program for Women in Science and Engineering (PWSE)
- Iowa 4-H Clubs
- Office of Admissions
- Office of Community College Research and Policy (OCCRP)
- Office of Financial Aid
- Office of the Registrar
- Research Institute for Studies in Education (RISE)
- John Deere Company – Ankeny, Iowa (DMACC EGR 100 class)
- Sauer-Danfoss - Ames, Iowa (DMACC EGR 100 class)
- ZLR IGNITION - Des Moines, IA (Marketing, collaborating on a new recruiting campaign)
- ISU Engineering Communications (Eric Dieterle, Director)
- ISU University Marketing (Carole Custer, Director)
- Society of Hispanic Engineers Student Chapter
- Strategic Engineering Recruitment Initiatives Coalition
- Iowa High School Principals, Counselors, STEM teachers
- Project Lead the Way Teachers, Iowa
- FLL Robotics
- College of Engineering Diversity Affairs
- Woodward Granger Schools
- ISU Learning Communities

3. Activities and Findings

In year three (2009-2010) of the SEEC project, the leadership team and objective teams participated in a number of activities designed to help meet the SEEC project goals.

3.1 Activities for Year Three

Leadership Team

The following action items took place in year three toward supporting the goals of the SEEC project.

- *Action.* The leadership team comprised of Diane Rover (PI), Monica Bruning (co-PI), Frankie Santos Laanan (co-PI), Steve Mickelson (co-PI), Mack Shelley (co-PI), Mary Darrow (senior personnel), RM Cooper (senior personnel), Mary Goodwin (senior personnel), Sandy Jennings-Hammond (communication specialist), and Gloria Hill (support) continued to meet on a bi-weekly basis to discuss project activities and goals. In year three, one additional member was added to the leadership team – Joel Johnson (Director of student Programs and Services, ISU COE).
- *Action.* The leadership team prepared the **STEP 3rd year review report** for the SEEC project and the project PI and co-PI's traveled to Washington, DC for the grant's 3rd year review. A copy of the submitted 3rd year review report can be found in Appendix C of this report.

- *Action.* The leadership team prepared a document highlighting SEEC activities that promoted inter-institutional cooperation between ISU's College of Engineering and DMACC. Additional activities not related to the SEEC project but enhance inter-institutional cooperation are also listed. The document can be found in Appendix D of this report.
- *Action.* Communication specialist, Sandy Jennings-Hammond was retained for year three to help direct and facilitate dissemination of grant specific information and to provide links between all grant stakeholders and special interest groups. Specific activities related to dissemination activities for year 3 of the SEEC grant can be found under the "Publications and Products" section of this report.
- *Action.* The leadership team utilized their logic model plans as a guide in developing assessment and evaluation activities specific to project activities defined in the logic models. Logic model planning continues to drive implementation for this project. See Appendix E of this report.
- *Action.* Individual Objectives Teams continued to meet and are engaged in project implementation guided by logic model plans.
- *Action.* The leadership team (including DMACC) has engaged in several conversation guided by our evaluation team to define data points for tracking transfer students between (and among) institutions.
- *Action.* The project website was expanded and additional information was added: www.eng.iastate.edu/seec/
- *Action.* Conducted two all-day meetings for the project:
 - one in the fall (October 28, 2009 - <http://www.eng.iastate.edu/seec/SEECretreat.shtml>), as a retreat to plan and organize grant activities for year three with a focus on diversity with full teams from both ISU and DMACC participating.
http://www.eng.iastate.edu/seec/SEECISU_DMACC_DiversityRetreatAgenda_102809.pdf
<http://www.eng.iastate.edu/seec/ChangingtheConversationAboutEngineering.pdf>
 - one in the spring (May 11, 2010), a professional development workshop on transfer students, participants were from DMACC and ISU.
http://www.eng.iastate.edu/seec/events/5_11_10_SEECISU_DMACCRetreatAgenda.pdf
http://gallery.eng.iastate.edu/main.php?g2_itemId=8570
- *Action.* The SEEC project has gained some visibility on campus resulting in opportunities for collaboration on new proposals and initiatives. SEEC co-PIs continue to be involved with organizers of a proposal for NSF's LSAMP program. In such activities, the SEEC project is recognized for recruiting into STEM and increasing/broadening participation in STEM, thus playing a key role in the spectrum of STEM-pipeline related efforts.
- *Action.* Over the past year, the ISU's college of engineering recruiting materials have been redesigned to incorporate the new messaging . The theme – that engineers create a better

world and that students can (*Be Creative*)² – was developed with ZLRIGNITION, a communications marketing firm that has experience with Iowa State and youth marketing. The new marketing materials are used in SEEC recruiting events. A screen shot is visible on the SEEC project poster used for the NSF 3rd year review meeting this past year. See Appendix I of this report.

- *Action.* DMACC has identified, developed and implemented a comprehensive communication plan that familiarizes high school students, parents, faculty, and staff with career opportunities and educational pathways in engineering. Advisors at each high school in DMACC's district (54) advise students about engineering opportunities and careers. Likewise, a communication plan has been implemented for enrolled college students to gain familiarity with opportunities at DMACC and transfer institutions in the field of engineering. Materials were created specific to each audience (one example can be seen in Appendix I of this report on the NSF poster from the year 3 review). ISU also provided training through staff development activities, involving staff and faculty from both institutions, to allow DMACC to more effectively transition students into this career path. DMACC has used input from business and industry regarding recruiting of non-traditional students into engineering. Career symposiums specifically for women and minority students have been offered. Through the project, DMACC has created additional capacity for students on their Ankeny campus (the largest of their six campuses), in part with a new science lab.

In the remainder of this section, action items that took place specific to each of the Objective Teams' goals and activities are highlighted.

Learning Village Objective Team

The overall objective is to enhance the Learning Community (LC) model at ISU by improving programming and availability; and to create a LC model that spans DMACC and ISU.

Activity 1. Continue to build and expand the Engineering Admissions Partnership Program (E-APP) "menu of options. The following action items supporting this activity guideline took place in year three:

- *Action.* Implemented Engineering-Admissions Partnership Program (E-APP) with Admissions and College of Engineering. (142 students participated in EAPP from July 1, 2009 – June 15, 2010.). These data are presented in more depth in the preceding Data section of this report.
- *Action.* Developed and distributed Engineering Admissions Partnership Program (E-APP) materials and brochures and posters were to all 5 DMACC campuses and 10 additional community colleges.
- *Action.* Hired and trained 5 transfer peer mentors to manage EAPP students' activities and on-line professional network.
- *Action.* Developed and launched EAPP Professional Networking site using Groupsite service package (101 participants).
- *Action.* Partnered with Admissions and College of Engineering in Transfer Day events/activities.

- *Action.* Implemented EAPP Transfer Student Career Fair Events (70 participants - NOTE: Spring event was cancelled due to weather).
- *Action.* Implemented EAPP Transfer Student VEISHEA event (15 participants).
- *Action.* Implemented EAPP event and luncheon for DMACC females in engineering and ISU WiSE Role Model students (10 participants).
- *Action.* Provided presentations from ISU faculty, staff, and students for DMACC EGR 100 classes (3 presentations per semester).
- *Action.* Developed and provided DMACC EGR 100 students with transfer resources including TRANSIT, an online course transfer credit program which provides a transfer course evaluation report for community college students.
- *Action.* Developed questions and conducted focus groups for DMACC EGR 100 course students (implemented).
- *Action.* Piloted a pre/post ISU engineering transfer student survey to gain insight into the experiences of students coming into the ISU engineering program (planning stage).

Activity 2. A comprehensive review of the courses that comprised the Pre-Engineering Program at DMACC was implemented. The following action items supporting this activity guideline took place in year three:

- *Action.* DMACC has created a new pre-engineering designation for students interested in engineering. Pre-engineering students at DMACC: 2008, 47 (7 female, 12 underrepresented minority); 2009, 94 (10 female, 19 underrepresented minority); 2010, 153 (13 female, 29 underrepresented minority).
- *Action.* Engineering 100 (EGR 100) class is now offered each semester as a career exploration and transfer planning course. This will also be expanded to other DMACC campuses. EGR 100 students at DMACC: Fall 2008, 16 students (1 female, 4 multicultural); Spring 2009, 18 students (0 female, 3 underrepresented minority); Fall 2009, 23 students (5 female, 6 underrepresented minority); Spring 2010, 25 students (2 female).
- *Action.* Action: Engineering 100 class will be offered at the DMACC Boone Campus in Fall 2010 (planned).
- *Action.* Based on this review gateway courses were linked to create learning communities. The first courses linked were Calculus II (MAT 217) and Physics II (PHY 223) (spring 09 – 9 students) to be followed by Calculus I (MAT 211) and Physics I (PHY 213) (fall 09), and Engineering Graphics (EGR 166) and Composition II (ENG 106) (spring 10).

- *Action.* Retention data will be analyzed as well as pre and post surveys to evaluate the effectiveness of these transfer strategies for incoming students.

Activity 3. Build and expand Engineering Learning Communities at ISU (first year). The following action items supporting this activity guideline took place in year three:

- *Action.* Increase the availability of learning communities to engineering students and promote learning community participation among first year students.
- *Action.* With the addition of a learning community for materials engineering students, every department in engineering now has a first-year learning community. Additional learning teams were added for undeclared students and engineering majors as needed.

Activity 4. Build and expand Engineering Learning Communities at ISU (transfer). The following action items supporting this activity guideline took place in year three:

- *Action.* New departmental transfer learning communities are being created in the electrical and computer engineering department and the industrial engineering department.
- *Action.* There is a new learning community for all undeclared engineering transfer students that will be available to all incoming transfer students.
- *Action.* New transfer orientation classes are being implemented for electrical, computer, software, and undeclared engineering students, and these will be opened to all transfer students.

Participation in 2009-10:

95 of the **252 (38%)** new transfer students in Engineering in Fall 09 were in a learning community.

10 continuing transfer students also participated in learning communities in fall 09.

This count does not include **67** new transfers that entered in Spring 10.

Participation in 2008-09:

47 of the **214 (22%)** new transfer students in Engineering in Fall 08 were in a learning community.

20 continuing transfer students also participated in learning communities in fall 08.

This count does not include **57** new transfers that entered in Spring 09.

Curriculum Objective Team

To redesign the first-year (FY) engineering curriculum to enable flexibility and commonality across the LCs; and to make selected engineering gateway courses available to DMACC students. Activities are categorized in two major areas: student success and engagement in the early years, and transfer student success.

Activity 1. Apply outcomes-based design to first-year engineering courses and identify multiple tracks to achieve outcomes that fit within the learning village. Emphasize the following attributes of the first-year curriculum: student engagement and success, academic rigor, and classroom climate. Understand curricular and co-curricular factors that affect 2nd and 3rd year retention, and expand opportunities for student professional development, interdisciplinary service-learning projects, and undergraduate research projects as part of LC programming for 2nd and 3rd year students. The following action items supporting this activity guideline took place in year three:

- *Action.* During fall 2009, a group of faculty and staff met to outline a plan for reviewing the first year experience in engineering: Diane Rover, Associate Dean and Professor of ECE; Larry Genalo, University Professor of MSE; Tom Brumm, Assessment Director and Assoc. Professor of ABE; Joel Johnson, Director of Student Programs and Services; Mary Goodwin, Manager of Advising and Transfer Services; and Roger Bentley, Manager of Student and Alumni Career Services. This group defined the high-level outcomes for the first year program review as follows: to improve first year engineering student success by improving articulation, learning, professional development, and retention. The scope of the review was defined to encompass academic, social acclimation/connectedness, and professional development. The proposed approach created subgroups in the areas of A) the engineering Basic Program (ENGR 101, 160, etc.) and transition programs; B) advising, orientation, transfers, and precollegiate programs; C) learning communities, first year honors program, multicultural student programs, Program for Women in Science and Engineering, Engineering Leadership Program, and NSF/S-STEM E2020 Scholars Program; D) student organizations and departmental activities; and E) career development. The group held preliminary discussions about a new introductory engineering course format. Due in part to state and university budget reductions and significant budget planning initiated during fall 2009, this review was put on hold and remains as pending for the upcoming academic year.
- *Action.* ISU students (first-year and senior) took the National Survey of Student Engagement (NSSE) in spring 2007-2009. NSSE benchmark results are used as an indicator of undergraduate student engagement. Research suggests that there is a strong correlation between student engagement, retention, and graduation rates. NSSE measures effective undergraduate practices in the areas of academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences, and supportive campus environment. The NSSE results were disseminated and reviewed within the university community during fall 2009, including by the SEEC team. Overall, Iowa State students reported higher participation in learning communities, internships, community service, study abroad, team assignments completed outside of class, and research projects with faculty than the national average. Participants in the spring 2008 NSSE included 233 engineering students (154 first-year, 5 sophomore, 4 junior, and 70 senior students). Participants in the spring 2009 NSSE included 306 engineering students (144 first-year, 162 senior students). Engineering-specific results will be reviewed with college faculty and staff. Student-faculty interaction is a key benchmark and will continue to be a focus for SEEC and the college in terms of improvement.
- *Action.* The SEEC project is working in concert with NSF S-STEM grant programming for the E2020 Scholars Program (www.engineering.iastate.edu/e2020) to advance curricular changes. Courses and learning communities will incorporate introductory learning modules emphasizing

selected outcomes from the NAE’s vision for the engineer of 2020. These include student professional development in the areas (or pillars) of leadership, interdisciplinary and systems thinking, innovation and entrepreneurship, and global awareness. Curriculum groups are led by faculty leaders in each area: leadership, Krishna Athreya, MSE and the Engineering Leadership Program; systems thinking, Chris Rehmann, CCEE; innovation, Doug Jacobson, ECE and IT-Adventures; and global awareness, Amy Kaleita, ABE. The group members include faculty, staff, and students in engineering, with multiple ties to college committees associated with learning communities and student learning assessment, as shown in the table below. The groups met during spring 2010 to begin planning for 2010-11. The faculty leaders participated in a new seminar course offered spring 2010 for E2020 scholars, ENGR 110X, taught by Mark Laingen. Each leader taught or supported three class sessions, developing material and activities to build knowledge, skills, and abilities in the area. The groups will finalize a competency-based learning model for each pillar, and faculty and student awareness of the “engineer of 2020” outcomes will be emphasized in the coming academic year. This work complements the new messaging promoted through other project activities.

Name	Pillar	Role	Dept. (Major)	Other Affiliation
Amy Kaleita	Global Awareness	Faculty Leader	ABE	Honors Program Committee Chair
Doug Gemmill	Global Awareness	Faculty	IMSE	Student Learning Task Force
Kevin Osgerby	Global Awareness	Staff	ME	Learning Communities Task Team
Julia Apple-Smith	Global Awareness	Staff	COE	Engineering International Programs
Devna Popejoy-Sheriff	Global Awareness	Staff	IMSE	Learning Communities Task Team
Mark Laingen	Global Awareness	Mentor/Instructor	ABE	E2020 Team
Chris Jolley	Global Awareness	Scholar	CE	E2020 Scholar
Steve Mickelson	Global Awareness	Project Liaison	CELT/ABE	E2020 Team
Doug Jacobson	Innovation	Faculty Leader	ECE	Student Learning Task Force
LeQuetia Ancar	Innovation	Staff	ABE	Learning Communities Task Team
Roger Bentley	Innovation	Staff	ECS	Learning Communities Task Team
Josh Sevcik	Innovation	Peer Mentor	EE	E2020 Peer Mentor
John King	Innovation	Scholar	CBE	E2020 Scholar (Transfer)
Alicia Fleege	Innovation	Scholar	ME	E2020 Scholar
Tom Brumm	Innovation	Project Liaison	COE/ABE	E2020 Team, SLTF
Krishna Athreya	Leadership	Faculty Leader	COE/MSE	Engineering Leadership Program
Beth Hartmann	Leadership	Faculty	CCEE	Learning Communities Task Team
Qingze Zou	Leadership	Faculty	ME	Student Learning Task Force
Kristin Mauro	Leadership	Staff	CCEE	Learning Communities Task Team
Joel Johnson	Leadership	Staff	ESS/ESPP	Engineering Student Council Advisor
Emily Kuster	Leadership	Peer Mentor	MatE	ELP

Alexander Carr	Leadership	Scholar	AerE	E2020 Scholar
Eric Schulte	Leadership	Scholar	CE	E2020 Scholar (Transfer)
Steve Mickelson	Leadership	Project Liaison	ABE	E2020 Team, LCTT, CELT
Chris Rehmann	Systems Thinking	Faculty Leader	CCEE	
Ambar Mitra	Systems Thinking	Faculty	AerE	Student Learning Task Force
Sue Ziegenbusch	Systems Thinking	Staff	ABE	Learning Communities Task Team
Kathy Platts	Systems Thinking	Staff	AerE	Learning Communities Task Team
Paul Castleberry	Systems Thinking	Staff	ESS	Learning Communities Task Team
Patrick Mulloy	Systems Thinking	Peer Mentor	ConE	E2020 Peer Mentor
Ethan McGuire	Systems Thinking	Scholar	CBE	E2020 Scholar (Transfer)
Justin Wenger	Systems Thinking	Scholar	ConE	E2020 Scholar
Diane Rover	Systems Thinking	Project Liaison	COE/ECE	E2020 Team

- *Action.* During fall 2009, SEEC team members and college staff, in coordination with university retention initiatives, the Provost Office, and Student Affairs, piloted the use of MAP-Works (<http://www.map-works.com/>) in engineering through learning communities and first-year programming. MAP-Works results were used by academic advisors to complement other established early-intervention activities in the college. MAP-Works results are being analyzed by university experts, and we expect to have an analysis available for engineering students and comparison with other models.

Iowa State University						
Response rate for the F09 MAP-Works <i>Transition Survey</i>						
MAJOR_COLL * TookMAP Took Map * ADMSN_TYPE Crosstabulation						
ADMSN_TYPE			TookMAP Took Map		Total	
			No	Yes		
FYFT	MAJOR_COLL	A	Count	160	423	583
			% within MAJOR_COLL	27.4%	72.6%	100.0%
		C	Count	127	289	416
			% within MAJOR_COLL	30.5%	69.5%	100.0%
		E	Count	214	1090	1304
			% within MAJOR_COLL	16.4%	83.6%	100.0%
		H	Count	126	285	411
			% within MAJOR_COLL	30.7%	69.3%	100.0%
		M	Count	163	261	424
			% within MAJOR_COLL	38.4%	61.6%	100.0%
Transfers	MAJOR_COLL	S	Count	302	916	1218
			% within MAJOR_COLL	24.8%	75.2%	100.0%
		Total	Count	1092	3264	4356
			% within MAJOR_COLL	25.1%	74.9%	100.0%
		E	Count	165	87	252
			% within MAJOR_COLL	65.5%	34.5%	100.0%
	Total	Count	165	87	252	
		% within MAJOR_COLL	65.5%	34.5%	100.0%	

- **Action.** During the past year, SEEC team members, in coordination with the Math Department and other university offices, acquired a new math placement exam called ALEKS (<http://www.aleks.com/>). ALEKS is being used during summer orientation with the fall 2010 incoming students. It is expected to provide additional information to improve the placement of students in appropriate math courses. Transfer student success in math courses was the topic of Math Department meetings with Iowa community colleges during the past year, including involvement by SEEC team members.
- **Action.** Project-based service learning is available to students through the Engineering Leadership Program and student organizations such as Engineers for a Sustainable World and Engineers Without Borders, both of which have active student chapters on campus. ISU's EWB chapter hosted a regional conference on campus in November 2009. Also in November 2009, several SEEC team members participated in a workshop that highlighted information from NSF-sponsored research on project-based service learning. The workshop, An Interactive Workshop Session on Measuring the Impacts of Project-Based Service Learning on Engineering Education, <http://www.eng.iastate.edu/aciee/workshops.asp>, was part of the Annual Conference on International Engineering Education hosted by ISU. This information will be shared with faculty in the coming year.

Activity 2. Develop and implement the ACCESS program, Academic Courses for Community Colleges in Engineering Study, an initiative to offer selected gateway courses in engineering to community college students. The following action items supporting this activity guideline took place in year three:

- **Action.** For each community college partner, there has been ongoing review of engineering programs of study, transfer guides, and courses on the critical path. With assistance from SEEC team members, two ISU engineering departments are actively developing 2+2 programs in Industrial Engineering and in Chemical Engineering to expand pathway options for pre-engineering students. For example, notice the third link from the IMSE department homepage in the screenshot below.



- *Action.* ISU-DMACC Cross Enrollment programs are available to students.
 - For ISU students: <http://www.public.iastate.edu/~registrar/info/crossroll.html>
 - For DMACC students: <http://www.dmacc.edu/registration/cross-enrollment.asp>

- *Action.* In Summer 2010, the following second- and third-year undergraduate courses were offered online:
 - ConE 380 Engineering Law
 - EE 311 Electromagnetic Fields and Waves
 - EM 274 Statics of Engineering
 - EM 324 Mechanics of Materials
 - EM 345 Dynamics
 - IE 305 Engineering Economic Analysis
 - ME 231 Engineering Thermodynamics I
 - ME 325 Machine Design
 - ME 332 Engineering Thermodynamics II

- *Action.* The use of, availability of, and need for online courses in relation to transfer programs of study continues to be evaluated.

Other Curriculum Activities

- *Action.* The bioengineering minor is an interdisciplinary program that complements an undergraduate student's major discipline by providing additional insight into the interactions between various engineering disciplines and biological systems, emphasizing new ways of solving biological problems (<http://www.eng.iastate.edu/bioengineering/>). While curriculum development has not been supported through the SEEC project, the project is promoting recruiting materials to emphasize opportunities in bioengineering and the life sciences to prospective students. The minor provides a core background in bioengineering and a choice of specializations in bioinformatics and systems biology, biomaterials and biomechanics, biomicro systems, or biosystems and environmental engineering. One of the goals of this curriculum is to broaden the participation of women in engineering.

Advising Objective Team

Student-centered Advising - to develop and enhance academic advising and mentoring programs for pre-college, community college, and university students.

Activity 1. Develop a data system which informs program development towards pathways of success in engineering. The following action items supporting this activity guideline took place in year three:

- *Action.* The SEEC Advising O-Team has developed two SEEC Data Briefs for dissemination for the purpose of informing transfer student programming.
http://www.eng.iastate.edu/seec/reports/SEEC_Transfer_Profile.pdf
www.eng.iastate.edu/seec/reports/SEEC_Transfer_Profile_1.pdf

- *Action.* Training ISUs engineering advisors about transfer students; understanding the factors that affect the academic and social integration of community college students has helped the

departments and the college as a whole, improve their student services and academic advising for these students.

- *Action.* Ongoing data on transfer student academic performance is disseminated and discussed to help inform advisors when they meet with transfer students for curriculum planning. In-depth analysis of academic data and ongoing review of student performance was incorporated in monthly Engineering Committee on Academic Advising Committee meetings and the joint SEEC Retreat.

Activity 2. Provide Professional Development to community college pre-engineering and ISU advisors and faculty. The following action items supporting this activity guideline took place in year three:

- *Action.* Developed and implemented joint DMACC/ISU student services workshop for faculty and staff. <http://www.eng.iastate.edu/seec/prodevelopment.shtml>
- *Action.* Presentation to all of DMACC advising and counseling staff to disseminate transfer advising materials and literature on the engineering majors.

Activity 3. Develop and implement transfer advising materials and communications for Community College audiences. The following action items supporting this activity guideline took place in year three:

- *Action.* New College of Engineering Transfer website was developed and launched (go to <http://www.eng.iastate.edu/transfer/>)
- *Action.* New College of Engineering Admissions Partnership page was developed and launched (go to <http://www.eng.iastate.edu/transfer/app/>)
- *Action.* Pathway to STEM website and Transfer Student Guide is in the final development stage. The web site provides detailed information for prospective community college students to learn about the STEM pathway. Information about specific majors in STEM as well as academic preparation and transfer/articulation information are provided. Resources for students, faculty and advisor at the community college are components of the Pathway web site. The Transfer Student Guide (TSG) includes eight chapters on topics such as: role of community colleges, crossing the transfer bridge in to STEM, understanding transfer, building the transfer bridge, understanding the articulation puzzle, financing your education, and after you cross the transfer bridge. In addition to the web site, educational videos will be provided that will highlight the experience of community college students and transfer students in STEM majors as well as two-year faculty. The goal of the videos is to educate a diverse audience, especially community college students about the strategies to successfully transfer from a two-year to a four-year STEM degree.
Web site link: www.pathway2stemdegree.org

Activity 4. Develop and implement a mentoring and transfer intervention program. The following action items supporting this activity guideline took place in year three:

- *Action.* Data and information from the SEEC transfer student profile as well as other data sources are being used to help SEEC transfer peer mentors talk with prospective community college students about the experiences of engineering students at ISU. Using data from student experiences will help facilitate the adjustment process into the college of engineering.

Networking Objective Team

To establish a recruiting and outreach network across Iowa and with alumni using ISU Extension, DMACC, and involving parents and educators; to inspire students from diverse backgrounds to major in engineering; and to improve the awareness and understanding of engineering among those who influence student choices.

Activity 1. Identify and execute recruitment strategies targeting academically-able or promising Math or Science high school populations. Focus on programs or strategies that are currently deemed promising, but under-developed. The following action items supporting this activity took place in year three:

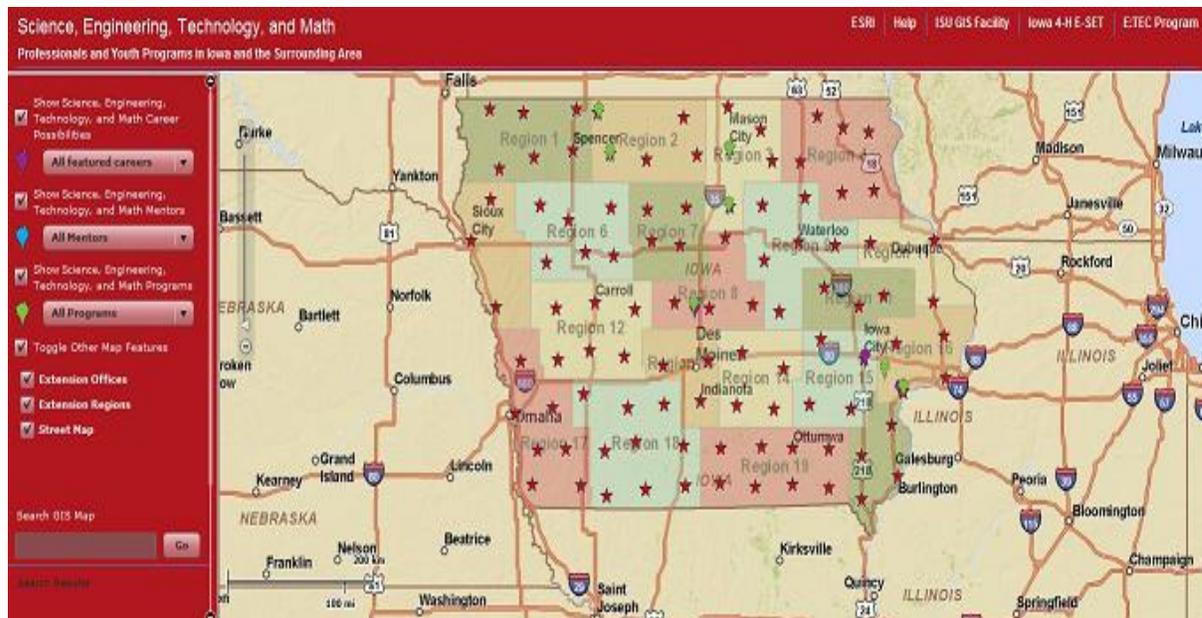
- *Action.* Developed a website of 9-14 STEM-related educational and recruitment materials, using principles outlined in *Changing the Conversation* (NAE 2008) recommendations and disseminated broadly. “Needs” included relevant introductory and specific information about engineering work and careers, financing your education information, professional engineers network information (professional resource or for job shadowing contacts).
- *Action.* Consulted with DMACC Enrollment Services in development of engineering recruitment and outreach communications. Consultation was based on principles outlined in *Changing the Conversation* (NAE 2008) and other higher education marketing literature.
- *Action.* Professional development training with DMACC college advisors and recruiters to improve communication and transmission of pre-college and career exploration engineering information.
- *Action.* Five DMACC SEEC team members and seven ISU SEEC team the 2010 NSF STEP Grantees conference this year to glean ideas to enhance the project at DMACC and led a breakout session on Improving Retention & Success via Cohort-building.
- *Action.* Communicated with all admitted new resident students (1018), more than 3000 prospective students, and more than 3000 STEM and pre-collegiate professionals including ISU Extension and Outreach & Recruitment database (high school and CC/JC); University Admissions, Financial Aid, Multicultural Vision Program, Science Bound, Program for Women in Engineering and PLTW network; STEM initiative programs (i.e., IT Adventures, Taking the Road Less Travelled) regarding ETEC scholarship opportunity.

Activity 2. Collaborate with ISU Extension to implement programs to improve awareness, understanding, and interest in engineering in every county in Iowa. Establish a network to encourage student interest. The following action items supporting this activity took place in year three:

- *Action.* ETEC initiative (<http://www.engineering.iastate.edu/etec/>) was further developed partnering with ISU Extension’s 4-H ESET programming and 4-H youth field staff to disseminate

and utilize a toolbox for extension staff and volunteers to facilitate awareness of engineering and career opportunities in science and engineering fields for underserved or under-represented groups. The toolbox is available online for at: <http://www.eng.iastate.edu/etec/>

- *Action.* Conducted 2 online meetings with Extension staff to both gain input and feedback to the ETEC program proposed activities as well as planning a professional development training for staff in implementing ETEC Initiatives.
- *Action.* Worked to engage youth in Iowa 4-H programs related to STEM as part of the ISU Extension 4-H Youth STEM Programming to create an awareness of opportunities, mentors and opportunities available through ISU College of Engineering. The Extension staff also provided support for the ETEC Scholarship program and assisted in dissemination of the scholarship information. (Est. reached 1000 youth and 800 Extension staff.)
- *Action.* Evaluated and promoted ETEC scholarship program. Evaluation included review of the description of scholarship, selection criteria, promotions and advertising venues (including revisions to the website), selection committee identification, and candidate selection and notification.
- *Action.* ETEC Scholarships were awarded to 41 incoming first year and transfer students. Scholarships were promoted as part of our ETEC career awareness and recruitment events. Scholarship application information was distributed through ISU extension, admissions, STEM program initiatives, and multicultural, women's, and community college networks.
- *Action.* Developed a new online information repository (Engineering Possibilities in Iowa Counties - EPIC) project with ISU Extension and Information Technology and software engineering (SE 319) class project to develop an online web resource to visually present outreach and recruiting information in map form using GIS (Geographical Information Systems) technology. The resource serves multiple purposes, with views of interest to parents and external stakeholders such as informal educators who need information about engineering and related STEM programming, to views of interest to the SEEC project, and other ISU staff and faculty who are developing, managing, and evaluating programs for youth interested in STEM, including recruitment components. In particular, for SEEC, it will provide an opportunity to let us visually analyze data to determine how well we are reaching out to different parts of the state and region to increase and broaden participation in engineering. A few screen shot images are shown below.



Add a Program to the Map

Science, Engineering, Technology, and Math Youth Programs in Iowa and the Surrounding Area

Fill out this form to add your Iowa (or surrounding area) science, engineering, technology or math youth program to the Map.

* Required

Previously Entered

If you are updating or editing information for a program already listed on the map, please enter the program ID and click submit. The ID can be found in the information bubble associated with your program on the map. After updating the information, click submit at the bottom of the page.

Personal Contact Information

This information will not appear on the map. We collect it so that we can contact you should we need further information or clarification.

Contact person's name *
 For internal use only. (Will not be published on map)

- **Action.** Presented at various professional venues to promote ETEC, create awareness of engineering, and conduct “train the trainer” workshops [engineering career awareness]. Professional venues included: 6 County Youth Coordinators and Field Specialists meetings; Iowa State Science Fair; IT Adventure Olympics; 6 Taking the Road Less Travelled conferences; Project Lead the Way training and other STEM-oriented professional develop programs; 4 scholarship and award banquets, and 3 Science Bound Kickoff Meetings; Reception to present or participate varied among venues due to various circumstances, however, over 75 STEM professionals were reached in year three.

Activity 3. Collaborate with DMACC personnel, alumni, and other existing ISU outreach and recruitment network personnel implementing programs to improve awareness, understanding, and interest in engineering. Establish a coordinated network to encourage and facilitate student interest. The following action items supporting this activity took place in year three:

- *Action.* SEEC team members and college staff utilized new recruiting materials to incorporate the college's new "2050 Challenge" mission, which, advances the national movement to redefine engineering as being vital to the future well-being of society. The 2050 Challenge is summarized at <http://www.engineering.iastate.edu/the-2050-challenge.html>. The new recruiting materials used elements of this mission to broaden the appeal of engineering as field that makes a difference in people's lives. A web version of the materials is online at: http://www.eng.iastate.edu/prospective/jrs_srs.asp. The challenge-oriented presentation of engineering study provided a broader perspective with which prospective students could explore societal problems to be solved, and from there, learn more about engineering majors.
- *Action.* Completed the development of "financing your education" website, and conducted 10 workshops to promote the materials/information. <http://www.eng.iastate.edu/scholarships/>
- *Action.* Continued operationalizing communications and processes to identify and reach current DMACC arts and Science, Career Advantage, and dual credit high school students with Math and Science interests, aptitudes or strong Math and Science Compass scores regarding the opportunities and scholarships in engineering.
- *Action.* Introduced and promoted Engineering Talent in Every County (ETEC) and E2020 scholarship program to all DMACC High Science Arts and Sciences & Pre-STEM students/classes (reached over 200 students and 30 faculty and staff).
- *Action.* Partnered with Phi Theta Kappan (PTK) state leadership team regarding the planning and implementation of the State PTK Conference and the DMACC Boone Campus including approx. 300 honor students and 30 PTK faculty advisors. The College of Engineering provided the following resources for this event: 1. Evening keynote speaker; 2. Booths in the afternoon during career exploration sessions; 3. Staff and students tended an interactive engineering booth in the evening and participated in the "Feed Haiti" service learning project to pack 10,000 meals for Haiti; and 4. Staff lead a planning conversation with 30 PTK advisors to discuss future collaborations.
- *Action.* Partnered with the DMACC West Campus during the Innovation Week serving 200+ DMACC and area high school students. The College of Engineering provided the following resources for this event: 1. Several booths for the career exploration sessions; and 2. Three one hour sessions led by ISU faculty and students during their workshop sessions.
- *Action.* Partnered with Kirkwood Community College during their Discover Engineering Event including approximately 300 high school STEM students. The College of Engineering provided the following resources for this event: 1. Several booths for the career exploration sessions; 2. Department Chair in IMSE did a general session regarding engineering at Iowa State along with administrators from the University of Iowa and University of Northern Iowa; 3. Small group

planning sessions were conducted with Kirkwood STEM administration and Student Services personnel.

- *Action.* Partnered with DMACC during their Discover Engineering Event including approximately 80 STEM high school students and 30 parents. The College of Engineering provided the following resources for this event: 1. 6 booths from various engineering student organizations and offices for the career exploration session; 2. Engineering faculty (Steve Mickelson) provided keynote address; 3. Faculty, staff, and students served as mentors with high school teams; 4. Coordinated and facilitated a panel of experts and engineers for parents; and 5. Provided 4 hands-on engineering breakout sessions led by student organizations during workshop sessions.

Activity 4. Collaborated with ISU Extension, ISU Admissions, and DMACC SEEC team on diversity recruiting across Iowa, seeking to develop cohort groups within clustered counties/schools/service areas and emphasizing participation of ethnic minority and female populations (i.e., E-TEC Recruitment – Engineering Talent in Every County). Offered scholarships through Extension, DMACC, and existing recruitment networks, in coordination with the College of Engineering scholarship program. The following action items supporting this activity took place in year three:

- *Action.* Collaborated with ISU Extension Communication and Marketing Services; continued promoting the identity program for E-TEC. See www.engineering.iastate.edu/etec. Identity program emphasized relevant, youth-oriented, and inclusive elements.
- *Action.* Collaborated with the College of Engineering Communications and Marketing personnel and created and launched identity program for E2020 Scholars scholarship program (S-STEM scholarship program in support of broadening participation). See www.engineering.iastate.edu/E2020
- *Action.* Reviewed and revised the E2020 scholarship program including scholarship selection criteria, promotions and advertising venues (including development of a website), selection committee identification, evaluation tool revisions and candidate selection and notification. Co-curricular programming for the Fall 2009 scholars is in development. See www.E2020groupsite.com. This program emphasizes contemporary engineering [2050 Challenge] content, student development programming, student participation and leadership development pedagogy, and gender, ethnic, and socio-economic relevance.
- *Action.* Targeted participation efforts to 8 youth field offices serving under-served and under-represented youth.

Activity 5. Develop recruiting kits for use by various stakeholders, including Extension, Admissions, the Alumni Association, College of Engineering faculty, students and staff, and interested others (PERK, Personal Engineering Recruiting Kit; or PRKS, Personal Recruiting Kit for STEM). The following action items supporting this activity took place in year three:

- *Action.* Identification and development of a dissemination plan for the new engineering recruiting campaign aligned with SEEC project, college, and national needs.

Evaluation Objective Team

To evaluate project effectiveness and improve project activities.

Activity 1. Apply quantitative and qualitative evaluation methods (both formative and summative) to improve project activities. The following action items supporting this activity took place in year three:

- *Action.* In collaboration with team members from the Learning Village and Advising O-Teams, conducted several focus groups for EGR 100 students. Analyzed the qualitative data for thematic results and presented findings to SEEC Executive and O-Teams.
- *Action.* In collaboration with team members from the Learning Village and Advising O-Teams, developed pre- and post-surveys for engineering community college transfers. Put surveys online to facilitate online data collection.
- *Action.* Numerous discussions and meetings with SEEC team members at ISU and DMACC on development of SEEC database(s) and variables to track retention and enrollment of College of Engineering students. Focusing on transfer students from DMACC as well as new freshmen students in the College of Engineering.
- Provided assessment and evaluation consulting and assistance to all SEEC O-Teams.

Activity 2. Create and use internal and external advisory groups. The following action items supporting this activity took place in year three:

- *Action.* Internal and External Advisory Board teams were assembled. They are:

ISU Institutional Advisory Board (Internal to ISU)

Chair: Elizabeth Hoffman, *Office of the Executive Vice President and Provost*

Sandy Gahn, *Office of Institutional Research*

Doug Gruenewald, *Learning Communities*

Connie Hargrave, *Center for Technology in Learning and Teaching*

Thomas Hill, *Vice President of Student Affairs*

Mary Holz-Clause, *Extension and Outreach*

Gary Mirka, *Industrial and Manufacturing Systems Engineering*

DMACC Institutional Advisory Board (Internal to DMACC)

Chair: Kim Linduska, *Executive Vice President for Academic Affairs, Ankeny Provost*

Ahmed Ageyman, *Academic Advisor*

Randy Mead, *Executive Dean for Program Development*

Randy Smith, *Professor and District Chair of Mathematics*

Carol (Renee) White, *Professor, Civil Engineering Technology*

Laurie Wolf, *Executive Dean for Student Services*

External Advisory Board

Chair: Jim Melsa, *Professor & Dean Emeritus, ISU College of Engineering*

Kimberly Douglas-Mankin, Director, Women in Engineering & Science Program, *Kansas State University*

Robert Driggs, Dean of Mathematics & Science, *Kirkwood Community College*

Leigh Hagenson Thompson, Technology Manager & Project Leader, *The Dow Chemical Company*

➤ *Action.* Several meetings took place in year three with the internal and external advisory boards. Minutes from the Internal and External advisory board meetings can be found in Appendix F of this report.

- A SEEC **Internal Advisory Board** meeting was conducted on December 15, 2009.
Agenda - <http://www.eng.iastate.edu/seec/agenda-iboard-Dec09.pdf>
Presentation Slides - <http://www.eng.iastate.edu/seec/iboard-slides-Dec09-rev.pdf>
Mid-Year Data Update - <http://www.eng.iastate.edu/seec/data-update-Dec09-rev.pdf>
- A SEEC **External Advisory Board** meeting was conducted on December 16, 2009.
Agenda - <http://www.eng.iastate.edu/seec/boardmtgs/external/agenda-eboard-Dec09.pdf>
Presentation Slides - <http://www.eng.iastate.edu/seec/boardmtgs/external/eboard-slides-Dec09.pdf>
Mid-Year Data Update - <http://www.eng.iastate.edu/seec/data-update-Dec09-rev.pdf>
- A SEEC **External Advisory Board** meeting was conducted on April 15, 2010 (small group).
- A SEEC ISU/DMACC Internal Advisory Board meeting was conducted on May 11, 2010.
Agenda - <http://www.eng.iastate.edu/seec/events/internal-board-mtg-2010May11.pdf>

3.2 Findings and Conclusions from Year Three Activities

In this section, we describe the findings (i.e., what we have learned) from SEEC activities/action items conducted in year three. Findings are listed below and separated by institution, ISU and DMACC.

Project Context

The following, reported in year two, is worthy of mention again as a new institutional context in which the SEEC project is being conducted. The university has transitioned to a form of decentralized budgeting, or resource centered management, referred to locally as the Resource Management Model, RMM. It began Fiscal Year 2009 (July 1, 2008). So Resource Responsibility Centers (i.e., units such as colleges) have been operating under the model for one year, keeping track of revenues and expenses. The success of the college is now tied to the success of the college's financial management under the RMM. Recruitment and retention have expanded in strategic value under RMM. While recruitment, retention, and graduation data have long been used to measure the success of the college, academic programs, and students, and data have been maintained for educational, benchmarking, and reporting purposes, data are now being monitored and prioritized for budgetary purposes.

ISU Findings and Conclusions

- All ISU engineering departments now have learning communities, including several transfer learning communities (one-year retention rates for full-time freshman is 88.5%)
- Through a new transfer peer mentor program, there is enhanced peer mentor relationship building with pre-engineering students.
- Partnerships have developed which leverage recruitment and retention resources across the college and university, including the NSF S-STEM project, academic departments, the Program for Women in Science and Engineering, ISU Learning Communities, ISU Admissions, and the Office of Community College Research and Policy.
- The college has customized the ISU's Admissions Partnership Program (APP) with Iowa community colleges to support prospective transfer students in engineering, called E-APP.
- Partnering with ISU Extension has been expanded to impact recruiting throughout the state. The ETEC (Engineering Talent in Every County) initiative combines a scholarship program with a new kit to provide Extension youth professionals with resources and training.
- The college's recruiting materials have been redesigned to incorporate the new messaging (that engineers create a better world and that students can *(Be Creative)*²)
- The number of new engineering majors shaping the 2012 graduating class is 1446, thus we expect to achieve 900 engineering graduates in the class of 2012.
- The biggest challenge relative to the original targets is likely to be the recruitment of women to reach 20% (% women in 2008 and 2009 are, respectively, 14.6 and 15.0).
- Research, education, and training are needed to inform faculty, staff, students, and parents in terms of building a better understanding of the factors leading to transfer success in engineering. Students enter our programs with various levels of "transfer capital" in terms of their personal/social, career, and academic preparedness. We continue to build programs and systems which urge community college student engagement with ISU early and often in hopes of increasing community college student enrollment and retention rates. Through these efforts, we are learning which strategies are most effective for increasing community college engagement and success.
- We have had limited success using social and professional networking products to create an on-line community college student network managed by ISU Transfer Peer Mentors. We continue to try new strategies for increasing student engagement and will do a comprehensive evaluation in the coming year in order to gather more comprehensive data from participants.
- Budget cuts across the college have created a stressful and challenging work environment which allows limited capacity for new directions and innovation.
- The first year experience in engineering at Iowa State is a highly distributed enterprise, influenced by individual academic departments, college programs and services, and courses and services across campus. There is a common first year curriculum for engineering students, but department offerings over time have evolved with differences arising. Thus, the process to gain consensus on outcomes may be nontrivial.
- These activities are time-intensive for both faculty and students. To involve a large enough number of students and thus have a significant impact on retention, there will need to be strong commitment from academic departments.
- Different community colleges have different needs. Even different academic programs have different needs. In other words, there is not a single solution to a smooth pathway for all

transfer students. Thus, there may be issues such as cost-effectiveness in implementation that require additional review.

DMACC Findings and Conclusions

- DMACC has identified pre-engineering student cohorts and created a four-semester learning community. Pre-engineering students at DMACC increased from 47 in 2008, to 94 in 2009.
- DMACC, in collaboration with ISU, has created its own introductory engineering orientation course, EGR 100, and revised their advising system for pre-engineering students.
- DMACC has significantly advanced its engineering-related programs and services as a result of the project.
- DMACC has identified, developed and implemented a comprehensive communication plan that familiarizes high school students, parents, faculty, and staff with career opportunities and educational pathways in engineering.
- 152 new transfers from DMACC were admitted to ISU in the fall 2009 in STEM majors, and of these, 47 were in engineering.

3.3 Opportunities for Training and Development from Year Three Activities

The team members, even those involved peripherally, have gained greater awareness about curricular issues in relation to recruitment, retention, and student success. Student diversity and transfer student pathways have been foci of discussions during year three, and substantial information has been shared. This awareness will be translated into actions as the project continues.

The E2020 curriculum groups are involved with curriculum development in areas that will enhance teaching skills, especially in relation to putting engineering into a societal context.

GRA's and Transfer Peer Mentors on this project have been afforded ample experiences to collect and use data to inform programming decisions and to evaluate impact. Additionally, transfer peer mentors develop leadership and teaching skills through planning and organizing seminars, presentations, and workshops for learning community participants.

3.4 Outreach Activities from Year Three Activities

The list below describes the numerous outreach activities in which the SEEC project was involved for year three.

- Various information and communication about ETEC and E2020 scholarships – and the E2020 Scholars Program – were provided to prospective students and other stakeholders, all using the new messaging about engineering to improve public understanding and awareness.
- All outreach events in which SEEC participated are listed at the project website (<http://www.eng.iastate.edu/seec/index.shtml>). The following events occurred over the project's year three.

- June 30 – July 2, 2010. Iowa 4-H Youth Conference : *E-TEC (Engineering Talent in Every County) – Voyage into Engineering with a Scholarship in Hand*
- August 26, 2009. Student Diversity Welcome Picnic
- September 21, 2009. Diversity Networking Reception
- September 22, 2009. Engineering Career Fair
<http://www.eng.iastate.edu/ecs/what/fairs.html>
- September 22, 2009. Engineering Career Fair Transfer Student Event
<http://www.eng.iastate.edu/seec/transfercareerfair.shtml>
- October 2, 2009. ISU Extension E-TEC Virtual Summit
- October 6, 2009. Engineering Diversity Fair
<http://www.engineering.iastate.edu/diversityfair>
- October 28, 2009. SEEC ISU/DMAcc Joint Retreat
<http://www.eng.iastate.edu/seec/SEECretreat.shtml>
- October 29, 2009. Presentations at Taking the Road Less Traveled Conference. Engineering – You Have What it Takes (audience High School Girls) and Supporting Young Women as They Explore Science, Technology, Engineering, and Math (audience HS girls, teachers, counselors, and parents)
- November 3, 2009. ISU Extension E-TEC Virtual Summit
- November 11, 2009 – Kiewit and Greater Omaha Strategic Engineering Recruitment Initiatives Inaugural Meeting (audience HS teachers and counselors, higher education staff and faculty, and engineering professionals)
- December 15-16, 2009. SEEC Advisory Board Meetings
<http://www.eng.iastate.edu/seec/advisoryboardmtgs.shtml>
- January 28, 2010 – University Extension Youth Specialists Webinar. E:ETEC Programming and Scholarships
- February 1, 2010 – SEEC Update for College of Engineering Academic Advisors
- February 18, 2010. Exploring Engineering Career Guidance Conference at Kirkwood Community College
- March 1-5, 2010. iWeek at DMAcc. <http://www.innovationfaces.org/>
http://www.kcci.com/video/22672094/index.html?treets=des&tid=2654761061813&tml=des_ent&tmi=des_ent_1_11150102262010&ts=H
- March 3-5, 2010. NSF's Division of Undergraduate Education (DUE) STEP Grantees Meeting
- April 7, 2010. Discover Engineering Day at DMAcc
http://www.eng.iastate.edu/seec/Discover_Eng_Poster.pdf
- April 8, 2010. E-TEC presentation at Ag Engineering Field Specialists in-service training
- April 8, 2010 - Taking the Road Less Traveled Conference. Engineering – You have what it takes (audience: HS girls) and Supporting Young Women as they Explore Science, Technology, Engineering and Math (audience HS teachers, counselors and parents)
- April 15, 2010. SEEC Advisory Board Meeting (small group)
- April 17, 2010. E-APP holds social event for members during VEISHA
- May 11, 2010. SEEC ISU/DMAcc Internal Advisory Board Meeting
<http://www.eng.iastate.edu/seec/events/internal-board-mtg-2010May11.pdf>

- May 11, 2010. SEEC ISU/DMACC Joint Retreat for SEEC teams
http://www.eng.iastate.edu/seec/events/5_11_10_SEECISU_DMACCRetreatAgenda.pdf
http://gallery.eng.iastate.edu/main.php?g2_itemId=8570
- June 14-17, 2010. ASEE Annual Conference & Exposition

4. Publications and Products

The following is a list of the products developed and disseminated in year three of the SEEC project.

- Enhancement of the project website and updates continued to be posted on the project website was developed which can be accessed at: <http://www.eng.iastate.edu/seec/> (see Appendix G for website welcome page).
 - The project website helps keep team members, advisory board members, and other interested parties current on the project's progress. It also provides resources related to the project. The site has seen 855 unique visitors between 6/10/09 and 6/3/10, with 48% of these users being returning visitors. These returning users spend an average of about three and a half minutes per visit on the site – nearly two and a half minutes longer than the average time spent by first-time visitors. This indicates that returning visitors are finding value in the site. The Resources and News pages captured the number two and three spots respectively after the SEEC home page for most visited.
 - The Big 12 STEP Network pages serve as a resource for Big 12 STEP grantees. 120 unique visitors have spent an average of nearly two and a half minutes on the main page for this section.
- SEEC Newsletter for dissemination of project information to various SEEC stakeholders.
<http://www.eng.iastate.edu/seec/seec-news/fall09others.html>
http://www.eng.iastate.edu/emails_html/SEEC-News/spring09.html
 - On June 23, 2009, and January 13, 2010, the SEEC project newsletter, *Connections*, was sent to 21 Advisory Board members. A second version targeting additional interested parties was sent to 124 others. A spike in SEEC Web site activity occurred on June 23 and 24 and on January 13 - 15. This, combined with evidence from the newsletter tracking system, showed that the newsletter helped drive traffic to the SEEC Web site.
- Transfer Student Website continues to be updated and utilized with the SEEC project:
<http://www.eng.iastate.edu/transfer>
- New recruiting materials for ISU's college of engineering were developed by ZLR and utilized by the SEEC project. See appendix I for a screen shot of the new materials on the NSF poster.
- DMACC developed a new communication plan that includes new recruiting materials for pre-engineering students. See appendix I for a screen shot of the new materials on the NSF poster.
- Pathway to a STEM baccalaureate degree website continues to be updated and utilized with the SEEC project: <http://www.public.iastate.edu/~laanan/pathway2stem/homepage.html>

- A press release was created to announce the E:TEC scholarship recipients. This release was used in the College of Engineering's *E-News* and *Alumni E-News* newsletters, which reach audiences of 583 and 20,885 respectively. They were also disseminated through the Iowa State Extension network, which reaches all counties in Iowa. An additional release was created for the E-TEC scholarship recipients to use in their local newspapers to announce their receipt of the E-TEC scholarship.
- Additionally, updates to the general prospective students' pages were completed. These pages included the prospective students' home page and the engineering scholarships (E-TEC and E2020) and financial aid pages. New pages were added for Juniors/Seniors and Transfer Students. The goal of this project was to create more comprehensive and user-friendly Web pages for prospective students seeking information about Iowa State's College of Engineering.
- Short articles describing the successes of the Engineering Admissions Partnership Program (E-APP) and Engineering 100 (EGR 100) class are being prepared. They will be sent to the National Science Foundation (NSF) as project highlights.
- Developed and disseminated marketing brochure for the E-APP (Engineering-Admissions Partnership Program) and posters for display at Iowa community colleges. See Appendix A for a copy of the E-APP Brochure.
- Two items were developed by the SEEC executive team for the **NSF Division of Undergraduate Education (DUE) STEP Grantees Meeting**, March 4-5, 2010.
 - SEEC Project Abstract (see Appendix H for Project Abstract)
 - SEEC Project Poster, http://www.eng.iastate.edu/seec/NSF%20poster-2_24_10.pdf (see Appendix I for Project Poster)
- **Iowa State's Program for Women in Science in Engineering (PWSE) Taking the Road Less Traveled Career Conference** – Iowa State University, Ames, IA – *Tools for teachers, counselors, and parents*. Presentation to high school teachers, parents, and counselors by Monica Bruning.
- **ASEE Annual Conference & Exposition** - Louisville, KY
 - NSF Grantees Poster Session - AC 2010-966: SEEC: STUDENT ENROLLMENT AND ENGAGEMENT THROUGH CONNECTIONS (SEEC)
 - Diane Rover, Iowa State University
 - Monica Bruning, Iowa State University
 - Steven Mickelson, Iowa State University
 - Mack Shelley, Iowa State University
 - Frankie Santos Laanan, Iowa State University
 - Mary Darrow, Iowa State University
 - Mary Goodwin, Iowa State University
 - Jacquelyn Baughman, Iowa State University
 - Harry McMaken, Des Moines Area Community College

- **1486: Retention Strategies in Action Part I**

AC 2010-1034: EXPERIENCES OF ENGINEERING TRANSFER STUDENTS: FROM COMMUNITY COLLEGE TO UNIVERSITY

Frankie Santos Laanan, Iowa State University
Dimitra Jackson, Iowa State University
Mary Darrow, Iowa State University

- **1686: Rethinking Traditional Pedagogical Strategies**

AC 2010-1725: PROBLEM-BASED LEARNING IN SUSTAINABLE TECHNOLOGIES: INCREASING THE STEM PIPELINE

Frankie Santos Laanan, Iowa State University
Dimitra Jackson, Iowa State University
Soko Starobin, Iowa State University
Mary Darrow, Iowa State University

- **Iowa 4-H Youth Conference** –Iowa State University, Ames, IA
[E-TEC \(Engineering Talent in Every County\)](#)
Voyage into Engineering with a Scholarship in Hand!
Monica Bruning presented information about the E-TEC program to high school 4-Hers and advisors.
- We have redesigned the College of Engineering Scholarship Page to include two new scholarships, E2020 and Engineering Talent in Every County (ETEC).
<http://www.eng.iastate.edu/scholarships/transfer.asp>. Each of these scholarships has their own web presence that was developed through this project. The ETEC Scholarship is funded through this project and the E2020 Scholarship is funded through a new NSF S-STEM grant.
- Schenk, T., Laanan, F. S., Rethwisch, D., Starobin, S., Chapman, M. J., & Zhang, Y. Initial results of Project Lead the Way Evaluation. Roundtable presentation at the American Educational Research Association annual meeting. Denver, Colorado. May 1, 2010.
- Laanan, F. S., & Zhang, Y. Vertical and horizontal transfers at a large research university: A comparative study of student engagement and satisfaction. Paper presented at the annual meeting of the Council for the Study of Community Colleges. Seattle, Washington. April 17, 2010.
- Jackson, D., & Laanan, F. S. Transfer students in STEM majors: Socialization factors that influence the academic and social adjustment. Paper presented at the annual meeting of the Council for the Study of Community Colleges. Seattle, Washington. April 17, 2010.
- Laanan, F. S., Starobin, S., Zhang, Yi, & Schenk, T. A longitudinal evaluation of Project Lead the Way in the state of Iowa. Poster presented at the conference of the Association for the Study of Higher Education. Vancouver, British Columbia. November 6, 2009

- Starobin, S., Laanan, F. S., Hagedorn, L. S., Lester, J., & Hardy, D. *Measuring STEM student success in community colleges: Perspectives to advance research inquiries for policy and practice.*. Symposium presentation at the conference of the Association for the Study of Higher Education. Vancouver, British Columbia. November 6, 2009.

5. Contributions, Major Accomplishments, Innovations, and Successes of Project

During year three, the SEEC project has expanded its reach, as evidenced by the partnerships involved in the project and the communications and events for widening communities. The activities of SEEC team members – directly and indirectly in relation to SEEC objectives – support and inform the development of resources and tools for recruitment and retention of engineering students. The following subsections highlight advances made through the project during year three.

5.1 Contributions to the principle discipline of the project

The project is increasing: the retention of students in engineering at Iowa State through learning communities and advising; the number of students at DMACC who are interested and prepared to enter an engineering program through learning communities, advising, and curriculum; and the number of transfers from DMACC to ISU in engineering. It is improving transfer recruitment and retention in engineering; and the messaging, awareness, and understanding of engineering to positively influence students to choose an engineering program of study through ISU or DMACC. Attracting and engaging more students in the discipline and helping students to succeed in engineering will strengthen the academic programs.

The project has successfully initiated the learning village concept. All ISU engineering departments now have learning communities, and transfer student learning community options are expanding. DMACC has identified pre-engineering student cohorts and created a four-semester learning community. DMACC, in collaboration with ISU, has created its own introductory engineering orientation course, EGR 100, and revised their advising system for pre-engineering students.

Engineering advising has used various early intervention strategies, and through project activities, has shared and enhanced information and practices.

Through the project, the college has customized ISU's Admissions Partnership Program (APP) with Iowa community colleges to support prospective transfer students in engineering, i.e., E-APP. A more extensive and effective transfer enterprise in engineering is being built. DMACC has significantly advanced its engineering-related programs and services as a result of the project.

Over the past year, the college's recruiting materials have been redesigned to incorporate new messaging. The theme – that engineers create a better world and that students can (*Be Creative*)² – was developed with a communications marketing firm that has experience with Iowa State and youth marketing. DMACC has identified, developed and implemented a comprehensive communication plan that familiarizes high school students, parents, faculty, and staff with career opportunities and educational pathways in engineering.

At ISU, the SEEC project is working in concert with an NSF S-STEM project on curriculum and programming to achieve first-year and later student development outcomes aligned with national studies on engineering education.

5.2 Contributions to other disciplines in science or engineering

The project has improved each institution's transfer programs and services.

DMACC's activities support not only pre-engineering students, but also students with STEM interests. Consequently, these students will gain new information about study and career opportunities in STEM fields. At DMACC, the project has highlighted other pre-professional programs that are offered as opportunities for students who start their education at the community college. It has also led to communications with career and technical students who might transition into engineering as a career field. In addition, the project has better positioned DMACC to manage and evaluate a STEM-focused grant program. For example, early in the project, DMACC quickly recognized the need to define what counts as STEM-related courses, departments, and students.

The partnerships on the ISU campus are not restricted to engineering. There is extensive collaboration with, for example, the Program for Women in Science and Engineering, and the Center for Excellence in Science, Math, and Engineering Education (CESMEE). The partnership with ISU Extension impacts their programs for talent expansion in STEM. Consequently, some of the activities of SEEC lead to interactions that address STEM more broadly.

5.3 Contributions to the development of human resources

Transfer advising information has been developed into materials and presentations for use with ISU engineering academic advisors, DMACC academic advisors, and other Iowa community colleges. Workshops were offered during spring 2009 for ISU and DMACC student services professionals. Training through staff development activities involving both institutions allows them to more effectively transition students. The project relationships have enabled both institutions to get the necessary people involved to understand and address the issues and needs of students transferring into engineering. Training and professional development have also been provided through webinars involving DMACC and ISU faculty and staff and ISU Extension staff and field specialists. DMACC has found that relationships have been developed with some at ISU who were not originally involved in the project, and these have fostered better services, training, and resources.

The ETEC (Engineering Talent in Every County) initiative combines a scholarship program with a new information kit to provide Extension youth professionals with resources and training. The result is network building, technology for professional development, and a train-the-trainer model for information dissemination.

The learning community and advising activities improve student success and engagement. In particular, transfer students enter engineering majors with a clear plan and connections that will assist them in making a smooth transition to ISU. The networking and communications activities improve the awareness, interest, and participation of high school and community college students in engineering, especially related to pathways and opportunities for study and careers in engineering.

Increasing and broadening the interest in engineering and improving the satisfaction and success of engineering students will ultimately grow the engineering workforce, and this goal of the STEP program is the motivation for all SEEC activities and accomplishments.

5.4 Contributions to the physical, institutional, or information resources that form the infrastructure for research and education

During the first year of the project, we emphasized partnerships and relationship building. We did so recognizing that connecting organizations and people leverages knowledge and resources. This was followed in the second year with an emphasis on communications to promote effective partnering and a shared vision for the project. We made it a priority to share information and engage stakeholders through various mediums. For example, project newsletters have been sent to project advocates every semester, and project news is disseminated through college newsletters to faculty, staff, and alumni.

An electronic professional network, hosted by ISU peer mentors and used by pre-engineering community college students across the state, has been created to facilitate early interactions. At ISU, the project has led to the on-going development of a more extensive and effective transfer enterprise in engineering. One element of this is E-APP, and this has increased awareness of and enrollment in the university's Admissions Partnership Program. The peer mentor and ambassador programs for transfer students have had a significant impact on students. E-APP has improved the information and services available to students and faculty at community colleges across Iowa.

In collaboration with Extension and ISU's GIS (Geographic Information Systems) Center, the project has initiated a new web-based, interactive database as a state-wide resource for engineering career exploration.

Through the project, DMACC has created additional capacity for students on their Ankeny campus (the largest of their six campuses), in part with a new science lab.

There has been an impact on both DMACC and ISU on the need for careful data collection and for cross-institution collaboration in long-term monitoring for program evaluation. We have been successful in establishing measurement criteria and have made considerable progress toward developing an ISU database appropriate for complex evaluation data analysis. As we collect, compile, and disseminate both research and evaluation data related to our SEEC objectives, SEEC data/research briefs and publications will become available.

5.5 Contributions to other aspects of public welfare beyond science and engineering

E-TEC scholarships provide financial aid to students entering engineering in difficult economic times.

The collective mission of the college and SEEC to change the perception of engineering and emphasize its impact on people and society is part of the national and global movement.

Expanding and improving the colleges' recruitment and retention efforts to community colleges expands access to STEM and engineering fields that did not exist prior to this project. Community college student access to higher education is viewed by many as a public welfare issue.

6. Special Requirements

The SEEC project has no special requirements to report for year three.

Appendix A

E-APP Brochure

Connect to Iowa State engineering.

Benefits of Engineering Admissions Partnership Program

- Get connected to Iowa State's College of Engineering.
- Engage with Iowa State faculty, staff, and students.
- Take advantage of peer mentoring and personalized advising from Iowa State's College of Engineering.
- Have access to Iowa State student services, libraries, career services, etc.
- Obtain an ISU/Canvas and e-mail account.
- Have an opportunity to live in Iowa State University housing at student rates.
- Attend cultural and athletic events at discounted student rates.
- Experience engineering!

See your community college adviser for an application!

Enroll in EGR 100, Engineering Orientation.

Participate in opportunities to interact with Iowa State faculty, staff, and students.

Connect with an Iowa State peer mentor.

Attend Iowa State's Engineering Career Fair.

IOWA STATE UNIVERSITY
College of Engineering

Engineering Programs
Engineering has become increasingly diverse. It's not just about building and designing things—it's about building and designing environments where people can work, live, and thrive. We offer one of the broadest and most comprehensive engineering programs in the country, featuring 12 undergraduate programs.

- Aerospace
- Agricultural
- Biological Systems
- Chemical
- Civil/Environmental
- Computer
- Construction
- Electrical
- Industrial
- Materials
- Mechanical
- Software

Engineering Minors

- Bioengineering
- Engineering Studies
- Nondestructive Evaluation
- Nuclear

Check out all the potential engineering majors at ISU:
www.eng.iastate.edu/prospective/fields.asp

IOWA STATE UNIVERSITY
College of Engineering

For more information about APP, visit:
www.admissions.iastate.edu/partnership/

For more information about Engineering-APP, visit:
www.eng.iastate.edu/transfer/app/

Engineering Admissions Partnership Program (E-APP)

Your E-APP adventure starts here.

Apply for APP through your community college adviser.

Develop an individualized transfer plan with your Iowa State adviser.

Be part of a growing social network.

E-APP was a really good experience. I was especially pleased that the program guided me to take only classes that would transfer to Iowa State. I also took advantage of cross-enrollment courses that allowed me to get my feet on the ISU campus and interact with professors and students.

Andrew Smith
Julian, Augustana and
Boyskins Engineering

Enjoy the Adventure.

Appendix B

Project Participants and their Roles by Objective Teams

*roles are defined by Objective Team Leaders

O1. Learning Village Objective Team

Participant	Role	Job Title, Department, and Institution	Contact Information
Steve Mickelson	Team Leader	Associate Professor, Associate Chair, Agricultural and Biosystems Engineering; Director of Assessment, College of Engineering; Director of Center for Excellence in Learning and Teaching, ISU	estaben@iastate.edu
Paul Castleberry	Member	Student Services Specialist, Engineering Academic/Student Affairs, College of Engineering, ISU	paulca@iastate.edu
Lora-Leigh Chrystal	Member	Program Coordinator, Program for Women in Science and Engineering, ISU	lchrysta@iastate.edu
Jennifer Garrett	Member	Student Program Coordinator (service learning/leadership), Memorial Union, ISU	Garrett1@iastate.edu
Doug Gruenwald	Member	Co-Director of Learning Communities, Student Affairs Office, ISU	dgrenwld@iastate.edu
Mani Mina	Member	Senior Lecturer, Electrical and Computer Engineering, ISU	mmina@iastate.edu
Kevin Saunders	Member	Coordinator of Continuous Improvement, Office of the Provost, ISU	saunders@iastate.edu
Harry McMaken	Advisor	Professor, Mathematics/Engineering, DMACC	hlmcmaken@dmacc.edu
Randall Jedele	Member	Instructor, English, DMACC	rejedele@dmacc.edu
Randy Smith	Member	Instructor, Mathematics, DMACC	rrsmith@dmacc.edu
Mary Goodwin	Member	Advising and Transfer Programs Director, Student Services, College of Engineering, ISU	goodwinm@iastate.edu
Mary Darrow	Member	Project Coordinator	mdarrow@iastate.edu
Jackie Baughman	Member	Graduate Student, Agriculture and Biosystems Engineering	Jacquelyn@iastate.edu

O2. Curriculum Objective Team

Participant	Role	Job Title, Department, and Institution	Contact Information
Diane Rover	Team Leader	Associate Dean and Professor, College of Engineering, ISU	drover@iastate.edu
Mary Goodwin	Collaborator (Advising Team, SEEC executive team, transfer programs)	Director of Academic Advising and Transfer Relations, COE, ISU	goodwinm@iastate.edu
Mani Mina	Collaborator (first year review)	Senior Lecturer, ECE, Director of Engineering Studies Minor, COE, ISU	mmina@iastate.edu
Krishna Athreya	Peripheral participant (ELP service learning, S-STEM faculty leader)	Engineering Leadership Program Director, Adjunct Prof. (MSE) COE, ISU	Ksa1@iastate.edu
Tom Brumm	Collaborator (first year review, S-STEM co-PI)	Assoc. Professor, ABE, Director of Assessment, COE, ISU	
Joel Johnson	Collaborator (first year review, S-STEM team, SEEC executive team)	Director of Student Programs and Services, COE, ISU	
Steve Mickelson	Collaborator (Learning Village Team, SEEC executive team, ELP, S-STEM co-PI)	Associate Professor, Associate Professor, ABE; Director of Center for Excellence in Learning and Teaching, ISU	estaben@iastate.edu
Paul Castleberry	Peripheral participant (S-STEM leader)	Student Services Specialist & Learning Communities Coordinator, COE, ISU	paulca@iastate.edu
Derrick Rollins	Collaborator (multicultural programs, diversity)	Professor, CBE; former Assistant Dean for Diversity, COE, ISU	drollins@iastate.edu
Harry McMaken	Collaborator, DMACC Leader	Professor, Engineering and Math; DMACC	hlmcmaken@dmacc.edu
Karen Zunkel	Collaborator on other project objectives related to PWSE	Director, Program for Women in Science and Engineering, ISU	kzunkel@iastate.edu
Roger Bentley	Collaborator (first year review)	Manager of Student and Alumni Career Services, COE, ISU	
Chris Rehmann	Peripheral participant (S-STEM faculty leader)	Professor, CCEE, COE, ISU	
Doug Jacobson	Peripheral participant (S-STEM faculty leader)	University Professor, ECE, COE, ISU	
Amy Kaleita	Peripheral participant (S-STEM faculty leader)	Assoc. Professor, ABE, COE, ISU	
Laura Centeno-Diaz	Collaborator (multicultural programs, diversity)	LEAD Program Coordinator	
Mark Laingen	Collaborator (ENGR 110X instructor, S-STEM team)	Graduate student	

03. Advising Objective Team

Participant	Role	Job Title, Department, and Institution	Contact Information
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STEP 3rd Year Report – 0653236
SEEC: Student Enrollment and Engagement through Connections
Diane Rover (ISU) and Harry McMaken (DMACC), Principal Investigators
Iowa State University and Des Moines Area Community College

Achievements

1. What are the successes you have experienced?

The goal of the SEEC project is to increase the number of engineering graduates at Iowa State by 100 per year to approximately 900 graduates annually [4]. This is slightly revised from the proposal due to a correction in the baseline average used for reference. Included with this goal are increases in the percentages of women and minority graduates in engineering at ISU and the number of pre-engineering students at Des Moines Area Community College. These goals will be met through several coordinated objectives described in the proposal and implemented in the project to enhance recruitment and retention. These are referred to throughout as: Learning Village, Advising, Networking, Curriculum, Dissemination, and Evaluation [1-3].

The main success of the project is progress on the objectives and goals. The answers to questions 9, 10, and 15 below summarize the progress toward the goal of increasing the number of graduates. The planning and results for each of the objectives are contributing to this progress. Successes in the implementation of the objectives are highlighted here.

The project is grounded in established and emerging practices in retention and recruitment. The key retention practice is learning communities combined with student-centered advising. The key recruitment practice is messaging, based on findings from the national study on “Changing the Conversation” [6] and social networking theory. The objectives of the project are intended to: increase the retention of students in engineering at Iowa State through learning communities and advising; increase the number of students at DMACC who are interested and prepared to enter an engineering program through learning communities, advising, and curriculum; increase the number of transfers from DMACC to ISU in engineering, and overall, to improve transfer recruitment and retention in engineering; and improve and expand the messaging, awareness, and understanding of engineering to positively influence students to choose an engineering program of study through ISU or DMACC.

The project has successfully initiated the learning village concept. All ISU engineering departments now have learning communities, and transfer student learning community options are expanding. DMACC has identified pre-engineering student cohorts and created a four-semester learning community. Through a new peer mentor program, there is enhanced peer mentor relationship building with pre-engineering students. Peer mentors are actively involved with transfer student activities and events. Partnerships have developed with various transfer recruitment activities, including the NSF S-STEM project, academic departments, the Program for Women in Science and Engineering, and the Office of Community College Research and Policy. A new data brief was prepared to inform project activities and student programming related to transfer recruitment and retention [9]. This information has been shared with key stakeholders at both ISU and DMACC.

DMACC, in collaboration with ISU, has created its own introductory engineering orientation course, EGR 100, and revised their advising system for pre-engineering students.

Through the project, the college has customized the ISU's Admissions Partnership Program (APP) with Iowa community colleges to support prospective transfer students in engineering, called E-APP. Students have access to services before transferring to ISU. An electronic professional network, hosted by ISU peer mentors and used by pre-engineering community college students across the state, has been created to facilitate early interactions. Community college students are invited to attend the fall and spring engineering career fairs at ISU, providing opportunities for career exploration and meeting with faculty, staff, students, and employers. Transfer advising information has been developed into materials and presentations for use with ISU engineering academic advisors, DMACC academic advisors, and other Iowa community colleges. Workshops were offered during spring 2009 for ISU and DMACC student services professionals.

Engineering advising has used various early intervention strategies, and through project activities, has shared and enhanced information and practices. In concert with university Student Affairs, the college is piloting the use of Map-Works, an online tool to get feedback from and inform first-year students, aimed at improving student success, retention, development, and involvement. During fall 2009, both first-year/first-time students and transfer students in engineering participated in MapWorks.

At ISU, the SEEC project is working in concert with an NSF S-STEM project on curriculum and programming to achieve first-year and later student development outcomes aligned with national studies, such as the Engineer of 2020 [7, 8]. Course modules are being piloted by a group of faculty leaders from several engineering departments in collaboration with faculty and staff involved with learning communities and assessment in the college. This work complements the new messaging promoted through other project activities, because the promise of engineering to create a better world is not only a message but an expectation for learning.

Through the project, partnering with ISU Extension has been expanded to impact recruiting throughout the state. The ETEC (Engineering Talent in Every County) initiative combines a scholarship program with a new information kit to provide Extension youth professionals with resources and training. The result is network building, technology for professional development, and a train-the-trainer model for information dissemination. In addition, in collaboration with Extension and ISU's GIS (Geographic Information Systems) Center, the project has initiated a new web-based, interactive database as a state-wide resource for engineering career exploration.

Over the past year, the college's recruiting materials have been redesigned to incorporate the new messaging [10]. The theme – that engineers create a better world and that students can (*Be Creative*)² – was developed with ZLRIGNITION, a communications marketing firm that has experience with Iowa State and youth marketing.

Evaluation and dissemination activities are proceeding as planned. We have been successful in establishing measurement criteria and have made considerable progress toward developing an ISU database appropriate for complex evaluation data analysis. The project has successfully initiated information sharing activities with other STEP projects in the Big 12 Conference. Teleconferences and a

workshop at the 2009 ASEE Annual Conference were held, with information available at the project website [5].

The project is a collaboration between ISU and DMACC, and the objectives and successes of the project are shared across both institutions. Our collaboration is, in itself, a success of the project. It has elevated our joint effort to create a DMACC-ISU transfer pathway for students into engineering, and is also improving each institution’s transfer programs and services. At ISU, it is helping us build a more extensive and effective transfer enterprise in engineering. DMACC has been successful in its own right, and has significantly advanced its engineering-related programs and services as a result of the project. DMACC has identified, developed and implemented a comprehensive communication plan that familiarizes high school students, parents, faculty, and staff with career opportunities and educational pathways in engineering. Advisors at each high school in DMACC’s district (54) advise students about engineering opportunities and careers. Likewise, a communication plan has been implemented for enrolled college students to gain familiarity with opportunities at DMACC and transfer institutions in the field of engineering. Materials were created specific to each audience. We also provided training through staff development activities, involving staff and faculty from both institutions, to allow them to more effectively transition students into this career path. DMACC has used input from business and industry regarding recruiting of non-traditional students into engineering. Career symposiums specifically for women and minority students have been offered. Through the project, DMACC has created additional capacity for students on their Ankeny campus (the largest of their six campuses), in part with a new science lab.

2. How many students have been impacted by each of the activities in your project? What is the nature of the impact? What are the demographics of the participants?

The annual reports to NSF provide participant/recipient numbers for many project activities [2, 3]. For this report, we’ll summarize using the following scale: less than 100, 100-500, 500-1000, 1000-5000, greater than 5000. The data below span the period of the project to date.

ISU Activities	No. of Students	DMACC Activities	No. of Students
ISU engineering learning communities	>1000/yr	DMACC pre-engineering cohort	100-500
ISU engineering transfer LCs	<100/yr	DMACC EGR 100 course	<100
E-APP students	100-500	DMACC prospective students/parents	>1000/yr
Peer mentors	<100	DMACC students	>5000/yr
Electronic professional network for community college students	<100	High school students taking academic prep courses at DMACC	>1000/yr
Campus/career fair visits by community college students	100-500	High school students/parents invited to DMACC symposium	>100
E2020 (S-STEM) scholars at ISU	<100	PLTW programming by DMACC	>100
ETEC scholars at ISU	<100	New science lab on Ankeny campus	>100
ISU prospective students/parents	>5000/yr	ISU/DMACC events for women	<100

These activities are not comprehensive but are representative and have data collected or estimated. The demographics of these students are reported for questions 9, 10, or 15, or if not reported, are assumed similar to the student population to which they belong. Additional student demographic information is also given in the “SEEC Data Update” [4]. At DMACC, overall the gender demographics are 56% female and 44% male; and the ethnicity is 86% white and 14% minority for the project.

The impact on students varies by type of activity. The learning community and advising activities improve student success and engagement. In particular, transfer students enter engineering majors with a clear plan and connections that will assist them in making a smooth transition to ISU. The networking and communications activities improve the awareness, interest, and participation of high school and community college students in engineering, especially related to pathways and opportunities for study and careers in engineering.

3. Have the project activities been integrated within your (department, school, college and/or university)? Yes. If so, what is the nature of the integration?

Integration was built into the design of the project in the proposal, starting with the team members, institutional advisory board members, and organizational strategies. Integration promotes strategic, sustainable approaches to meet recruitment and retention goals. Organizationally, integration has happened through: (a) meetings of the SEEC Executive Team, whose members come from multiple colleges and departments; (b) the semester retreats and workshops conducted with Executive Team members and many others from ISU and DMACC; (c) on-campus connections through the Office of the Provost, ISU Academic and Student Affairs, Institutional Research, ISU Extension, and other administrative units and committees; and (d) connections among College of Engineering offices, committees, and academic departments. DMACC has also worked between departments on its initiatives and across its six campuses to try to ensure consistency for all students.

During the first year of the project, we emphasized partnerships and relationship building. We did so recognizing that connecting organizations and people leverages knowledge and resources. This was followed in the second year with an emphasis on communications to promote effective partnering and a shared vision for the project. We made it a priority to share information and engage stakeholders through various mediums. A communications consultant joined the project to support this effort. For example, project newsletters have been sent to project advocates every semester, and project news is disseminated through college newsletters to faculty, staff, and alumni.

Integration is also achieved as results of the project become part of the college's plans, practices, procedures, events, and materials. For example, new communications have been integrated into communication plans and media. New training is incorporated in events and materials. New information is shared and informs best practices. ISU's E-APP is an example of program integration between the college and the university; E-TEC, between the college and Extension. At DMACC, the new pre-engineering designation represents an integrated effort across departments, faculty, and staff.

4. Has this project had any impact beyond the intended project goals, for example on other students, faculty, departments, or institutions?

The scope of the project is deeper than originally envisioned in several areas: (1) transfer program development, (2) staff professional development, (3) networking to "change the conversation", (4) resource sharing with partners on common goals, and (5) data collection and evaluation.

At ISU, the project has led to the on-going development of a more extensive and effective transfer enterprise in engineering. One element of this is E-APP, and this has increased awareness of and enrollment in the university's Admissions Partnership Program. The peer mentor and ambassador programs for transfer students have had a significant impact on students. E-APP has improved the information and services available to students and faculty at community colleges across Iowa.

Although we anticipated that information would be made available to those who mentor and advise prospective and transfer students, we did not realize the need for and interest in training and professional development. In particular, we have responded with workshops and webinars involving DMACC and ISU faculty and staff, and also ISU Extension staff and field specialists.

We are still early in the development of the networks to “change the conversation.” The networks are not as flat or homogeneous as one might expect. There is already evidence that an entity in the network has the potential to create sub-networks involving other organizations. Moreover, the sub-networks may be very different from one another. DMACC has its own sub-network of high school and youth contacts. Extension has its own sub-network in the field.

ISU Extension underwent reorganization in 2009 due to state budget reductions. That led to a greater need to collaborate and leverage resources, which has strengthened the partnership with them on programs for talent expansion in STEM. Ultimately this financially benefits both.

There has been an impact on both DMACC and ISU on the need for careful data collection and for cross-institution collaboration in long-term monitoring for program evaluation.

Additionally, SEEC is impacting other student programs. At ISU, linkages have been established with other student programs in engineering, such as the Engineering Leadership Program and the NSF S-STEM program. At DMACC, the project highlighted other pre-professional programs that are offered as opportunities for students who start their education at the community college. It has also led to communications with career and technical students who might transition into engineering as a career field.

5. If you have partner institutions, what are you achieving through this partnership? Has the role of your partners changed from what was specified in the original proposal?

ISU and DMACC are partners on this project. The achievements of the partnership are described in this report. Although each institution manages its own activities, the project objectives span both schools, and the teams working on the objectives are comprised of members from both institutions. There is a mix of activities, from highly collaborative to institution-specific. DMACC has been able to use early collaborations with ISU to spin-off its own initiatives, such as EGR 100 and a communications plan. ISU has been able to pilot new programs, such as E-APP, with DMACC in advance of using with all Iowa community colleges. At DMACC, the collaborative efforts have enabled access to additional resources to better fulfill responsibilities within the institution particularly regarding training, staff development, symposiums, and PLTW. The project relationships have also enabled both institutions to get the necessary people involved to understand and address the issues and needs of students transferring into engineering.

The project has better positioned DMACC to manage and evaluate a STEM-focused grant program. Early in the project, DMACC quickly recognized the need to define what counts as STEM-related courses, departments, and students. This had not been done previously, and made it difficult to coordinate ISU and DMACC evaluation data. Whereas ISU has a substantial number of faculty and staff involved in program evaluation data collection, DMACC’s resource base is much less. DMACC has responded to the needs of the project.

Other partnerships within an institution and with other organizations are important for the project. These are referenced in this report and highlighted in question 3.

Additionally, the project has initiated a coalition among institutions in the Big 12 Conference having STEP projects with the goal to share information and best practices. A workshop at the 2009 ASEE Annual Conference provided an introduction and seeded interest in further interactions. An external advisory board member is also a STEP PI in the Big 12, and her observations about SEEC project activities and data have been very useful, reinforcing the potential value of this institutional network.

6. Have you had any positive surprises, including unexpected benefits from this grant?

Overall, the partnering, relationships, and networking have been richer than expected. Aspects of this are evident in the responses to questions 4 and 5. The interest by Extension youth field specialists to get involved has been very positive. The E-APP electronic professional network has opened a new door to connecting with community college students across the state.

DMACC has observed that relationships have been developed with some at ISU who were not originally involved in the project, and these have fostered better services, training, and resources. An ISU team member also points to relationships, stating: "Personally, I've been grateful for the expertise, openness, and flexibility of College of Engineering faculty and staff, and for the relative ease with which the highly diverse SEEC cross-disciplinary group has interacted productively."

Challenges/Adaptation/Assessment/Sustainability

7. What challenges have you faced when implementing your STEP project?

Management of a large, complex project that crosses boundaries between and within institutions is inherently challenging. Effectively working at the interfaces demands the time and ingenuity of project members. These interfaces are with partners, collaborators on campus, and outside organizations. Effective teaming is a constant consideration.

As relationships develop and evolve throughout the project, there are transitions in roles and work. Recognizing and coordinating these transitions are nontrivial for team members.

At both institutions, time pressures impact the involvement of faculty and staff. DMACC specifically cites staff demands, resources, and the number of students served at the community college. In normal times, there is often resistance to taking on new activities and making changes. In these times of budget shortfalls, this is magnified by a domino effect of staff and program reductions, even if not directly within your unit. ISU has met with significant state budget reductions during 2009. The SEEC project has provided critical support.

Evaluation has been challenging, in particular, figuring out initially how to structure data—and where to obtain the data—needed to address the objectives of the project. A secondary issue was the need to coordinate much of the detailed analysis with DMACC and to work with them to collect necessary information for the evaluation effort.

8. Describe any significant changes or deviations from the planned grant activities that you have made or would like to make. Explain why these changes were necessary or seem to be necessary.

Provide an explanation about how these changes have already impacted or are expected to impact the project.

In the original proposal, we did not specify the use of logic models as a planning, organizational, and management tool. During the first semester of the project, the evaluation team members introduced us to logic modeling, and we have been using it every year. We are also using the models to assess progress toward project goals.

Question 4 addresses impact beyond the planned goals, and in some cases where we have seen impact (or the potential for impact), we have adapted our activities accordingly. One example is the professional development and training activities. Another example is DMACC's communication plan. DMACC has spent much time and resources targeting students with appropriate materials to effectively communicate with all of the parties involved to recruit students into engineering. These activities have generated student interest in engineering.

Through review of intermediate metrics for the project, we observed significant variation in retention rates by academic department. See the graphs in question 10 for first-year rates. The data for second- and third-year retention shows even greater variations. Thus, the project will not only be evaluating college-level retention rates in engineering, but also each academic department. In particular, different departments may have different needs. With additional department-specific retention activities, there is an opportunity to improve retention overall and thus graduation rates in engineering. This will be an emphasis for the fourth year of the project.

9. What intermediate measures and metrics are you using to monitor the progress of your project?

The goal of the project is to increase the number of engineering graduates at ISU, the number of pre-engineering students at DMACC, and the gender and ethnic diversity of both. This is accomplished through recruitment and retention. Some metrics of interest are standard ones, and we need to judge the impact of project activities on measurement results. In other cases, a project activity naturally leads to a measurement, which is then matched to project goals.

- A. A key recruitment metric is fall new student enrollment, including first-year and transfer students, in engineering at ISU. Incoming students are the basis for a graduating class. Here, any reference to enrollment includes various demographic subtotals.
 - i. Admissions data (spring through summer) and summer orientation data are monitored in advance of fall enrollment. Participation by prospective students in recruitment events is tracked. In addition, the university has developed an enrollment projection model (and tuned it due to a university budget model that distributes tuition revenue to colleges); and these numbers are reviewed as well.
 - ii. Enrollment in E-APP is an intermediate indicator related to new transfer enrollment.
 - iii. Specific project activities also use qualitative measures and activity data. For example, a survey might be used to determine whether new messaging had the expected effect, such as increasing awareness about engineering. Or data might be collected to explore whether students in E-APP are engaged based on number of advising sessions.
- B. A key metric is number/diversity of DMACC students identifying pre-engineering as their designated emphasis.
- C. Another metric is number/diversity of DMACC students enrolled in EGR 100.

- i. Likewise at DMACC, specific project activities might use surveys, activity data, or other measures. For example, a survey of EGR 100 students might be used to gauge interest in pursuing a degree in engineering.
- D. Total engineering enrollments at ISU, including overall transfer enrollment and DMACC transfer enrollment, are metrics that capture all recruitment and retention efforts and reflect trends.
- E. A set of retention metrics are relevant, including first-, second-, and third-year retention rates, retention in the university, retention in the college, retention in the academic department, and retention by group.
 - i. An intermediate metric that contributes positively to higher retention is student participation in learning communities.
 - ii. Here, too, a specific activity might use a survey, such as student satisfaction with a peer mentor, which leads to improvement in peer mentoring, which leads to greater effectiveness of learning communities. Or data might be collected on student performance in math classes to draw conclusions about preparation, math placement, or advising.
 - iii. The National Survey of Student Engagement (NSSE) provides benchmarks of the student experience that contribute to student success and retention. In particular, first-year survey results provide relevant information.

10. Do these intermediate measures indicate that you are on track to meet your project goals? Yes, relative to the major goals. However, there are areas for improvement. **Include data that support your response.**

9.A. – The use of new student enrollment to track progress on increasing the number of engineering graduates at ISU is described in the SEEC Data Update [4] and summarized in question 15.

9.B. – Pre-engineering students at DMACC: 2008, 47 (7 female, 12 multicultural); 2009, 94 (10 female, 19 multicultural); 2010, 74 (7 female, 16 multicultural) (only fall 2009 data available).

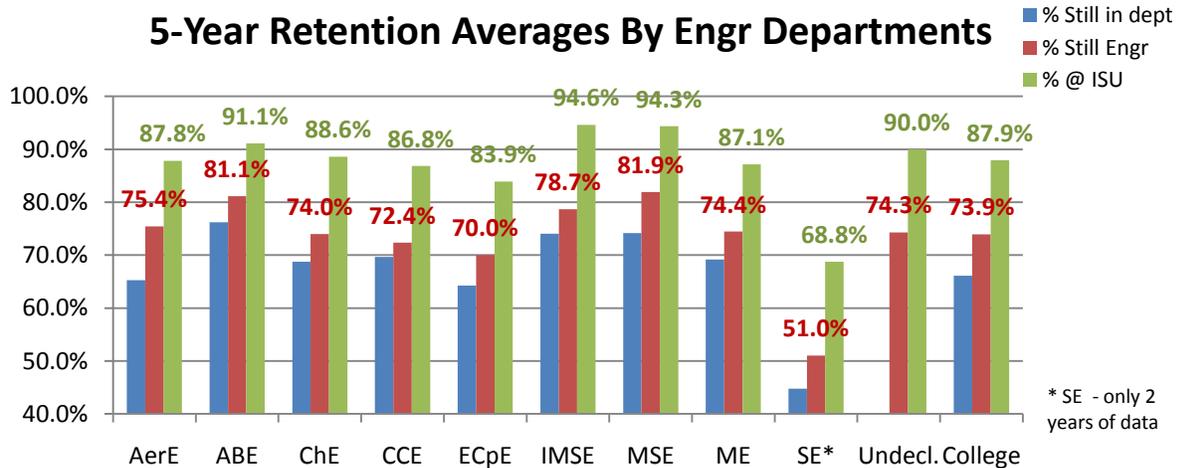
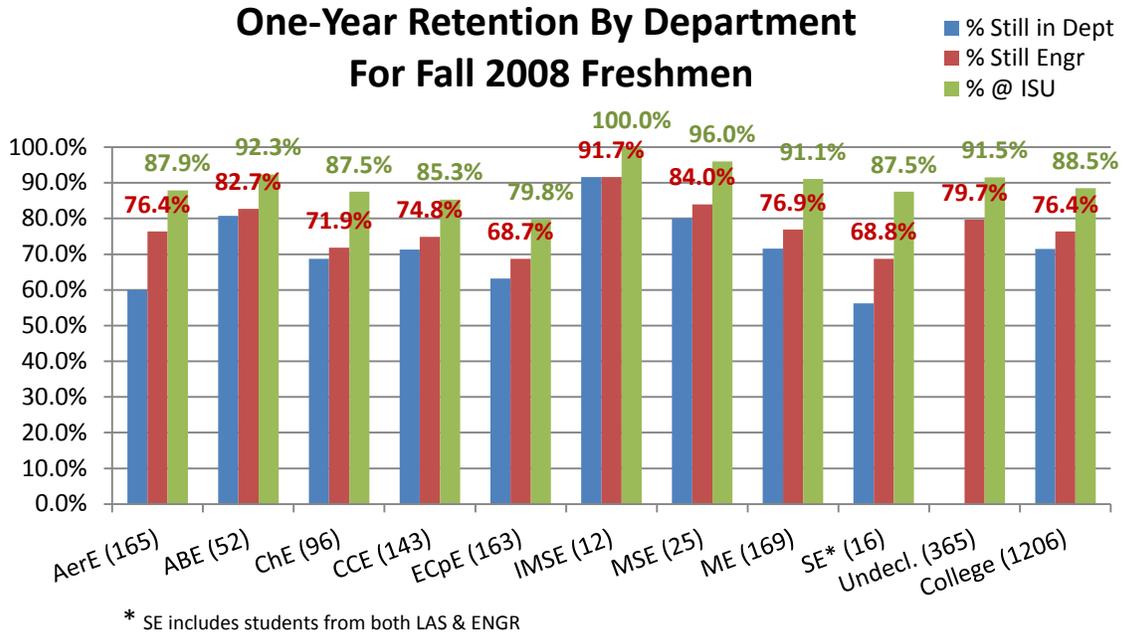
9.C. – EGR 100 students at DMACC: Fall 2008, 16 students (1 female, 4 multicultural); Spring 2009, 18 students (0 female, 3 multicultural); Fall 2009, 23 students (5 female, 6 multicultural).

9.D. – Selected total enrollment figures are included in the SEEC Data Update [4] and summarized in question 15.

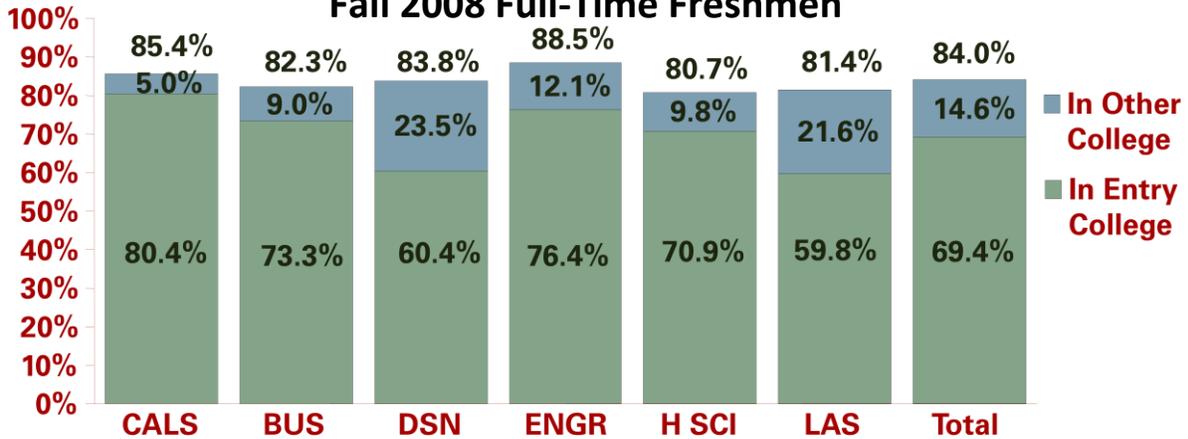
9.E. – The graphs below illustrate various retention rates for engineering at ISU. The first graph shows one-year retention from fall 2008 to fall 2009 for engineering students and whether students remained in their entry department, the college, or the university. An external advisory board member observed that the retention rate for “Undeclared” students remaining in the college (79.7%) is very good. This is particularly important since almost one-third of incoming engineering students are undecided on a major. There is an “Undeclared” learning community in the college.

The second graph shows the same subset of first-year retention information as an average over five years. This allows for a comparison with the first graph. In all but a couple of departments, retention within the college and the university are higher today than on average in the recent past. This is a good indicator for project goals.

The third graph shows the same first-year retention data as the first graph but across the colleges in the university. This suggests that engineering is positively influencing retention in the college relative to the rest of campus.



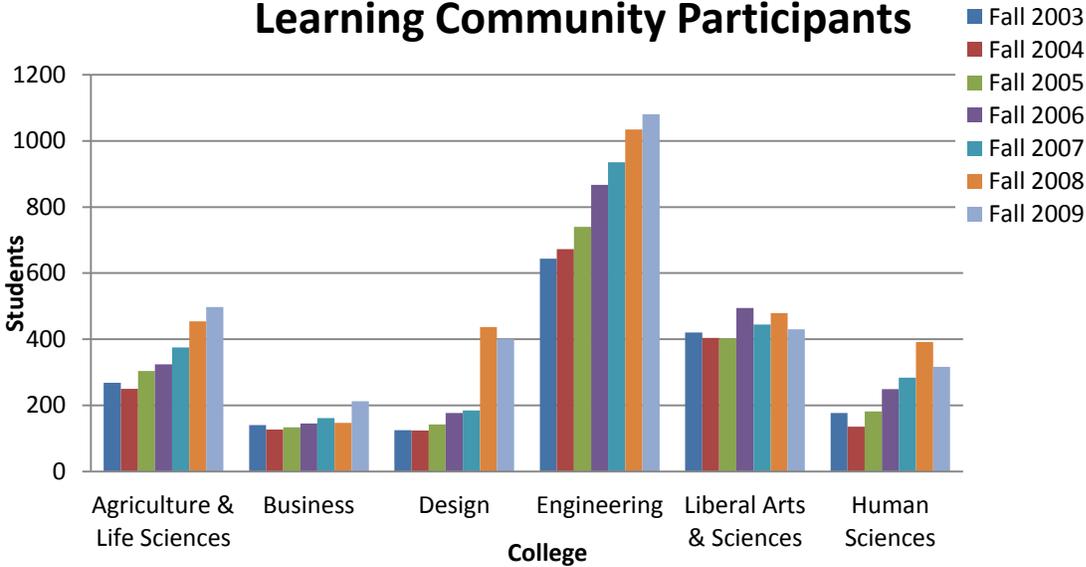
One-Year Retention Rates by Entry College for Fall 2008 Full-Time Freshmen

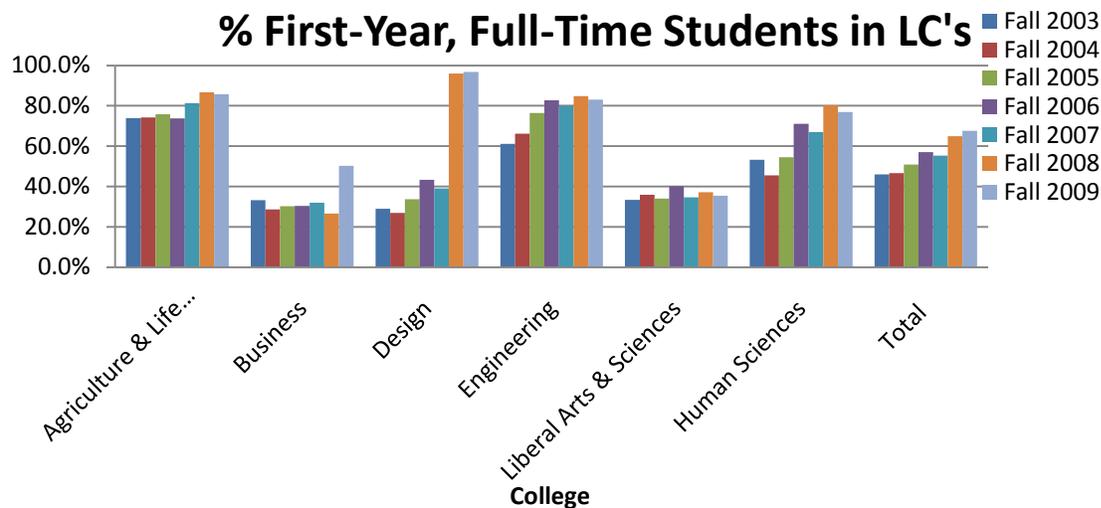


Metrics 9.E.i and 9.E.iii offer insights into engineering's retention results.

9.E.i. – Learning community participation in engineering and other colleges at ISU is shown in the two graphs below. The first shows numbers of students, and the second, percentages of students in a college. Nearly 85% of first-year engineering students belong to LCs.

Learning Community Participants





9.E.iii. – A comparison of the NSSE first-year student survey results from 2007 to 2009 for engineering students sampled at ISU shows increased ratings for each benchmark over that period. The benchmarks are: Level of Academic Challenge, Active and Collaborative Learning, Student-Faculty Interaction, Enriching Educational Experiences, and Supportive Campus Environment.

11. What actions have you taken to address sustainability of this project beyond the grant period?

One of the keys to sustainability is integration, addressed in the response to question 3. In addition, as part of project planning and discussions, we routinely consider whether an activity is expected to continue after the project, or whether outcomes will continue to be achieved. Every team leader is engaged in that process. The goal of the project is not restricted to the project. There is institutional commitment at many levels for recruitment and retention in STEM. The question is which SEEC project activities should be sustained and in what form to achieve recruitment and retention outcomes. These deliberations will be an emphasis during the fifth year of the project. However, team leaders are already exploring various options, for example, industry partnering to support the ETEC initiative.

In the College of Engineering, we have recognized the need for more robust and automated data collection, and the project is facilitating that. We added a senior staff member to the project team with this in mind. In addition, an institutional advisory board member is a senior analyst in Institutional Research, creating important linkages for project data needs. Project members will be consulted during the development of a new data warehouse by the university. At ISU, the bottom line is that recruitment and retention drive the educational mission and the financial health of the university and college, and thus we are charged with implementing and sustaining activities to those ends.

DMACC has created Pre-engineering as a component of its Pre-professional options. We have also created lab space which is dedicated to creating additional capacity for students interested in engineering. Also we have trained staff and faculty with newly developed communication pieces that target engineering. We also plan to utilize this model with other pre-professional programs in hopes of enabling community college students to more effectively take coursework which will help them to transition into colleges and universities as they complete their educational preparation.

Advisory Board

- 12. What is the relationship between the grant activities and the internal advisory board? How has the board been involved in assessing progress, addressing challenges or facilitating change, if needed, and addressing sustainability?**
- 13. What is the relationship between the grant activities and the external advisory board? How has the board been involved in assessing progress, addressing challenges or facilitating change, if needed, and addressing sustainability?**

Several comments are common for both boards, so we'll first consider the general relationship and then address specifics.

There are three boards: ISU's internal (institutional) advisory board, DMACC's internal board, and an external advisory board. The board members are listed at the project website [5]. The boards were introduced to the project during the first year with an email about the project, the proposal, and the website. Starting the second year, a project newsletter (personalized to the boards) was sent each semester. The boards have access to a Sharepoint intranet workspace used by the project. The site provides an inside look at project activities. The complete logic model for year three of the project was shared with the boards. The boards formally convened for the first time during the third year. The internal board met in person, and the external board by teleconference. Meeting documents are posted on the website and the workspace. Both boards reviewed the activities, data, and progress referenced in this report and provided feedback.

Internal Advisory Boards: The internal advisory board membership was carefully crafted to align with project objectives. Board members have institutional responsibilities in areas of the project, and SEEC Executive Team members are liaisons with board members. Several board members have participated in project activities during the course of the project. For example, Mary Holz-Clause, a senior leader with ISU Extension, has opened E-TEC web conferences with field specialists. Doug Gruenewald, co-director of ISU Learning Communities, has attended team meetings. Gary Mirka, department chair of industrial engineering, which recently launched a new 2+2 program with DMACC, participated in a SEEC workshop. ISU's provost highlighted the project at an annual community college summit hosted by the university. Likewise, several DMACC board members have been actively involved with project activities. As a follow-on to the fall 2009 board meeting, SEEC Exec Team members liaised with respective board members to gather additional feedback on progress. They commented on impact, which activities are sustainable, and what issues concern them. Their input is reflected in this report. The next board meeting will be later in spring 2010.

External Advisory Board: The external board brings broader perspectives to the project. The chair is a former engineering dean (of ISU) who has also been president of ASEE. Members include a STEP PI from a Big 12 university and another STEP PI from an Iowa community college. Another member is an engineering alumnus working in industry. The fall 2009 board meeting resulted in specific feedback and opportunities for continued dialogue. The board has recommended that we create a top-level logic model that identifies two or three main activities for each objective of the project – as a means to manage scope and evaluation. Kimberly Douglas-Mankin has suggested some data comparisons. Robert Driggs will be visiting campus early spring semester for further discussion. The board plans to meet by teleconference and in person in spring 2010.

Lessons Learned/Overall Impact

14. What have you learned from this project and its implementation? What advice would you offer to new STEP PIs?

These are complex projects, requiring leadership and management skills and strategies. Logic models help with project management and evaluation.

There is a need to be flexible and adjust to changing circumstances (e.g., inter-institutional differences, new dean, declining state budgets).

Partnership development between different institutions takes time and persistent effort. Taking time to build relationships and identify informal leaders improves progress.

Network development is a dynamic process, thus, there is a need to be flexible. A combination of interpersonal interaction and technology is required.

Evaluation of transfer student success and persistence is complex and requires both quantitative and qualitative measures. Transfer student transcript stories can serve to inform transfer policy within the college and university.

Institutional data management is nontrivial. Involve the data experts on campus.

15. Finally, please provide an overall summary of how the state of your project relates to your original targets and to the other goals of the project. Include the number of students majoring in fields affected by your project versus the projections.

The goal of the SEEC project is to increase the number of engineering graduates at ISU to approximately 900 graduates annually, the number of pre-engineering students at DMACC, and the gender and ethnic diversity of both.

The 2007 and 2008 new enrollments should lead to the 2012 graduating class, which is the first target class for SEEC. The number of new engineering majors (freshmen and transfers) for fall 2007 is 1423, and for fall 2008, 1469 – an average of 1446. In our analysis, as described in the SEEC Data Update [4], we used the new enrollments for 2001 and 2002 as a target, and the average new enrollment for these two years is 1442. Thus, the actual number of new engineering majors shaping the 2012 graduating class is 1446 (an average), compared to the projection of 1442. Thus, we have a reasonable number to reach our goal.

This assumes that the retention and graduation rates affecting the 2007/2008 students will be at least as high as those for the 2001/2002 students. Given the retention data presented in questions 9 and 10, and successful project activities described in question 1, we expect to achieve 900 engineering graduates in the class of 2012.

In terms of graduation numbers beyond 2012, our current enrollment numbers are strong. The trend of increasing new student enrollment, including transfer students, continued for fall 2009. The fall 2009 new student enrollment in engineering at ISU is 1575 students. The total number of engineering majors at ISU as of fall 2009, 5085, is the highest enrollment in 25 years. There is also increasing enrollment in

engineering from DMACC. In fall 2009, 453 transfers from DMACC were enrolled in STEM majors, including 123 in engineering majors. This compares with 2008 figures of 393 and 103 in STEM and engineering, respectively. 152 new transfers from DMACC were admitted in fall 2009 in STEM majors, and of these, 47 in engineering. The percentages of women students in engineering at ISU in 2008 and 2009 are, respectively, 14.6% and 15.0%. The percentages for students of color are, respectively, 7.7% and 8.9%. Pre-engineering students at DMACC increased from 47 in 2008, to 94 in 2009.

Thus, there are many positive indicators that we are making progress on the goals of the project. The biggest challenge relative to original targets is likely to be the recruitment of women to reach 20%. The next challenge will be maintaining graduation numbers in the long run, especially given the projections for decreasing high school graduates in/near Iowa. This will put more pressure on broadening participation and on retention, and we will need to continue to increase rates in the college.

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Note: As a collaborative project submitting one report, we were given permission to have a few extra pages if needed.

NSF STEP SEEC Project
ISU/DMACC Collaborations in Engineering
www.engineering.iastate.edu/seec/
May 2010

SEEC Highlights

- The college has customized ISU's Admissions Partnership Program (APP) with Iowa community colleges to support prospective transfer students in engineering, called E-APP. As a part of E-APP, DMACC students are assigned an academic advisor, invited to join an online professional network, introduced to ISU transfer peer mentors, and invited to participate in transfer events on campus including the Engineering Career Fair and VEISHEA.
- DMACC has identified pre-engineering student cohorts and created a four-semester learning community. The number of pre-engineering students at DMACC increased from 47 in 2008 to 94 in 2009.
- DMACC, in collaboration with ISU, has created its own introductory engineering orientation course, EGR 100, and revised its advising system for pre-engineering students.
- Through a new transfer peer mentor program, an enhanced peer mentor relationship is being built with pre-engineering students.
- ISU transfer peer mentors, faculty, and staff make presentations in DMACC's EGR100 class.
- PWSE transfer peer mentors and engineering staff visited DMACC EGR100 class and then hosted 7 female pre-engineering students for a networking lunch at the DMACC Ankeny Campus.
- DMACC has significantly advanced its engineering-related programs, communications, and services.
- DMACC has identified, developed, and implemented a comprehensive communication plan that familiarizes high school students, parents, faculty, and staff with career opportunities and educational pathways in engineering.
- DMACC and ISU co-sponsored a Discover Engineering Day at the DMACC Ankeny Campus FFA Building. Eighty high school students (29 female) and 60 parents attended this event. ISU Engineering provided speakers, student orgs, and staff support for this event.
- ISU provided an engineering speaker, dinner, and various speakers and booths at the annual Phi Theta Kappa Conference held at the Boone Campus.
- ISU Engineering provided two sessions and booths at the Innovate Week Events at the DMACC West Campus.
- ISU Engineering hosted over 75 DMACC/ISU advisors and recruiters for the SEECing Connections professional development workshop, to introduce engineering resources, discuss student transfer issues, network, and visit engineering departments.
- 152 new transfers from DMACC were admitted to ISU in the fall 2009 in STEM majors; of these, 47 were in engineering.
- The SEEC Project Executive Team compiles and disseminates transfer student success data, to inform program and policy development.
- Through the complementary NSF S-STEM (E2020) project, ISU provides 4-year \$10,000 scholarships to transfer students, including students from DMACC; www.engineering.iastate.edu/e2020/.

Other Highlights (not specific to SEEC)

- Two ISU engineering departments are actively pursuing 2+2 programs in Industrial Engineering and in Chemical Engineering to expand pathway options for pre-engineering students.
- ISU Engineering has proposed a new Bachelor of Engineering Technology (BET) degree program in information and computer engineering technology, which will afford a new career path for DMACC students.
- ISU Engineering hosts high school and CC/DMACC students for information technology/cyber security competitions through IT Adventures and IT Olympics.
- ISU Engineering provides Project Lead The Way training to high school and CC faculty in Merged Area 11. Regional training recently occurred at the DMACC Ankeny Campus FFA Building. ISU coordinates PLTW certification visits at Merged Area 11 high schools.
- ISU engineering is working with DMACC high school programming staff to plan a FIRST Lego League tournament at the DMACC Ankeny Campus.

Opportunities

- Continued relationship building, collaboration, communication, and resource dissemination will lead to increased awareness and public understanding of engineering careers among students, parents, faculty, and staff (including K-14 audiences).
- Explore, strategize, and develop approaches to reach and enroll more women and under-represented domestic minority students.
- For this coming year, ISU Engineering has established E-APP as a new ISU learning community, with the intention of increasing community college pre-engineering student engagement prior to coming to Iowa State.
- Further study, dissemination, and professional development related to engineering transfer students' success and retention will lead to more informed programming, advising, and student choices.
- Expansion of pre-engineering offerings at other DMACC campuses. ISU can assist in recruiting new engineering faculty and/or grad students to teach at DMACC.
- Additional funding opportunities exist that can help maintain momentum for 2- to 4-year STEM initiatives (National Science Foundation, Lumina, Iowa Department of Economic Development, Iowa Workforce Development, private funding, etc.)
- Summer research experiences for students and/or faculty needs to be expanded.
- Transfer scholarship opportunities (at all levels) and processes need to be a priority in order to ensure access for economically disadvantaged transfer students.

Feedback

At a lunch in fall 2009 following a training program with DMACC high school recruiters/advisors, a recruiter said: "This is great; six months ago I didn't even know DMACC offered pre-engineering courses. Now, I do and I can talk to the teachers and counselors in the schools and encourage the students to learn more about engineering." *Reported by a SEEC team member*

"The Admissions Partnership Program was a really good experience. It helped make my transfer from DMACC to ISU a success. My advisors from both schools were a big help. They guided me to take only classes that would transfer, so I wasn't wasting my time. I also took ENG 160 and ENG 170 through the dual-enrollment program, which was also a big help." *Andrew Smith—Junior, Agricultural and Biosystems Engineering, DMACC Transfer, Peer Mentor for EGR 100*

“Peer mentors help with the peer connection because they are examples of successful transfer students. They understand the struggles transfer students have and serve as another ‘bridge’ between ISU and DMACC. Peer mentors are a big key in making student connections. Each peer mentor is assigned several transfer students and they are required to interact weekly – usually this happens electronically. Being a peer mentor is a good leadership opportunity.” *Jacquelyn Baughman—Graduate Assistant and Doctoral Student, Agricultural and Biosystems Engineering, EGR 100 Instructor*

“The E-APP program is a great idea for community college students who want to be engineers. It makes them think longer-term and gets them prepared to transfer to ISU. It gives the students an opportunity to have advisors on both campuses who can guide the students to take the ‘right’ classes so they don’t waste time or money. Additionally, the cross-enrollment program allows students to get their feet on the ISU campus and interact with ISU professors and students.” *Sue Ziegenbusch—Academic Advisor, Agricultural and Biosystems Engineering*

“I speak to students in EGR 100 about the E-APP program, Career Fair, course sequence and other services that are available to pre-engineering students. I help students schedule appointments with ISU advisors on the DMACC campus so they can better plan their transfer sequence. In general, I work with faculty and staff at both DMACC and ISU to help better connect DMACC pre-engineering students to ISU.” *Ahmed Onwona-Agyeman—SEEC Advising Contact, DMACC*

“The SEEC project has helped to enhance the Admissions Partnership Program at ISU. This program allows community college students to enjoy all of the benefits of being an Iowa State student while enrolled at their community college. Although ISU started this program a few years ago, it wasn’t until the SEEC project created key partnerships with DMACC and the other Iowa community colleges, that we saw significant numbers of students signing up for this program. It is critical that community college students get connected with academic advisor, university peer mentors, and to the academic programs in order to be successful in transitioning to a large research university.” *Doug Gruenewald, Co-director ISU Learning Communities and member of the SEEC Internal Advisory Board*

DMACC EGR 100 Students:

“I went to the Program for Women in Science and Engineering conference and got to know a lot of the counselors and different people and that helped me. I even keep in contact with some of the girls I met there. We talk about different classes we’re taking and when we’re transferring and stuff like that, so it makes me feel a little bit more comfortable about the transfer process.”

“We had a couple professors who came down and did demonstrations. I was very surprised that at least two of them came down and said, “If you have any questions e-mail or call me.” Although we’re not technically Iowa State students, they were very willing to help through the E-APP. I was very surprised at just how helpful the advisors have been.”

“I’ve actually been in the E-APP since last fall and I’ve contacted my advisor at Iowa State several times and he’s been incredibly prompt at returning my e-mails. I’ve gotten responses within hours and not days, and I’ve been very impressed with that. He’s given me some advice on a list of classes I thought I would take this semester and he recommended some changes and that was very helpful to me.”

Appendix E

**LOGIC MODELS by O-Teams
SEEC Year Three, 2009-2010**

01. Learning Village. To Build a Learning Village (LV) that enhances student engagement and creates ISU connections for community college pre-engineering transfer students. (3rd Yr).

RESOURCES	ACTIVITIES	OUTPUTS	SHORT TERM OUTCOMES	LONG TERM OUTCOMES	LV TEAM ASSESSMENT: Measuring Progress	
In order to accomplish our set of activities we will need the following (or we have the following on hand).	In order to address our O-Team goal(s) we will accomplish the following activities.	What are the tangible products of our activities? (what do we expect to see as a result of our activities...remember these are tangible outputs.)	What changes do we expect to occur within the short term? (year 3 of the grant)	What changes do we want to see occur after that?	What will we measure to determine progress towards team objective & grant goals?	ISU=ISU Assessment, DM=DMACC Assessment
Graduate Assistants LV Team Members Peer Mentors Grant Funds\$ LCTT PWSE CoE Staff & Faculty Advising O-Team	A1. Expand/Enhance LV Concept -APP-Engr Program Development and Marketing/Communication -Peer Mentor Program Development and improvements -Ambassador Program Development -Expand E-APP availability -Develop and implement diversity recruitment strategies -Partnerships with PWSE and Diversity with ISU and DMACC events	-Peer Mentor Resource Manual Developed -Peer Mentor Training Mapped/Outlined -Transfer Ambassador Program Developed -Developed social/professional networking site with E2020 transfer students (Groupsite) -Develop and implement transfer student activities/semester -Provide E-APP brochure online (MD, PM) -Expand E-APP communication and marketing plans to IA CCs (MD, ML, PM) -Diversity Recruitment Events	-Enhance peer mentor relationship building with pre-engineering students -Peer mentors continue to develop leadership skills and plan and host events -Peer mentors partner with COE E2020 peer mentors to enhance transfer student events/activities -Peer mentor responsibilities include both recruitment and relationship building -Develop partnership with E2020 transfer scholarship program participants -Improve and enhance diversity recruitment efforts at IA CCs	-Established and sustainable peer mentor program -Established and sustainable Ambassador program -Increased diversity in peer mentor program through development of Ambassador Team program -Established and sustainable process for peer mentor recruitment and relationship building -Established online E-APP brochure for IA CCs -Increased diversity of engineering transfer student population	1. Track # of EGR 100 enrollees & demographics 2. Track Pre-engineering # and demographics 3. Track E-APP enrollment/ demographics 4. Track engineering student success for APP-Engr vs. non APP-Engr 5. Capture qualitative data on CC students experiences (Pre/POST) 6. Capture EGR 100 perceptions of engagement and transfer-readiness 7. Track # of engineering transfer students semester: CC, Demographics, etc. 8. Track DMACC LC participation. 9. Track DMACC LC Demo 10. Track attendance/demo at ISU engineering career fair, APP days, Transfer Student Days, SEEC/LV Transfer student event/activities attendance and satisfaction 11. Track ISU engineering retention data APP v. nonAPP, LC and non-LC, SI, etc. 12. Track recruitment demographics	1. DMACC 2. DMACC 3. ISU 4. ISU 5. ISU 6. ISU, DMACC 7. ISU 8. DMACC 9. DMACC 10. ISU 11. ISU 12. ISU and DMACC

	A2. Enhance/expand LC Model at DMACC and ISU	<ul style="list-style-type: none"> - Pre-engineering LC @ DMACC implemented with progress reports (HM, RS) - ISU LC enhancement/expansion to all students/departments (SM, DP, PC) 	<ul style="list-style-type: none"> - All ISU engineering dept. have LCs - DMACC identifies pre-engineering student cohorts and builds 4-semester LC 	<ul style="list-style-type: none"> - Sustainable community college pre-engineering LC model. - ISU LC enhancement/expansion 	<ol style="list-style-type: none"> 1. Pre-engineering 4-semester LC development 2. Track # pre-engineering students/demographics 3. Track ISU LC program enhancement/expansion 4. Track LC Transfer Student Retention 	<ol style="list-style-type: none"> 1. DMACC 2. DMACC 3. ISU 4. ISU
	A3. Share information with other Big 12 Step sites	<ul style="list-style-type: none"> - Mutual sharing of information with peers from Big 12 STEP sites (ASEE'09 session) (SM, MD, HM, DR, ML) - Develop posters/publications for dissemination of information (SM, MD, HM, DR, JB, ML) 	<ul style="list-style-type: none"> - Build an information sharing network - Reduce travel required for information sharing between sites - Share successes and challenges and gather input into project problem solving and decision making 	<ul style="list-style-type: none"> - Connect Big 12 STEP sites - Develop and build sustainable information sharing network - Provide professional development for all sites - Provide benchmarking and continuous improvement opportunities for participating sites 	1. Posters/Presentations/Papers	1. ISU, DMACC
	A4. Develop informational materials with Advising O-Team	<ul style="list-style-type: none"> - Develop and provide input into the "SEEC Transfer Student Profile Data Brief" (MD, RC, FSL) - Develop 1 webinar/video per semester for fall'09 and spring'10 (MD, PM, ML, JB) 	<ul style="list-style-type: none"> - Develop data brief to inform project activities with Advising O-Team - Provide cross-institutional information to key stakeholders (advisors, students, admin., etc.) 	<ul style="list-style-type: none"> - Continuous improvement of team activities - Ensure sustainability and institutional transformational change - Provide transfer resource information for key stakeholders 	<ol style="list-style-type: none"> 1. -Data brief format with Advising O-Team -Develop communication and information dissemination plan and format with Advising O-Team 2. -Webinar/video progress/updates 	<ol style="list-style-type: none"> 1. ISU 2. ISU

O2. Connected Curriculum. To redesign the first-year engineering curriculum to enable flexibility and commonality across LCs; and to make selected engineering gateway courses available to DMACC students.

- A1. Apply outcomes-based design to first-year engineering courses and identify multiple tracks to achieve outcomes that fit within the learning village. Emphasize the following attributes of the first-year curriculum: student engagement and success, academic rigor, and classroom climate.
- A2. Implement interdisciplinary service-learning projects and undergraduate research projects as part of LC programming for 2nd and 3rd year students. Evaluate curricular and co-curricular factors that affect 2nd and 3rd year retention.
- A3. Develop and implement the ACCESS program, Availability of courses for Community Colleges in Engineering Study, an initiative to offer selected gateway courses in engineering to community college students.

RESOURCES	ACTIVITIES	OUTPUTS	SHORT TERM OUTCOMES	LONG TERM OUTCOMES	CURRICULUM TEAM ASSESSMENT: Measuring Progress	
Faculty and staff time.	Curriculum planning by First Year Steering Committee (Diane Rover, Associate Dean and Professor of ECE; Larry Genalo, University Professor of MSE; Tom Brumm, Assessment Director and Assoc. Professor of ABE; Joel Johnson, Director of Student Programs and Services; Roger Bentley, Manager of Student and Alumni Career Services; and Ana Williams, chemical engineering undergraduate student and E2020 peer mentor). Involve DMACC faculty in the review process.	Set of FY student outcomes, which will be used by a college-wide Review Committee during 09-10 to develop a comprehensive vision of the first-year-plus for all engineering students. Draft course plan for new introductory engineering course. Budget plan under the university's Resource Management Model (RMM).	Commitment to update the curriculum and related student programs to achieve desired student outcomes.	Redesigned first-year-plus program that emphasizes student engagement and success, academic rigor, and classroom climate. Broaden participation in engineering.	formative assessment of course plan	ISU/COE
Report from Institutional Research. Faculty and staff time.	Analysis of the 2008-09 NSSE (National Survey of Student Engagement) results for engineering students.	Evaluation and dissemination of results to academic and student programs.	Baseline indicator of student engagement. Faculty/staff awareness of student engagement.	Recognition and active use of engagement as a FY-plus student outcome. Improvement of student engagement.	Are the NSSE results being used, by who and how	ISU/COE
Faculty and staff time. Dissemination expenditures.	Re-distribute the resources on classroom climate developed in the first year of the project. Share resources with DMACC.	Dissemination of resources via faculty meetings or electronic communications.	Faculty/staff awareness of classroom climate.	Recognition and active use of best practices for classroom climate. Improvement of classroom climate. Broaden participation in engineering.	Are the classroom climate resources being used, by who and how	ISU/COE
Faculty and staff time. Financial support	Monitor student success factors related to curriculum <u>in coordination with the Advising Team</u> and the Engineering College Advising Committee. In coordination with university retention initiatives,	MAP-Works results used by academic advisors. Analysis of MAP-Works data for engineering students and	More effective tools and models available to improve student retention and success.	Improvement of student retention and success. Broaden participation in	# using MAP-works and how is it being used	ISU/COE

<p>for MAP-Works and ALEKS.</p> <p>Leadership by Mary Goodwin.</p>	<p>the Provost Office, and Student Affairs, pilot the use of MAP-Works (http://www.map-works.com/) in engineering through learning communities and first-year programming. This complements well-established early-intervention activities in the college.</p> <p>In coordination with the Math Department and other university offices, pilot the use of a new math placement exam called ALEKS (http://www.aleks.com/). This complements the work of academic advisors in the college to use available data to place students in appropriate math courses during orientation.</p> <p>Collaboration with DMAACC (and other community colleges) on math preparation of transfer students.</p>	<p>comparison with other models.</p> <p>Use of ALEKS for 2010 orientation.</p> <p>Obtain results of Math Department meetings with community colleges.</p>		<p>engineering.</p>		
<p>Faculty and staff time.</p> <p>Coordination with NSF S-STEM “E2020” project team.</p>	<p>Use NSF S-STEM grant programming to advance curricular changes for SEEC. First-year courses and learning communities will incorporate introductory learning modules emphasizing selected outcomes from the NAE’s vision for the engineer of 2020. These include student professional development in the areas (or pillars) of leadership, interdisciplinary and systems thinking, innovation and entrepreneurship, and global awareness. Groups will be led by faculty leaders in each outcome area: leadership, Krishna Athreya, MSE and the Engineering Leadership Program; systems thinking, Chris Rehmann, CCEE; innovation, Doug Jacobson, ECE and IT-Adventures; and global awareness, Amy Kaleita, ABE.</p>	<p>Pillar groups actively working on curriculum development and outcomes assessment.</p> <p>Competency-based learning model for each pillar.</p> <p>Sample activities and assessments for each pillar.</p>	<p>Faculty awareness of “Engineer of 2020” outcomes.</p> <p>Student awareness of “Engineer of 2020” outcomes.</p>	<p>Program outcomes, curriculum, and assessment supporting student achievement of “Engineer of 2020” outcomes.</p> <p>Improvement of student engagement and retention.</p> <p>Well-prepared graduates who meet the expectations/needs of employers.</p> <p>Broaden participation in engineering.</p>	<p>Formative assessment on student professional development</p>	<p>ISU/COE</p>
<p>Faculty, staff, and student time.</p>	<p>Build on the example of the Engineering Leadership Program’s service-learning project during the second semester of the first year (http://www.eng.iastate.edu/leadership/serviceprojects.asp). The new E2020 Learning Community will facilitate project-based learning experiences during the student’s second year and beyond.</p> <p>Use information from recent workshops on NSF-sponsored research on Project-Based Service Learning, e.g., see An Interactive Workshop Session</p>	<p>Documentation of project-based service learning (PBSL) practices.</p> <p>Define a new faculty appointment, the director of service learning in engineering, to provide leadership in the college.</p>	<p>Increased resources, expertise, and guidance to develop and integrate PBSL activities into the student experience.</p>	<p>Improvement of student engagement and retention.</p> <p>Student achievement of program outcomes.</p> <p>Broaden participation in engineering.</p>	<p>#s involved in service learning projects, # of service learning projects.</p>	<p>ISU/COE</p>

	<p>on Measuring the Impacts of Project-Based Service Learning on Engineering Education, http://www.eng.iastate.edu/aciee/workshops.asp.</p> <p>Promote and support student interest and participation in service-learning projects in engineering. Service learning projects are often co-curricular or extracurricular, sometimes through student organizations such as Engineers for a Sustainable World and Engineers Without Borders, both of which have active student chapters on campus.</p> <p>The College of Engineering is actively involved with the university in supporting the Carnegie classification for Community Engagement.</p>					
<p>Faculty time.</p> <p>Possible financial support for programs.</p>	<p>Promote and support undergraduate research opportunities in engineering. The PERUSE Program (Providing Experiences in Research for Undergraduate Students in Engineering), managed by Engineering Graduate Programs, promotes and facilitates undergraduate research for current students.</p>	<p>Disseminate information about PERUSE (Providing Experiences in Research for Undergraduate Students in Engineering, managed by Engineering Graduate Programs) and NSF REU programs.</p>	<p>Increase faculty awareness about the impact of undergraduate research experiences.</p>	<p>Improvement of student engagement and retention.</p> <p>Student achievement of program outcomes.</p> <p>Broaden participation in engineering.</p>	<p>#s involved in REUs and PERUSE</p>	<p>ISU/COE</p>
<p>Faculty and staff time.</p>	<p>In coordination with academic departments and the <u>Advising Team</u>, ongoing review of transfer programs of study, transfer guides, and courses on the critical path. Review of transfer student programs. Review of transfer credit.</p> <p>Monitor student enrollment in ISU-DMACC Cross Enrollment programs.</p> <p>For ISU students: http://www.public.iastate.edu/~registrar/info/crossnroll.html For DMACC students: http://www.dmacc.edu/registration/cross-enrollment.asp</p>	<p>Department initiatives, such as IMSE's new 2+2 plan for transfer students in Industrial Engineering.</p> <p>Provide information to departments about the new TRANSIT website, https://transit.iastate.edu/, a convenient tool for community college students to explore how coursework will satisfy ISU degree requirements.</p> <p>Data on ISU-DMACC Cross Enrollment program use.</p> <p>Data on transfer credit.</p>	<p>Increase department awareness and activities in relation to curriculum for their transfer student constituency.</p>	<p>Well-defined curricular paths for transfer students.</p>	<p>See LV assessment for tracking transfer students, etc.</p>	
<p>Staff time.</p>	<p>Monitor second- and third-year undergraduate courses being offered online during the summer</p>	<p>Data on community college student enrollment in online</p>	<p>Evaluate the current availability and need for</p>	<p>Improve course availability for transfer students to</p>	<p>Track # enrolled</p>	<p>ISU/COE</p>

	and academic year.	undergraduate engineering courses at Iowa State.	online courses in relation to transfer programs of study.	enable a smooth, efficient, and successful transition.		
Faculty and staff time. Dissemination expenditures.	<p>Monitor, facilitate, and contribute to, as appropriate, faculty-led curriculum initiatives that advance the recruitment and retention of engineering students using approaches strongly aligned with SEEC objectives. Several ongoing or pending initiatives include:</p> <ul style="list-style-type: none"> • Bioengineering minor, which offers new biology-themed curricular opportunities to students in all engineering majors. Also attractive to broader demographics of students. • Summer bridge program called SPEED, Summer Program for Enhancing Engineering Development, offered by the Engineering Diversity Affairs office. The eight-week program is designed to provide women and multicultural students the opportunity to participate in either an academic program or a research program prior to their first semester at Iowa State. The academic track prepares the students to begin their first year taking advanced-level math and physics courses instead of prerequisite courses. They also develop stronger study habits and create a support network of peers, faculty, and staff. Students in the research track are paired with a mentor and gain hands-on experience working on active research projects. • Engineering technology bachelors degree program in Information and Computer Engineering Technology, proposed by the Department of Electrical and Computer Engineering. The program is being designed in collaboration with community colleges to provide increased opportunities for transfer students to pursue STEM careers. 	Leverage the programs and disseminate information in mutually beneficial ways.	Targeted program offerings that address specific needs.	<p>Faculty engagement in recruitment and retention.</p> <p>Increase in student interest, preparation, and retention.</p> <p>Well-prepared graduates who meet the expectations/needs of employers.</p> <p>Broaden participation in engineering.</p>	Track # and types of initiatives	

03. Student-centered Advising. To develop and enhance academic advising and mentoring programs for pre-college, community college, and university students.

RESOURCES	ACTIVITIES	OUTPUTS	SHORT TERM OUTCOMES	LONG TERM OUTCOMES	ADVISING TEAM ASSESSMENT: Measuring Progress	
Advising Team Program Coordinator OCCRP GRA	A1. Develop a data system which informs program development towards pathways of success in Engineering.	1..Student success/engagement reports, student snapshots, and benchmarking will be used to capture and communicate transfer student success/retention. 2. Two new SEEC Data Briefs will be developed and disseminated	Data driven program development will occur at both CC and ISU levels allowing for evidence-based decision making. Recruitment and advising messaging to transfer students will reflect practices which are most likely to result in success. Advising “10 ten” for engineering transfer students	Transfer students will enter engineering majors with a clear plan and connections that will assist them in making a smooth transition to ISU. The number of College of Engineering graduates will increase by at least 120.year when compared to the baseline(s). Community college students are more engaged and successful after they arrive at ISU.	Entering GPA	DMACC/CC
Advising Team LV Team	A2 Provide professional development to CC pre-engineering advisors and faculty.	1. Professional Development Event 2. Career Development /Transfer Webinar Series. 3. Presentations to DMACC Advisor Group.	Teams of CC advisors and faculty are engaged in professional development activities aimed at dissemination of student success reports, best practice, curriculum, and new resources.		Course taking patterns	DMACC/CC
Advising Team Transfer Materials Sub Committee OCCRP/Pathway2STEM	A3. Develop and implement a. Communications and b. transfer advising materials for CC audiences	1. Newsletter is distributed (Nov. and Feb) 2.Student success information is distributed (student stories, quotes, and input 3. New print and web-based materials are distributed Updating process is ongoing 4.Electronic Network for prospective transfers through Groupsite	CC advisors, counselors, and faculty access resources from multiple mediums aimed at providing advising services leading to increasing levels of engagement at ISU.		Transfer retention rates	ISU
Advising Team Transfer Intervention Sub-Committee	A4. Develop and Implement a mentoring and transfer intervention program.	1. Early Warning System. A simple computer-based system to let instructors contact students and advisors within the first 4 weeks of classes. 2. MAP-Works Survey Tool 3. New Transfer learning community for engineering students, especially undeclared. 4. ECE Learning Community 5. Transfer Orientation class for all students 6. E2020 Scholarship Class 7. Targeted Tutoring based upon student needs. 8. Review policies, procedures, and practices regarding recruitment, enrollment and retention of each engineering transfer student group (DMACC).			Student interview data	ISU
					Pre-Post assessment for event Year end survey of CC advisors and faculty.	ISU/RISE
					See student engagement measures in LV plan. Year end survey of CC advisors and faculty	RISE/LV Team
					Focus Group with Mentors and Mentees Intervention plans/reports from departments.	RISE ISU

O4. Coordinated Networking. To establish a recruiting and outreach network across Iowa and with alumni using ISU Extension, DMACC, and involving parents and teachers; to tap into diverse communities of students; and to improve the awareness and understanding of engineering among those who influence student choices.

RESOURCES	ACTIVITIES	OUTPUTS	SHORT TERM OUTCOMES	LONG TERM OUTCOMES	NETWORKING TEAM ASSESSMENT: Measuring Progress	
<p>Network Teams</p> <p>Time</p> <p>Funding and expertise to support efforts</p> <p>Technical Support for Developing and Delivering Series & ETPIC</p> <p>Extension Network</p> <p>Community College staff, directors, advisors, faculty, etc.</p> <p>Alumni Network</p> <p>Engineering Career Services (liaison to Engineering Coops and interns and alumni)</p> <p>Economic Development</p>	<p>A1. Improve engineering awareness across Iowa.</p> <p>A2. Insure programming and strategies emphasize recruitment of under-represented students (girls and ethnic minority students)</p> <p>-Develop, promote, and deliver (via Adobe Connect & professional meetings) engineering career awareness resources and TtT series.</p> <p>-Develop a web-based GIS application to identify engineering awareness resources (practicing engr, companies who conduct engr. work, outreach/education programs) – Engineering Possibilities in Iowa Counties EPIC</p> <p>-Continue to increase awareness of ETEC scholarship program</p> <p>-Enhance ETEC website (navigation, usability, content)</p> <p>-Develop, test and refine engagement (Brown 2009) and integrated marketing strategies for ETEC.</p> <p>- Develop communication plan for DMACC Career Advantage students.</p> <p>-Identify gaps or under-developed outreach, recruitment or enrollment information/communication plans. Develop plan that addresses gaps. Implement.</p> <p>-Develop ethnic minority networks for ETEC promotion</p> <p>- Develop staff development</p>	<ol style="list-style-type: none"> 1. ETEC Initiative and scholarship program is established via ETEC Connects, presentations, and web presence. 2. ETEC “Connects” web-conferences offered 3. TRLT Adult workshops conducted 4. Youth ETEC/Career Awareness wksp @ 4-H Leadership Annual Meeting 5. ETEC promotion @ recruiting and outreach events 6. ETEC awareness @ professional development workshops. 7. ETEC Initiative Identity program is created 8. ETEC website is developed and promoted. 9. Career awareness & recruitment print publication developed; 10. ETEC scholarship postcard distributed; 11. ETEC website updated; 12. Web 2.0/social network-based engr awareness strategies identified, developed, and tested. 13. Pick a Project developed 14. Engr women’s brochure developed 15. Financing your education bookmark developed 16. TtT materials and curriculum developed 17. DMACC pre-engineering communication plan developed 18. DMACC advisor training Conducted 	<p>Identify students/cohorts through County Directors, field specialists and county youth coordinators.</p> <p>Increased awareness, increased participation rates of under-represented minority students and women</p> <p>Engagement of the network including ISU alumni/Professional Engineers (PE), ISU Coop and Interns, ISU Extension/AEA,</p> <p>100 students compete in ETEC scholarship program (improve diversity)</p> <p>70 students are awarded scholarships through the ETEC Program.</p> <p>Career Advantage students attend engineering recruitment activities</p> <p>Career Advantage students apply for admission</p> <p>Advisors and informal educators actively use engineering awareness resources (ETEC, College of Engineering, etc.)</p>	<p>The number of College of Engineering graduates will increase by at least 120/year when compared to baseline(s).</p> <p>Increase in engineering enrollment numbers by extension areas.</p> <p>Increase in first generation Iowa students enrolling in engineering.</p> <p>Increase in females and URM students enrolling in engineering.</p>	<ol style="list-style-type: none"> 1. Track # of applicants 2. # of conferences and conference evals 3. # attended workshops 4. # attended workshops 5. # who received promotion materials 6. # who attended workshops 7. Evaluation of materials created 8. Evaluation of website, no# of hits, etc. 9. Evaluation of materials created 10. # of postcards distributed 11. no# of hits 12. Evaluation of strategies 13. 14. Distribution #s of brochure 15. Distribution #s of bookmark 16. 17. 18. Summative evaluation of training 19. 20. Evaluation of PERKits 	<ol style="list-style-type: none"> 1. ISU 2. ISU/RISE 3. ISU 4. ISU/EXT 5. ISU/EXT 6. ISU/EXT 7. ISU/EXT 8. ISU/EXT 9. ISU/EXT 10. ISU/EXT 11. ISU/EXT 12. ISU/RISE 13. 14. ISU/EXT 15. ISU/EXT 16. 17. 18. ISU/RISE 19. 20. ISU/RISE/EXT

	strategy/curriculum and implementation A3. Develop and disseminate Personal Engineering Recruitment Kits (PERKits)	19. Phase one of EPIC database developed and tested 20. PERKit developed; promotion and training conducted				
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Appendix F

SEEC Internal Advisory Board Meeting

December 15, 2009

Present: Monica Bruning, Robyn Cooper, Mary Darrow, Kimberly Douglas-Mankin, Harry McMaken, Robert Driggs, Mary Goodwin, Leigh Hagenson Thompson, Gloria Hill, Sandy Jennings-Hammond, Frankie Laanan, Jim Melsa, Steve Mickelson, Diane Rover, and Mack Shelley

Absent: Joel Johnson

Jim Melsa, Chair of the SEEC External Advisory Board, welcomed all to the first teleconference meeting of the group.

Rover gave an overview of the SEEC project, stating the objective is to increase the College of Engineering graduates to 900, by approximately 100 per year. The percentage of women and minority graduates will approach 20% and 10%, respectively. Five project objective teams (O-teams), comprised of both ISU and DMACC personnel, have been formed and meet with team leaders to organize activities. Team leaders meet 2 times/month and team-wide workshops are held each semester.

Shelley, Professor of Statistics and part of the project evaluation team, indicated Logic Models (included in meeting handouts) have been used to organize, evaluate and track actions of the 5 established project areas – Learning Village, Curriculum, Advising, Networking and Evaluation.

Rover summarized project data (slide 10 of presentation and “SEEC Data Update” handout). Douglas-Mankin said she has tracked/compared Big 12 data since 1999 and data provided by SEEC team maps well with her tracking numbers. In Table 2 of “SEEC Data Update”, Goodwin clarified freshmen are classified as those students carrying 29 ½ credits or less. The New Enrollment column in Table 2 includes special, non-degree seeking students. At the 12/15/09 SEEC “internal” advisory board meeting, Sandra Gahn, program manager in the ISU Institutional Research (IR) office, indicated that IR currently has a consultant on campus to help with effective/consistent data collection.

Themes for each year of the project were outlined by Rover (slides 13-20 of meeting power point presentation).

Year 1 – Partnerships

Year 2 – Communications

Year 3 – Diversity

O-Team Activity Highlights:

Learning Village (LV) –Steve Mickelson, Leader

- Collaborates closely with Advising and Curriculum O-teams
- Implemented Engr 100 course at DMACC; up to 35 students this year, including 5 females
- Established LVs at DMACC

- Expanding LV model at ISU/Engineering
- Graduation numbers improved 8% for those students involved in LVs as compared to students that are not

Advising – Mary Darrow for Frankie Laanan, Leader

- Working with Learning Village and Advising teams
- Building on Engineering Admissions Partnership Program (E-APP)
- Peer mentors, ambassadors, campus events, on-line networking, etc. have been hired/implemented to aid retention of transfer students

Networking – Monica Bruning, Leader

- Expanding awareness of engineering across Iowa by working with “connectors” -- Extension, DMACC recruiters, Program for Women in Science and Engineering (PWISE), etc.
- Using NAE publication, *Change the Conversation*, as a guide
- Launched E2020 scholarship program; 52 of 70 scholarships awarded (7 to women, 0 to ethnic minorities)
- Conducted professional development workshops
- Developed PERKits

Curriculum – Diane Rover, Leader

- Engr 110 curriculum is being developed and will be associated with scholarships
- Engr 100 course at DMACC is a cornerstone of getting information to students

Action Items:

- In 3 year review report, Driggs recommended putting all enrollment/retention numbers together (do not separate by year); NSF wants “simple” data.
- Data should be “consistent”, aligning with previous reports.
- Douglas-Mankin said freshmen cohort data should be tracked and year-to-year changes noted.
- PerKITS will be sent to board members.
- Another teleconference of group will be scheduled Spring 2010, followed by a face-to-face meeting.
- Include Project Lead-the-Way in future reports, including the NSF 3 year review.
- Topics for next meeting:
 - Learning Communities
 - “Crossing the Finish Line” publication; ISU is part of the study
 - How industry can help the SEEC project

**SEEC Executive Team Meeting w/External Advisory Board Members,
Leigh Hagenson-Thompson and Jim Melsa
April 15, 2010**

Present: Monica Bruning, Mary Darrow, Mary Goodwin, Leigh Hagenson-Thompson, Gloria Hill, Joel Johnson, Jim Melsa, Steve Mickelson, and Diane Rover

Absent: Robyn Cooper, Frankie Laanan, and Mack Shelley

Meeting Goal: Share SEEC project information and get feedback from external advisory board members

1) Team Members/Introductions

- **Mary Goodwin** – Advisor/transfer student coordinator in Engineering Student Services. Trains advisors at community colleges.
- **Mary Darrow** – SEEC Project Coordinator. Transfer recruitment with focus on community colleges.
- **Joel Johnson** – Director of Engineering Student Services
- **Steve Mickelson** – Ag & Biosystems Engr. Professor, Director of the Center for Excellence in Teaching and Learning (CELT), and Co-Director for Learning Communities Initiative at ISU. Oversees SEEC Learning Village objective team.
- **Monica Bruning** – Director of Engineering Talent Expansion. Oversees SEEC Networking objective team with emphasis on recruitment and retention with community colleges and more recently, Extension.
- **Diane Rover** – Associate Dean of Engineering and PI of project
- **Gloria Hill** – Administrative Assistant, supporting Dr. Rover
- **Jim Melsa** – Retired, now emeritus dean; Served as Dean of Engineering @ ISU 1995-2004.
- **Leigh Hagenson-Thompson** –Solvents & Monomers Global Process R&D Technology Leader, The Dow Chemical Company in Midland, Michigan.

Rover stated contacts have been made at STEP Grantees conference with the other two external board members - Bob Driggs, Dean of Mathematics & Science at Kirkwood College, and Kimberly Douglas-Mankin, Director of Women in Engr. & Science at Kansas State University. Douglas-Mankin has expressed an interest in exchanging/sharing data.

2) Overview of Project/Discussion

- Melsa suggested involving Dale Johnson in project as he has an interest in STEM.
- The SEEC project goal is to increase the number of engineering graduates at Iowa State University by ~100 students/year, strengthening the partnership between ISU and DMACC, and advancing the learning environment of each school.
- NSF approved funding of \$1.5 million for ISU and \$500K for DMACC over a 5 year period. End date is 2012 and funding has been received for 4 years.
- DMACC and ISU project teams have had one joint meeting/semester since project began.
- Enrollment information:
 - Transfers compose of ~15% of new engineering enrollment.

- Tuition revenue from transfer students includes student-credit-hour tuition for engineering courses and differential tuition for juniors and seniors.
- The ISU Admissions Partnership Program (APP) was developed to help community college students transition smoothly/successfully.
- Collaboration with community colleges enhances recruiting.
- The percentage of women engineering students has remained flat around 15-16% and is below the national average. This may be in part due to high enrollments in majors such as mechanical, electrical/computer, and aerospace that are among the smallest percentages. The ETEC project with Extension is designed to improve the participation of women.
- Community colleges typically prefer transfer plans/agreements that allow students to take two years of courses and match up courses for a smooth transition.
- The current engineering job market may temporarily inflate enrollment/graduate numbers.
- Graduation rate is over 70% for students involved in Learning Communities. The retention of first-year, first-time engineering students within the university is 88.5%, the highest of any college.
- International enrollment is steadily increasing, especially with Chinese students.
- Pre- and post-surveys are given to transfer students to gain insight into their engineering experience. The University conducts a survey of all incoming students.
- DMACC collaborated with ISU at recent Discover Engineering Day event at DMACC Ankeny campus.
- Mack Shelley leads the project evaluation team, which oversees project effectiveness, activities, and data collection.
- Sustainability and partnerships with industry/corporations will be discussed at future external and internal advisory board meetings.
- Learning Community (LC) funding at ISU is solid as LCs support retention.
- Faculty and staff campus-wide are engaged with project.
- The engineering recruitment brochure emphasizes how engineering helps people.
- “Engineering Going For It (eGFI) – Dream Up the Future” (ASEE) and “Changing the Conversation” (NAE) publications are helping broaden the public image of engineering.
- Hagenson-Thompson suggested using U.S. and international graduate students as recruiters/ambassadors.

3) NSF Third-Year Review

- Project underwent 3-year review with NSF in March with 3 panelists. Formal feedback is forthcoming.
- Panelists indicated they do want to see “direct” effects of project.

**SEEC ISU/DMACC Internal Advisory Board Meeting
May 11, 2010**

Present: Monica Bruning, Robyn Cooper, Sandy Gahn, Doug Gruenewald, Gloria Hill, Betsy Hoffman, Mary Holz-Clause, Dave Kissinger, Frankie Laanan, Kim Linduska, Harry McMaken, Steve Mickelson, Gary Mirka, Diane Rover, Mack Shelley, Vicky Thorland-Oster, and Renae White

- 1) Provost Hoffman, Chair of ISU SEEC Internal Advisory Board, welcomed participants and introductions were made.
- 2) Rover gave a project synopsis which included grant goals and progress made towards the goals. (Presentation posted on SEEC intranet Sharepoint site -- <https://webspacespace.eng.iastate.edu/SEEC/advisorybds/Shared%20Documents/Forms/AllItems.aspx>).
- 3) Rover highlighted feedback from the NSF third-year review conducted in March.
- 4) Handouts were provided on project successes at ISU and DMACC, collaborations involving engineering between ISU and DMACC with direct and indirect connections to the project, and data that profile engineering transfer students at ISU.
- 5) Board discussion:
 - Following steps will/have been taken to sustain project:
 - Orientation/introductory engineering courses have been established at several community colleges (CCs).
 - The college has customized ISU's Admissions Partnership Program (APP) with Iowa community colleges to support prospective transfer students in engineering, called E-APP.
 - A professional (social) networking site has been developed to distribute information and provide a forum for prospective transfer students from across the state to get connected.
 - Egr 101 has been established at the DMACC Ankeny campus and will be offered at other campuses.
 - DMACC/ISU teams will continue to work together and share best practices (what worked and what did not).
 - DMACC has become a model for other CCs with their communication plan that incorporates new messaging strategies developed through SEEC using national reports such as the NAE's "Changing the Conversation". This is important because CCs have close ties with high schools.
 - Recommendation to identify/use key items from data to make decisions about which parts of the project are having an impact and should be continued.
 - There is increasing interest in 2+2 programs.
 - A new bachelor of engineering technology degree in information and computer engineering technology has been proposed at ISU.
 - Strategies to increase women and underrepresented student enrollment will be discussed at a retreat following the board meeting; diversity is first topic on agenda. Strategies to target these groups include:

- Use of “Changing the Conversation” report in communications.
- Association with Extension and ETEC program.
- DMACC use of a nontraditional marketing and communications plan.
 - ✓ Working with local businesses and industry reps both internally and externally.
 - ✓ Connecting with ISU Engineering colleagues to share information.
 - ✓ Discover Engineering event (held at DMACC in collaboration with ISU)

6) Hoffman concluded meeting by thanking all for attending.

Link to Dr. Freeman Hrabowski diversity talk (excerpts included in the joint ISU-DMACC retreat following the board meeting and also available at the SEEC intranet Sharepoint site):

<http://vimeo.com/6928398>

   		
<h1 style="text-align: center;">STEM Student Enrollment and Engagement through Connections</h1>		
<p>College of Engineering • College of Human Sciences • College of Liberal Arts and Sciences</p>		
<ul style="list-style-type: none"> Home About Advisory Boards Team Members Initiatives News Events Newsletters Reports & Resources Big 12 STEP Network <li style="background-color: #005596; color: white; padding: 2px;">Quick Links Iowa State University Des Moines Area Community College ISU College of Engineering ISU Extension ISU Office of Community College Research and Policy National Science Foundation NSF STEP Program 		<div style="background-color: #005596; color: white; padding: 5px;">Fast Facts about ISU Engineering</div> <p>The undergraduate engineering programs are fourth on the <i>U.S. News & World Report</i> ranking of best undergraduate engineering programs among public universities in the region.</p> <p>The College of Engineering continues to be ranked among the top 25 public engineering colleges in the country, according to the graduate and professional school rankings.</p> <div style="background-color: #005596; color: white; padding: 5px;">News</div> <p>Engineering Diversity Fair promotes networking and idea sharing</p> <p>Engineering enrollment exceeds 5,000</p> <p>Collaborating with:</p> 
<p>The STEM Student Enrollment and Engagement through Connections (SEEC) project seeks to increase the number of engineering graduates at Iowa State University by approximately 100 per year. The means to that end are connections rooted in community: learning communities, community colleges, and Iowa communities. The project is collaborative between Iowa State University (ISU) and Des Moines Area Community College (DMACC). The cornerstone of SEEC is the success of learning communities for recruitment and retention, and the project builds upon Iowa State's established learning community infrastructure, leadership, and expertise. Retention at DMACC and ISU will be increased by a new learning community model, called a learning village or meta-community. First-year and gateway engineering courses are being reviewed to better engage students, to provide flexibility, and to support transfer students. Working with DMACC and the STEM Pathway project, student-centered advising is being coordinated to broaden the diversity of students enrolled in engineering and to make students aware of the various paths to successfully completing an engineering degree, including transfer from a community college. Students are advised on the range of STEM disciplines. With ISU Extension, we seek to improve the public awareness and understanding of engineering, especially among students and their parents. The methods of the project serve ISU and DMACC in several contexts and will also be adaptable to other institutions.</p>		

Appendix H

SEEC Project Abstract 2010 NSF STEP Meeting

SEEC: Student Enrollment and Engagement through Connections

Iowa State University: Diane Rover, Monica Bruning, Frankie Santos Laanan, Steve Mickelson, Mack Shelley, Robyn Cooper, Mary Darrow, Mary Goodwin

Des Moines Area Community College: Harry McMaken, Kim Linduska, Michael Lentsch, Randy Mead, James Stick

The Student Enrollment and Engagement through Connections (SEEC) project is a collaboration between Iowa State University and Des Moines Area Community College (DMACC). The project's goal is to increase the number of engineering graduates at Iowa State by 100 per year, to approximately 900 graduates annually. Included within this goal are increases in the percentages of women and minority graduates in engineering at Iowa State and the number of pre-engineering students at DMACC. The number of new engineering majors shaping Iowa State's 2012 graduating class is 1,446; thus we expect to achieve the target of 900 engineering graduates in the class of 2012.

Project objectives are designed within the areas of learning communities, curriculum, advising, networking, and evaluation. Activities are planned in each of these areas using a logic model approach that identifies resources, outputs, outcomes, and impact. Highlights resulting from this process include the creation of a transfer-friendly environment, a community of practice through partnerships, and an increase in awareness of engineering through inclusive messaging and network development.

Transfer students are supported prior to entering Iowa State through the Engineering Admissions Partnership Program (E-APP), which includes curriculum planning and advising by Iowa State engineering advisors, peer mentoring, and access to the E-APP Web-based group network. Scholarship opportunities have been promoted to engineering transfer students. Upon arrival at Iowa State, these students can join learning communities designed especially for their needs. Fall 2009 transfer enrollment was 252 students, up from 215 in 2008 and 206 in 2007.

Partnerships are developing to leverage recruitment and retention resources across the college and university, including the NSF S-STEM project, academic departments, the Program for Women in Science and Engineering, ISU Learning Communities, ISU Admissions, and the Office of Community College Research and Policy. The Engineering Talent in Every County (E:TEC) initiative combines a scholarship program with a new recruitment kit to provide ISU Extension youth professionals with resources and training to increase engineering awareness across the state. DMACC, in collaboration with ISU, has created its own introductory engineering orientation course and revised their advising system for pre-engineering students.

The college's recruiting materials have been redesigned to incorporate new messaging—that engineers create a better world and that students can be creative. The copy reflects the National Academy of Engineering's *Changing the Conversation* recommendations. Additionally, DMACC has identified, developed and implemented a comprehensive communication plan that familiarizes high school students, parents, faculty, and staff with career opportunities and educational pathways in engineering.

Looking forward, we recognize that our biggest challenge relative to the original targets is likely to be enhancing the recruitment of women to reach 20% (% women in 2008 and 2009 are, respectively, 14.6 and 15.0). The new recruitment materials and network-building initiatives, including the E-TEC program, specifically will help us address this challenge.

We recognize that there is considerable opportunity to leverage the best practices of the learning communities to retain students at the second- and third-year levels, which ultimately will contribute to higher graduation rates.

