Research Pilots Assess Enhanced Student Success Resulting from Student Affairs Collaboration with Engineering and Applied Sciences

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Abstract

Three research pilots to enhance student success were implemented through the collaboration between engineering and applied sciences and student affairs in 2010 to 2012. The research pilots are Engineering House (EH), Mandatory Math Tutoring, and At-Risk Student Intervention. Preliminary results show that while there is no statistically-significant difference in individual course performance between EH and non-EH students, first-year as well as all engineering and applied sciences students living in EH have a statistically-significant higher fall term GPA than non-EH students. Mandatory Math Tutoring appears to have a greater impact in Pre-Calculus than Calculus I, leading the project team to expand this research pilot to include Algebra II in fall semester 2012. One outcome of the Early Alert for At-Risk Student is a new data-reporting tool from the Office of Institutional Research that is user-friendly and allows the project team to run one report instead of multiple reports to identify all the potential at-risk students and their difficulties in critical courses in the engineering and applied sciences curricula. True collaboration between engineering and applied sciences and student affairs comes about through identifying the roles of faculty and student affairs professionals and providing the opportunity for joint planning and implementation.

Introduction

Western Michigan University (WMU) is a state regional university located in Kalamazoo, MI. Founded in 1903 as a normal school for teachers, WMU is one of 139 public institutions of higher learning that are classified by The Carnegie Foundation for the Advancement for Teaching as "research universities." WMU offers 139 undergraduate, 81 master, and 30 doctoral programs. Total enrollment in fall 2012 consisted of 19,478 undergraduate and 5,120 graduate students.

The College of Engineering and Applied Sciences (CEAS) has nine EAC-ABET accredited engineering programs, three ETAC-ABET accredited engineering technology programs, and one CAC-ABET accredited computer science program. In addition, CEAS offers nine master and six doctoral programs. Fall 2012 enrollment consists of 2,222 undergraduate and 403 graduate students. In 2011-12, CEAS awarded 324 bachelor, 100 master, and 12 doctoral degrees. The average ACT sub-score for mathematics for first-time first-year CEAS students is 25.2. WMU is classified by the Consortium for Student Retention Data Exchange (CSRDE) as "Moderately Selective."

Since 2005, first-time first-year CEAS students have been placed in STEP cohorts during Summer Orientation where they are enrolled in the same 3-to-5 courses in the fall semester and the same 2-to-4 courses in the spring semester. Progressing through the first-year of college as a

cohort allows the engineering and applied sciences students to build social and academic connection with each other, thus easing the transition from high school to college and helping students form study groups[1]. The STEP retention project has resulted in an increase in 2nd-year retention to CEAS from a baseline of 57.4% (averaged 2000-2004) to 67.6% (average 2005-2009), and 5-year graduation and 6-year continuation in CEAS from a baseline of 32.3% to 42.4%. Details on how the STEP cohorts are constructed for CEAS first-year students, which have diverse academic preparation backgrounds can be found elsewhere[2].

In 2006, the WMU Residence Life (RL) office created a living learning community, Engineering House (EH), for engineering and applied sciences students choosing to live on campus; CEAS students are not required to select the learning community. Since 2006, the two units have increasingly worked together to support student success, and collaboration has been extended to other units of Student Affairs (SA), e.g., Career and Student Employment Services. The partnership between CEAS and SA was strengthened in 2009 with joint planning and submission of a proposal to the National Science Foundation's STEM Talent Expansion Program (STEP). In 2010 CEAS and RL developed and co-supervise a Student Center (SSC) located at EH that provided tutoring in mathematics, chemistry, physics and engineering courses 7 p.m. to 1 a.m. five days a week. In 2011, the SSC expanded from one site to three.

In this paper, we will describe three research pilots resulting from CEAS and SA collaboration to enhance student success -- Engineering House; Mandatory Mathematics Tutoring; and Early Intervention for At-Risk Students. We will describe the design of the research pilots, some preliminary results, and the lessons learned. Success indicators include performance in first-year science, technology, engineering and mathematics (STEM) courses as measured by grade point average (GPA) and percentage of students who successfully completed the course with a grade of C or higher, and, in the case of Engineering House, student satisfaction. The results of this paper should be of value to other engineering programs interested in leveraging collaboration with student affairs to enhance student success.

Motivation for Collaboration between Engineering and Student Affairs

Writing in *Change*, Banta and Kuh[3] argue that the "cognitive and affective development (of students) are inextricably intertwined and that the curricular and out-of-class activities are not discrete, independent events; they affect one another (sometimes profoundly) in ways that often are not immediately obvious." They further stated that "improving the quality of the undergraduate experience at any institution is so complex and multifaceted that it demands cooperation by the two groups on campus that spend the most time with students: faculty members and student affairs professional." They reasoned that "a faculty cannot by itself accomplish the college's objectives for students' intellectual and personal development; it needs the cooperation of others who work with students where students spend the majority of their time – in employment settings, playing fields, living quarters, and so on." Other research[4] shows "Student growth and development are processes that encompass a broad array of capacities lying within both the affective and cognitive domains. Intellectual growth, arguably richly nourished, is only one dimension within this array."

Denton, *et al* demonstrated that an integrated affective-cognitive approach had a positive effect on student learning and achievement in a first-year computing class[5,6]. Additional studies on the

affective development of first-year engineering students that included the involvement of Student Affairs have occurred at Arizona State Universities[7] in the 1990's and The University of South California[8] in the late 2000's.

Engineering House

Design of Engineering House

One of the research pilot projects is Engineering House (EH). Ninety-seven percent of first-year engineering and applied sciences students choose to live in the residence halls even though there is no requirement that first-year students live on campus. Enrollment in EH has grown from 88 first-year CEAS students in 2006 to 162 in fall 2011 and 155 in fall 2012, while there were 217 first-year CEAS students living in non-EH residence halls in fall 2011 and 204 in fall 2012. Hence, there are sufficient numbers of students in the EH versus non-EH populations to assess the value added to student success as a result of CEAS and SA collaboration. EH is distinguished from non-EH by the following three features: student staff on EH floors are upper-level CEAS students while staff on non-EF floors represent all academic colleges; 4 of the 8 required programs by EH staff must focus on academic success strategies in CEAS, careers in engineering, or illustrate engineering principles (e.g., buoyancy when building cardboard boats, civil engineering when making bridges with spaghetti) while there is no such requirement in non-EH RA programming; and EH is the only learning community with a computer lab . There is no statistically-significant difference in the academic preparation between EH and non-EH first-year CEAS students; average ACT mathematics score of EH students is 25.4 while the non-EH students' average is 25.2.

There is no complete national database to indicate how many engineering house or women in science and engineering (WISE) community exit but they are common. In Michigan, three universities have an engineering living-learning community, three have a WISE, and one has a computer science living-learning community.

In the research pilot, performance in the required first-year STEM courses was compared in fall 2010 to fall 2012 between EH and non-EH students. These courses include mathematics (Algebra II, Pre-Calculus, Calculus I), General Chemistry I, University Physics I, Technical Communication, and Engineering Graphics. Second semester and second year retention to engineering and applied sciences were also compared. The chi-squared test with significance level α equal to or less than 0.05 was used in comparing the performance of EH and non-EH students. In addition, student perceptions of the ease of transition from high school to college; academic habits; and participation in and valuing of STEP program components were compared between the EH versus non-EH populations. These data were gathered through a STEP survey conducted at the end of their first fall semester.

Preliminary Results

There was no statistically-significant difference between EH students and non-EH students in individual course performance, as well as second semester and second year retention to engineering and applied sciences. However, EH students as a group has a statistically-significant,

higher semester GPA than non-EH students in fall 2010 and 2012 – see Table 1 below for comparisons in 2010 to 2012.

Table 1. Comparison of Average GPA of Beginner EH versus non-EH Students

	2010			2011			2012		
	# of Students	Term GPA	St. Dev.	# of Students	Term GPA	St. Dev.	# of Students	Term GPA	St. Dev.
EH	164	2.65*	0.84	148	2.60	0.97	143	2.71*	0.86
Non-EH	224	2.39	1.03	176	2.50	1.02	177	2.62	1.07

*Statistically significant at α </= 0.05

Furthermore, all CEAS students, including upper-level students, who live in EH had a statistically-significant, higher term GPA than CEAS students who live in non-EH residence halls in fall 2010 – see Table 2 below for comparisons in 2010 to 2012.

Table 2. Comparison of Average GPA of All CEAS Students Living in Residence Halls

	2010			2011			2012		
	# of Students	Term GPA	St. Dev.	# of Students	Term GPA	St. Dev.	# of Students	Term GPA	St. Dev.
EH	227	2.68*	0.89	225	2.52	0.99	221	2.65	0.88
Non-EH	401	2.46	0.98	402	2.56	1.00	380	2.73	0.98

*Statistically significant at α </= 0.05

In the responses to the STEP survey, the 2010 EH residents responded with statistically-significant, higher ratings for the following items than the non-EH residents:

- Confidence in managing life
- Confidence in managing school
- Have studied with other STEP students
- Were able to find tutors
- Have used a tutor
- Have used Student Success Center
- Have participated in CEAS student society activities
- Value enrollment in STEP cohort
- Value living in residence hall (EH)

For the 2011 EH students, they responded with statistically-significant, higher scores in the following items than the non-EH students:

- Know at least 6 STEP students
- Have used Student Success Center
- Have participated in mentoring activities
- Value living in residence hall (EH)

Discussion

Marketing for EH highlights community advantages of study groups, an on-site computer lab and Student Success Center, and benefits of accessible upper-level student staff majoring in CEAS. Students, or their parents, who select EH may have higher self-selection factors. However, comparison of EH and non-EH first-year students shows little difference in academic preparation before entering WMU. The self-selection factor could be a factor in the observed difference between EH and non-EH students. For example, EH students use SSC more than non-EH students. In 2011 and 2012, an average of 40% of EH students use a SSC, but only 24% of non-EH.

There was also no statistically-significant difference in individual course performance between the EH and the non-EH students. However, EH students as a group had a statistically-significant, higher fall semester GPA than non-EH students as shown in Tables 1 and 2 above, as well as higher ratings on many elements of the STEP survey.

Furthermore, STEP students as group had a statistically-significant (α </= 0.05), higher course success rates (% grade >/= C) than non-STEP students taking the same course for Calculus II, General Chemistry I, and Engineering Graphics in Fall 2010; Pre-Calculus, Calculus II, University Physics I in Spring 2011; Pre-Calculus, Calculus I, Calculus II, General Chemistry I, Technical Communication and Engineering Graphics in Fall 2011; Algebra II, Calculus I, Calculus II, General Chemistry I, and Engineering Graphics in Fall 2012.

A significant development in EH is the substantial growth in the number of students electing to live in this living-learning housing option; there has been a 515% growth from 2006 to 2012 (from 88 to 155). There has also been significant growth in the number of upper-level CEAS students living in the residence halls. Overall, the number of CEAS students returning to live in residence halls has shown a 130% increase in second-year students and 200% increase in third-year students since 2006.

Mandatory Math Tutoring

Design of Mandatory Math Tutoring

Another research pilot project is Mandatory Math Tutoring. This pilot in fall 2011 involved one section of Pre-Calculus and one section of Calculus I in which first-year CEAS students were the majority of the sections' roster. The instructors set the trigger at which students were required to participate in content tutoring (e.g., 65% or below on homework, quizzes, and examination) as well as the reward for attending and/or penalty for not attending. Student participation in tutoring in the Student Success Centers (SSCs) located in the residence halls was tracked using a swipe card reading of their university identify card, and bi-weekly data of who attended tutoring was provided to the mathematics instructors. The average course GPA of students who used a SSC was compared to the non-SSC users, and performance of students in Pre-Calculus and Calculus I of the research pilot sections was compared to sections without the mandatory math tutoring requirement.

For fall semester 2012, this research pilot involved four sections of Algebra II and one section of Pre-Calculus.

Preliminary Results

The preliminary results of the Mandatory Math Tutoring pilot research project in fall 2010 are summarized in Table 3 below. The difference in class GPA between SSC users and non-users in both Pre-Calculus and Calculus I is not statistical significant

Table 3. GPA Comparison of Student Success Center (SSC) Users *vs.* Non-Users in Mandatory Math Tutoring Pilot, 2011

	Pre-Calculus	Calculus I
Total # of Students (CEAS and non-CEAS) in Pilot Section	42	32
Total # of Unique SSC Users in Pilot Sections	19 (45%)	19 (59%)
Average Class GPA	2.29 (σ=1.12)	2.57 (σ=1.05)
Average GPA of SSC Users	2.45 (σ=1.08)	2.47 (σ=1.14)
Average GPA of SSC Non-Users	2.12 (σ=1.20)	2.78 (σ=0.94)
GPA Difference (Users – Non-Users)	+0.33	-0.31

The average GPA of the research pilot sections are also compared to the other Pre-Calculus and Calculus sections without mandatory tutoring requirement in fall 2011 as shown in Table 4 below.

Table 4. Comparison of Student Performance in Sections of Pre-Calculus and Calculus I With *vs.* Without Mandatory Math Tutoring

	# of Students Completing Course	Mean Course GPA	St. Dev.	# Students Passed (%)	# Students Withdrawing
Pre-Calculus A	40	1.60	1.38	20 (45.5%)	4
Pre-Calculus B	28	2.19	1.28	18 (47.4%)	10
Pre-Calculus C – Pilot Section	37	2.28	1.12	29 (65.9%)	7
Calculus IA	30	1.92	1.40	18 (60.0%)	0
Calculus IB – Pilot Section	37	2.23	1.28	27 (71.1%)	1
Calculus IC	35	2.06	1.17	23 (59.0%)	4
Calculus I	30	1.93	1.27	18 (52.9%)	4

There were no statistically significant differences among sections in the respective course, although the pilot section of Pre-Calculus just missed the 0.05 cut-off, compared to Section 1.

Results of the Mandatory Math Tutoring research pilot for Fall 2012 will be presented at the 2013 ASEE conference.

Discussion

The results of the Mandatory Math Tutoring research pilot show that it has a greater impact in Pre-Calculus than Calculus I, perhaps due to better math preparation and greater math skills of the students taking Calculus I *vs*. Pre-Calculus as first-year students. This is the rationale for expanding the research in fall 2012 to include four sections of Algebra II.

Requiring tutoring increased student usage of the Student Success Centers (SSC); 69% of Pre-Calculus students and 79% of all Calculus I students attending the SSC in fall 2011 came from the sections with mandatory math tutoring. However, for the students of the pilot research project, the habit of seeking tutoring help in the Student Success Centers did not continue in spring semester Only 7 of the 22 (32%) Pre-Calculus fall SSC users and 9 of the 24 (38%) Calculus I fall SSC users continued to use a SSC spring semester. Anecdotal accounts are that students were forming study groups on their own and meeting elsewhere on campus.

Not considering the factors of class meeting time and instructors, students in the sections with mandatory math tutoring have a slightly higher success rate than sections without mandatory math tutoring as indicated by average course GPA and percent who passed the course – see Table 4.

In their comments, students in the research pilot sometimes perceived that tutors did not know the subject because they were using a solution strategy that was different from the instructor. Therefore, for fall 2012, the Mandatory Math Tutoring pilot adopted the Supplemental Instruction (SI) model for Algebra II in which the tutors attend classes so they can follow the same problem-solving strategies as the instructor.

Early Intervention for At-Risk Students

Design of Early Intervention for At-Risk Students

The last research pilot described in this paper is Early Intervention for At-Risk Student using term and midterm grade reports. The target populations are first-time first-year students, returning sophomores, and first-time transfer students. The project team proactively identified students who live in the residence halls whose term GPA of the previous semester falls between 1.50 and 1.99. The rationale for choosing students who live in residence hall is to take advantage of the residence hall staff who already connect and follow-up with the students based on midterm grade performance. The choice of the selected GPA range for intervention is constrained by staffing available to meet with identified students. Students who responded met with either a graduate student assistant or the associate dean in January and February of 2012 for a diagnosis and personalized recommendation for academic habit change. The STEP project director then followed up with each student to check whether they were following the recommendations, which included logging the number of hours per week studying and doing homework; reaching 30 hours per week studying and doing home work; using the Student Success Centers; joining a

study group; and seeing an academic advisor. Students with a "C" or below in mid-term grade in critical CEAS courses (e.g., math) were required to meet with CEAS advising staff to discuss options. The performance of the n students in spring semester who participated in the intervention was compared to students who did not respond to the meeting request. In addition, feedback from the students who participated in the research pilot was reviewed.

Preliminary Results

A total of 44 out of 70 students identified in spring 2012 responded to the request for an initial meeting for diagnosis of student performance in the previous semester (a response rate of 63%). Fifteen (15) first-year students and four (4) first-time transfer students met with a graduate student assistant who is himself a former transfer student, and 25 returning sophomores met with the CEAS Associate Dean. The differences between spring and fall semester GPAs of the students in this research pilot are summarized in Table 5 below.

Table 5. Fall-to-Spring Semester GPA Differences for At-Risk Student Pilot

Student Type		Intervention	No Intervention
First-Time First-Year	# of Students	15 (59%)	11 (42%)
	GPA Difference	+0.28*	-0.41
	St. Dev. of Diff	0.63	0.98
Returning Sophomore	# of Students	25 (74%)	9 (26%)
	GPA Difference	+0.71	+0.66
	St. Dev. of Diff	0.70	0.91
First-Time Transfer	# of Students	4 (40%)	6 (60%)
	GPA Difference	+0.77	+0.35
	St. Dev. of Diff	0.33	0.94

*Statistically significant at α </= 0.05

There was a statistically significant difference in the mean GPA changes from fall to spring semesters for the first-time first-year students who met with an interventionist *vs*. those who did not.

There were no statistically significant differences between returning sophomores and transfer students who met with someone vs. those who did not. (Note that the numbers in the latter group were small.)

Note: The average fall 2011 GPA of those students who met for an intervention was slightly higher than those who did not for sophomores (2.07 *vs.* 2.00) and transfer students (1.51 *vs.* 1.41). For first-time first-year students, this was not the case. Those who agreed to a meeting had an average GPA of 1.74; those who did not had an average of 1.78.

Comments were received from 11 students who participated in the research pilot (25% of all the participants). All reported they were following the recommended academic habit changes. Some examples follow:

- Comments illustrating the recommendation of logging study hours include:

  - "I haven't quite been getting in 30 hours of studying. I've been around 25 hours a week and have been logging it. At first, I didn't think logging in study times would help but it has. It helps me visualize my goal."
  - "I have increased the amount gradually and should be about 30 hours this week. I also have my schedule written out better this week to help achieve this. The last two weeks not using that had started getting me off track."
  - "I have noticed myself studying and doing homework a lot more these past few weeks."
- Regarding time management, the following comments show students were following the recommendations:
  - "I've improved my time management by doing homework while I'm working the front desk and leaving the dorm to get studying done."
  - "My schedule is full of projects and tests/quizzes that I am trying to stay on top of, along with my homework. So far so good."
- Regarding seeking help from the instructor, the following comment indicates the student was following the recommendation:
  - "I'm talking to my teachers any time I get stuck. I don't have a regular study partner in math but I have gone to a study group multiple times."
  - "I also have talked to Dr. Fajardo about joining SAE and she said she has not problems with me joining."
- Regarding meeting with an academic advisor, the following comments indicate the students were following the recommendation:
  - "I met with my advisor already and am all set to sign up for classes."
  - I have met with an advisor twice to discuss classes."
  - I met with Dr. Kerstetter before spring break for advising, so I will be registering within this week."

Results of the 2012 At-Risk Student Intervention research pilot will be presented at the 2013 ASEE conference.

Discussion

The impact of proactive intervention using term GPA has the greatest impact on first-time first-year students (see Table 5). First-year CEAS students who met with the graduate student assistant saw an average improvement in spring semester GPA of 0.28 above the fall term GPA while those who declined to participate saw an average GPA drop of 0.41 from fall to spring semesters. Even with the improvement in term GPA from fall to spring semesters, several students who were on the lower end of the GPA spectrum did not move out of poor academic standing.

As part of the process of deciding where to intervene effectively, an outcome of this research pilot is a more user-friendly report from the Office of Institutional Research to identify potential students who are at-risk. Prior to this pilot, potential at-risk students could only be identified one at a time, thus requiring multiple runs of the report. Now, CEAS can run a single report by college and course subject codes, resulting in a list that can then be sorted to identify students

who are at-risk because of prior difficulty in critical courses in the engineering and applied sciences curricula, e.g., Calculus I.

In September 2012, the project staff, using the new tool from Institutional Research, identified and contacted 77 students who had difficulty in one or more critical courses in the engineering and applied sciences curricula during the 2011-12 academic year. Those students met with either the graduate student assistant or the associate dean. Results of this year's Early Intervention for At-Risk Student project will be reported at the 2013 ASEE conference.

This new report was run again after the mid-term grade submission period for fall 2012. A total of 2,673 mid-term grades in mathematics, chemistry, physics, mechanical engineering, computer science, electrical and computer engineering, and industrial and manufacturing engineering were reported for CEAS students of which 747 grades (or 27.9%) were less than "C". Of the 747 students who have a midterm grade less than C in a course, 80 were international students and they were removed from the pilot since the grant supporting the effort can be only used only for U.S. citizens or legal residents, resulting in 667 students in the pilot. The students in the pilot were contacted via e-mail and directed to seek help from specific Student Success Center staff members who could provide content tutoring help in the specific subjects in which the students received a midterm grade that was less than a "C." For those who received a grade less than "C" in Algebra II, Pre-Calculus and General Chemistry I, they were also invited to sign up for remind101, which allows the STEP project coordinator to text the students about final exam review for these three courses. Their attendance in a SSC was tracked by the students' ID. The results of using mid-term grades generated through this report will be presented at the 2013 ASEE conference.

Reflections on CEAS and Student Affairs Collaboration

True collaboration requires understanding and respecting the culture, language, and organization characteristics as well as philosophical and programmatic approaches of engineering and applied sciences and student affairs[9]. Barriers to collaboration between academic and student affairs can be attributed to background and training; habit of isolation in higher education; differences in language, culture, and theoretical bases; poor communication; organizational structures; goals and priorities; and lack of mutual understanding[10,11]. True collaboration also involves identifying the roles of faculty and student affairs professionals and the opportunity for interaction between the two units[9]. True collaboration can only take place through joint planning, implementation, and accountability, and institutional commitment[12]. For our project, the Vice President of Student Affairs is a member of the STEP Advisory Board which is chaired by the Provost/Vice President of Academic Affairs.

In Engineering House, consistent communication and responsiveness were critical to success in the early stages of this project. When CEAS faculty members attended Residence Life's training for Resident Assistants (RAs), it resulted in increased understanding of the processes, philosophies and expectations of Residence Life. When CEAS faculty members became more involved with EH programming, it led to greater understanding of the rhythms and life of students outside of the classroom. EH is the longest collaborative project between CEAS and Student Affairs, yet there can still be logistical issues. For example, movable white boards are

used by engineering and applied students on a regular basis for group work and study. CEAS assumed they would be a welcomed addition to the Student Success Centers in the residence halls, without realizing the white boards have storage and facility implications for Residence Life, as well as possible implications as Residence Life attempts to maintain equity among all its learning communities regarding the academic support provided. The issue was resolved through consistent communication.

Residence Life acted as a catalyst in initiating Mandatory Math Tutoring in fall 2011, hosing several planning meetings in its conference room on the Main Campus. Residence Life continued to play a role in 2012 by serving as repository and reporting of attendance data to the math faculty and to the STEP team.

A key to success in the Mandatory Math Tutoring project is giving the mathematics faculty the freedom to implement the concept in their classes and to follow up with attendance data and any concerns raised. Another important factor is to realize that partners from mathematics in this project may shift from semester to semester due to changing teaching assignments, thus requiring project staff to maintain continued communication and data sharing

The Early Intervention of At-Risk Student began as an expansion of Residence Life's practice of meeting with students with low mid-term grades to provide support and educate about academic resources. Creating an independent report removed dependency on Residence Life for data, yet student services was still represented by CEAS advising. The project expanded in 2012 to involve a larger group, which resulted in more complicated logistics and longer planning. A key to success is when everyone is invested in the outcome of student success, and the end result is a near-perfect hybrid of best practices and new ideas.

Conclusion and Future Work

By leveraging the expertise and resources of Student Affairs through joint planning and implementation, CEAS is able to implement support services in close proximity to where students live. Preliminary results of the three research pilot projects show the added value of collaboration to student success.

Future work includes rethinking Engineering House since the community is relocating to another building with significantly more space for fall semester 2013. The new location for the Engineering House will provide a number of things that could not be accommodated in the current facility, such as a larger Student Success Center (SSC). The new SSC has an adjoining large study lounge for group study, and SSC staff can easily move back and forth between helping individuals in SSC and assisting groups in the larger room. The co-location of these facilities is seen as a strategic advantage. Having support staff in the facility dedicated to group study will help to maintain the "study atmosphere". It also sends and reinforces the message that being assisted as an individual is good, but that helping others (in group study) is even better.

The new residence hall also has multiple small lounges on each floor, something that the current EH hall does not have. One lounge on each floor will be designated as a study lounge. The new

hall also has a room that will be converted to a meeting room and another that will be converted to a computer lab that will double the size of the current EH computer lab.

A major challenge facing the project team is to collect data on the progression of students from individual study to productive group study. It has been observed that most successful upper level students report the use of study groups in many of their challenging classes. Conversely, the struggling students in the early intervention program generally report that they are not studying in a group. The new facilities should help to both model, reinforce and track the transition of this critical academic habit.

For the Mandatory Math Tutoring pilot, fall 2011 results showed it had a greater impact in Pre-Calculus and this was the rationale for expanding the pilot in fall 2012 to include four sections of Algebra II. The expansion effort was made easier because of the willingness (even eagerness) of the Algebra II coordinator, further demonstrating the importance of collaboration to support student success. The results of the fall 2012 effort, in which the Supplemental Instruction model was adopted, are being analyzed. The four Algebra II instructors who participated each taught a mandatory and non-mandatory section, so instructor bias can now be examined, and the results will affect the future direction of Mandatory Math Tutoring at our institution.

For Early Intervention for At-Risk Students, we can now run a single report to identify potential at-risk students for intervention. Future work includes identifying the best communication approach with students to increase the likelihood of their responding to meeting requests, and evaluating what are the best GPA ranges to target so that the intervention will have the greatest impact under the constraint of staffing and time.

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