Student Retention Task Force Report to EAC

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Strategic Plan 2020

The overarching vision of the College of Engineering and Applied Science at CU-Boulder is to enhance our standing as the premier engineering college in the greater Rocky Mountain Region and be distinguished as one of the leading engineering research and educational programs in the world.

**People:** We will attract and develop outstanding and diverse students, faculty and staff, with objectives of growing our student enrollments by 15-20% and our faculty and staff by 30% by the year 2020.

. . . [W]e will involve every undergraduate in hands-on learning and team-based design throughout the curriculum and in at least one extracurricular, personalized learning experience prior to graduation.
Quantitative Retention Metrics from 2020

<table>
<thead>
<tr>
<th>Metric</th>
<th>2007 Baseline</th>
<th>2010 Target</th>
<th>2020 Target</th>
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</thead>
<tbody>
<tr>
<td>3rd-semester undergraduate retention</td>
<td>81%</td>
<td>83%</td>
<td>86%</td>
</tr>
<tr>
<td>6th-year undergraduate grad. rate</td>
<td>53%</td>
<td>56%</td>
<td>70%</td>
</tr>
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Achieving 2020 goals requires improved retention across all segments of CEAS student body
Retention Performance vs. Engineering 2020 Goals

3rd Semester Retention

6 Year Graduation Rates
Task Force Process

Developed outline of Issues & Alternatives

Reviewed CEAS retention data & Strat Plan Goals

3 TF calls, numerous co-chair consults with Dean, add’l data from College, drafted Recommendations
Data Reviewed

Student retention/graduation data for 15 yrs, by dep’t, gender, & URM

Senior Survey and Freshman Survey data

Paper: Retention Benefits of GEEN 1400

Numerous newspaper, journal articles

BOLD 2011 Exit Survey results

Retention analysis of Engineering Quad and Andrews Hall programs

Faculty Review Process and Faculty Course Questionnaire (“FCQ”) scores

Fall 2010 Cohort Analysis

Applied Math WorkGroups results from Fall 2011

Freshman Physics and Chemistry for Freshman internal review reports
What Our Students Say

2011 Freshman Survey

What could be done to make your experience in the College of Engineering more satisfying?

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<table>
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<tr>
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<tbody>
<tr>
<td>Smaller Classes</td>
<td>59%</td>
</tr>
<tr>
<td>More help/review sessions</td>
<td>53%</td>
</tr>
<tr>
<td>Offer more free electives</td>
<td>47%</td>
</tr>
<tr>
<td>Better professors</td>
<td>35%</td>
</tr>
<tr>
<td>More social activities</td>
<td>33%</td>
</tr>
</tbody>
</table>
First Year Projects
GEEN 1400

Figure 1. Six-year graduation rates for GEEN 1400 takers vs. non-takers, 1994-2004.
Fall 2010 Cohort Analysis & BOLD 2011 Exit Survey

- Students who don’t take First Year Projects are twice as likely to leave CEAS as those who do.

- GPA of “Transfers” or “Leavers” after first year: 50% of students who leave or transfer out of CEAS have a GPA > 2.50. (Consistent with Seymour & Hewitt’s study dispelling myth that majority of students who leave engineering are those performing poorly).
Impact of Living Situation on Retention

Students who did not live in Andrews Hall or the Engineering Quad were 60% more likely to leave the College. (Fall 2010 Freshman Cohort)

From Freshman Survey, 2011
To what degree would you say your living situation is supportive of you as an engineer?

<table>
<thead>
<tr>
<th>Living Situation</th>
<th>Score</th>
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<tbody>
<tr>
<td>Engineering Honors dorm</td>
<td>4.69</td>
</tr>
<tr>
<td>Living at home</td>
<td>4.00</td>
</tr>
<tr>
<td>Engineering Quad dorm</td>
<td>3.96</td>
</tr>
<tr>
<td>Other</td>
<td>3.00</td>
</tr>
<tr>
<td>Other dorm on campus</td>
<td>2.59</td>
</tr>
<tr>
<td>Dorm off campus</td>
<td>2.27</td>
</tr>
</tbody>
</table>
Top 5 Success Factors

From Senior Survey, 2011

- Working with Others (nearly always #1)
- Support of Family
- Support of Friends
- Self-motivation
- Natural Ability
The College as a whole is on track with the targets in the 2020 Strategic Plan (2007 Baseline - 3.8, 2010 target - 3.9, 2020 goal - 4.1)

The variation in the satisfaction data by department, and individually, is wider than desired:

“How satisfied are you?”

<table>
<thead>
<tr>
<th>Department</th>
<th>ALL</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEAS</td>
<td>4.00</td>
<td>4.47</td>
<td>3.59</td>
</tr>
<tr>
<td>Major Choice</td>
<td>4.09</td>
<td>4.79</td>
<td>3.83</td>
</tr>
<tr>
<td>Faculty Advisor</td>
<td>3.90</td>
<td>4.92</td>
<td>3.28</td>
</tr>
<tr>
<td>Staff Advisor</td>
<td>4.05</td>
<td>4.57</td>
<td>3.40</td>
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</table>
Who do Freshmen Talk to Before Leaving the College?

Exit Survey, Spring 2011

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<table>
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<tbody>
<tr>
<td>Parents</td>
<td>83%</td>
</tr>
<tr>
<td>Other students/friends</td>
<td>75%</td>
</tr>
<tr>
<td>Advisor in new major</td>
<td>52%</td>
</tr>
<tr>
<td>Relatives or Family Friend</td>
<td>49%</td>
</tr>
<tr>
<td>CEAS advisor</td>
<td>48%</td>
</tr>
<tr>
<td>Faculty member</td>
<td>22%</td>
</tr>
</tbody>
</table>
Top 5 Reasons Cited for Leaving BOLD Exit Survey, 2011

1. Unsatisfactory progress

2. Fear of failing or lack of confidence in success

3. Loss of interest or deciding that engineering is not the right career or fit

4. Unreasonable workload or high level of demand

5. Lack of interest/sympathy shown by faculty/staff
**Applied Math WorkGroups Results**

**Fall 2011**

<table>
<thead>
<tr>
<th></th>
<th>CEAS avg. GPA (# students)</th>
<th>BOLD WG GPA Avg. (# students)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calc I</td>
<td>2.32 (505)</td>
<td>2.73 (77)</td>
</tr>
<tr>
<td>Calc II</td>
<td>2.26 (283)</td>
<td>2.88 (33)</td>
</tr>
</tbody>
</table>

Thank you to ConocoPhillips and Dean’s Club members for funding WorkGroups!
Conclusions

- Difficult courses can be taught successfully, enhancing student performance and retention. Applied Math is an example.

- Sense of community is critical in making transition to college.

- Sense of community, supporting retention, can be achieved through focus on at least the freshman learning experience: Quad, Andrews, BOLD

- 50% of students leave in good standing. CEAS unlikely to achieve retention goals without significant improvement in the retention of students in good standing.

- Our long-term effort to recruit better students has not translated to noticeably improved retention scores.
Recommendations

Curriculum Levers:

- Require all departments to participate in Freshman Projects Course, staffed with best instructors.

- Consider how to improve lower division, lg. courses.

- Look at impact of changes in pedagogy for Freshman Math. Apply learnings to other freshman stumbling block courses, such as Chemistry for Engineers.
Recommendations

Teaching & Advising:

- Enhance reward & recognition for teaching (Peebles is $2K, Hutchinson is $1K) and advising ($1K)

- Consider adding retention element to Teaching Measurement criteria for faculty evaluation. Consider whether FCQ score fully captures teaching strength and innovation, comparable to research.

- Place faculty who do not receive adequate teaching evaluations on a Performance Improvement Plan.
Recommendations

Policies:

- Require students seeking transfers to other CU schools and colleges to consult with CEAS advisor.

- Explore how to increase concentration of engineering students in Learning & Living Engineering Dorms.

- Evaluate effectiveness of current peer mentoring programs. Make mentorship for purposes of creating a supportive environment mandatory for first-year, and “at-risk” students.
Recommendations

Leadership & Mgmt. Systems

- Recognizing that 50% of students who leave do so in good academic standing, challenge leadership to develop a plan to motivate & retain 1/3 of that cohort.

- Establish annual evaluation of department performance against retention objective, and report on progress to EAC, including specific actions on pedagogy, curriculum, teaching performance evaluation, and satisfaction metrics.

- Consider ways to create more engagement within College, separate and apart from Andrews or Engineering Quad.

- Identify CEAS “at risk” populations & develop targeted retention plans for each.