# AC 2011-426: EXTENDING INFORMATION ON TIME EFFECTIVE STUDENT INTERACTIONS TO ENGINEERING FACULTY

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# Extending Information on Time Effective Student Interactions to Engineering Faculty

## Abstract

The College of Engineering at The Ohio State University is one of ten initial institutions currently collaborating in an NSF funded Extension Services project entitled ENGAGE (Engaging Students in Engineering) (www.EngageEngineering.org).  The main thrusts of the ENGAGE Project are to encourage the implementation of research-proven techniques that have been shown to improve retention of undergraduates in engineering programs.  One of the three thrusts is to introduce faculty to techniques for student interactions which are both effective and require a minimum amount of faculty time.  ENGAGE has released a four-page publication entitled "Taking Action: Time Effective Student Interactions for Engineering Faculty" which describes six suggested approaches.  This paper reports on a study of the efficacy of a novel approach introducing faculty to this material.  As an alternative to conventional approaches such as an email distribution or seminars, the materials were introduced to faculty by current students.  Thirty-four students enrolled in a course entitled College Teaching in Engineering distributed the ENGAGE publication to the faculty, interviewed them about the publication, and then the students wrote a summary of their interview as a class assignment.  Their interview reports were summarized and results were shared with the students without any attribution to individual students, faculty, or departments.  Using a more conventional approach, a second set of 30 faculty received the publication via email and were encouraged to read the publication and implement its recommendations.  After 5 months, a brief follow-up survey to both sets of faculty was used to compare results of the two distribution methods.  It is not clear if student interviews are the ideal way to disseminate information to faculty, but it appears to be more effective than just emailing information to faculty.  Students used this exercise as an opportunity to, not only talk to faculty about faculty-student interaction, but also to talk about teaching in general.  They learned valuable teaching strategies as well as validated what they were learning in the class.

## Introduction

As highlighted below, much has been done to show the positive impact of faculty engagement with students.  Dr. Norman Fortenberry, Director of the Center for Advancement of Scholarship in Engineering Education at the National Academy of Engineering recently stated "Two of the most significant factors affecting engineering student engagement, retention, and academic performance are the quality and extent of students' interactions with engineering faculty.  Positive student learning outcomes are correlated with faculty discussion with students about the nature of engineering work and affirmation of students' ability to successfully perform such work."[1]  Astin (1993)[2], Ewell & Jones (1996)[3], Pascarella & Terenzini (1991)[4] and Tinto (1993, 2000)[5] have all documented the strong association of both formal and informal faculty–student contact to enhanced student learning.  Research done by Braxton et al. (1997) [6], Hurtado & Carter (1997) [7], Stage & Hossler (2000)[8] and Umbach & Wawrzynski (2005)[9] has shown that faculty-student interactions were frequently the best predictors of student persistence.  In 2006, MentorNet surveyed approximately 2,500 science, technology, engineering, and mathematics (STEM) undergraduates, graduate students, and postdoctoral scholars to learn more about their

perceptions of the value of and need for mentors as they progress through their academic studies. The study yielded a new dimension to the existing literature and is useful for both understanding student perceptions and for communicating effectively to students. Students and postdoctoral scholars who participated in the MentorNet study considered mentoring important for the successful completion of their degree.[10]

The College of Engineering at The Ohio State University is one of ten institutions currently collaborating in an Extension Services project funded by the National Science Foundation (NSF) entitled ENGAGE (Engaging Students in Engineering). Extension Services projects are modeled after the Cooperative Extension Service in Land Grant Institutions and are intended to extend proven, research-based strategies into STEM education. The overarching goal of ENGAGE is to increase the capacity of engineering schools to retain undergraduate students by facilitating the implementation of three research-based strategies to improve the student day-to-day classroom and educational experience. There is research evidence demonstrating increased retention of undergraduate engineering students, particularly women; and because they are enhancements rather than changes to the curriculum, these strategies are very appealing.[11]

One of the three strategies is to build and support faculty knowledge and skill to improve interaction between faculty and first and second year engineering students inside and outside of the classroom[1]. A four-page publication developed by ENGAGE entitled "Taking Action: Time Effective Student Interactions for Engineering Faculty" describes six suggested approaches[11]:

1. **Share an encouraging or informative message with students**, even at about 2 minutes per week, possibly as an opening or closing message at lecture.
2. **Take a minute to give constructive feedback** on a test or a quiz in addition to the grade. Instruct your teaching assistants to do the same.
3. **Show that you are approachable** when you see students, during and outside of class. Conveying approachability can be as simple as using eye contact and saying hello in the hallway.
4. **Encourage students to meet with you during office hours** in ways that are comfortable, such as meeting with small groups of students in public spaces.
5. **Find quick and helpful alternatives to saying "no"** or "I'm not the one to ask about that." Instead you could say, "That's a good question" or "Let me think of a good place to start."
6. **Interact with your students in respectful, challenging, and collaborative ways.** Learning student names and facilitating small group work can help.

This publication has since been replaced by a set of two publications focusing separately on written and oral communications.

Little research can be found on the dissemination of this type of information to faculty. The purpose of this research study was to assess the effectiveness of using student interviews of faculty to introduce a best practice for faculty members and compare this to an email distribution approach. Participants for this project were 34 students enrolled in the Food, Agricultural, and Biological Engineering (FABE) 810 College Teaching in Engineering class. Students in the class include graduate students and undergraduates from across the College of Engineering. The first step of the project was accomplished by students interviewing faculty who agreed to the process and then doing a written summary of their interview as a class assignment. These

interview reports were summarized and results were shared with the students without any attribution to individual students, faculty or departments.  A second set of 30 faculty received the publication at about the same time via an email distribution which encouraged them to read the publication and implement its recommendations.  After 5 months, a follow up survey of both sets of faculty was done to assess the impact of these different dissemination approaches.  In this paper, these two approaches will be summarized and compared.  In addition, although it was not an initial objective of this research study, knowledge gained by the students going through the interview process will be summarized and conclusions drawn from the findings will be discussed.

**Methods**

This study includes distributing the publication "Taking Action: Time Effective Student Interactions for Engineering Faculty" to faculty in two ways:  1) through students with a request for an interview regarding the content of the publication; and 2) through an email distribution to a similar number of faculty.  A copy of the publication is included in Appendix A.

Participants

For the first group, the 34 students enrolled in the  College Teaching in Engineering course were asked to identify three current faculty members (regular, clinical, or lecturer) in the college whom they would be willing to interview for the assignment.  Since students were from a range of departments across the college, this gave a distribution of faculty across the college.  The College of Engineering (COE) has more than 300 individuals eligible to be asked.  Since the students picked the faculty to contact, the sample was not truly random.  The instructor of the course finalized the faculty member assignments, making sure that a faculty member was not contacted more than once.  Thirty faculty members, not chosen for interview, were selected at random from the list generated by the students to receive the publication by email.  The demographics of the interviewed and emailed faculty are shown in Table 1.  Note that several of the faculty selected were not from the College of Engineering but from the College of Business or Arts & Sciences.

| Title | Faculty Interviewed | Faculty Emailed (not interviewed) |
|---|---|---|
| Professor | 16 | 12 |
| Associate Professor | 7 | 4 |
| Assist Professor | 5 | 7 |
| Lecturer | 6 | 6 |
| Post-Doctoral Student | | 1 |
| | **34** | **30** |
| **Department/Unit** | | |
| College of Business | | 1 |
| Chemical & Biomolecular Eng | 1 | 1 |
| Civil & Environmental Eng and Geodetic Sciences | 5 | 6 |
| College of Medicine | 1 | 1 |
| Computer Science Eng | 2 | 4 |
| Electrical and Computer Eng | 4 | 1 |
| Educational Psych | 1 | |
| Engineering Education Innovation Center | 4 | 2 |
| Food, Agricultural, and Biological Eng | 2 | 3 |
| Design (College of Arts & Sciences) | 1 | |
| Math (College of Arts & Sciences) | | 1 |
| Integrated Systems Eng | 2 | |
| Materials Science & Eng | 1 | 1 |
| Mechanical & Aerospace Eng | 11 | 9 |
| | **34** | **30** |

Table 1. Demographics of faculty interviewed and emailed

Procedures

*Dissemination Through Student Interviews*
The first step of the project was accomplished by students contacting and interviewing the faculty. Students distributed the publication to the faculty member prior to the interview. Students prepared for the interview in-class by discussion and role play exercises. Each student was asked to follow a defined protocol of contacting the faculty member to ask for cooperation in this exercise, distributing the publication, and arranging for a 30-45 minute interview time. Students interviewed their assigned faculty member using a set of prepared questions for guidance. Students were instructed to ask that they be able to take notes in order to complete the class assignment. The student informed the faculty member that a summary of the interviews may be shared with the class. The question set and suggested interview format is provided in Appendix B. The students were asked to complete a post-interview summary form which is provided in Appendix C. These summary forms were summarized for discussion during a class period later in the term. No faculty or departments were identified in the summary, thereby protecting the anonymity of both the students doing the interviews and the faculty members being interviewed. Students and faculty were asked to sign a form giving consent to use their

reports as part of research being done. If consent was not received from both parties, the summary from that particular student and faculty member was not used in the study.

*Dissemination Through Email*
At approximately the same time as the student interviews of faculty, the second group of faculty received the "Taking Action: Time Effective Student Interactions for Engineering Faculty" publication as an attachment to an introductory email from Robert Gustafson, Director of the Engineering Education Innovation Center at The Ohio State University.

*Follow-up Survey*
Approximately five months following the interview and email distribution, the faculty members were surveyed with a web-based tool, to ascertain if they remember the interview (or remember receiving the email of the publication), the content of the publication, if the publication changed their behavior in any way, and if so have they seen positive results from the changes. Consent of the faculty member for use of their responses was built into the survey.

## Results and Discussion

Student Interviews of Faculty

Of the 34 students doing interviews, 32 submitted a summary report. Consistent with an approved IRB protocol, one faculty member asked that a report not be done and one student chose not to report; therefore, their responses are not reported in this paper.

As part of their reporting on the interview, students were asked if they thought the faculty member had read the publication prior to their interview. Students reported six of the thirty-two (nineteen percent) of the faculty had not. This would imply that it cannot be assumed that all faculty members will read such a publication in preparation for a student interview.

When asked if the faculty member agreed with the premises of the publication regarding faculty-student interaction, 84% of the faculty agreed with the premise of the publication. For another group (13%), students did not explicitly say if the interviewed faculty member agreed with the publication. One student reported that the faculty member gave "a very conditional yes". The faculty member continued by stating "Faculty-student interactions CAN make a difference, but it depends on the level of interaction and the general nature of each specific student. It depends on how comfortable the student is with getting attention and asking or answering questions." It would appear that the premise of positive impact of faculty-student interaction is well accepted by the faculty.

When asked if they had one or two of the six suggestions in the publication they liked to use, faculty reported examples of all six of the suggested faculty-student interaction techniques. The students also reported hearing of specific examples of these techniques such as "show that you are approachable by being relaxed and informal in class", "be approachable by sticking around after class", "encourage students to come to office hours in groups so they might feel more comfortable" and "instead of office hours, have an open door policy". The faculty were also

asked which of the suggestions they might use more often.  Table 2 shows the number of faculty who reported using each suggestion as well as the number who might use that suggestion more often.

| Suggestion | Number of faculty who reported using suggestion | | Number of faculty who reported they might use suggestion more often | | Number of faculty who indicated caution should be used with suggestion | |
|---|---|---|---|---|---|---|
| Share an encouraging or informative message with students | 12 | 38% | 4 | 13% | 5 | 16% |
| Take a minute to give constructive feedback | 9 | 28% | 5 | 16% | 0 | 0% |
| Show that you are approachable | 14 | 44% | 7 | 22% | 5 | 16% |
| Encourage students to meet with you during office hours | 14 | 44% | 4 | 13% | 6 | 19% |
| Find quick and helpful alternatives to saying "no" | 4 | 13% | 4 | 13% | 3 | 9% |
| Interact with your students in respectful, challenging, and collaborative ways, including learning students' names | 18 | 56% | 13 | 41% | 2 | 6% |

Table 2.  Number of faculty who used, might use, or is cautious about each publication suggestion

It is interesting to note that discussing interacting with students in respectful, challenging, and collaborative ways, 13 students reported faculty mentioned the challenge they have in learning names in "large" classes or classes with over 50 students.  A few faculty mentioned tricks they use in learning names, such as, name tents for each student and taking photos of the students.

Faculty were also asked if they thought any of the suggestions should be used with caution. Table 2 shows the frequency of their responses.  A few of the written comments regarding this question included that faculty should be cautious about being too approachable and being too much of a "friend" and five faculty suggested caution should be used with office hours noting that they felt that office hours in a public place, such as a coffee shop, is not appropriate.

Follow-up Survey

Approximately 5 months following the interview and email distribution, the faculty members were surveyed with a six-item questionnaire to ascertain what they remember about the interview or email of the publication.  Table 3 shows the six questions used and the results of the survey.

Of the 34 faculty who were interviewed, 14 faculty (44%) responded to the email survey and of the 30 faculty who were emailed the publication, 5 faculty (17%) responded. Two reminders were sent; however, they did not yield additional submissions.

| Faculty Interviewed | | | Faculty Emailed | | |
|---|---|---|---|---|---|
| **1. Do you recall being interviewed by a student/receiving an email regarding the publication "Taking Action: Time Effective Student Interactions for Engineering Faculty"?** | | | | | |
| Yes | 14 | 93% | Yes | 1 | 20% |
| No | 1 | 7% | No | 4 | 80% |
| **Total** | 15 | 100% | **Total** | 5 | 100% |
| **2. Do you think this was an effective way for you to receive this information?** | | | | | |
| Yes | 13 | 93% | Yes | 3 | 60% |
| No | 1 | 7% | No | 2 | 40% |
| **Total** | 14 | 100% | **Total** | 5 | 100% |
| **3. Do you agree that faculty-student interaction can have a positive impact on student motivation, learning, performance, and careers?** | | | | | |
| Strongly Agree | 14 | 93% | Strongly Agree | 3 | 60% |
| Agree | 1 | 7% | Agree | 2 | 40% |
| Neutral | 0 | 0% | Neutral | 0 | 0% |
| Disagree | 0 | 0% | Disagree | 0 | 0% |
| Strongly Disagree | 0 | 0% | Strongly Disagree | 0 | 0% |
| **Total** | 15 | 100% | **Total** | 5 | 100% |
| **4. Do you think your level of faculty-student interaction has changed since receiving this publication?** | | | | | |
| Increased significantly | 0 | 0% | Increased significantly | 0 | 0% |
| Increased | 2 | 13% | Increased | 0 | 0% |
| No Change | 13 | 87% | No Change | 4 | 100% |
| Decreased | 0 | 0% | Decreased | 0 | 0% |
| Decreased significantly | 0 | 0% | Decreased significantly | 0 | 0% |
| **Total** | 15 | 100% | **Total** | 4 | 100% |
| **5. Without going back to look at it, do you recall any of the six specific approaches the publication suggested?** | | | | | |
| Yes | 7 | 47% | Yes | 1 | 20% |
| No | 8 | 53% | No | 4 | 80% |
| **Total** | 15 | 100% | **Total** | 5 | 100% |

| Faculty Interviewed | | | Faculty Emailed | | |
|---|---|---|---|---|---|
| **6. Have you increased or added the use of any of the six recommendations?  If Yes, please indicate which one(s).** | | | | | |
| Share an encouraging or informative message with students | 6 | 86% | Share an encouraging or informative message with students | 2 | 100% |
| Take a minute to give constructive feedback | 4 | 57% | Take a minute to give constructive feedback | 0 | 0% |
| Show that you are approachable | 4 | 57% | Show that you are approachable | 1 | 50% |
| Encourage students to meet with you during office hours | 6 | 86% | Encourage students to meet with you during office hours | 1 | 50% |
| Find quick and helpful alternatives to saying "no" | 3 | 43% | Find quick and helpful alternatives to saying "no" | 0 | 0% |
| Interact with students in respectful, challenging, and collaborative ways | 4 | 57% | Interact with students in respectful, challenging, and collaborative ways | 1 | 50% |

Table 3.  Results from responses of faculty who were asked to recall ENGAGE publication

A higher proportion of the faculty recalled the interview and, by implication, read the publication than for those just receiving the email.  In addition, a higher percentage (93%) viewed the interview as an effective way to receive the information than just email distribution (60%).  It is interesting to note that for the email group only 1 of 5 respondents indicated specifically recalling receiving the publication by email, although 3 of 5 indicated email as an effective way to distribute such a publication.  Although both groups agreed that faculty-student interaction can have a positive effect, those in the interview group reported a higher percentage of "strongly agrees".  A higher percentage of the interview group (47% versus 20%) self-reported that they could recall specific techniques suggested.  Only 13% of the interview group as compared to 0% of the email group reported increasing their use of the techniques since receiving the publication.  However, a much higher percent of both groups indicated increased use when asked about each specific recommendation.  It may be that faculty misinterpreted the questions and reported use, rather than increased use.  This question would need to be clarified if the survey is repeated in the future.

In addition to the questions listed in Table 3, faculty were also given the opportunity to respond to an open-ended prompt for additional comments.  Eight of the interviewed faculty provided additional comments which ranged from "I've always tried to do most of these things, but the interview encouraged me to try harder and gave me some ideas for new approaches" to "The six recommendations are behaviors that I have always practiced in teaching. I was surprised that they needed to be stated as recommendations".  One faculty member resented the student interview approach.  He/she indicated his/her "teaching methods, which do receive very good ratings by the students, were being challenged for no apparent reason".  This response provides good information on areas of improvement for future studies.

## What Students Learned from Doing the Faculty Interviews

As part of their reporting, students were asked to reflect on what they learned from the interview exercise. They uniformly reported they enjoyed the exercise and had a good discussion with the faculty member. In many cases the discussion went well beyond the particular focus of the publication and, per the classroom discussion, the original time requested. Student reflections were in the response to the open-ended question "What did you learn from doing this exercise?"; thus they could have more than one reflection of the same theme and category. A qualitative content analysis was done on the student reflections by the three authors of this paper. Students' reflections fell in four themes: ones that: 1) directly addressed the ENGAGE publication; 2) addressed faculty-student interaction beyond the publication; 3) addressed teaching more broadly than faculty-student interaction; and 4) addressed generalizations about the interview. Within each theme, there were up to three categories in which the reflections fell. Table 4 shows the themes and categories and their frequencies.

| Themes and Categories | # of Reflections | % of Reflections Addressing Theme/Category | # of Students Addressing Theme/ Category | % of Students Addressing Theme/ Category |
|---|---|---|---|---|
| A. Directly Address ENGAGE Publication | 10 | 20% | 9 | 38% |
| General Validation of Publication Concepts | 7 | 14% | 6 | 25% |
| Skepticism of Need for Publication | 3 | 6% | 3 | 13% |
| B. Address Faculty-Student Interaction | 11 | 22% | 8 | 33% |
| Generalizations about Faculty-Student Interaction | 9 | 18% | 6 | 25% |
| Examples of Faculty-Student Interaction | 2 | 4% | 2 | 8% |
| C. Address Teaching More Broadly | 24 | 48% | 21 | 88% |
| Characteristics of Faculty | 8 | 16% | 7 | 29% |
| Generalizations about Teaching | 9 | 18% | 8 | 33% |
| Examples of Teaching Methods Utilized | 7 | 14% | 6 | 25% |
| D. Generalizations about the Interview | 5 | 10% | 5 | 21% |
| **Total** | **50** | | | |

Table 4.  Frequency counts for participants' reflections

Twenty percent of the reflections directly addressed the ENGAGE publication – 14% validating the concepts in the publication and 6% indicating that the concepts seemed intuitive or seemed difficult to execute.  Since the previous questions of the assignment asked explicitly about the concepts, it is likely that the students felt that they did not need to elaborate on this further.

Twenty-two percent of the reflections addressed faculty-student interaction beyond the six suggestions listed in the publication with two students providing specific examples of faculty-student interaction such as using different types of media (course management software, Facebook) to communicate with students and working to develop respectful relationships with students.

Students used the reflection question to discuss what they learned about teaching beyond just faculty-student interaction.  Forty-eight percent of the reflections dealt with characteristics of faculty, generalizations about teaching, and examples of teaching methods utilized by the faculty member they interviewed.  Students found that faculty who they interviewed "self-analyze their teaching" and that "good teachers have to work at being good teachers".  They also found that "faculty members are reluctant to change" and they "need more incentive to change".  When writing about teaching in general, students mentioned "to teach well and to interact with most students, need to use diverse methods" and "simply standing up in front of the room talking at a slide show or chalkboard is not an option".

Five students used this reflection as an opportunity to convey that they learned valuable teaching techniques through this experience.  Sample comments include:  "I got useful advice on how to effectively interact with my students", "…provided me with a chance to learn a lot of helpful yet simple tips for teaching", and "I learned several strategies to successful[ly] implement this material".

**Conclusions**

The initial objective of this study was to assess the effectiveness of using student interviews of faculty to introduce a best practice for disseminating information to faculty members (Time Effective Student Interaction Options) and compare this method to an email distribution approach.  From the follow-up survey, it appears that faculty who were interviewed were more likely to have read the publication (93% remembered being interviewed about the publication) than the faculty who were just emailed the publication (only 20% remembered getting an email with the publication).  It is not clear if student interviews are the ideal way to disseminate information to faculty, but the low survey response rate and responses received indicates it is more effective than that just emailing information.

In FABE 810 College Teaching in Engineering, students used this exercise has an opportunity to, not only talk to faculty about faculty-student interaction, but also about teaching in general.  Although it was not an initial objective of this exercise, it was useful for students to learn valuable teaching strategies as well as validate what they were learning in the class.  Students

came back with a robust set of observations and indicated that they learned teaching techniques that they plan to use.  Plans are in place to repeat this exercise with a new set of students and faculty members.  Caution will be used such that faculty interviewed and emailed in this study will not be contacted again.

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## Appendix
A.  "Taking Action: Time Effective Student Interactions for Engineering Faculty"
B.  Protocol and Report for Faculty Interviews
C.  Post-Interview Summary Form

Appendix A.  "Taking Action: Time Effective Student Interactions for Engineering Faculty"

**engage**

Engaging Students in Engineering

## Taking Action: Time Effective Student Interactions for Engineering Faculty

### Why?
Research shows that:
- Faculty interactions with engineering students make more of a difference than you might think. Even very casual, brief conversations with faculty can:
  - ➢ Motivate students
  - ➢ Enhance learning
  - ➢ Improve student performance
  - ➢ Positively influence retention
  - ➢ Increase student commitment to engineering careers
- All of these outcomes lead to more engaged students and higher quality work from students.

### What You Can Do:
1. **Share an encouraging or informative message with students**, even at about 2 minutes per week, possibly as an opening or closing message at lecture.

2. **Take a minute to give constructive feedback** on a test or a quiz in addition to the grade. Instruct your teaching assistants to do the same.

3. **Show that you are approachable** when you see students, during and outside of class. Conveying approachability can be as simple as using eye contact and saying hello in the hallway.

4. **Encourage students to meet with you during office hours** in ways that are comfortable, such as meeting with small groups of students in public spaces.

5. **Find quick and helpful alternatives to saying "no"** or "I'm not the one to ask about that." Instead you could say, "That's a good question" or "Let me think of a good place to start."

6. **Interact with your students in respectful, challenging, and collaborative ways.** Learning student names and facilitating small group work can help.

# Applying This Research in Your Own Classroom

1. **Share an encouraging or informative message with students**, at about 2 minutes per week, possibly as an opening or closing message at lecture.

   **Why?** Very often, students may not seek out additional information after class because they feel intimidated or perceive professors and TAs as too busy. Many students, especially those from underrepresented groups, spend time wondering if they fit in or made the right choice. As a result, a simple communication can function as an invitation to persist in the field. Most people don't have time to encourage many individual students each day, but 2 minutes a week, to reach an entire class, is usually possible. With this approach, you reach many students instead of only the one that happens to snag you after class.

   **How?**

   - You might provide an "insider's" perspective on a good opportunity such as an activity, encouragement, or a general "word to the wise." Some examples:
     - "A lot of students don't realize that they can volunteer to work with a graduate student or professor on research for a few hours a week. By the way, only do this if you are very reliable."
     - "You all did better on the last problem set / quiz / exam than I expected. Keep up the good work."
     - "One of my former students says that she uses what she learned in this class on a regular basis in her work." (If you can name the student, his or her job title, and where s/he works, it will make this example even more effective – your alumni/ae office can often help with examples.)
     - "I noticed that in Tom Friedman's latest op-ed; he makes a strong case for how those trained in engineering will be well-prepared to help tackle some of these major global challenges we are facing."

2. **Take a minute to give constructive feedback** on a test or a quiz in addition to the grade. Instruct your teaching assistants to do the same.

   **Why?** Students hear feedback in different ways. Quite frequently, they are alone with a graded assignment, exam, or project. They hear from you primarily through the feedback provided. Constructive feedback means you communicate confidence in the student and specific ideas about how and what to improve. Your expectations of students will influence their performance, so it's important to convey expectations that they will be able to learn.

   **How?**

   - Be candid if a student's work (not the student) is missing the mark, and take the extra minute to emphasize you are confident that the student is capable of achieving higher quality work.
   - Example: "This project includes many quantitative errors, resulting in a low grade. I am confident that you can do higher quality work. Most students who go to the supplemental instruction sessions report that their grades have improved because they catch these errors before turning in work. Try this and consult the TA for additional strategies because I'd like to see you succeed."
   - Specific feedback helps. Students then feel energized to tackle the challenge if they think they can fix their work and strive for excellence. In contrast, it is deflating to wonder about what was missing. To save time, you might consider developing a set of examples of typical errors paired with examples of better work without the errors, to refer to when grading.

3. **Show that you are approachable when you see students**, during and outside of class**.** Conveying approachability can be as simple as using eye contact and saying hello in the hallway.

   **Why?**  Most faculty feel pressed for time and it is often not feasible to increase office hours. But during class, or in the hallway, you can increase students' perception of your approachability, and as a result, they are more likely to ask good questions and engage in the class. Having an approachable teacher contributes to a supportive climate for learning for all students, but especially for students from underrepresented groups.

   **How?**
   - If you rarely have time for questions, leave 3 minutes at the end of class for students to write questions on paper or submit on-line, possibly with their section number at the top. This method is effective without reducing lecture time significantly. You can skim for themes and target your next lecture accordingly or pass along to section TAs to guide their remediation. And when you ask for questions, students feel valued.
   - Look at students when you lecture, rather than only at the computer, screen, or black/whiteboard.

4. **Encourage students to meet with you during office hours in ways that are comfortable**, such as meeting with small groups of students in public places.

   **Why?**  Students find informal interaction powerful, and these interactions can foster the idea that faculty (and engineers by proxy!) are people. Students also more likely to get their questions addressed when in smaller group settings, too.

   **How?**
   - On a rotating basis, schedule project teams to visit your office hours. Or consider holding office hours in a public setting such as a table in the campus center. The combination of the group and the public space may increase comfort for students and faculty alike.

5. **Find quick and helpful alternatives to saying "no"** or "I'm not the one to ask about that." Instead you could say, "That's a good question" or "Let me think of a good place to start."

   **Why?**  A moment of interested reflection goes a long way to encourage students and it also gets them to where they can find the information or support they need.

   **How?**
   - Take a moment to say, "This is a really good question" or "I'm glad you are interested." This approach helps to validate students' interests and allows them to hear you as you direct them to another resource.
   - Rather than brush off the student, consider alternatives that direct the student to another person. For example, "I don't know but my guess is that Jamie Smith in Global Initiatives would at least know the right person to ask about that. If you find out, will you let me or my TA know, so we can know how to answer that next time?" Students will get on the right track and feel more positive about asking.

6. **Interact with your students in respectful, challenging and collaborative ways.** Learning student names and occasionally facilitating small group work can help.

   **Why?**  Many students view their class experiences as a window into a future engineering career. If they see respectful, challenge, and collaborative interactions in the classroom, they are more apt to envision these qualities in the workplace, and want to pursue a career in the field.

**How?**

- Try to learn students' names and how to pronounce names correctly.  It's not always easy to learn many new names at once, though a number of faculty have developed "tricks of the trade" to help them learn the names of students even in very large classes. But by demonstrating the effort to learn even a few names and how to pronounce them correctly can help students to feel more like individuals and respected. Many faculty members can now print a roster with pictures for use in class. If your campus does not have this tool, a TA might be able to help to construct something similar.

- Try to use a student's name during a lecture. For example, instead of saying "Let's say we wanted to build a bridge" you could say, "Let's say Jennifer wanted to build a bridge." When students feel the class is relevant, they are more likely to engage.

- Facilitate small group interactions or consider modeling responsible ways to interact and disagree. Taking time to work on responsible and respectful ways of working together can help men and women students alike to learn how to challenge one another and learn more from each other.

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**References and Further Reading**

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Kim, Y. K., & Sax, L. J. (2009). Student–faculty interaction in research universities: Differences by student gender, race, social class, and first-generation status. Research in Higher Education, 50(5), 437-459.

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**Useful Web Links**

Project Implicit
        https://implicit.harvard.edu/implicit/  and   http://isites.harvard.edu/fs/html/icb.topic58474/TFTrace.html
Teaching Tolerance
        http://www.tolerance.org/activity/test-yourself-hidden-bias

*ENGAGE encourages the distribution of this publication.*

Appendix B. Protocol and Report for Faculty Interviews


Suggested Format for Student to Use for Faculty Interview/Interaction

Pre-visit
1.  Make sure you have confirmed with Dr. Gustafson the faculty member to be contacted.  We do not want multiple contacts to one faculty member.
2.  Contact faculty member via email to 1) introduce the purpose of your request  ( As an assignment in FABE 810 College Teaching in Engineering class, we are being asked to interview a current faculty member regarding the topic of faculty-student interactions and the content of the attached brief handout), 2) ask if they are willing to review the document and discuss it with you for 30 to 45 minutes.  (You can assure them you are not asking them to do a written evaluation if you like. )  Maybe give some suggested times that would work for you.
3.  Day before the meeting, send a reminder email that you will be at the appointed meeting place at the appointed time, and that you are looking forward to discussing the handout with them.
4.  Make sure you have reviewed the handout and the questions you are going to ask to guide the discussion.

Visit
1.  Introduce self and restate the purpose for discussion

        Suggested Script Outline
        a.  Introduce self if you are not well known to faculty member
        b.  State purpose of the visit. (Again this is an exercise for the FABE 810 class you are taking.  You would like to get their perceptions the handout on "Taking Action: Time Effective Student Interactions for Engineering Faculty".  You have some questions that you can use to guide the discussion, but you may need to be flexible in order or even if you use them all.
        c.  Ask if it is okay if you take a few notes during the discussion.  You can let them know that we will be discussing the results of the interviews as a class, but that no faculty member names will be associated with any comments.  So they can feel free to be candid in their responses.
        d.  Suggested questions:

1.  We can get into specifics later, but from your experience, do you agree with the premise of the handout that faculty-student interactions do make a difference for students like those listed in the "Why?" Statement section?   If yes, maybe ask why they think this works. (If no, please ask why not.)   Maybe ask if they can recall a specific student incident that demonstrates this.
2.  Of the 6 "suggestions" on the first page,
    a)  Do they have one or two that they specifically like to use and could maybe give you examples of how they do those?
    b)  Are there any of the six that think, now that they have read the handout , that they might use more or more often?  Which ones and how?  Where the descriptions on second and third pages helpful?

   c)  Are there any of these that they think should be used with caution or that they do not think are appropriate for faculty-student interaction?

3.  Pick <u>one</u> of the three from the "How?" section and ask a question like:

On the last page of the handout, it makes the suggestion that the faculty member
1. "Try to learn students' names and how to pronounce them correctly."  or
2. "Try to use student's name during lecture"  or
3. "Facilitate small group interactions or consider modeling responsible ways to interact and disagree".

Ask them their reaction to this suggestion.

4.  Be sure to thank the person for the time and their input.  Please let them know that Dr. Gustafson might be contacting them regarding this interview and the material at some later date.

You might also ask them if they have any questions of you.

Post-Visit

1.  Please send a follow-up email thanking the faculty member for their time and sharing their ideas with you.

2.  Please fill out the following post-interview summary form by May 5.  Note that you are being asked to sign a consent form such that the summary can be used as part of a research project.  If you do not wish to consent, this will in no way effect your grade in the course.  Information from you summary will not be used in the research without your consent.

**xxxxx Consent to Participate in Research – Student Consent for Use of Written Reports**

**Study Title:** Extending Time Effective Student Interactions Information to Engineering Faculty

**Researcher:  Robert J. Gustafson**

**This is a consent form for research participation.**  It contains important information about this study and what to expect if you decide to participate.
**Your participation is voluntary.**  Please consider the information carefully. Feel free to ask questions before making your decision whether or not to participate.  If you decide to participate, you will be asked to sign this form and will receive a copy of the form.
**Purpose:**  Assess the effectiveness of using student interview of faculty to introduce a best practice for faculty members (Time Effective Student Interaction Options) and compared this to an email distribution approach.

**Procedures/Tasks:**  You are being asked to develop a report regarding your interview of a faculty member regarding the publication "Taking Action: Time Effective Student Interactions for Engineering Faculty" following guidelines distributed in FABE 810 class.

**Confidentiality:**
Efforts will be made to keep your study-related information confidential.  However, there may be circumstances where this information must be released.  For example, personal information regarding your participation in this study may be disclosed if required by state law.  Also, your records may be reviewed by the following groups (as applicable to the research):
• Office for Human Research Protections or other federal, state, or international regulatory agencies;
• xxxxx Institutional Review Board or Office of Responsible Research Practices;
• The sponsor, if any, or agency (including the Food and Drug Administration for FDA-regulated research) supporting the study.

**Participant Rights:**
You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you are a student or employee at xxxx, your decision will not affect your grades or employment status.

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits.  By signing this form, you do not give up any personal legal rights you may have as a participant in this study.

An Institutional Review Board responsible for human subjects research at xxxxx reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

For questions, concerns, complaints, or if you feel you have been harmed as a result of study participation please contact either Robert J. Gustafson, xxxxx or Lisa Abrams, xxxxx

For questions about rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

**Signing the consent form**
I have read (or someone has read to me) this form and I am aware that I am being asked to participate in a research study.  I have had the opportunity to ask questions and have had them answered to my satisfaction.  I voluntarily agree to participate in this study.

I am not giving up any legal rights by signing this form.  I will be given a copy of this form**.**

| | |
|---|---|
| **Printed name of subject** | **Signature of subject** |

|  | **AM/PM** |
|---|---|
| **Date and time** | |

Appendix C.  Post-Interview Summary Form

Person Being Interviewed:
      Name:
      Rank:   Instructor, Assistant Professor, Associate Professor, Professor, Other
      Department:

Do you think the faculty member had read the handout prior to your visit?
          Yes,  No,  Could not tell


Response to Question 1.

Brief summary of response to "Why it works question".

Responses to Question  2.

a.  List items selected that they like to use.  Brief summary of examples if given.

b.  Items they might consider using more often.  Brief summary of how if discussed.

c.  Items to use with caution or not at all.  Brief summary of reasons if discussed.

Response to Question 3.

Which one of the three "Hows" did you pick to ask about?

Brief summary of faculty members response.

Reflection Question

What did you learn by doing this exercise?