Promoting Academic Integrity in Your First Classroom

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Abstract - Many new engineering educators are not fully aware of the prevalence of cheating among undergraduates. As many as 60-75% of graduating engineering students self-report cheating during undergraduate school. New faculty members need to be aware of academic dishonesty statistics and take steps in their first classroom to prevent cheating and promote a culture of academic integrity. This preliminary research study consists of a qualitative survey of assistant professors within the first five years of their career and graduate students preparing for an academic position. Respondents were asked to provide their best estimates of cheating statistics, as well as descriptions of situations they have personally encountered and how they were handled. This paper presents the survey results and summarizes advice for new engineering educators who wish to promote academic integrity in their first classroom setting.

Index Terms - Academic Integrity, Cheating, New Engineering Educators.

INTRODUCTION

Many new engineering educators are not fully aware of the prevalence of cheating among undergraduates. As many as 60-75% of graduating engineering students self-report cheating during undergraduate school, a number that has been on the rise and which is higher than those reported by students in the sciences and humanities [1]. New faculty members need to be aware of academic dishonesty statistics and take steps in their first classroom to stop cheating before it starts, thus promoting a culture of academic integrity.

In one study, college students reported cheating on approximately one test per academic year and 6-19% of homework assignments [2]. This same study reports that opinions among students regarding what constitutes cheating vary widely and may not match faculty definitions. At the high school level, surveys have been conducted showing that 75% of high-achieving students had cheated and that 95% of the cheaters reported not getting caught; another survey found that 90% of high school teachers now say cheating is a problem in their school [3]. A recent survey of 57% of the graduate students at Caltech showed that 23% of students admitted to breaking the Honor Code by either taking extra time on an exam or assignment (18%), referring to prohibited materials (9%), or collaborating (5%). Many of these cases were not detected and the students themselves were found to underestimate the amount of cheating that occurs [4]. Some research has shown that students at schools with honor codes self-report much lower levels of cheating (25% compared to 45%) [5]. These problems with academic integrity are obviously occurring at all levels of the education system.

Other researchers are investigating student definitions of cheating, factors that influence their decisions about cheating, and potential deterrents [1, 2, 6]. One of the results of this survey showed that while 96.8% of students thought it was cheating to copy answers during an exam, only 71.6% felt that it was cheating to allow someone else to copy their work. Engineering students cheat for a variety of reasons stemming from workload, time, and peer pressures in a highly competitive environment and desires for good grades that will "beat the curve," gain them acceptance to graduate schools and jobs, maintain their financial aid and scholarships, and because they assume other students around them are cheating.

This new preliminary research study consists of a qualitative survey of assistant professors within the first five years of their career and graduate students preparing for the academic marketplace. The survey asks respondents for 1) their own definition of cheating, 2) an estimate of the percentage of U.S. undergraduate engineering students who engage in cheating, 3) the frequency and type of cheating situations they have personally encountered and how they were handled, 4) how they adjusted their teaching methods or policies, and 5) basic demographic information. This paper also summarizes new and previously published advice for new engineering educators who wish to promote academic integrity in their first classroom setting. These include syllabus content, rhetoric for the first day of class, institutional honor codes, homework assignments, test design, test day procedures, the impact of technology, possible faculty responses when cheating is detected, and building rapport with your students.

NEW ENGINEERING EDUCATOR SURVEY

A small survey was conducted with university instructors who are within their first five years in faculty positions or the last year of graduate school. The survey was sent to twenty people and nine people responded (45%) from six different institutions.
Some of the more interesting responses were to the questions, “What percentage of undergraduate engineering students do you think would self-report cheating” and “What percentage of undergraduate engineering students do you estimate have actually cheated?” The average response to the first question was 31.67% of undergraduate engineering students would self-report cheating. The average response to the second question was that the survey respondents estimated 45.56% of engineering undergraduates actually cheat. The data points are shown in Figure 1. Only two respondents estimated percentages that were close to values that have been reported in previous studies involving surveys of students. Both of those responses came from faculty members with 3-5 years of experience rather than 0 or 1-2 years. Yet several other respondents with more than three years of teaching experience still underestimated the proportions of students who might cheat.

Survey respondents were asked to provide a definition of cheating. Most of the survey respondents included some version of taking credit for the work of others. Specific situations that could fall under the definition of cheating include (but are not limited to):

- Looking at other students’ exams
- Copying assignments or labs
- Plagiarism
- Absent or improper reference citations
- Using unapproved resources (storing formulas in a calculator, using books during a closed-book take home exam)
- Signing attendance sheets for other students
- Working together on non-collaborative assignments

Other methods of cheating reported in [7] and [8] are obtaining copies of tests in advance, passing information to a friend on a borrowed personal item, writing notes on clothing or skin, skipping an exam but accusing the instructor of losing the paper copy, changing answers after solutions are available and grading is complete, paying someone else to take a test or write a paper, or finding other ways to consult friends during the exam.

The average number of cheating incidents that the survey respondents had encountered was three. Everyone had at least suspected cheating in at least one instance. Methods of handling the situation included:

- Reviewing academic integrity policies directly with the students involved
- Reporting the incident to other university officials such as the honor code board, or warning students that this would result from future incidents
- Assigning a grade of zero, or reducing the score (such as dividing the earned grade by the number of students who handed in identical papers)
- Deducting points for plagiarism or improper citations
- Warning students who cheat on quizzes to not sit near each other in the future

About half of the respondents stated that they had changed their teaching policies and methods after having encountered cheating, or that they planned to do so. Changes include:

- Discussing academic integrity, ethical behavior, and/or honor codes more thoroughly during the first class session in subsequent courses
- Providing a clear description of cheating policies on syllabus
- Giving verbal reminders about cheating policies when new work is assigned
- Designing assignments so that cheating is easier to identify
- Spending more time comparing student’s answers on assignments and exams
- Monitoring exams more closely

**PROMOTING ACADEMIC INTEGRITY**

This section reviews advice to new engineering educators on how to promote academic integrity in the classroom. The best way to deal with cheating situations is to prevent them before they occur [9].

### I. Defining Cheating

Prior to entering a physics classroom, the professor first acquires a firm understanding of the principles of physics through coursework and research, reviews the topics that he or she expects to cover that particular day and develops a lesson plan that will ideally help all of the students learn this material. Similarly, if engineering educators expect students to be well versed in matters of academic integrity, they must first understand the complexities of this topic, clearly define cheating for themselves, and develop a plan for relaying this information to the students.

One of the complexities of defining cheating is the issue of collaboration. Learning occurs not only when the instructor is teaching, but also when students work on assignments together. Collaboration with peers can lead to even greater learning for both strong and weak students. The strong students benefit based on the principle that the best way to fully learn something is to teach it to someone else. The weak students benefit through an explanation of the material from a
source other than the professor or the textbook. This is particularly useful when the preferred learning style of the student does not match the instructor’s teaching style. Instructors should use a variety of teaching methods to reach out to students with different learning styles, but this does not always happen. As a new instructor, you must carefully consider how you will build collaboration into some of the assignments, yet still be able to assess students individually and ensure that everyone learns the material in the course.

In general, cheating definitions that professors abide by are more stringent than those of the typical university student. For instance, almost all engineering students work together on homework assignments regardless of whether a professor has promoted or prohibited this behavior, or simply failed to mention their policy on collaboration. In addition, many students do not realize that knowingly providing aid to other students can make them as guilty of cheating as the person who copied. Plagiarism is an area that is often misunderstood by students in a university setting, even if it should have been covered while learning to write reports during high school. By clearly explaining their own definition of cheating, an instructor can prevent some cases of academic dishonesty before they occur.

II. The First Class

One of the first challenges that a new engineering educator has is to prepare for the first day of class. While constructing the syllabus, it is good to include information about academic integrity in addition to the typical details about instructor contact information, course learning objectives, and topic schedule. Clear statements explaining what constitutes cheating from the professor’s perspective should be included, as well as potential consequences.

References and resources exist that can help a new faculty member in constructing their first syllabus, including educational research publications and websites by learning and teaching centers at various universities [7, 9-12], as well as examples from other instructors and other courses. It is also important to inquire about department, college, and university policies while talking with your colleagues. Many schools have an Honor Code in place that establishes policies related to cheating as well as formalizes the procedures that must be followed when infractions occur. Even in schools with a written Honor Code, however, portions of the process of defining, identifying, and reporting cheating incidents may be left up to the instructor’s discretion. The ability to report students to an honor council or review board is dependent upon the instructor having clearly defined cheating ahead of time and publicly informing students of these policies.

Despite the fact that university students are presumably all literate adults, it is important to review the syllabus aloud on the first day of class. Reading the syllabus aloud may seem like a waste of valuable class time, but it will help students fully understand the contents, as well as get a feeling for the importance that the instructor places on the various course objectives and policies. The message will be most effective if a concrete example is provided along with specific consequences. For instance, the instructor could say “If I find homework from two students who seem to have worked together, both papers will be marked down,” or “Cheating on a test will result in an automatic score of zero and will be reported to the school’s honor board.” Even if the instructor thinks that they are stating the obvious, it is worth reviewing concepts such as plagiarism and collaboration which are often misunderstood by university students.

Reviewing the syllabus during class also provides an opportunity to build good rapport with the students, such as by offering to meet with them during the first weeks of the semester to address any concerns they have and to clarify policies. It is also a good time to tell students that you are available to help them understand the course material. Remind students that it is a waste of your time to grade assignments that are copied, but worse yet, it is a waste of their time to exert effort in cheating without actually learning the material, which will lead to poor performance on tests and ultimately, in the workplace. Many students are so concerned with attaining high grades in challenging engineering courses that they forget that the ultimate goal is learning. These are the students that, under stress and limited time constraints, may resort to cheating before they think to contact the professor for help. This is the justification behind listing prerequisites and realistic workload expectations on the syllabus, so that students can properly assess their ability to devote sufficient time to the course and be successful without feeling the need to cheat.

III. Assignments

Some less-than-reputable organizations and individuals maintain files of textbook solutions manuals, computer code to common programming assignments, and answer keys to exams from previous semesters. These materials can be shared freely, such as between members of clubs, sports teams, or fraternities and sororities, or sold for profit such as through sales on the internet. The difficulty for new faculty members is that developing original material for every assignment and exam when you are teaching a course for the first time is extremely time-consuming. New problems must be carefully checked to make sure that the correct answer can be obtained and to be sure that the recently developed answer keys do not have errors themselves.

If problems are assigned from the textbook or old homework assignments and exams that might be available, the instructor must be aware of the fact that answer keys are almost certainly available to students who choose to look for them. The course grading policy can be set up so that homework contributes a very small percentage of the final grade compared to exams. If the instructor has successfully established a classroom environment based on mutual respect and trust, then the students will also recognize the value of doing their own work in order to truly learn the material. It is realistic, however, to think that this will apply to every student in the class, so the instructor should carefully watch submissions for evidence of copying answers from other students or the solutions manual. Alternatively, the instructor...
could insert slight numerical changes to the problems so that students who try to cheat can be easily detected but the development of the assignment is not as time consuming for the instructor. For qualitative questions and reports, you will need to check for plagiarism by comparing responses to sentences from the textbook as well as online sources.

Knowing that students will almost certainly consult their friends or answer keys in varying degrees, instructors can instead choose to have team assignments or team projects. Some classes, such as senior capstone design projects and laboratory experiences, lend themselves to and even require teamwork. Assignments in non-project courses, however, can be redefined to require collaboration and student-to-student instruction. Grading of such assignments could include a teamwork skills or peer evaluation component. Regardless of what type of assignments you choose to distribute, you should specify collaboration policies at the top of each one, even if this was included on your initial course syllabus [9].

IV. Exam Preparation

The first step in promoting academic integrity during the assessment process is to design tests that are challenging but fair. This includes providing students with study guides, review sessions, or appropriate practice problems on homework assignments. It is also essential to begin establishing a reputation as a professor who grades fairly and genuinely cares about student learning. Some students cheat in retaliation because they feel that the professor has been unfair to them, such as by assigning too much work. It is “much easier to cheat if a professor is cold and aloof,” compared to when the professor knows students personally and exhibits interest in the ultimate goal of learning [9]. If there are students who are not doing well in the class, you can specifically ask them to meet and discuss the difficulties they are encountering so that you can offer your assistance before they are tempted to cheat [7]. A reputation as a fair and approachable professor will take you much further than a reputation of being difficult or unreasonable with regard to exams and grading. Beyond this aspect of building good rapport with your students, there are many specific steps you can take to reduce the probability of cheating on exams in your classes.

Multiple choice tests might simplify the grading task for the instructor, but it also simplifies the cheating process for the students. In addition to simply glancing at a neighbor’s test, many creative methods have been used in the past when students have shared answers on multiple choice exams (coughs, taps, hand signals, etc.). Tests are more difficult to cheat on if they require students to demonstrate analysis, synthesis, and evaluation skills on questions that are either qualitative, quantitative, or both, rather than simply pure memorization. These types of questions are testing skills from the higher levels of Bloom’s Taxonomy of Educational Objectives, which progresses through knowledge, comprehension, application, analysis, synthesis, and finally to evaluation [13]. It is a good to consider these levels both when you are developing learning objectives for your course syllabus, as well as when you are later evaluating student learning through exams and assignments. When designing exams based on higher level learning objectives, however, it is important to consider the time that will be allotted for students to complete the questions. Students will generally require three times longer than the professor needs to complete exam questions. Unlimited time is essentially available during take home exams, but students almost always collaborate by at least casually discussing these tests before they are submitted [9].

Another important question is whether tests will be closed book, open book, or some combination thereof, such as formula sheets prepared by either the instructor or the students themselves. Closed book exams can often increase the pressure and text anxiety that students feel, thereby increasing the probability that they will feel the need to cheat in order to pass [9]. Instructors can reduce the pressure students may feel by providing a wide variety of ways for students to demonstrate that they have learned the material [7]. If the entire evaluation of student learning is based on two closed book exams at the middle and end of the term, students will feel more pressure than if they have more frequent exams, homework assignments, and projects. This also decreases pressure on students who believe that they never perform well on tests, whether this is true or not.

While you are developing the test content, be sure to keep notes and early drafts of the exam under your complete control. This includes both paper copies and computer files that students could potentially obtain or even accidentally see on your desk prior to the exam day. Make your own photocopies of the exam and keep track of how many you distribute and later collect back [9].

V. Exam Administration

Instructors next have to consider how closely they should monitor the exam period. On one hand, the students are adults and hopefully an environment of trust has been built and nurtured in the class. On the other hand, cheating is prevalent on college campuses. Some Honor Policies prohibit professors from being in the room during an exam. Other professors choose to follow this practice as a demonstration of trust in their students. If the students are well informed of the fact that they are “on their honor” to not cheat, then they may face more stringent consequences if cheating is detected. You could also allow students to vote on whether the honor system should be used or not, following a class discussion of academic integrity issues [7].

If you do choose to monitor the exam room, you can enlist the help of teaching assistants for large or multi-room exams. Having one exam proctor at the back of the room discourages cheating since students do not know if they are being watched at any given time. If you notice something suspicious, you can let the students know you are watching by moving closer to them, asking if they need information from you, or asking them to change seats in extreme instances. You should not be accusing anyone of cheating without just cause, but rather preventing any possible cheating by removing some
of the temptations. You can also walk around the room so that you are available to answer questions and closely monitor student behavior [9].

One of the most readily practiced suggestions for preventing cheating on exams is to ask students to sit further apart than usual. This helps students resist any temptations to glance at a friend’s paper intentionally and eliminates accidental glances as well. You can also ask students to leave all personal belongings at the front of the room during a closed book exam and assure them that everything they need to complete the exam will be provided. Announcing these rules immediately before the first exam could thwart possible cheating situations students have planned, but this will not work on future tests. Another method to prevent cheating in a large class is to have several different versions of a test, where problems are either presented in a different order or have slight numerical variations. Before giving the first exam, it is important to think about how you will handle requests from students who want to leave the room. This may vary depending on the length of the exam, but it will be impossible to completely monitor students under all conditions (restrooms, multiple classrooms, etc.).

At the end of the exam, ask everyone to stop writing at the same time, so that students will not see other people’s answers as they come forward to submit their copy of the test. As you collect exams, you might choose to require students to show photo identification in a large class, and you should definitely record any absences. It is important to have a plan in mind for students who miss an exam, which may be different if the excuse is an unexpected serious illness or simply an unexplained absence. Just as it was important to keep track of all copies of the exam before the test, it is important to not lose any completed exams or allow them to be stolen. Many instructors post exam solutions, but discussing them in class instead allows you to possibly use those same problems in future homework assignments. You should have a formal and fair regarding policy, such as accepting written requests and explanations within a certain time period after the exam is returned. Be careful, however, about giving credit to correct answers that suddenly appear. To discourage students from updating their answers after solutions are posted or discussed, mark each page as you grade it and write specific comments about what was done incorrectly on their original answer. You may even choose to photocopy some exams before returning them especially if you noticed suspicious behavior during this exam period or a previous one. As an added benefit, these exam copies can contribute to your teaching portfolio that can be used when colleagues or administrators inquire about your teaching and grading methods, such as during annual reviews.

VI. Impact of Technology
It should come as no surprise that term papers on just about any topic are readily available on the internet. Some services are able to easily spot cheating in the future. Some computer software and websites have been developed to detect plagiarism and stolen term papers or computer code, and instructors would be wise to utilize these methods when applicable. But with the vast amount of information available to tomorrow’s students, instructors will ultimately face a losing battle [3]. The best defenses, therefore, are to promote academic integrity in your classroom through other means and to diligently identify and punish those instances of cheating that you are able to detect.

RESPONDING TO CHEATING
It is important to react responsibly and carefully when you suspect a student has cheated in your course. The first general rule is that you should not ignore or tolerate cheating, because this is how students slip through the educational system without obtaining the proper knowledge and skills to be successful as practicing engineers. If there is a reasonable doubt that cheating has not occurred, then you may choose to do nothing initially and watch that student more closely in the future, bearing in mind that you must still treat all students as equitably as possible.
It is very important to check university regulations on cheating and follow them exactly. This may require you to report a situation in a very specific way that removes you from the process of determining penalties. If the policies are not adhered to, it is possible that the student might “get away with” cheating due to a technicality, or that the instructor can be reprimanded for not having followed proper procedure and due process. In schools with an honor council, it is important to report all suspected cases of cheating for several reasons. First, it maintains the legitimacy of the honor code and students will know that all cases are handled fairly. Second, the review committee will be able to check previous records that could indicate a chronic cheating problem with a particular student [9].

Some schools have policies that give the professor more discretion in terms of how to respond to cheating. If it is up to you to confront the student, you may choose to first allow them to explain their performance on the test or assignment, prior to presenting them with your evidence that cheating may have occurred. By the time your meeting is complete, be clear with them about the penalty they will now face, either in the form of lower grades from you or formal reports to university administrators. In addition, however, you should let them know that while their grade in your class will suffer, or even their overall GPA, the greater damage is to their character. Regardless of the type of policies your institution has, you will want to document the situation very well, and have someone else witness your proof that cheating has occurred, if possible.

Conclusions

As a new engineering educator, it is important to know that the percentage of students who self-report cheating in engineering undergraduate programs is higher than you might initially think. This paper reports the results of a small-scale preliminary survey of new engineering educators that supports the fact that many new professors are not fully aware of the prevalence of cheating or the methods they can employ to prevent it. Students cheat due to a variety of reasons and through a wide variety of methods. Some students have been allowed to pass through the educational system without understanding that the ultimate goal of completing a college course should be to learn the material that they will need to know in their future careers, not simply to achieve a high grade by any means necessary.

The best way to handle cheating in your classroom is to prevent it. This can be achieved by first promoting a culture of academic integrity and making it clear to students that you want to help them learn the material. Beyond this, there are many practical steps you can take to discourage cheating, or at the very least make it difficult to do so. As a professor, you have the exceptional opportunity to help students through the learning process and train future engineers. This includes holding students accountable to high standards of academic integrity. Ethical students will become ethical practicing engineers.

References


