

On the Frequency and Causes of Academic Dishonesty Among Engineering Students

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Abstract

According to studies of self-reported academic dishonesty conducted over time, cheating among college students has been on the increase since at least the 1940's. This is especially true for engineering students who are now among the most likely to cheat compared to other disciplines. This paper will present a synopsis of the literature on academic dishonesty. In addition, the results of a pilot study on cheating among engineering students conducted at a small mid-western private engineering school are described. Engineering students in an introductory engineering materials course were asked to complete a survey on their perceptions of cheating; therefore, all results are self-reported. The goal of the pilot study is to establish student attitudes about what does and what does not constitute cheating and the frequency of student cheating. In addition, the pilot study was intended to help the researchers identify best practices for conducting a more complete research project. The overall objective of the research is to establish useable approaches for faculty to curtail the pressure to cheat which engineering students may feel.

I. Introduction

For many instructors, efforts to catch cheaters often entail considerable effort on the part of the instructor and/or are frustratingly ineffective. What if a set of techniques existed that an instructor could call upon to use in her class to convince students that they don't need to cheat, long before they have the opportunity to do so? This is the premise of an ongoing research study being conducted by the author to examine what factors motivate engineering students to cheat and what techniques can be used to change their attitudes about cheating before it happens. The present paper will review the literature on academic dishonesty and discuss the results of a pilot study, including data on engineering students' perceptions of what constitutes cheating and the frequency of student cheating. In another paper presented at this conference¹, the various techniques for reducing cheating developed as a result of this research are discussed.

II. Review of Literature on Academic Dishonesty

Higher education has not always been plagued by academic dishonesty. However, since the 1940's the number of students who admit to cheating in college has been on a steady increase. During the '40s the number of students who self-reported cheating was around

23%.² But by 1960 this number was up to 38-49%³ and as high as 50-59% by the mid-60s.⁴ In the early 1990's the percentage of students who self-reported cheating reached 67%⁵ and is expected to go even higher in coming decades. Unfortunately, the trends are similar for engineering students and the numbers are even higher than the college-wide averages. Between 1964 and 1992 the number of engineering students who self-reported cheating in college increased from 58% to 74%.^{6,7} In terms of the extent to which students admit to cheating, engineering students are second only to business students, as shown in Table 1.

Table 1: 1992 Levels of Cheating Among Students of Various Disciplines in College⁶

Discipline	Percent who self-reported cheating
Business	87%
Engineering	74%
Science	67%
Humanities	63%

One of the most difficult aspects of measuring the degree to which students cheat is providing an acceptable definition of cheating. It seems that the most definite finding from the research is that students and faculty differ significantly on what is and is not cheating.⁸ Professors appear to consistently rate various scenarios as cheating more often than students.⁹ For example, 87% of faculty felt that a student is cheating if they ask another student for the questions from a test that they themselves have not yet taken. Only 45% of students felt this was cheating, but 76% of them admitted to doing this. Similarly, 94% of faculty think that it is cheating for students to preview an exam from an unapproved exam file, but only 57% of students see this as cheating. It is difficult to identify the exact reason for this difference, but it may be linked to a socialization process that students undergo when they enter college or perhaps sooner. For example, 60% of students reported that they disapproved of cheating and 71% felt guilty about cheating indicating that for most students there is an ethical implication associated with academic dishonesty.¹⁰ However, in the same study, 85% of students indicated that cheating was a normal part of life in college.

Several researchers have examined this question of what causes students to cheat. Competition for grades and the impact of grades on students' long-term goals are frequently reported as primary reasons.^{10,11,12} Students rationalize this behavior because they perceive other students as benefiting more than they do from cheating, and that they must cheat just to keep up. Research studies have identified a number of other reasons for cheating including graduate school requirements, insufficient study time, heavy workloads, peer pressure, a highly selective definition of cheating, teacher centered reasons (poor instructors, inadequate test times, confusing lectures, etc.) and a dependence of financial aid on good grades.^{10,12,13,14}

Haines et al. described these explanations for cheating as "neutralization" mechanisms.¹⁵ Neutralization can be described as the denial of responsibility for improper action because of the improper action of others. According to this theory, students feel justified

in cheating because outside influences, which are beyond their control, have created a situation in which they would be foolish not to cheat. The top ten neutralizations, according to the researchers, are listed in Table 2. While these statements certainly do not justify cheating, they give us cause to examine what can be done to convince students that even under these sometimes difficult circumstances cheating is still unacceptable.

Table 2: Common neutralizations made by students to justify cheating in a class

Neutralizations: Student reasons for cheating
The instructor assigns too much material
The instructor left room during a test
A friend asked me to cheat and I couldn't say no
The instructor doesn't seem to care if I learn the material
The course information seems useless
The course material is too hard
Everyone else seems to be cheating
I'm in danger of losing a scholarship because of poor grades
I don't have time to study because I am working to pay off school
People sitting around me made no attempt to cover their tests

A further complication to understanding why students cheat is the increasingly diverse student body on college campuses. Several researchers have examined differences in background as a possible explanation for cheating. Perhaps the most conclusive data on cheating is the difference in the frequency of cheating observed for men and women of college age. Men are consistently found to cheat more often than women.^{16,17,18,19} However, the number of women who admit to cheating in college is on the rise, while that of men has remained largely unchanged.^{20,21,22} An interesting finding on gender was a difference in the reasons for cheating between men and women. Calabrese and Cochran found that women were most likely to cheat when there was an opportunity to help another student, whereas men were more often motivated by personal gain.²³

In general, ethnic differences among students seem to have little influence on the degree to which students cheat. Sutton and Huba found no difference in what Caucasian and African-American students viewed as cheating, how often these activities occurred or their moral implications.²⁴ Similar results have been found for students of Hispanic and Arabic ethnicity.²⁵

Other correlates for cheating that have been studied include age, academic achievement and membership in a fraternity or sorority. Age, and therefore maturity, does seem to play an important role in the level of cheating among students. Younger, traditional college students cheat more often than older, non-traditional students.^{22,15,20} However, seniors appear to cheat more often than freshmen.²⁶ The level of academic achievement of students, in terms of grades, seems to have a moderate inverse relationship with cheating.^{10,20,22,26} Those students with higher grade point averages (GPA) cheat slightly less often than those with lower GPAs. It has been repeatedly observed that students

associated with fraternities and sororities are more likely to cheat than their non-greek counterparts.^{7,15,20,26}

Even if a correlation can be established between cheating and various demographic factors, there are significant ethical and legal issues regarding the use of this information. For example, if it is known that men cheat more frequently than women, should we be suspicious of all male students? Should the exams and assignments of fraternity and sorority members be scrutinized more carefully than other students? Clearly we have to treat all students equally, since we have no basis on which to suspect that any given individual is a likely cheater. Further, any information regarding the characteristics of typical cheaters could lead to litigation in cases where students' rights may have been denied. The vast majority of faculty would probably agree that we ought to treat all students as innocent until proven guilty, but there is significant disagreement as to where the responsibility for curtailing cheating lies and how to accomplish it.

Some faculty would argue that preventing cheating is the responsibility of the student. But students clearly don't see it that way. Students may feel that cheating is wrong personally, but they are unlikely to report other students they see cheating. In a study conducted in 1970, Centra found that 46% of students would do nothing if they witnessed another student cheating.²⁷ Only 5% said they would report the incident and name the student.

Others believe that it is the institution's responsibility to prevent cheating. While most universities and colleges do have an academic policy for dealing with cheating, the effectiveness of these policies is often mixed at best. Policies that have been successful in reducing cheating are those in which all persons involved take more responsibility for academic dishonesty, have a heightened sensitivity to academic integrity and communicate more openly about the importance of academic integrity.²⁸ Most importantly, the institution's academic policy must be one that encourages all members of the institution to develop a community that values learning, rather than competing for good grades.

It is the author's position that the best opportunity for reducing cheating among college students lies with the individual faculty. This can be accomplished either by developing mechanisms that make it more difficult for students to cheat or by working to create a classroom environment of trust and honesty. In the former case, we are likely to develop students that are expert at concealing cheating, but lack a strong ethical foundation. In the latter case, we may not catch students who still decide to cheat, but we are far more likely to influence the attitudes of students as they pertain to the moral implications of cheating. In the end we are probably far better off not catching some cheaters in exchange for producing students who understand that cheating, whether academic or on the job, hurts the individual student and others.

III. Results of Pilot Research Study

Much of the literature reviewed above used large student populations with homogeneous backgrounds to get an unbiased sample. However, these samples are not representative of engineering students. Given that engineering students appear to cheat more often than most other students, there is a surprising lack of information about what factors might cause this difference. A study which samples engineering students only may provide significant insight.

The primary assessment goals of the pilot study were to examine the perceptions toward cheating of a select sample of engineering students and identify best practices for conducting a broader research study into engineering student academic dishonesty. The pilot study is not based on any previous research approaches; however, instruments to be used in the larger study are modeled on the work of several researchers.^{5,21,27,29}

For the pilot study, data were gathered from students in two different offerings of the Engineering Materials course (MFGE-370). All students were declared engineering students. Data were collected using a survey format that was distributed to students in the Spring 2000 and Summer 2000 quarters. The direct question survey (DQS) approach was chosen for this research because of its simplicity and anonymity. However, evidence suggests that this approach does lead to biased results.^{30,31} Some researchers have found that the DQS technique underestimates the level of cheating,^{30,31} while others have observed an overestimate³². An alternative technique is direct surreptitious observation.^{33,34,35} However, this method produces only class-specific results. In the present study all student responses were anonymous, which is thought to encourage truthful responses.³⁶ Survey data was compiled and analyzed using analysis of variance (ANOVA) where appropriate. Statistical significance was defined as $p \leq 0.05$, indicating a less than 5% chance for acceptance of the null hypothesis.

A total of 65 students responded to the survey (81.25% response rate). It should be stated that this sample of students is not necessarily representative of all engineering students or even all engineering students at the school in question. Students were asked to provide some background information including class year, grade point, gender and ethnicity. On average the study group was dominated by third-year students (78%). Much smaller percentages of fourth-year (15%), second-year (5%) and first-year (2%) students were also in the study group. The group of students who completed the survey in the Spring 2000 quarter had a significantly larger number of senior students ($p=0.012$), which would suggest that this group would be slightly more socialized to the academic environment than their counterparts in the Summer 2000 quarter.

The average reported grade point average for the study population was 87%. A similar value was reported for both study groups indicating equal academic ability. SAT scores were not available to provide a more standardized indicator for academic ability. Gender and ethnic distributions were also similar for both groups of the study. Of the total study population, 75% of respondents were male, 24% female. 86% of students identified

themselves as Caucasian, 6% African American, 4.5% Asian American, and 3.5% foreign student or “other”.

Students in both study groups were asked to respond whether they felt that each of thirteen different scenarios represented cheating. Students in the Summer 2000 quarter were also asked to state whether they had found themselves involved in any of these scenarios – data for students in the Spring 2000 term is not available. The results of this portion of the survey are shown in Table 3. The top five scenarios that students felt most strongly constituted cheating were related to tests. Over 90% of students in the study felt that each of these scenarios could be considered cheating. This is compared to those scenarios related to homework that received fewer “yes” votes. The difference is apparent from Table 3, but is not statistically significantly based on the standards established in this study ($p=0.116$). This suggests that students may take cheating on tests more seriously, but at this point the data is inconclusive.

Table 3: Spring and Summer term student response to “I would consider cheating to be...”. Data is also provided for whether students in the Summer 2000 term found themselves involved in each scenario – students in the Spring 2000 term were not asked to reveal this information.

Scenario	Yes	No	% of Summer 2000 group involved in a scenario
Looking at another student’s test	98%	2%	36%
Passing an answer to another student during a test	92%	8%	20%
Bringing unapproved crib sheets to a test	92%	8%	15%
Changing answers on a test that was already graded and asking for more points	91%	9%	0%
Having someone else take a test for you	91%	9%	0%
Copying another student’s homework	86%	14%	74%
Storing information for a test in a calculator or PDA	74%	26%	14%
Copying old homework assignments	72%	28%	18%
Sharing answers with friends in a very difficult clas just to get a passing grade	60%	40%	51%
Copying passages out of the textbook for homework assignments	37%	63%	62%
Witnessing cheating and not reporting it to the professor	31%	69%	79%
Working in a group on homework or lab reports	8%	92%	100%
Studying with other students for a test	8%	92%	100%

The difference in responses between test-related and homework-related scenarios may be related to heavy student workloads. One could hypothesize that students are rationalizing cheating on homework because it is a reasonable method of managing their time outside of the classroom. The large number of students who admitted to having copied another

student's homework (74%), copied passages from a textbook for homework assignments (62%) and shared answers with friends in a difficult class (51%) supports this theory. However, it is also possible that test-related scenarios are more clearly defined as cheating by other instructors, leading students to indicate as such on the survey.

As a group students felt that looking at another student's test, passing answers during a test and bringing unapproved crib sheets to tests was cheating. However, alarming numbers of the Summer 2000 group admitted to having been involved in these scenarios – 36%, 20% and 15% respectively. Similarly, students viewed copying each other's homework as a form of cheating, but a majority (74%) admitted to copying homework. A large number of students also reported copying passages from the textbook (62%). This suggests that while students recognize cheating, there is a serious disconnect with their actual behavior.

The survey results suggest that students are unlikely to report incidents of cheating that they witness to the instructor. Only 31% of students felt that not reporting an incident of cheating was itself cheating, and nearly 80% of students had actually witnessed an instance of cheating and not reported it. Similar results were obtained for both the spring and summer term groups and there appears to be no correlation with academic standing, grade point average, gender, ethnicity or number of family members who attended college ($p>0.05$ in all cases).

Finally, only 8% of students view working in groups on homework or studying in groups for tests as cheating. Further, a full 100% of students in the summer term had worked or studied in groups. The author would tend to agree with the students, that working in groups is not cheating and may in fact improve learning.

Students were also asked to report the frequency with which they and their friends cheat, or have cheated, in college. Students indicated that they cheated on roughly 8.6% of their homework assignments per term as a whole. They also indicated having cheated on 1 test per year. However, when examining the spring and summer groups separately, it was found that students in the spring term admitted to cheating on an average of 12.2% of their homework assignments. Those in the summer term reported cheating on only 6.3% of assignments. This difference was found to be statistically significant ($p=0.011$). Students in the spring term also reported cheating on four times as many tests per term than their summer term counterparts (0.96 vs. 0.22) with a significance of $p<0.01$. One could speculate that the higher percentage of seniors in the spring term might have led to a higher rate of cheating, or that summer term students are more motivated and less likely to cheat.

Students were also asked whether their friends cheated more or less often than they did. Respondents expected their friends to cheat more than twice as frequently as they do (18.9% vs. 8.6%). The significance of this observation was quite high ($p<0.01$). When asked directly whether their friends were more or less likely to cheat than they were, the results were overwhelming. Of the respondents to the survey, 95% believed that other

students would cheat more often than they would. This suggests that students perceive themselves as having higher ethical standards than others.

IV. Conclusions

Research on academic dishonesty clearly indicates that cheating is a serious problem at institutions of higher education, particularly among engineering students. Researchers in the sociology and psychology fields have conducted numerous experiments and surveys to examine correlates between psychological, demographic and situational factors and a propensity for cheating in college. However, much of this work has been conducted on large samples of students from a wide cross-section of disciplines. Given that engineering students are some of the most frequent cheaters, more research is needed to examine this phenomenon.

The preliminary results of a pilot study on cheating, using a small sample of engineering students from a private, mid-western university, provide a glimpse of the magnitude of the problem. The research results presented here are being used to lay the ground work for a more complete survey that will be distributed to students at Kettering University as well as engineering students at area public universities and community colleges. Students will be asked to reflect on their own moral feelings about cheating and the situational factors that might influence those beliefs. They will also be asked to comment on a wider range of faculty approaches to dealing with cheating. In a later phase of the research, focus groups will be formed that will seek to compare student and faculty perceptions of the severity of cheating on campuses.

V. References

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