

STUDENT PRECEPTIONS OF INSTITUTIONAL AND INSTRUCTOR BASED TECHNIQUES FOR DEALING WITH ACADEMIC DISHONESTY

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Abstract - Research suggests that a large percentage of engineering students engage in some form of academic dishonesty. To investigate this very serious concern, the authors have undertaken a research project on the Perceptions and Attitudes toward Cheating among Engineering Students (P.A.C.E.S.). The premise of this research is that a combination of pressures, rather than malicious motivations, account for most student cheating. This paper will focus on a portion of the P.A.C.E.S. survey; student opinions on what actions might prevent cheating. The authors examined data collected from approximately 350 engineering and pre-engineering undergraduate students at 5 institutions. In the survey, the students were presented with 23 institutional and instructor based actions and asked to comment on whether such actions would prevent them from cheating if they might have been inclined to cheat under other circumstances. Student responses to those actions along with subsequent statistical analysis are reported. Practical implementations of several student-identified techniques are then discussed.

Index Terms $\frac{3}{4}$ Academic Dishonesty, Cheating, Teaching Methodologies

INTRODUCTION

Academic dishonesty on college campuses has been a well-known problem for some time. In fact, research has shown that upward of 60 or 70 % [1]-[3] of all students have reported one or more instances of cheating as undergraduates. Of additional concern is the fact that some studies indicate that engineering undergraduates cheat at higher levels than many of their counterparts in other disciplines. Despite these alarming statistics, little educational research has been performed on why engineering undergraduates cheat at such high levels and what can be done to reduce academic dishonesty. The authors' ongoing research project, Perceptions and Attitudes toward Cheating among Engineering Students (P.A.C.E.S.) seeks to develop approaches that may help to rectify this situation. The ultimate goal of our research is to clarify students' perceptions of cheating, to assess how frequently cheating occurs, and to suggest practical methods that can be

used to help students resist the pressures that encourage cheating. The premise is that it is easier and preferred to help students avoid cheating than to respond to problems after they occurred.

The P.A.C.E.S study [4] [5] consists of a seven page, self-reported survey that investigates: (1) the magnitude of academic dishonesty among engineering undergraduates, (2) student definitions of academic dishonesty, (3) correlations of academic dishonesty with theories of psychological, demographic and situational factors, and (4) student attitudes on methodologies to discourage academic dishonesty. The survey has been distributed to approximately 750 students at colleges and universities across the United States as well as overseas. Currently, 349 surveys from 5 institutions in Michigan, ranging from community colleges (pre-engineering) to a large research university, have been processed.

This paper focuses on the final portion of the P.A.C.E.S. survey; student opinions on what actions might prevent them from cheating. In the survey, the students were asked to comment on whether they felt different institutional and instructor based actions would prevent them from cheating if they might have been inclined to cheat in the past. This paper reports student responses and considers practical implementation of instructor-based methodologies based on student opinions. Of particular interest to faculty and administrators would be the impact of a controllable method for deterring a student from cheating; for example, the effect of an institution's academic dishonesty policy or an instructor's examination policy. Also, it is the belief of the authors that if students set high standards for academic conduct as undergraduates, they will perhaps act more responsibly as professionals. Preliminary results from the remaining portion of the survey can be found in Carpenter et al. [5].

METHODOLOGY

Sample Demographics

Currently, the survey has been completed by 349 engineering and pre-engineering undergraduates at 5 institutions in Michigan, including a large public university

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(23.3% of sample), two small private universities (64.5% of sample), and two community colleges with pre-engineering programs (12.2% of sample). 78.5% of respondents were male, 17.2% female, and 4.3% did not indicate gender. The mean age was 21.1 years with a range of 17 to 59 years of age; however, it should be noted that the average age of students attending community colleges, 26.0 years, was significantly different from that of students attending the 4-year universities, 20.4 years. Ethnicity data was not collected to protect student identities within small sample subsets. 35.1% of respondents were freshmen with a minimum of 14.7 % in each class level so there is an adequate representation of classes. There was a wide range of economic backgrounds with parents' household incomes ranging from less than \$20,000 to more than \$200,000 annually. The median income of our sample was approximately \$56,000. The mean GPA was approximately a 3.3 on a 4.0 scale and was fairly consistent across all institutions. 91.3 % of respondents were raised in the United States, including 79.3 % in the Midwest. 13.2 % of respondents had at least one dependent, with 3.9 % having 3 or more. 24.0 % of respondents belonged to either a fraternity or sorority and 67.1 % participated in some form of club, professional organization, or athletic team. Finally, 27.5 % of respondents reported that they never cheated in high school, while 62.2 % admitted to cheating more than once.

Data Collection

Surveys were provided to individual faculty who volunteered to administer the surveys in class during the 2001 calendar year. Prior to administering the survey, instructors informed the students about the goals and purpose of the study to alleviate student concerns about being singled out for past indiscretions. While using a survey for data collection provides anonymity and simplicity, the accuracy of this approach is inconclusive. This approach did ensure a very high response rate, however, we are aware that the sample likely does not accurately reflect the entire student population at each institution. Respondents who completed the surveys returned them to their instructors, who in turn mailed them to the authors for analysis using statistical software.

RESULTS

When investigating student attitudes on actions that would prevent cheating (Part 6 of the P.A.C.E.S survey), we are primarily interested in polling students who have or would consider cheating. If a student would never under any circumstances cheat, than their opinion on what methods

would discourage them from cheating are irrelevant. To separate the respondents into two data sets, the students were instructed that "if you have **never** cheated and feel that you never would under **any** circumstances, please go on to Part 7. If you feel that there are some circumstances under which you might cheat, please indicate whether each of the following would help prevent you from cheating by filling in the circle that best represents your answer." Those students who feel they might cheat then replied either "Yes", "No", or "Don't Know" to 23 actions or methods that might prevent them from cheating. 231 out of 349 students (66.2%) answered Part 6 of the survey and their responses are summarized in percentages in Table I.

From this data, it appears as if 33.8% of students would never consider cheating under any circumstances. However, this number is somewhat inconsistent with results from other parts of the survey. The first part of the survey investigated student definitions of cheating and frequency of occurrence and results indicated that a much lower percentage of students have never cheated. This apparent discrepancy could be attributed to either students not wanting to complete Part 6 (survey instrument was lengthy) or inconsistent student and faculty definitions of cheating. In other words, they did not believe their acts constituted cheating therefore they could omit Part 7 on the survey in good conscience.

To determine whether or not the results were statistically significant, a non-parametric t-test was performed on the data. The results were significant at the 99% level ($p < 0.01$) for all methods with the exception of Methods 1, 8 and 13. Methods 8 and 13 were still significant at the 95% level ($p < 0.05$) and Method 1 was not statistically significant ($p = 0.248$). The fact that Method 1 (institution had a formal honor code) was not statistically significant is an interesting observation. Previous research has shown that formal honor codes may effectively reduce academic dishonesty, yet it was the one action in this survey in which students were unsure the effect it would have on reducing cheating.

The three actions for which at least half of respondents thought it would prevent them from cheating were open book or reference sheet exams (Action 17, 55.7% answered yes), instructors assigning fair tests and homework (Action 14, 52.4%), and course material relevant to students future career (Action 23, 50.0%). The next three, in which nearly half of respondents answered "Yes" were instructor provided sample exams (Action 15, 49.6%), study guides and review sessions (Action 16, 49.1%), and instructor cared about my learning (Action 7, 48.9%).

TABLE I
STUDENT RESPONSES (IN PERCENT OF TOTAL) ON
STATEMENTS ON WHETHER THE FOLLOWING WOULD
PREVENT THEM FROM CHEATING.

Statement	Yes	No	Don't Know
1) If the institution had an honor code that clearly described what constituted cheating and penalties for cheating	36.8	34.6	36.8
2) If classes were smaller	42.9	35.5	21.6
3) If the instructor discussed the institution's penalties for cheating	35.9	40.7	23.4
4) If the instructor discussed the penalties for cheating in their course	41.1	36.8	22.1
5) If the instructor and class discussed and agreed upon what would constitute cheating in their course	46.3	29.9	23.8
6) If the instructor knew my name	39.0	41.6	19.5
7) If the instructor cared about my learning	48.9	28.6	22.5
8) If the instructor discussed the importance of ethical behavior at the beginning of the term	34.6	40.4	25.0
9) If the instructor encouraged students to be honest during the term	43.7	32.3	24.0
10) If the professor passed out multiple versions of the exam randomly to students in the class	47.4	29.8	22.8
11) If the instructor had additional proctors in the room during the exam	44.7	32.9	22.4
12) If the instructor remained in and moved around the room during the exam	48.2	31.6	20.2
13) If the instructor allowed us to work in groups on homework	39.7	34.1	26.2
14) If the instructor wrote fair tests and homework	52.4	21.4	26.2
15) If the instructor passed out copies of old tests to everyone so we all had the same study materials	49.6	26.3	24.1
16) If the instructor provided a study guide or held a review before the exam	49.1	25.0	25.9
17) If tests were open book or reference sheets were allowed	55.7	19.3	25.0
18) If the instructor put more essay questions on the exam	24.1	51.3	24.6
19) If the instructor assigned students to seats during the exam	15.8	63.6	20.6
20) If the instructor checked bibliographic references in student term papers	44.7	34.2	21.1
21) If the institution provided a telephone hotline for reporting cheating	19.7	53.5	26.8
22) If the instructor stressed how other people are hurt by my cheating	24.5	50.1	25.4
23) If I felt the material in the course was important to my future career	50.0	26.8	23.2

Several of the actions presented in the survey dealt with in-class discussion on cheating, ethical behavior, and faculty expectations. More respondents believe that discussing an instructor's policy on academic dishonesty (Action 4, 41.1% answered yes and 36.8% answered no) is more effective than discussing an institution's policy (Action 3, 35.9% yes and 40.7% no). However, a significant gain is made if the entire class discusses and agrees upon what would constitute cheating (Action 4, 46.3% yes and 29.9% no). In other words, empowering the students to decide what constitutes academic dishonesty is perceived as a strong deterrent. Likewise, discussing ethics at the beginning of the term (Action 8, 34.6% yes and 40.4% no) was less effective than encouraging students to be honest during the term (Action 9, 43.7% yes and 32.3% no). The significantly different responses to Actions 8 and 9 might be partially explained by a student's ability to differentiate between unethical behavior and cheating as was shown in results from another portion of the survey (Table III) [5].

With regards to exams, respondents did not believe that assigned seating (Action 19, 63.6% answered no) or essay questions (Action 18, 51.3% answered no) would prevent them from cheating. Conversely, more closely monitoring exams (Action 11 and Action 12) were likely to deter a student from cheating.

Finally, a majority of respondents did not believe an institution "hotline" to report cheating (Action 21, 53.5% answered no) or if an instructor stressed how a student's cheating affected others (Action 22, 50.1% no) would be a deterrent.

The authors also wanted to see if results from this portion of the survey correlated with student definitions of cheating and how often they cheated. The premise is that if we can correlate student identified preventative measures with situations in which cheating was common, perhaps we could identify several "best practices" for faculty implementation. However, correlating 23 preventative situations with 18 actions that a majority of students defined as cheating or unethical is a difficult process. Therefore, a factor analysis was conducted on these 23 situations to reduce this large set into a more manageable set of constructs.

The first step was to ascertain that this set of situations had sufficient common variance to undertake a factor analysis (as indicated both by Bartlett's Test of Sphericity, $p < .001$, and Kaiser-Meyer-Olkin's Measure of Sampling Adequacy, $MSA = .918$). A series of factor analyses was computed using the Principal Axis Factoring method to extract factors, followed with orthogonal rotation through VARIMAX. Of the possibilities reviewed, the 3-factor solution was judged as being superior to the 4, 5, and 6-factor solutions (see Table II - Factor Analysis Results for the three identified factor sets).

The first factor extracted was termed "Equity of Preparation," in that the variables with the highest loadings on this factor are related to the perception that the likelihood

of cheating is reduced when students have sufficient opportunities to prepare for examinations. The factor loading represents the correlation between an average individual response and the factor itself. In other words, the higher the factor loading number, the better that action correlated with the entire factor set. This factor also included situations in which the instructor shows an interest in student learning as well as more personal classroom settings. While some of the methods included in this factor may not seem logically compatible, it should be reinforced that the factor analysis was based on student patterns of response and therefore individual preventative situations were not subjectively assigned to factors. The second factor was termed "Awareness of Implications" and was marked by responses to questions related to the student's understanding of ethical issues, as well as potential penalties, associated with cheating. The third factor was named "Impediments to Cheating," as the questions most closely associated with this factor relate to classroom and evaluation practices intended to minimize the incidence of cheating.

Factor scores were then calculated for each respondent. A factor score is based on the factor loading and their reply to each item in the factor set. The factor scores for each respondent was then correlated with student responses to actions that could constitute cheating, as well as frequency of those actions. Table III lists each action along with the percentage of students who thought the action was cheating, unethical but not cheating, and neither. How often a student performed each act (i.e. the magnitude of cheating) is also included.

Factor I (Equity in Preparation) positively correlated (at the 0.05 significance level) with actions primarily associated with copying from other students or using previous terms materials (numbers 5, 10, 12, 14, 15, 17 in Table III). Practically, this means that students who felt additional course equity and instructor concern for their learning would prevent them from cheating were more likely to identify these actions as cheating. Another way to view these results are the more access a student has to materials they believe provide classroom equity, the more likely they are to define an action as cheating and subsequently the less likely they consider the action to be an acceptable method of studying. Factor I also negatively correlated with the frequency of cheating for numbers 4, 7, and 15 in Table III. In these cases, the more a student views course equity as a preventative measure, the less likely they are to perform these actions.

Factor II (Awareness of Implications) positively correlated with several of the same actions as Factor I, but fewer overall (numbers 5, 10, 13, and 14 in Table III). Therefore, if students felt being made aware of the implications of cheating would act as a deterrent, they were more likely to define these acts as cheating. Likewise, Factor II negatively correlated with the frequency of cheating for numbers 5, 9, 13, and 14. For these actions, the more a student is aware of the implications of their actions,

the less likely they were to perform these actions which included copying from unapproved sources and work from previous terms.

Factor III (Impediments to Cheating) only positively correlated with action 13 and did not correlate at all with frequency of cheating. Effectively, students who felt impediments to cheating would prevent them from performing an act did not define or perform acts of cheating any differently than other respondents.

TABLE II
FACTOR ANALYSIS RESULTS.

Factor I – Equity in Preparation	Factor Loading
14) If the instructor wrote fair tests and homework	.812
16) If the instructor provided a study guide or held a review before the exam	.797
15) If the instructor passed out copies of old tests to everyone so we all had the same study materials	.772
17) If tests were open book or reference sheets were allowed	.750
7) If the instructor cared about my learning	.637
10) If the professor passed out multiple versions of the exam randomly to students in the class	.589
13) If the instructor allowed us to work in groups on homework	.586
23) If I felt the material in the course was important to my future career	.568
5) If the instructor and class discussed and agreed upon what would constitute cheating in their course	.562
6) If the instructor knew my name	.501
2) If classes were smaller	.431
Factor II – Awareness of Implications	
3) If the instructor discussed the institution's penalties for cheating	.712
8) If the instructor discussed the importance of ethical behavior at the beginning of the term	.684
4) If the instructor discussed the penalties for cheating in their course	.619
22) If the instructor stressed how other people are hurt by my cheating	.608
9) If the instructor encouraged students to be honest during the term	.573
21) If the institution provided a telephone hotline for reporting cheating	.496
1) If the institution had an honor code that clearly described what constituted cheating and penalties for cheating	.496
Factor III – Impediments to Cheating	
11) If the instructor had additional proctors in the room during the exam	.759
12) If the instructor remained in and moved around the room during the exam	.613
20) If the instructor checked bibliographic references in student term papers	.542
19) If the instructor assigned students to seats during the exam	.443

PRACTICAL IMPLEMENTATION

These results are preliminary since they are based on only 349 students at 5 midwestern institutions. However, the results from this survey do suggest several practical actions that an instructor could implement to prevent a student from cheating. Since these methods are based on student responses on what they feel would be effective preventative actions, as well as correlations with student definitions of cheating, an instructor could anticipate some success from these methods. Of course, what a student “thinks” would incline them not to cheat may, in fact, not be the best approach to deter academic dishonesty. This is an issue that we hope to address as part of our future research plans.

This section is divided into two sub-sections, which are subjectively labeled “Course Procedures” and “Examinations”. The Course Procedures Section documents what we feel might prevent students from cheating in a course and the Examinations Section what might prevent students from cheating specifically on examinations.

Course Procedures

Respondents indicated that they think the two primary deterrents to cheating in a course are instructor concern for student learning and empowering students to decide what constitutes academic dishonesty in a course (Table I). Expressing care and concern for student well-being has been shown to be an effective means for creating a more open learning environment in which students will excel [6]-[8]. This open classroom environment in which an instructor has a good rapport with the students can also be used to limit instances of cheating. This idea correlates well with students being involved in the deciding what will constitute cheating in a course. If cheating is clearly discussed and defined at the beginning of the course, students will be less likely to invoke individual judgment on what constitutes cheating. This does imply that the students should vote on what constitutes cheating or that an instructor's opinion has less weight, rather the instructor facilitates the discussion and gets a consensus opinion. More than likely this consensus opinion will be similar to the instructor's opinion yet this method is viewed as more effective by the students than an instructor dominated discussion on penalties for cheating in the course. The factor analysis also shows that making students aware of the implications of cheating as part of the decision process correlated with frequency of cheating. In other words, if students believed being made aware of the consequences of their actions was a deterrent, the less likely they were to perform those acts. Overall, faculty should strive to make it clear to students that they care about their learning and develop an open dialog with students. A more honest and ethical environment may subsequently follow.

Other methods students identified as effective course practices for reducing cheating are relating material to their future careers and encouraging honesty during the term. If a

student is reminded that they should be ethical and honest it helps reinforce what was decided at the beginning of the term. Additionally, if a student can understand the importance of the material, they are less likely to cheat. Likely this can be attributed to students wanting to fully comprehend material they will use in their careers. If a student believes the material is irrelevant their motivation for learning the material is significantly less.

Examinations

Results from this survey show that students believe that the most effective way to reduce cheating on exams is to provide equity in student preparations for exams. This was indicated by direct student responses to actions they believe would deter cheating as well as the results of the factor analysis. The factor analysis indicated that the more access students have to materials that provide classroom equity, the more stringent they were on their definitions of cheating. While the concept of course equity may sound very obvious, it is not standard practice in many engineering courses.

One method for creating course equity is to have open book exams or allow reference sheets. Respondents felt that these were the best methods for reducing cheating on exams. This technique allows the students to prepare for exams without worrying about memorization. Contrary to the belief of some faculty, open book or reference sheet exams can be more difficult since it should emphasize concepts more than memory.

The second most student identified method to reduce cheating was to assign fair exams. This does not mean an exam has to be easy. Rather it should be relevant, challenging, and fair to the students. One technique for writing fair exams is to use learning objectives [9]-[11]. Learning objectives are used to inform the students what is expected of them in each section of the course. In other words, what they should be able to perform or accomplish after a given length of time (week, month, etc.). The learning objectives can then be used to write the exams and the students will be well aware of what is expected of them.

Other methods identified by students to limit cheating on exams were to provide study guides, have review sessions, and providing sample exams. While many instructors might feel employing all of these techniques might be providing too much help for the students. The more preparation the students have the less likely students are to feel the need to cheat and the more difficult an instructor can make an exam. If students have all the information they need, instructors can more effectively test their knowledge of a subject.

Students also identified several impediments to cheating as deterrents (closely monitor exams, hand out multiple versions of the exam, have additional proctors), but fewer respondents thought these were effective measures than the previously listed methods of preparation equity. Additionally, the factor analysis did not reveal any

significant correlations between the Impediments to Cheating factor and student definitions and frequency of cheating. Efforts to reduce the incidence of cheating by creating structural impediments may simply be less effective than empowering students to not feel that they need to cheat to succeed academically.

TABLE III
PERCENTAGE OF STUDENTS DEFINING EACH ACTION AS CHEATING AND THE CORRESPONDING MAGNITUDE

	Cheating	Unethical but not cheating	Neither	Have done (# of times)		
				0	1 - 2	3 +
1) Copying from another student during a test or quiz	96.8	2.0	1.1	67.5	21.3	11.2
2) Permitting another student to look at your answer during a quiz or exam	71.6	23.8	4.6	59.2	27.1	13.7
3) Asking another student about questions on an exam you have not yet taken	23.8	45.9	30.2	30.2	31.7	38.1
4) Delaying taking an exam or turning in a paper later with a false excuse	22.9	67.2	9.9	71.1	22.3	6.5
5) Copying from an unapproved reference sheet during a closed-book exam	92.5	5.8	1.7	72.4	21.6	6.0
6) Claiming to have handed in an assignment or exam when you did not	58.4	36.9	4.7	93.7	5.4	0.9
7) Taking an exam for another student	95.4	3.5	1.2	98.2	.6	1.2
8) Working in groups on assignments when there is no class policy	5.5	19.0	75.5	18.0	18.6	63.4
9) Adding face references to term papers to expand the bibliography	35.5	57.3	6.9	71.0	22.1	6.9
10) Copying an old term paper or lab-report from a previous year	59.1	26.5	14.4	57.8	27.7	14.6
11) Studying with other students for a test	0.3	1.7	98.0	6.0	5.4	88.6
12) Copying another student's homework when it is not instructor permitted	72.0	23.6	4.3	42.8	33.7	23.5
13) Copying a passage out of the textbook for homework assignments	17.9	34.4	47.4	39.2	30.4	30.4
14) Submitting or copying homework assignments from previous terms	49.3	31.4	19.3	64.4	21.0	14.6
15) Witnessing a case of cheating in a class and not reporting it to the instructor	6.9	59.8	33.2	46.3	27.5	26.3
16) Storing answers to a test in a calculator or Personal Digital Assistant (PDA)	72.1	16.4	11.5	57.7	20.4	21.9
17) Changing the answer on your test or homework after it has been graded and then telling the instructor a mistake was made in grading	93.9	4.9	1.2	94.6	3.6	1.8
18) Paying someone else to take an exam/write a paper for you	88.8	9.5	1.7	96.4	2.7	0.9
19) Working in groups on web-based quizzes	35.0	30.3	34.7	73.2	12.0	14.8
20) Working in groups on take-home exams	37.9	30.1	32.1	59.0	27.7	13.3

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