P.A.C.E.S. – A study on academic integrity among engineering undergraduates (preliminary conclusions).

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Abstract

Student academic dishonesty, commonly referred to as cheating, has become a serious problem at institutions of higher education. This is particularly true of engineering students who, according to previous research, are among the most likely to cheat in college. To investigate this 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. The P.A.C.E.S study consists of a seven page, self-reported survey that investigates: (1) student definitions of academic dishonesty; (2) the magnitude of academic dishonesty among engineering undergraduates; (3) the correlations of academic dishonesty with theories of psychological, demographic and situational factors; and (4) student opinions on different approaches used to discourage academic dishonesty. The survey was administered to approximately 350 engineering and pre engineering undergraduates at 5 institutions, ranging from community colleges to a large research university. This paper will discuss some of the current results from the study as well as future goals, which include the refinement and further distribution of the survey instrument and the development of practical pedagogical methods to help students avoid the pressure of cheating and a better understanding of what students and faculty perceive as cheating.

I. Introduction

Research has shown that upward of 60 or 70 % of all students have reported one or more instances of cheating as undergraduates[1,2,3]. 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. In a recent study conducted by Meade[4], roughly 74% of engineering students said they engaged in some form of academic dishonesty while in college, compared to 67% of

science students, and 63% of humanities students. The only group that reported higher levels were business students, 87% of whom reported in engaging in academic dishonesty as undergraduates. 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 change 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 P.A.C.E.S study 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. Data collection and analysis are ongoing. Currently, 349 surveys from 5 institutions in Michigan, ranging from community colleges (pre-engineering) to a large research university, have been processed.

This paper begins with an explanation of our reasons for conducting this research and the methodology we elected to use, based on prior research on academic dishonesty among undergraduates. The paper will then discuss the current results from the study as well as some preliminary conclusions. Finally future goals are discussed, which include the refinement and further distribution of the survey instrument and the development of practical pedagogical methods to help students avoid the pressure of cheating and of a better understanding of students and faculty attitudes toward cheating.

II. Literature Review

A complete literature review, described here in brief, was published in the Proceedings of the 31st ASEE/IEEE Frontiers in Education Conference[5]. We concluded in that paper that social scientists have studied various aspects of academic dishonesty among undergraduate students but not given much attention to the field of engineering. In developing our study we were guided by research performed on other student groups, but recognized that engineering students may have unique characteristics. There is clear agreement in the literature is that academic dishonesty is a problem at institutions of higher learning and that cheating is becoming more of a social norm for students.

Researchers have generally divided reasons for cheating into three categories: psychological factors[6,7,8], demographic factors[9], and situational factors[10,11,12]. Even though most researchers have segregated reasons for cheating for ease of analysis, most likely a complex relationship exists when determining whether or not a student will cheat in a given situation.

Most researchers report that psychological factors play the most important role in student cheating. For example, Roth and McCabe[13] found a strong correlation between student values and cheating. An example of this is the apparent success of honor codes based on the idea of shared communities and individual responsibility at colleges and universities in reducing cheating. Carefully designed honor codes, which speak directly to student moral and ethical standards, have also been found to reduce the levels of cheating[1,13].

Demographic factors appear to play a less significant role in determining whether or not a student will cheat. Researchers have found little or no correlation between ethnicity[14,15] or religious beliefs[16] and cheating, and the influence of gender[13,17] has yielded mixed results. Other demographic factors that have been considered are GPA, age, and participation in organizations (such as fraternities and athletic teams). Researchers have observed an inverse correlation between cheating and GPA meaning that students with lower GPA tend to cheat more[18,19,20]. Also, students appear to cheat more frequently as they progress through college[21], however older, non-traditional students tend to cheat less than their younger counterparts[18,22]. Finally, research has shown that students who are involved in campus organizations, such as fraternities, sororities, and athletic teams, are more likely to cheat than their peers[2,18,21,23].

Finally, there has been some research performed on how situational factors, such as the pressure to succeed in school, affect academic dishonesty. Other such factors include external work commitments, heavy course loads, and financial aid or scholarship requirements[1,4,24]. Additionally, students frequently place the blame for cheating on the faculty, citing poor instructional quality, irrelevant course material, and faculty apathy about cheating[23].

Overall, we believe that the responsibility for reducing academic dishonesty lies with the entire college community, including students, academic institutions, and faculty. Research has shown that one effective way to reduce cheating is to ensure that faculty and students understand the expectations of the academic institution[24]. The institution's policy of academic integrity must be publicized by the administration and communicated to the students through the classroom. It appears as if institutions with well-designed and effectively communicated honor codes that reflect the values of the institution have lower rates of cheating[1, 13]. Conversely, simply discussing an institution's policy and the penalties associated with it have been shown to be ineffective[31]. Additionally, there must be other practical pedagogical methods to help students avoid the pressure of cheating. Identifying and helping faculty implement those methods is one of the goals of the P.A.C.E.S study.

III. Methodology

Based on our evaluation of other researchers' methods, it was decided that the primary research tool in this study should be a self-reported, direct question survey. Our seven-page survey asks students a variety of questions about their academic integrity, their perceptions about the academic integrity of others, and their demographics. Student participation in the study is

voluntary, unmonitored, and the results are anonymous to protect each participant. Since cheating violates the academic policies of the participating institutions anonymity promotes more truthful responses. The survey was printed using a scanable form so that results could be processed automatically and data analysis could be conducted using statistical software.

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. Research suggests that direct-question surveys produce reasonably accurate estimates of the frequency of cheating[25]; however, some researchers have argued that this technique underestimates the frequency of cheating[26,27] while others believe it overestimates it[28]. Overall, the direct question survey seemed to be the most effective method for our study.

IV. Demographics of Sample

The survey was completed by 349 engineering and pre-engineering undergraduates at 5 institutions in Michigan, including a large public university, two small private universities (one primarily commuter and one primarily residential), and two community colleges with pre-engineering programs. 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. 35.1% of respondents were freshmen with a minimum of 14.7 % in each class level so there is an adequate representation of classes. In addition to being administered in freshman engineering or pre-engineering programs, the surveys were administered to students in a range of engineering disciplines, including electrical, civil, chemical, and mechanical. 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, with 61.7 % of students indicating they typically carried a heavy course load. 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.

V. Results and Discussion

The results from this study are summarized in tables below. Results are presented as percentage of respondents that answered each category, and each question or statement is mutually exclusive, such that the total for each is 100 %. Not every student responded to every question; however, in all cases at least 92.8% of students responded to each question.

a) Student definition and frequency of cheating

Before the issue of academic dishonesty can be addressed, there needs to be an understanding of what constitutes cheating. It is well known that students and faculty differ widely on their beliefs and perceptions of cheating[10,13,29,30,31]. To determine what this study group considers cheating, students were given 20 actions and asked whether they considered each to be "cheating", "unethical but not cheating", or "neither". They were also asked how frequently they had engaged in each action. The results are presented in Table 1.

In conversations with faculty, many do not make a distinction between something being unethical and cheating. From casual conversations, most faculty tend to hold the belief that if something is unethical, it is academically dishonest and therefore it must also be cheating. Table 1 shows that a large portion of students definitely make a distinction between the two. Webster's Dictionary defines unethical as "not conforming to moral or professional standards of conduct." Students apparently believe that an action can be against professional standards of conduct, but not against the specific academic policies of their institution and therefore not cheating. The fact that students make this distinction might be one of the reasons that faculty and students differ on their beliefs and perceptions of cheating.

There are some interesting results from this portion of the survey. With respect to examinations, 96.8 % of students believed that copying off another person during an exam was cheating; yet only 71.6 % believed permitting someone else to copy of their exam was cheating. Students made a definite distinction between performing the act of copying and permitting others to copy. The number of times a student has performed each act varies accordingly with 32.5 % of students admitting to copying from others and 40.8 % allowing others to copy. Interestingly, only 23.8 % of students thought asking another student about an exam they had not taken constituted cheating with 69.8 % performing this act. 92.5 % of respondents thought that using an unapproved reference during an exam was cheating, yet only 72.1 % thought that using a programmable calculator or PDA during an exam was cheating. Programming answers is effectively the same as using an unapproved reference sheet, yet more students found it to be unethical and not cheating. Additionally, only 35.0 % thought that working together on web-based quizzes is cheating with 34.7 % stating it is neither cheating nor unethical. Similar rates were reported for take-home exams (non web-based). These rates are significantly lower than if the quiz or exam was held in the class. It appears as if the use of technology and the use of out of class examinations change students' opinions on cheating. This might be a very significant finding, considering that education is heading toward more web-based instruction, distance learning, and use of technology in the classroom.

				Have done (# of times)		
	Cheating	Unethical but not cheating	Neither	0	1-2	3+
a) Copying from another student during a test or quiz	**96.8**	2.0	1.1	**67.5**	21.3	11.2
b) 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
c) 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**
d) 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
e) Copying from an unapproved reference sheet during a closed-book test or quiz	**92.5**	5.8	1.7	**72.4**	21.6	6.0
f) 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
g) Taking an exam for another student	**95.4**	3.5	1.2	**98.2**	.6	1.2
h) Working in groups on assignments when there is no class policy on group work	5.5	19.0	**75.5**	18.0	18.6	**63.4**
i) Adding face references to term papers to expand the bibliography	35.5	**57.3**	6.9	**71.0**	22.1	6.9
j) Copying an old term paper or lab-report from a previous year	**59.1**	26.5	14.4	**57.8**	27.7	14.6
k) Studying with other students for a test	0.3	1.7	**98.0**	6.0	5.4	**88.6**
l) Copying another student's homework when it is not permitted by the instructor	**72.0**	23.6	4.3	**42.8**	33.7	23.5
m) Copying a passage out of the textbook for homework assignments	17.9	34.4	**47.4**	**39.2**	30.4	30.4
n) Submitting or copying homework assignments from previous terms	**49.3**	31.4	19.3	**64.4**	21.0	14.6
o) 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
p) 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
q) 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
r) Paying someone else to take an exam/write a paper for you	**88.8**	9.5	1.7	**96.4**	2.7	0.9
s) Working in groups on web-based quizzes	**35.0**	30.3	34.7	**73.2**	12.0	14.8
t) Working in groups on take-home exams	**37.9**	30.1	32.1	**59.0**	27.7	13.3

Table 1: Percentage of students defining each category as cheating and frequency of each.

There is an interesting trend with respect to copying. 96.8 % of students believe that copying from another student during an exam is cheating. This number drops to 72.0 % for copying homework from another student, 59.1 % for copying laboratory reports from previous terms, 49.3 % for copying homework from previous terms, and 17.9 % for copying passages out of the textbook. There is a corresponding increase in students who thought these acts were unethical but not cheating. Exams, laboratory reports, and homework are all methods of assessing student performance in a class and all play a role in the final grade, yet students are obviously making a distinction between them. In most classes, exams weigh more heavily towards the final grade than laboratory reports and homework. As the significance of the assessment measure decreases, student opinions on whether copying is cheating decreases as well. One could equate this to petty theft compared to grand theft. The analogy would be that students feel that stealing a package of gum is not as bad as stealing a stereo. Also, more students view copying from previous terms as unethical and not cheating than copying from students during the current term. Either students' feel it is the instructor's responsibility to not reuse assignments or they do not understand the definition of plagiarism. Considering that most students did not think that copying out of a textbook is cheating, it appears to be a combination of both.

Studies have shown that upwards of 60 or 70 % of engineering students cheat in college[1, 2, 3]. While it obviously depends on your definition of cheating, our results indicate at least a similar percentage. If you considered each category individually, then the percentages vary. For example, 32.5 % have copied from another student during an exam, 27.6 % have used an unapproved reference sheet and 57.2 % have copied another student's homework. However, if you look at the responses as a whole, the results are entirely different. If we do not include the two statements (1h and 1k) in which a majority of the students believe the action is neither cheating nor unethical, then only 13 out of 349 students (3.7%) never did any of the things in our list. In other words, when looking at the aggregate data, 96.3% of respondents have performed at least a single act on the list that a majority of respondents believed to be either cheating or unethical behavior. As one would expect, it appears that student definitions of cheating affect the frequency in which they perform the act and preliminary analysis shows this to be the case. A majority of the statements in Table 1 have a negative correlation with frequency such that if a student defines an act as cheating, the less likely they were to have performed the act. Therefore, the rate at which engineering students cheat will vary depending on whose definition of cheating is used: their own, the institutions, or the instructor.

b) Neutralizations

To examine under what conditions students might consider it acceptable to cheat, students were asked to respond to 12 situations in which they might consider cheating. The situations were primarily based on a list of "neutralizations" as defined by Haines et al.[6] According to Haines, neutralizations are used by students to justify their improper actions because of influences beyond their control. Common neutralizations include "the course information seems useless", "the instructor doesn't care if I learn the material", and "the material is too hard." Since these

influences are beyond their control and, from the students' perspective, improper, they provide and excuse for cheating. Students responded to the situations presented on a scale from "strongly disagree" to "strongly agree", with the results presented in Table 2.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a) It is wrong to cheat no matter what the circumstances	3.8	12.9	15.5	**42.2**	25.5
b) It is wrong to cheat even if the instructor has done an inadequate job of teaching the course	6.8	17.6	20.0	**38.5**	17.1
c) It is wrong to cheat even if the instructor assigned too much material	3.5	17.1	20.0	**42.1**	17.4
d) It is wrong to cheat even if the instructor left the room during an exam	2.6	2.3	6.7	**47.5**	40.8
e) It is wrong to cheat even if the instructor wrote unfair exams	3.8	14.7	20.8	**39.6**	21.1
f) It is wrong to cheat even if the instructor didn't seem to care if I learned the material	4.4	12.9	16.8	**43.5**	22.4
g) It is wrong to cheat even if the course material seemed useless	3.2	8.5	12.0	**53.4**	22.9
h) It is wrong to cheat even if the course material was too hard	3.8	5.3	12.4	**51.9**	26.5
i) It is wrong to cheat even if other students' scores are not affected	2.9	7.1	12.1	**50.9**	27.1
j) It is wrong for me to cheat even if the instructor does not grade fairly	4.7	14.7	15.6	**43.1**	21.8
k) It is wrong to cheat even if I didn't have time study for an exam	2.9	3.8	10.0	**51.2**	32.1
l) It is wrong to cheat even if I am in danger of failing the class	4.4	7.6	16.5	**45.3**	26.2

Table 2: Percentage of students agreeing with statements on situational cheating.

67.7 % of students either agreed or strongly agreed with the statement 2a, "it is wrong to cheat no matter what the circumstances." According to this, only about one-third of students would rationalize situations in which cheating would be acceptable. To reiterate, this does not indicate that only one-third of students will cheat, just that they will rationalize situations in which cheating could be considered acceptable. Since the first statement is about all circumstances, the rest of the situations should have similar if not higher percentages of students agreeing or strongly agreeing with the statements. However, statements 2b and 2c have 55.6 % and 59.5 % of student agreement accordingly. Apparently some respondents adjusted their thinking as they continued answering statements. It should be noted that the number of students who strongly disagreed with the statements was very small. Most of those who were not in agreement with a statement were neutral and a majority of students agreed or strongly agreed with every statement. Of the neutralizations listed in Table 2, the top five in which respondents were in disagreement (disagree or strongly disagree) were all instructor-related (statements 2b, 2c, 2j, 2e and 2f) Neutralizations

based on course material and other student issues had significantly ($p<0.01$) fewer respondents in disagreement.

c) Academic policies of institutions

Research has shown that the most important aspect of reducing cheating is ensuring that faculty and students understand the expectations of the academic institution[24]. For example, research has shown that schools with well designed and communicated honor codes have lower rates of cheating[1, 13]. Table 3 summarizes student opinions about the academic policies of their institutions. Only half of respondents believe that faculty support the academic policies of their institution a lot, and only 38.0 % believe these policies are very effective at deterring cheating. However, a majority (63.6 %) believe that they would be punished if they were caught. Overall, students do not appear to be well informed about the academic policies at their institutions and their support for the academic policies is only lukewarm at best.

	Not at all	Somewhat	A lot
a) Do students and faculty understand the academic policies of your institution?	2.3	**62.5**	35.2
b) Do faculty support the academic dishonesty policies of your institution?	7.7	43.1	**49.3**
c) Do the academic dishonesty policies at your institution deter cheating?	12.3	**49.7**	38.0
d) How likely is it that you would be punished if caught cheating?	2.6	33.7	**63.6**

Table 3: Student opinions on academic policies of their institutions (in percentages).

d) Student values and perceptions

The survey also investigated students' values by asking them to respond to statements about cheating as well as whose responsibility it is to prevent cheating. Students responded to the situations presented on a scale from "strongly disagree" to "strongly agree". Results are presented in Table 4.

The first interesting thing to note is who respondents believe is responsible for preventing cheating. Overwhelmingly they believe that it is the instructors' and institution's responsibility to limit cheating (over 70 % agree or strongly agree) and not theirs (only 20.3 % agree or strongly agree). A majority of respondents would not report instances of cheating to an instructor or confront a student they observed cheating. Only 17.4 % of respondents disagreed or strongly disagreed with the statement, "if I saw another student cheating I would do nothing."

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a) Helping someone else cheat is not as bad as cheating myself	16.5	30.6	16.2	**32.6**	4.1
b) It is my responsibility to prevent cheating	20.1	**32.7**	26.8	16.8	3.5
c) It is the instructor's responsibility to prevent cheating	2.1	8.2	11.5	**53.5**	24.7
d) It is the institutions responsibility to prevent cheating	2.4	11.5	14.2	**49.6**	22.4
e) Cheating is a necessary part of life	29.7	**37.6**	19.1	10.3	3.2
f) If I saw another student cheating I would report the student to the instructor	19.4	**40.6**	30.6	7.4	2.1
g) If I saw another student cheating I would confront the student	22.4	**43.8**	23.5	9.1	1.2
h) If I saw another student cheating I would do nothing	2.1	15.3	27.6	**40.3**	14.7
i) I would cheat to avoid getting a poor or failing grade in class	19.8	**32.5**	24.6	18.9	4.1
j) I have to cheat just to get grades good enough to compete with other students at this school	**47.4**	38.5	8.8	4.1	1.2
k) Other students cheat more frequently than I do	1.5	2.4	30.9	**40.1**	25.2
l) If a good friend asked me to cheat for them, I wouldn't be able to say no	21.8	**39.8**	20.1	13.9	4.4
m) I would cheat in a class if it seemed that everyone else was cheating	14.7	**31.8**	29.7	21.2	2.6
n) I would cheat if doing so helped me retain my financial assistance	14.4	**28.8**	25.9	25.9	5.0
o) I would cheat to avoid letting my family down if I failed	18.6	**39.3**	24.1	12.0	3.4
p) I would cheat if I had studied really hard for an exam, but it wasn't going well	17.5	**42.1**	20.1	14.6	3.2
q) I would cheat if I hadn't had time to study properly for a test	22.7	**43.7**	21.5	10.0	2.1

Table 4: Student opinions on statements about cheating (in percentages).

The responses to several other statements are also very interesting, and in fact differ from our original hypothesis. For example, research has indicated that frequency of cheating is rising and that academic dishonesty is becoming a social norm or "a necessary part of life"[32, 33]. Yet, 29.7 % of respondents strongly disagreed with this statement with only 13.5 % agreeing or strongly agreeing. Likewise, engineering is commonly considered a highly competitive environment in which students would feel more compelled to cheat to compete with other students. Only 5.3 %

of students agreed or strongly agreed with statement 4j, with 47.4 % strongly disagreeing. Peer pressure is also hypothesized as a reason students cheat, yet 61.6 % of respondents disagreed or strongly disagreed with the statement “if a good friend asked me to cheat for them, I wouldn’t be able to say no.” If these reports of anticipated behavior conform to actual attitudes about cheating, it would appear cheating is not becoming a social norm and is perceived as wrong by a significant majority of students.

It appears as if losing financial assistance might be a major reason for student cheating, as opposed to grade and family-based pressure. When asked for reasons they would cheat, 30.9% of students agreed or strongly agreed with the reason "if doing so helped retain my financial assistance," compared to only 23.0% who would do so "to avoid getting a poor or failing grade in a class," and 15.4% "to avoid letting my family down if I failed."

Finally, 65.3% of respondents agreed or strongly agreed with the statement “other students cheat more frequently than I do,” with only 3.9 % disagreeing or strongly disagreeing. Essentially, students are convinced everyone cheats as much if not more than they do. We hypothesized that if students perceive others are cheating more than they are, they are more likely to cheat themselves. However, data from this study does not clearly confirm this hypothesis. For example, 46.5 % of respondents disagreed or strongly disagreed with “I would cheat in a class if it seemed everyone else was cheating.” Identifying the role of students’ perceptions of their peers’ behavior in cheating requires further research.

e) Correlations with demographic information

Many researchers have explored correlations between demographic data and the extent to which students cheat in college. We take a similar approach here; however, it should be noted that such data should be examined with caution. We must remain mindful of the practical usefulness of and ethical implications associated with this data. For example, if we find that men are more likely to cheat than women, how are we to use this data without violating the civil rights of the male students in our classes?

To determine if any correlations exist, the portions of the survey represented in Tables 1-4 were compared to demographic data. The comparison was made using Pearson’s correlation coefficient, or r-value, which, though it assumes a linear bivariate relationship is viewed as a first approximation. An r-value of 1 indicates a perfect correlation while a –1 indicates a perfect inverse correlation. A value near 0 indicates no correlation between the variables. Besides calculating r-values for each pair of variables they were also subjected to a hypothesis test to determine whether the sample coefficient would be indicative of the population at either a 95 % ($p = .05$) or 99 % ($p = .01$) confidence interval. Finally, it was subjectively decided that a correlation coefficient between ±0.2 and ±0.4 was deemed a weak correlation, between ±0.4 and ±0.8 a moderate correlation, and between ±0.8 and ±1.0 a strong correlation. If the correlation coefficient was between –0.2 and +0.2 it was considered too weak to report regardless of the

significance of these correlations. However, it should be noted that we are correlating two data sets with limited ranges (respondents only had between 3 and 5 choices for most sections of the survey). As such it is more difficult to establish strong correlations than if the data set had a larger range (for example a 100 point scale). While ±0.2 was determined as the arbitrary cut-off, we did find numerous statistically significant ($p \leq .01$) correlations between definitions and frequency of cheating (Table 1) with demographical information, but most of them were between -0.2 and 0.2. However, the lack of moderate correlations does represent a significant finding. For group of students, there was very little correlation between demographics (including age, GPA, gender, class level, work load, and Greek or community organizations) and what is defined as cheating or unethical.

There were some statistically significant correlations between frequency of cheating and demographic information. Respondents were more likely to allow students to look at their exams (Statement 1b, Correlation coefficient r = .21), to use unapproved reference sheets (1e, r = .23), and to ask questions about an exam they have not yet taken (1b, r = .25) if they were in a Greek organization. Also, respondents were more likely to use a calculator or PDA to cheat as their class level increased (r = .24). This is intuitive since juniors and seniors are more apt to be proficient in using PDAs and programmable calculators. Finally, respondents were much more likely to perform various acts of academic dishonesty {(1b, r = .22) (1d, r = .23) (1e, r = .23) (1l, r = .28) (1t, r = .21)} if they cheated in high school.

Correlations were also examined between situational definitions of cheating (Table 2) and demographics. Overall, there were very few correlations between demographics and the statements in Table 2. There were some weak correlations between when cheating is justifiable and if they had cheated in high school. Students who reported cheating in high school at high levels were more likely to disagree with several of the statements in Table 2 {(2a, r = -.27) (2b, r = -.20) (2e, r = -.20) (2f, r = -.20) (2i, r = -.23) (2j, r = -.28) (2l, r = -.22)}. This indicates that students who cheated in high school are more likely to use personal judgment regarding when cheating is permissible. Finally, there are moderate to strong correlations ($p < .01$) among Table 2 statements indicating that students' responses were consistent.

Finally, correlations between Tables 3 and 4 with demographics were considered. There was no correlation between demographics and student opinions and perception about an institution's academic policy (Table 3), though there were some weak correlations between Table 4 and demographic data. For example, as the respondents GPA increased, they were more likely to disagree with the statement "I have to cheat to compete" (4j, r = -.34) and more likely to agree with the statement "others cheat more than I do" (4k, r = .29). Finally, the more frequently students cheated in high school, the more they agreed with numerous statements in Table 4 {(4a, r = .23) (4e, r = .20) (4i, r = .31) (4m, r = .33) (4n, r = .35) (4o, r = .21) (4p, r = .33) (4q, r = .31)}. The notable exceptions were frequent high school cheaters were less likely to agree with the statements "if I saw another student cheating I would report the student to the instructor" (4f, r = -.21) and "if I saw another student cheating I would confront the student" (4g, r = -.26).

VI. Conclusions and Future Research

The P.A.C.E.S. study has several goals including: (1) determining student definitions of academic dishonesty and how those definitions differ from the faculty, (2) the magnitude of academic dishonesty among engineering undergraduates and under what circumstances they consider cheating acceptable, (3) who is responsible for deterring cheating and what actions might discourage it, and (4) correlations of academic dishonesty with theories of psychological, demographic, and situational factors. The initial survey of students has addressed some of these issues and suggests directions for future research.

Perhaps the most significant conclusion based on the data analyzed so far is the distinction students make between cheating and unethical behavior. In casual conversations with faculty, faculty appear to make less of a distinction between the two. The difference in opinion between students and faculty appears significant and needs to be further investigated by surveying faculty to determine their actual definitions of academic dishonesty.

Based on the data, students in this study are cheating at or above levels reported by other researchers. However, how frequently students are cheating depends on one's definition of cheating. If we only include statements in which a majority of the students believe the action is either cheating or unethical, then 96.3% of respondents have performed at least one act on the list. As one might hypothesize, student definitions of cheating will affect the frequency at which they perform a particular act of cheating.

Previous research has also shown that academic dishonesty is becoming an acceptable social norm. However, student responses in this study do not appear to support this hypothesis. Nor do they indicate that competition or peer pressure was a compelling reason to cheat. However, respondents do indicate that other students cheat more frequently than they do and were more likely to agree with the statement "I would cheat if it seemed everyone else was cheating." This creates a scenario that could perpetuate academic dishonesty.

This research shows that students used instructor-based neutralizations such as "the instructor did an inadequate job" or "the instructor assigned too much material" more commonly than neutralizations based on course material. This correlates well with students' belief that it is primarily the instructors' or the institutions' responsibility to limit cheating and not the students'. This is important information because it indicates that there is a lot that an individual instructor can do in their class to minimize cheating.

Finally, our data did not confirm any strong correlations between demographic factors and

students' definitions of and frequencies of cheating. There were some weak correlations associated with membership in a fraternity or sorority and whether a student had cheated in high school. Overall, academic behavior in high school was the strongest predictor of academic behavior in college.

The next step in the P.A.C.E.S study is to complete processing the remaining surveys (approximately 500) and to analyze these results in conjunction with the results reported in this paper. Then, enlarging the data set and broadening the range to include schools outside of Michigan will yield a better indication as to what engineering students define as cheating, how often they cheat, and when they feel cheating is permissible. After the initial data set is analyzed, we hope to refine our survey instrument and distribute it to a much larger group of students. We then hope to further investigate correlations between academic dishonesty and psychological, situational, and demographic factors. Finally, we also need to modify the survey so we can get faculty attitudes toward academic conduct and ways to prevent cheating.

In the near future we will also investigate what actions might prevent students from cheating. The overall purpose of the research is to identify practical ways to reduce academic dishonesty among engineering students. As part of this effort, we will be closely examining how the academic policies of various institutions affect academic dishonesty. Finally, we want to compare the perceived differences between students and faculty in their definitions and attitudes towards cheating.

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