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# Engineering Students' Perceptions of and Attitudes Towards Cheating

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## ABSTRACT

Academic dishonesty has become a serious problem at institutions of higher learning. This is particularly true in engineering where, according to previous research, engineering undergraduates are among the most likely to cheat in college. To investigate this concern, the authors embarked on a research project whose goal was to develop a better understanding of what students and faculty perceive as cheating and to use this knowledge to help instructors and institutions increase the level of academic integrity among students. The primary instrument for this project was a seven-page survey that was administered to 643 engineering and pre-engineering undergraduates at eleven institutions, ranging from community colleges to large research universities. This manuscript provides an overview of the descriptive data from the PACES-1 Survey organized around the following questions: what is student cheating and how often does it occur; why do students cheat; and what methods can be used to reduce or stop cheating?

**Keywords:** academic integrity, cheating, ethics

## I. ACADEMIC DISHONESTY AND ITS IMPLICATIONS FOR ENGINEERING EDUCATION

Understanding cheating, or academic dishonesty, and its implications for engineering education can be organized around three key research questions: what is student cheating and how often

does it occur; why do students cheat; and what methods can be used to reduce or stop cheating? These questions are the basis around which this paper is organized.

### A. What Is Student Cheating and How Often Does It Occur?

Before one can determine how often students cheat, the definition of "cheating" needs to be established. *Webster's New World Dictionary* [1] defines cheating as "being dishonest or deceitful." In the college setting, this equates to intentionally trying to deceive the instructor with regards to work completed by the student. In many cases, faculty avoid the issue of explicitly defining "cheating" to their students, often because of the pervasive attitude that "cheating" is universally understood and that every college student knows what "cheating" is. However, it has been shown that students and faculty differ widely on their beliefs and perceptions of cheating [2–6], so the definition of cheating deserves additional consideration. This problem of an unclear definition of cheating is further exacerbated by institutional policies. Some institutions define "cheating" simply as "acts of academic dishonesty." In other cases, institutions spend considerable effort in defining cheating, especially if the school has an honor code or student code of conduct, which defines how students should behave in an academic setting.

In what many consider a seminal text on academic dishonesty, "Academic Dishonesty – An Educator's Guide" by Whitley and Keith-Spiegel [7], the authors attempt to define academic dishonesty by presenting a "typology of academic dishonesty" including definitions of cheating, fabrication, plagiarism, facilitating academic dishonesty, misrepresentation of work, failure to contribute to a collaborative project, and sabotage. In this typology, the definition of cheating provided by Pavela [8] is that "cheating" is merely one form of academic dishonesty. However, the terms cheating and academic dishonesty are often used synonymously by faculty and institutions and likely would not be differentiated by students. Hence, there is a need for faculty and institutions to clearly define "cheating" and "academic dishonesty" for the students or risk students defining cheating for themselves.

Academic dishonesty is distressingly prevalent on college campuses throughout the United States with upwards of 80 percent of undergraduates reporting that they have cheated at least once during college [9–13]. Of particular interest for this project is the pattern of cheating among *engineering* students. It is well documented that the percentage of undergraduate students who self report engaging in cheating behaviors differs by college major [2, 13–20]; however, prior to the authors' research, there were very few investigations specifically differentiating *engineering* students from the general student population. Of those, only two were multi-institutional studies: one conducted in 1963–64 [13] and the other thirty years later [10]. As an indication of the difference by major, McCabe and Trevino [10] collected data from 1,946 undergraduates at 16 institutions and

found that 82 percent of engineering students self report engaging in any type of cheating compared to 91 percent of business students, 73 percent of social sciences students, and 71 percent of natural sciences students. In these studies, the survey instrument provided the definition of cheating since the surveys included a list of acts that commonly could be defined as “cheating.” These acts included copying on exams, fabricating a bibliography, and falsifying lab data. The students were then asked in turn if they committed each of these acts with percentage of “yes” responses being reported as indicated above.

## B. Why Do Students Cheat?

Why students cheat is of particular importance in undergraduate engineering education because the implications of academic dishonesty are numerous—it affects the integrity of the learning process, an individual’s long-term behavior, and the ability of academic institutions to achieve their stated objectives. For example, students who cheat are likely to develop attitudes and habits that can interfere with their learning, and this may ultimately lead to practicing engineers who are insufficiently prepared. Furthermore, acts of academic dishonesty undermine the assessment of student learning and interfere with the efforts of faculty to properly diagnose and address shortcomings in student learning. Research has also shown that students who cheat in college are more likely to shoplift [20], cheat on income taxes [21], abuse harmful substances [22, 23], cheat in graduate and professional schooling [24], and engage in unethical work–place behavior [25–32]. All of these correlations raise the possibility that interventions that increase a student’s level of academic integrity could reduce the frequency of his or her decisions to engage in other unethical behavior during college and beyond. The longer-term consequences are cause for even greater concern. A student who has managed to cheat his way through college not only presents a false impression of themselves to future employers, but may also have such a poor sense of moral obligation and responsibility that he cannot be expected to act ethically as a professional engineer. In this case, much more than the integrity of the academic process is at stake because engineers (more often than their business counterparts) are responsible for the physical welfare of the consumers of the products they design and manufacture.

The importance of determining why students cheat in undergraduate engineering education is further reflected in the recent nationwide emphasis among engineering faculty and accreditation boards on assessing student learning outcomes related to professional ethics. This emphasis was codified in changes to the nationwide accreditation requirements for engineering programs [33]. In addition, the importance of graduating engineering students who understand professional and ethical responsibility is becoming clearer, as evidenced by *The Engineer of 2020* report [34] produced by the National Academy of Engineering (NAE). In this report, the group concluded that future engineers would need to “possess a working framework upon which high ethical standards and a strong sense of professionalism can be developed.” A further indication of the importance of ethics was the convening of a workshop that led to the publication of another NAE report, *Emerging Technologies and Ethical Issues in Engineering* [35]. The goal of the workshop was “to bring together a group of experts in different disciplines to facilitate discussion” around the issue that emerging technologies will yield engineers who are trained to advance technologies, but are not trained to address the “social and ethical implications” of these technologies.

To specifically address the question “Why do students cheat?” researchers have typically divided reasons for cheating into three categories—psychological [36–39], demographic [40], and situational [3, 39, 41]. Of these three, research indicates that psychological factors appear to play the most important role in student cheating. For instance, Roth and McCabe [39] 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 [10, 39, 42]. In another illustration of the probable role of student values, Bowers [1] found that 64 percent of students who cheated in high school also cheated in college, and Harding et al. [25–27] found a strong relationship between cheating in high school and cheating in college.

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 cheating and ethnicity [4, 43] or cheating and religious beliefs [4, 44], and the correlation between cheating and gender [39, 45] has yielded mixed results. However, other demographic factors such as grade point average (GPA), age, and participation in organizations (such as fraternities and athletic teams) have been shown to be related. Researchers have observed an inverse correlation between cheating and GPA, meaning that students with lower GPA tend to cheat more [5, 46, 47]. Also, students appear to cheat more frequently as they progress through college [48], although older, non-traditional students tend to cheat less than their younger counterparts [18, 40]. In addition, 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 [13, 42, 46, 48]. This connection between campus organizations and cheating could be a product of multiple factors including peer influence, ease of access to cheating aids, or even an overall culture that supports deviant behavior. Finally, there have been a few investigations into how situational factors, such as the pressure to succeed in school, external work commitments, heavy course loads, and financial aid or scholarship requirements affect academic dishonesty [9, 49, 50]. In general, these factors have little effect.

## C. What Methods Can Be Used to Reduce or Stop Cheating?

Given the alarming state of academic dishonesty among institutions of higher learning, there is a clear need to understand what factors may reduce student cheating. Arguably, the responsibility for reducing cheating lies with both students and academic institutions, and one of the most important components to promoting academic integrity on college campuses is to ensure that faculty and students understand the values and expectations of the institution. The institution’s policy of academic integrity must reflect these values and the administration must actively promote it [50]. Simply discussing the institution’s policy and the penalties associated with cheating has been shown to be ineffective [39, 51]. A preferable approach is to increase the understanding of what constitutes cheating and increase the communication about academic integrity between students and faculty.

The institutional response to cheating is often to develop an academic dishonesty policy. Academic dishonesty policies can be effective if properly designed, since schools with well-designed and well-communicated honor codes are known to have lower rates of cheating [9, 39, 42]. As mentioned previously, this may be related to the strong correlation between student values and cheating.

However, the greatest weakness of honor codes seems to be that few faculty members actually use them for dealing with cases of academic dishonesty, despite institutional requirements to do so. Instead, faculty often prefer to handle cases individually for one of several reasons: incidents of cheating are difficult to prove, there is a lack of knowledge regarding the policies of the institution, or the institution has an organizational culture that discourages faculty from reporting such cases [52, 53]. Unfortunately, this approach leads to an inherently unfair situation in which similar cases are treated differently, punishments are not consistent, and repeat offenders are not identified. Faculty who use informal adjudication in resolving instances of cheating may be violating the student's right to due process, and therefore, placing themselves in legal jeopardy.

While convincing faculty to enforce institutional policies for academic dishonesty deserves considerable effort, the greatest reduction in cheating may come from faculty who promote and nurture the highest levels of integrity both from the students and themselves in their classrooms. For example, one study found that students frequently place the blame for cheating on faculty, citing poor instructional quality, irrelevant course material, and faculty apathy about cheating [50]. Therefore, it is logical to assume that increasing instructional quality, relevance in course design, and faculty concern for the learning process may reduce levels of cheating. An additional benefit of this approach is that graduates will have a strong ethical foundation, rather than a well-stocked toolbox of techniques for concealing cheating.

While students need to share in the responsibility of reducing cheating, over-reliance on students should be avoided since research suggests that they are not likely to report the cheating of other students. Centra [54] found that approximately 71 percent of students would "do nothing" if they observed another student cheating or simply express concern to the cheater individually and only 5 percent would actually report the incident to the instructor and specifically name the student involved. Students realize how difficult it can be to maintain one's integrity in the face of the many pressures they experience while in school. Given this and the general socialization process they have undergone in which they have been taught not to "tattle" on one another, it is not surprising that students tend not to report instances of cheating.

## II. THE PACES-1 SURVEY

Much of the published literature about academic dishonesty has reported studies of large student populations with homogeneous backgrounds. However, the samples are not representative of *engineering* students so there is little information about what factors might result in the increased cheating among engineers reported earlier. To address this issue, the study reported here is based upon data collected from a direct-question survey that was administered to engineering undergraduate students. The survey is designed to identify perceptions and attitudes of engineering undergraduate students about cheating. The survey was developed after an extensive review of literature on the subject [55] and is modeled on the work of previous researchers [10, 17, 39], thus providing a limited measure of validity.

The primary instrument of the study was the seven-page PACES-1 Survey that contains 139 questions subdivided into seven sections. Though students' behavior in a given situation is likely influenced by a complex interaction of a variety of factors, this

research follows the lead of others in studying three types of factors—psychological, demographic, and situational. As such, the PACES-1 Survey included questions in all three categories to analyze the role of each for engineering undergraduates. Section 1 addresses students' definition of cheating in several contexts and the frequency with which they have engaged in those activities; Sections 2 through 5 investigate psychological and situational factors that might affect students' decision about cheating; Section 6 addresses deterrents to cheating and the students' perception of their effectiveness; and finally, Section 7 addresses student demographics. The survey was printed in a format that is easy to scan so that results could be processed automatically and data analysis could be conducted using statistical software.

Using a survey for data collection provides anonymity and simplicity and is the standard measurement instrument in research on cheating. Nevertheless, the accuracy of self reports of engaging in cheating behavior is debated. Some researchers have argued that students may underreport their cheating on surveys because cheating is a socially undesirable behavior [56, 57], while others believe such a survey approach results in overestimates of cheating [32]. Despite these possible sources of error, there is evidence that in many situations self-reports of dishonest behaviors can be accurate [58]. Sudman and Bradburn [59] have shown that, when survey participants are asked to reveal sensitive information, posing questions which assume that the behavior occurred can reduce under reporting due to social desirability. For example the question "How frequently did you cheat on coursework during an average term in high school?" is written in such a way that cheating in high school is assumed to have occurred. The survey for this study was designed according to Sudman and Bradburn's findings. To further reduce the effects of social desirability, great care was taken to develop protocols that assured anonymity, thereby encouraging more truthful student responses [60]. The Behavioral Sciences Institutional Review Board at the University of Michigan approved these protocols, as well as the survey itself.

## III. METHODOLOGY

Surveys were provided to specific faculty who volunteered to administer them during a class period. The protocol used to administer the surveys was designed to alleviate student concerns about being singled out for past indiscretions and is similar to the procedure used at many institutions to administer the end-of-term instructor evaluations. Prior to administering the survey, the instructor briefly read a written script about the nature of the research and the students' rights. This information was also included on the survey itself in text form. The instructor also informed students that their participation was voluntary. In order to assure anonymity, the instructor then left the room while students completed the survey. Students were asked to fill out the survey and place the completed surveys in one large plain envelope when finished. The envelope was sealed and returned to a department administrative assistant, who in turn mailed it to one of the authors of this manuscript for inclusion in the data set.

It should be noted that institutions and individual classrooms were selected based on the willingness of a faculty member to distribute the surveys in a course. Thus, this sample is one of convenience and is not necessarily representative of engineering students on any single campus. Because of the informal method of selecting

volunteer faculty to distribute surveys for this study, records that would enable the calculation of response rates were not kept. However, in each class in which the survey was distributed, nearly all students completed the survey—yielding an estimated response rate above 90 percent. Possibly because of the length of the survey, several students did not respond to all questions and the response rate for individual questions declined near the end of the survey. A shorter instrument or financial incentives for participation might have assisted in alleviating this problem.

#### IV. THE DEMOGRAPHICS OF THE SAMPLE

The survey was completed by 643 undergraduate engineering and pre-engineering undergraduates at eleven institutions in the United States and abroad, including large public universities, small private universities, and community colleges with pre-engineering programs. Of the sample, 58.0 percent was raised in the Midwest, 19.4 percent was raised in the United States (but outside the Midwest), and 20.8 percent was raised outside of the U.S. (1.8 percent did not indicate). A total of 81.0 percent of the sample was male and 18.8 percent was female (0.2 percent did not indicate). The mean age was 21.6 years with a range of 17 to 48 years of age (however, 89.5 percent of the sample was under 26 years of age). There is good representation of year in college with 22.9 percent of respondents being in their first year, 13.7 percent in their second year, 24.1 percent in their third year, 21.3 percent in their fourth year, and 18.7 percent being in their fifth year or more of undergraduate instruction. Also, although students were not asked to identify their specific engineering discipline, the surveys were administered in courses 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 (6.7 percent of respondents) to more than \$200,000 (6.1 percent) annually. However, only 30.6 percent of the respondents indicated that their parents were the primary method of paying for college with 40.4 percent paying their own way and 26.9 percent on scholarship. The mean GPA was approximately 3.2 on a 4.0 scale with 59.6 percent of respondents indicating they carried a "heavy" course load. A total of 36.9 percent reported that they had heavy family responsibilities. Participation in social organizations was high with 18.8 percent belonging to either a fraternity or sorority and 63.6 percent participating in some form of club, professional organization, or athletic team. Finally, 28.8 percent reported that they never cheated in high school, while 60.2 percent admitted to cheating during high school on multiple occasions.

#### V. RESULTS

This section presents an overview of the student responses on the survey as well as insight into the three research questions for this study: what is student cheating and how often does it occur; why do students cheat; and what methods can be used to reduce or stop cheating? Student responses are documented in tables, and each table reports valid percentages of replies by category. Each table represents one complete section of the survey with each question/statement in the order as presented on the survey. As such, this manuscript includes the PACES-1 dataset in its entirety. Readers

interested in a more detailed analysis on individual components of the survey can refer to several other manuscripts that have been published by the authors [61–64].

##### A. What Is Student Cheating and How Often Does It Occur?

Before the issue of how often students cheat can be accurately addressed, one must define what constitutes cheating (at least in the students' mind). Therefore, one goal of this study was to determine what this sample of students defined as cheating. To this end, students were given twenty behavioral acts and asked whether they considered each to be "Cheating", "Unethical but not cheating", or "Neither." This provided the students' definition of cheating, which was subsequently used to interpret students' reports of how frequently they engaged in each action as a college student. The results are presented in Table 1. The first column lists the survey question verbatim, the next three columns list the percentage of students defining each scenario as "Cheating", as "Unethical but not cheating", and as "Neither", and the last three columns indicate how often (in percentage of responses) respondents engaged in the behavior during a typical college term.

Table 1 does present several interesting findings. For example, when considering student responses to questions regarding examinations, 96.4 percent of students responded that "copying from another student during a test or quiz" (item *a*) was cheating; yet only 73.3 percent responded that "permitting someone else to look at your answer during a quiz or exam" (item *b*) was cheating. Students made a definite distinction between performing the act of copying and permitting others to copy. Additionally, 91.6 percent of respondents thought that "copying from an unapproved reference sheet during a closed-book test or quiz" (item *e*) was cheating; yet only 74.5 percent responded that "storing answers to a test in a calculator or PDA" (item *p*) was cheating. In the authors' opinion, programming answers is effectively the same as using an unapproved reference sheet, yet more students found it to be unethical and not cheating. However, this question may have been insufficiently specific about what "storing answers" meant (i.e., the survey did not specifically state that using a programmed calculator or PDA was not permitted). Additionally, only 40.7 percent responded that "working in groups on Web-based quizzes" (item *s*) was cheating with 29.1 percent stating it is neither cheating nor unethical. Similar rates were reported for "working in groups on take-home exams" (item *l*). 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/or the use of out of class examinations change students' opinions on cheating. This is potentially a very significant finding, considering trends in higher education towards more Web-based instruction, distance learning, and use of technology in the classroom.

There are also interesting results with respect to copying. As previously mentioned, 96.4 percent of students responded that "copying from another student during a test or quiz" (item *a*) is cheating. This number drops to 72.9 percent for "copying another student's homework when it is not permitted by the instructor" (item *l*), 60.7 percent for "copying term papers or laboratory reports from a previous year" (item *j*), 52.3 percent for "submitting or copying homework assignments from previous terms" (item *n*), and 19.1 percent for "copying a passage out of the textbook for homework assignments" (item *m*). 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

	Attitude Toward Cheating			Frequency of Cheating Behavior		
	Cheating	Unethical but not cheating	Neither	0	1-2	3+
a) Copying from another student during a test or quiz	<b>96.4</b>	2.3	1.1	<b>63.3</b>	20.2	11.5
b) Permitting another student to look at your answer during a quiz or exam	<b>73.3</b>	23.3	3.4	<b>53.7</b>	25.3	15.4
c) Asking another student about questions on an exam you have not yet taken	26.7	<b>45.6</b>	26.6	27.2	29.9	<b>37.5</b>
d) Delaying taking an exam or turning in a paper later with a false excuse	24.9	<b>65.5</b>	8.7	<b>68.9</b>	19.4	6.4
e) Copying from an unapproved reference sheet during a closed-book test or quiz	<b>91.6</b>	5.8	1.9	<b>68.1</b>	19.0	7.3
f) Claiming to have handed in an assignment or exam when you did not	<b>61.1</b>	33.0	4.5	<b>86.6</b>	4.4	1.9
g) Taking an exam for another student	<b>92.1</b>	5.4	1.7	<b>89.9</b>	2.0	1.2
h) Working in groups on assignments when there is no class policy on group work	6.4	20.1	<b>72.5</b>	14.6	19.1	<b>59.6</b>
i) Adding fake references to term papers to expand the bibliography	36.1	<b>55.7</b>	7.2	<b>65.6</b>	20.4	7.3
j) Copying an old term paper or lab-report from a previous year	<b>60.7</b>	26.1	12.3	<b>55.7</b>	22.9	14.2
k) Studying with other students for a test	0.6	2.2	<b>96.3</b>	3.7	5.3	<b>85.1</b>
l) Copying another student's homework when it is not permitted by the instructor	<b>72.9</b>	22.6	3.9	<b>37.9</b>	31.7	24.3
m) Copying a passage out of the textbook for homework assignments	19.1	36.1	<b>42.6</b>	<b>38.4</b>	27.2	26.1
n) Submitting or copying homework assignments from previous terms	<b>52.3</b>	31.1	16.0	<b>58.2</b>	18.4	16.8
o) Witnessing a case of cheating in a class and not reporting it to the instructor	9.2	<b>59.6</b>	30.3	<b>41.1</b>	26.0	27.2
p) Storing answers to a test in a calculator or Personal Digital Assistant (PDA)	<b>74.5</b>	15.6	9.8	<b>54.9</b>	18.8	20.1
q) Changing the answer on your test/homework after it was graded and then telling the instructor a grading mistake	<b>92.2</b>	5.0	2.2	<b>87.9</b>	4.7	1.6
r) Paying someone else to take an exam/write a paper for you	<b>87.1</b>	10.7	1.6	<b>89.1</b>	3.4	1.1
s) Working in groups on Web-based quizzes	<b>40.7</b>	29.4	29.1	<b>66.4</b>	14.8	11.8
t) Working in groups on take-home exams	<b>39.0</b>	28.6	31.4	<b>53.2</b>	25.2	14.9

Table 1. Percentage of students defining a behavior as "Cheating", "Unethical but not cheating", and "Neither", and self-reporting engaging in the behavior a given number of times in a typical term. Highest percentage of each category is in bold.

and typically all are factors in the final grade, yet students are clearly distinguishing between them based on their reported behavior. In most engineering classes, exams weigh more heavily towards the final grade than laboratory reports and homework. One explanation could be the following: for assessment measures that contribute less to final course grades, students less frequently categorize copying as cheating. 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.

One final note regarding Table 1 is the distinction students make between "Cheating" and "Unethical but not cheating". In conversations with faculty, most do not make a distinction between something being unethical and cheating. Most faculty hold the belief that if something is unethical, it must be dishonest, and subsequently, given the academic setting, must be academically dishonest. However, Table 1 indicates that a large portion of students

definitively make a distinction between unethical behavior and cheating. *Webster's New World Dictionary* [1] defines unethical as "not conforming to moral or professional standards of conduct." One hypothesis to explain this finding is that students believe that an action can be counter to moral professional standards of conduct, but not counter to the specific academic policies of their institution, and therefore not cheating. Another possibility is that students know a behavior is wrong, but can rationalize or justify engaging in that behavior. Regardless of the reasoning, the fact that students make a distinction between cheating behaviors and unethical behaviors might be one of the reasons that faculty and students differ on their beliefs and perceptions of cheating.

## B. Why Do Students Cheat?

Trying to determine why students cheat is problematic, as each individual student will decide whether or not to cheat in a given

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a) Helping someone else cheat is not as bad as cheating myself	18.4	28.8	18.2	<b>29.2</b>	5.1
b) It is my responsibility to prevent cheating	17.3	<b>31.4</b>	29.4	16.6	5.0
c) It is the instructor's responsibility to prevent cheating	2.5	7.0	10.9	<b>50.1</b>	29.2
d) It is the institution's responsibility to prevent cheating	3.3	9.5	14.0	<b>47.6</b>	24.9
e) Cheating is a necessary part of life	31.4	<b>34.4</b>	20.5	9.0	4.0
f) If I saw another student cheating I would report the student to the instructor	20.7	<b>37.9</b>	30.6	7.8	2.6
g) If I saw another student cheating I would confront the student	21.9	<b>39.7</b>	26.1	9.5	2.2
h) If I saw another student cheating I would do nothing	3.1	13.1	31.4	<b>37.2</b>	14.9
i) I would cheat to avoid getting a poor or failing grade in class	22.6	<b>31.6</b>	23.2	16.8	5.3
j) I have to cheat just to get grades good enough to compete with other students at this school	<b>46.5</b>	37.6	10.3	4.0	0.9
k) Other students cheat more frequently than I do	1.4	2.2	27.5	<b>36.7</b>	29.9
l) If a good friend asked me to cheat for them, I wouldn't be able to say no	22.6	<b>37.8</b>	19.8	13.7	5.6
m) I would cheat in a class if it seemed that everyone else was cheating	16.3	<b>32.2</b>	27.7	19.1	4.0
n) I would cheat if doing so helped me retain my financial assistance	17.6	<b>29.7</b>	25.5	21.2	5.3
o) I would cheat to avoid letting my family down if I failed	22.1	<b>37.6</b>	22.2	13.4	3.9
p) I would cheat if I had studied really hard for an exam, but it wasn't going well	20.5	<b>41.7</b>	19.6	13.5	4.0
q) I would cheat if I hadn't had time to study properly for a test	24.6	<b>42.1</b>	20.1	10.1	2.3

Table 2. Percentage of students agreeing with statements concerning cheating. Highest percentage of each category is in bold.

situation based on a variety of factors. However, one way to address this question is to consider common hypotheses of why students cheat including a growing social acceptability, grade competition, and peer pressure. These hypotheses were included in a list of statements about cheating and students responded using a five-point Likert scale from “Strongly disagree” to “Strongly agree” with the results presented in Table 2.

The student responses to statements regarding these hypotheses are surprising and differ from the authors' expectations. For example, research has indicated that frequency of cheating is rising and that academic dishonesty is becoming a social norm or “necessary part of life” [65]. Yet, a majority of students disagreed with the statement “cheating is a necessary part of life” (item *e*) with only 13.0 percent in agreement. Likewise, engineering is commonly considered a highly competitive environment in which students might feel more compelled to cheat to compete with other students. However, only 4.9 percent of students agreed or strongly agreed with the statement “I have to cheat just to get grades good enough to compete with the other students at this school” (item *j*), and 46.5 percent strongly disagreed. Regarding the hypothesis that peer

pressure is a reason students cheat, 60.4 percent of the sample 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” (item *l*), which suggests limited effects of peer pressure.

Another interesting result in Table 2 is that 66.6 percent agreed or strongly agreed with the statement “other students cheat more frequently than I do” (item *k*), with only 3.6 percent in disagreement. Essentially, students are convinced everyone cheats as much if not more than they do. When developing the survey, the authors believed that if students perceived that others cheat more than they do, the students would be more likely to cheat themselves. However, data from this study does not clearly confirm this belief. For example, nearly one-half (48.5 percent) of respondents disagreed or strongly disagreed with “I would cheat in a class if it seemed everyone else was cheating” (item *m*). Therefore, identifying the role of students' perceptions of their peers' behavior in cheating requires further consideration.

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

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a) It is wrong to cheat no matter what the circumstances	3.9	10.4	14.6	<b>41.1</b>	29.9
b) It is wrong to cheat even if the instructor has done an inadequate job of teaching the course	6.4	14.3	19.3	<b>37.0</b>	22.9
c) It is wrong to cheat even if the instructor assigned too much material	3.6	13.7	19.3	<b>40.1</b>	22.9
d) It is wrong to cheat even if the instructor left the room during an exam	2.8	4.4	8.1	<b>42.5</b>	41.8
e) It is wrong to cheat even if the instructor wrote unfair exams	5.6	13.7	18.4	<b>37.3</b>	24.6
f) It is wrong to cheat even if the instructor didn't seem to care if I learned the material	5.3	11.9	16.8	<b>39.7</b>	26.0
g) It is wrong to cheat even if the course material seemed useless	3.4	9.2	11.8	<b>48.1</b>	27.2
h) It is wrong to cheat even if the course material was too hard	3.7	6.5	12.6	<b>46.5</b>	30.0
i) It is wrong to cheat even if other students' scores are not affected	3.0	6.8	13.1	<b>45.7</b>	31.4
j) It is wrong for me to cheat even if the instructor does not grade fairly	5.4	13.5	15.2	<b>39.2</b>	26.0
k) It is wrong to cheat even if I didn't have time study for an exam	3.3	4.2	9.6	<b>46.5</b>	36.2
l) It is wrong to cheat even if I am in danger of failing the class	5.4	8.4	14.2	<b>41.4</b>	30.2

*Table 3. Percentage of students agreeing with neutralization statements. Highest percentage of each category is in bold.*

engineering students. Also, according to these results, engineering students are not motivated to cheat by perceptions of a highly competitive environment or by excessive peer pressure. If many of these common hypotheses for cheating are not at the root of the problem, then what is? This is a question that remains to be answered, but other components of the survey provide insight.

One intriguing explanation why students cheat involves their value judgment system. As previously mentioned, student values appear to play a key role in determining why students cheat [1, 10, 25–27, 39, 42]. As such, student values were assessed by using statements designed around psychological factors related to cheating with statements probing whose responsibility it is to prevent cheating. These statements along with student responses are also presented in Table 2. Overwhelmingly, students believe the responsibility to limit cheating belongs to the instructors and the institution. Additionally, a majority of students would not report instances of cheating to an instructor or confront a student they observed cheating, with only 16.2 percent of students disagreeing or strongly disagreeing with the statement, “If I saw another student cheating I would do nothing” (item *b*). However, in Table 1, a majority of students (59.6 percent) responded that “Witnessing a case of cheating in a class and not reporting it to the instructor” (item *o*) was unethical. This is an important finding because it suggests that although a majority of students believe it is unethical to not report other cheaters (59.6 percent), very few students (16.2 percent) predict that they would act on this belief, representing a discrepancy between student beliefs about and compliance with a behavior.

Another explanation for why students cheat is the existence of situations in which students might consider it acceptable to cheat or situations in which students might rationalize their behavior and

behave differently than their responses indicate. To examine this possibility, students were asked to respond to twelve situations in which they might consider cheating. The situations were primarily based on a list of “neutralizations” as defined by Haines et al. [66]. According to Haines et al., 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 are improper from the students’ perspective, they provide an excuse for cheating. Students responded to the situations presented using a five-point Likert scale from “Strongly disagree” to “Strongly agree,” with the results presented in Table 3. This data indicates that 71.0 percent of students either agreed or strongly agreed with the statement, “it is wrong to cheat no matter what the circumstances” (item *a*). According to this, approximately three out of ten students would rationalize situations in which cheating would be acceptable (note, this does not mean that three out of ten students will cheat; just that they will rationalize situations in which cheating could be considered acceptable). This suggests that students are willing to engage in behavior that they believe to be wrong. In fact, student responses in Table 1 indicate that more than three out of ten students are engaging in behavior they believe to be wrong.

One should note that the number of respondents who strongly disagreed with any of the statements in Table 3 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 3, the top five in which respondents were in disagreement (Disagree or Strongly disagree) were all instructor-related (items *b*, *e*, *j*, *c* and *f* in descending order).

The neutralizations based on course material and other student issues had fewer respondents in disagreement. This suggests that students are willing to place the blame for cheating on the instructor and to use poor instructional quality, etc. as rationalizations. These results agree with student responses in Table 2, which indicate students believe it is the instructors' responsibility to limit cheating.

### C. What Methods Can Be Used to Reduce or Stop Cheating?

Previous research indicates that one important aspect of reducing cheating is ensuring that faculty and students understand the expectations of the academic institution [50]. As indicated earlier, studies have shown schools with well-designed and well-communicated honor codes generally have lower rates of cheating [9, 39, 42]. With this in mind, the authors designed one section of the survey to probe students about whether they believe institutional policies would deter cheating. Students were asked to respond "Not at all", "Somewhat", or "A lot" to three questions regarding the academic policies of their institutions. Table 4 provides student responses as a percentage. Approximately one-half (51.6 percent) of respondents indicate that faculty support the academic policies of their institution "a lot" (item *b*), and only 41.4 percent believe these policies are very effective at deterring cheating (item *c*). However, a majority of the sample believed that they would be punished if caught cheating, with 63.3 percent of respondents answering "a lot" to the question "How likely is it that you would be punished if caught cheating?" (item *d*). Despite this fact, a large number of students still engage in cheating. Therefore, students are engaging in a behavior that they not only know is wrong, but also one that they perceive to carry certain risks of punishment.

To further investigate what might prevent a student from cheating, a portion of the survey presented students with three hypothetical situations in which they might consider cheating. The three situations are listed in Table 5, and they included cheating on an examination, copying a homework solution, and adding a false reference to the bibliography. These actions were designed to represent situations that most faculty members would define as academic dishonesty and that would encompass a range of severity of cheating. Student responses in Table 1 confirm that a majority of students defined these situations as the authors had predicted: 96.4 percent of the students classified copying on an exam as "cheating", 72.9 percent of the students classified copying homework as "cheating", and 55.7 percent of the students classified adding false refer-

ences as "unethical but not cheating". Students were asked to indicate whether they "Agreed", "Disagreed", or were "Not sure" with statements about the certainty of experiencing potential consequences to cheating in each scenario and to indicate whether that possible consequence would serve as a deterrent to cheating. The potential consequences or deterrents can be broadly classified as shame, loss of respect by others, and punishment. Student responses to each deterrent are listed in Table 5.

Results show for this sample that the potential consequences of shame, loss of respect by others, and punishment are more likely to have a deterrent effect on the decision to cheat in the context of examinations than in other contexts. This is evidenced by higher levels of agreement in the examination situation than in the others, and it corresponds to data in Table 1, which indicated students reported behaving differently for examinations than other forms of assessment. Conversely, the lowest levels of agreement with the statement about experiencing potential consequences are for the situation, which involved copying homework.

Of the three potential consequences investigated (shame, loss of respect, and punishment), an instructor's influence on whether a student feels shame is probably limited because this results from a student's own ethical standards and moral values. However, if a student respects the instructor and would feel embarrassed if their instructor discovered they were cheating (i.e., would lose respect of the instructor), then this could be an effective deterrent. Since embarrassment results from social interaction and could be influenced by campus culture, both faculty and students could influence campus culture and promote academic integrity. Finally, punishment and formal sanctions are the most straightforward consequences to influence. However, while student responses indicate sanctions (i.e., the chance of getting caught) play a slightly larger role than shame and embarrassment (according to percentage of agreement), many students do not feel or are unsure whether the threat of sanctions would actually prevent them from cheating.

Another section of the survey directly asked students their opinions about several deterrents to cheating (unrelated to situational context). Because responses from students who have or who would consider cheating were of most interest, students who felt they would never cheat under any circumstances were instructed to skip this section of the survey. Those students who felt they might cheat then replied either "Yes", "No", or "Don't Know" to twenty-three deterrents that might have prevented them from cheating. Overall,

	Not at all	Somewhat	A lot
a) Do students and faculty understand the academic policies of your institution?	4.0	<b>57.1</b>	38.6
b) Do faculty support the academic dishonesty policies of your institution?	8.1	39.7	<b>51.6</b>
c) Do the academic dishonesty policies at your institution deter cheating?	12.3	<b>45.9</b>	41.4
d) How likely is it that you would be punished if caught cheating?	4.5	31.7	<b>63.3</b>

*Table 4. Percentage of students agreeing with statements about academic policies of their institutions. Highest percentage of each category is in bold.*

	Agree	Not Sure	Disagree
<i>Situation 1: Imagine you are stuck on a problem during the final exam in a required class you are failing. You are considering looking at your neighbor's exam.</i>			
I would feel ashamed of myself if I benefited from looking at my neighbor's exam.	<b>60.0</b>	21.9	17.6
Feeling shame about looking at my neighbor's exam would prevent me from doing so.	<b>48.4</b>	28.6	22.6
Most of the people whose opinion I value would lose respect for me if they found out.	<b>46.7</b>	27.2	25.3
This potential loss of respect would prevent me from looking at my neighbor's exam.	<b>45.9</b>	23.6	28.8
There is a good chance that I would get caught if I looked at my neighbor's exam.	<b>43.4</b>	29.7	26.3
The chance of getting caught would prevent me from looking at my neighbor's exam.	<b>66.3</b>	19.3	13.8
<i>Situation 2: Imagine you are working on a homework assignment in a group and you are considering copying one of the homework solutions from another student in the group.</i>			
I would feel ashamed of myself for copying another student's homework solution.	23.6	20.7	<b>55.1</b>
Feeling shame about copying another student's solution would prevent me from doing so.	20.5	24.7	<b>54.0</b>
Most of the people whose opinion I value would lose respect for me if they found out.	15.2	22.6	<b>61.4</b>
This potential loss of respect would prevent me from copying another student's homework.	20.2	22.7	<b>56.0</b>
There is a good chance that I would get caught if I copied another student's homework.	19.3	23.8	<b>56.3</b>
The chance of getting caught would prevent me from copying another student's homework.	26.6	24.4	<b>48.1</b>
<i>Situation 3: Imagine you are considering including references to articles you have not read in the bibliography of your term paper, just to increase the length of the bibliography.</i>			
I would feel ashamed of myself if I were to falsely lengthen the bibliography of my paper.	<b>42.9</b>	22.2	34.1
Feeling shame about falsely lengthening my bibliography would prevent me from doing so.	<b>36.5</b>	26.4	35.8
Most of the people whose opinion I value would lose respect for me if they found out.	23.8	29.7	<b>45.1</b>
This potential loss of respect would prevent me from falsely lengthening the bibliography.	29.5	26.6	<b>42.3</b>
There is a good chance that I would get caught if I falsely lengthened the bibliography.	32.0	29.1	<b>37.5</b>
The chance of getting caught would prevent me from lengthening the bibliography.	<b>42.5</b>	25.0	30.5

*Table 5. Percentage of students agreeing with statements about deterrent effect of shame, loss of respect, and punishment on cheating for three different situations. Highest percentage of each category is in bold.*

66.1 percent of all respondents completed this part of the survey and their responses are summarized as percentages in Table 6.

Because of the fraction of students completing this section, one could infer that 33.9 percent would never consider cheating under any circumstances. However, this number is 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 student responses in Table 1 indicate that less than ten percent of respondents have never engaged in an act that they defined as either cheating or unethical. This apparent discrepancy (less than ten percent compared to 33.9 percent) could be attributed to either students not wanting to complete this section of the survey (the survey instrument was lengthy) or inconsistent student and faculty definitions of cheating.

## VI. DISCUSSION

This manuscript describes responses for 643 engineering or pre-engineering undergraduates on the PACES-1 Survey and repre-

sents an initial investigation into the following questions: what is student cheating and how often does it occur; why do students cheat; and what methods can be used to reduce or stop cheating? The answers to these questions are complex and the authors are still formulating conclusive responses; however, there are several insightful and significant observations.

One insightful observation is the distinction students made between cheating and behaving unethically. Through conversations with faculty, the authors have found that most instructors do not clearly distinguish between the two, and that faculty members define "engaging in unethical acts" and "cheating" as being synonymous. This difference in distinction between students and faculty definitions is noteworthy and efforts should be made to clearly define and consequently bridge this gap.

Perhaps the most significant finding of this study is that the frequency of student cheating is influenced by students' attitudes toward the behavior. For example, Table 1 indicates that more students believe copying from another student on an exam is cheating than believe copying from another student on homework is cheating. This corresponds to a significantly higher frequency of students

I would cheat ...	Yes	No	Don't Know
a) If the institution had an honor code that clearly described what constituted cheating and penalties for cheating	<b>40.9</b>	29.2	29.9
b) If classes were smaller	<b>43.1</b>	28.0	28.9
c) If the instructor discussed the institution's penalties for cheating	<b>40.8</b>	33.0	26.1
d) If the instructor discussed the penalties for cheating in their course	<b>43.6</b>	26.8	29.6
e) If the instructor and class discussed and agreed upon what would constitute cheating in their course	<b>42.4</b>	24.7	32.9
f) If the instructor knew my name	<b>42.5</b>	30.0	27.5
g) If the instructor cared about my learning	<b>44.7</b>	23.3	32.0
h) If the instructor discussed the importance of ethical behavior at the beginning of the term	<b>41.3</b>	32.6	26.1
i) If the instructor encouraged students to be honest during the term	<b>43.7</b>	24.9	31.4
j) If the professor passed out multiple versions of the exam randomly to students in the class	<b>47.3</b>	22.6	30.1
k) If the instructor had additional proctors in the room during the exam	<b>48.8</b>	22.0	29.2
l) If the instructor remained in and moved around the room during the exam	<b>47.0</b>	21.5	31.5
m) If the instructor allowed us to work in groups on homework	<b>44.1</b>	27.0	28.9
n) If the instructor wrote fair tests and homework	<b>40.9</b>	25.8	33.3
o) If the instructor passed out copies of old tests to everyone so we all had the same study materials	<b>44.7</b>	23.0	32.3
p) If the instructor provided a study guide or held a review before the exam	<b>44.5</b>	24.1	31.4
q) If tests were open book or reference sheets were allowed	<b>43.0</b>	21.5	35.5
r) If the instructor put more essay questions on the exam	<b>39.7</b>	37.1	23.2
s) If the instructor assigned students to seats during the exam	<b>47.2</b>	35.2	17.6
t) If the instructor checked bibliographic references in student term papers	<b>39.5</b>	28.2	32.2
u) If the institution provided a telephone hotline for reporting cheating	39.7	<b>41.5</b>	18.8
v) If the instructor stressed how other people are hurt by my cheating	<b>41.3</b>	34.7	23.9
w) If I felt the material in the course was important to my future career	<b>41.2</b>	24.8	34.0

*Table 6. Percentage of students agreeing with statements about actions that might deter cheating. Highest percentage of each category is in bold.*

copying on homework than exams. As a further illustration of this relationship, Table 7 presents cheating frequencies for each behavior grouped by student's reported attitudes toward each behavior. Numbers listed in the columns represent the average reported degree of engagement in the given behavior (on a scale of 1 to 3). Analysis of variance showed that for every behavior there was a statistically significant difference ( $p < 0.001$ ) in frequency of engagement between the different attitudinal groups. Post-hoc analysis confirmed that the frequency with which a student engages in a given behavior is higher for students who define an act as "unethi-

cal" as compared to those who define the act as "cheating" for every act except one (item *k*, "studying with other students for a test"). These findings suggest that a student's attitude toward the behavior has an important influence on their ultimate decision on whether to commit the act.

Another important finding is that students knowingly conduct acts that they define to be wrong. In Table 7, the score for students who define a behavior as "cheating" is greater than 1.0 for every act, meaning that individual students commit a given act despite having defined the act as cheating. In addition, a majority of students

	Attitude Towards Cheating*		
	Cheating	Unethical but not cheating	Neither
a) Copying from another student during a test or quiz	1.44	2.22	1.43
b) Permitting another student to look at your answer during a quiz or exam	1.46	1.99	2.39
c) Asking another student about questions on an exam you have not yet taken	1.59	2.13	2.61
d) Delaying taking an exam or turning in a paper later with a false excuse	1.16	1.37	1.69
e) Copying from an unapproved reference sheet during a closed-book test or quiz	1.32	1.83	1.93
f) Claiming to have handed in an assignment or exam when you did not	1.06	1.12	1.38
g) Taking an exam for another student	1.03	1.35	1.36
h) Working in groups on assignments when there is no class policy on group work	1.65	2.16	2.64
i) Adding fake references to term papers to expand the bibliography	1.20	1.46	1.63
j) Copying an old term paper or lab-report from a previous year	1.38	1.78	2.08
k) Studying with other students for a test	2.25	2.08	2.88
l) Copying another student's homework when it is not permitted by the instructor	1.75	2.15	2.52
m) Copying a passage out of the textbook for homework assignments	1.27	1.72	2.29
n) Submitting or copying homework assignments from previous terms	1.35	1.65	2.14
o) Witnessing a case of cheating in a class and not reporting it to the instructor	1.70	1.74	2.16
p) Storing answers to a test in a calculator or Personal Digital Assistant (PDA)	1.47	1.99	2.33
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	1.07	1.27	1.71
r) Paying someone else to take an exam/write a paper for you	1.04	1.14	1.71
s) Working in groups on Web-based quizzes	1.17	1.44	1.74
t) Working in groups on take-home exams	1.27	1.65	1.94

*Table 7. Results of ANOVA analysis of student responses in Table 1. Twenty different behaviors are listed in the first column; the mean score (based on frequency with 1 = never; 2 = 1 or 2 times; and 3 = 3 + times) associated with a given attitude towards these behaviors is listed in the next three columns (\*-all differences significant at  $p < 0.001$ ).*

defined seventeen behaviors in Table 1 as either cheating or unethical (every act except items *b*, *k*, and *m*). If those seventeen acts are analyzed in aggregate form, then 96.3 percent of respondents have performed at least one act of cheating. These seventeen acts would also likely be considered cheating by a majority of faculty such that students in this study are self-reporting acts of cheating with higher frequency than reported by previous researchers.

One question posed in this manuscript was “why do students cheat?” This is probably the most difficult of the three questions to answer given the individuality and complexity of the decision making process. However, student responses do offer some insight into the student decision-making process. For example, previous re-

search has shown that academic dishonesty is becoming an acceptable social norm, but student responses in this study do not support this trend. Other commonly cited reasons that students cheat include the competitive nature of engineering or peer pressure, and student responses in this study also seem to indicate that these are not compelling reasons to cheat. However, the sample of engineering undergraduates studied here did indicate that other students cheat more frequently than they do, and respondents were more likely to agree with the statement “I would cheat if it seemed everyone else was cheating.” If students believe others are cheating more frequently than them and also think they would cheat if everyone else did, then this creates a scenario that could perpetuate academic

dishonesty. While it is not practical to postulate an answer to the question, it is clear that further research into the decision-making process is needed.

As a final observation, this research also indicated that students were able to rationalize cheating behavior using 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 institution’s responsibility to limit cheating and not the students’. This is a significant finding because it indicates that an individual instructor can minimize cheating in their class. As such, practical pedagogical methods to help students avoid the pressure of cheating need to be identified and widely disseminated.

In conclusion, students in this study were willing to engage in behaviors that they defined as wrong and that they perceived to carry risks of punishment. Furthermore, a student’s definition of cheating directly affected their behavior. Together, these findings provide insight into students’ definition about what is or is not morally wrong and their commitment to acting morally right. Thus, educators need to be concerned that students have misguided moral principles—and it may be the educational system itself (and not some nebulous societal failure) that is causing the problem. Overall, the authors believe that the responsibility for promoting academic integrity lies with the entire academic community, including students, academic institutions, and faculty. The institution’s policy of academic integrity must be publicized and modeled by the administration and communicated clearly to the students via faculty in the classroom environment. However, to truly implement effective techniques at reducing academic dishonesty, a better understanding of the student decision-making process is necessary.

## VII. FUTURE RESEARCH DIRECTIONS

This manuscript has presented descriptive data resulting from the PACES-1 Survey, and the data is useful in establishing student perceptions, attitudes, and behaviors. However, student responses provide little insight into the underlying interconnection of these variables. Consequently, the authors’ current and future research direction involves two primary objectives. The first is to develop and validate a predictive model of a student’s decision to cheat or not to cheat and the second involves using the model to develop and disseminate practical pedagogical techniques for reducing academic dishonesty.

While developing a predictive model, the authors discovered that the focus of most research on academic dishonesty (particularly institutional research) is on quantifying the magnitude of the problem and measuring student attitudes toward the behavior. What is lacking is research that investigates the decision-making processes of individual engineering students prior to performing an act of cheating. The predictive model proposed by the authors is based primarily on Ajzen’s Theory of Planned Behavior [20]. According to this theory, a decision to perform a behavior, in this case cheating, is a function of the individual’s attitude toward the behavior and the perceived outcomes of that behavior, the social norms of others, and the perception of one’s own control over completion of the behavior. Together these variables influence the intention to perform the behavior, which is seen as an immediate antecedent to

the behavior itself. The authors have modified Ajzen’s model by incorporating measures of moral development and obligation into the Theory of Planned Behavior. This model was pilot tested on 388 engineering undergraduates at three institutions and found reliable in predicting both student behavior and intention. Additionally, the scales used to measure the underlying variables within the model were able to discriminate between students who cheated and those who did not in accordance with the underlying theory. Thus, the pilot study has confirmed the validity of using theoretical models for mapping out the underlying variables of students’ decision-making processes with regards to engaging in dishonest behavior. The next step is to validate the model on a large scale and subsequently use the model to develop the practical pedagogical techniques.

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