



WIP: A Student-Instructor Survey on Student Use of Unsanctioned Online Resources

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Abstract: This work-in-progress paper presents an initial survey of undergraduate engineering students and engineering course instructors on the use of websites and apps like Chegg, Course Hero, and Slader (collectively “unsanctioned online resources,” or UORs) in engineering courses. The survey sought to determine 1) the degree to which engineering students are using UORs to violate academic integrity, 2) how well instructors’ beliefs about students’ use of these resources align with students’ actual behaviors, and 3) potential strategies for decreasing the use of UORs in violating academic integrity. The students reported similar frequencies in using UORs compared to traditional resources for most of the queried behaviors. Instructors estimated a much higher frequency of students’ violation of academic integrity both with and without UORs than the student sample reported. However, the grade point averages of student respondents to the voluntary survey appear to be skewed high, and response bias in both the students and instructors may account in part for instructors’ overestimation of students’ violation of academic integrity. Three instructor strategies out of ten options—grading homework for attempted completion only, providing an instructor-moderated social platform where students can answer each other’s questions, and holding more office hours—are highlighted as showing promise for both being adopted by instructors and curbing students’ violation of academic integrity using UORs.

Introduction

In recent years, platforms like Chegg, Course Hero, and Slader have made it easier than ever for engineering students to obtain past exams, answers to assigned homework problems, and even graded lab reports from previous semesters. These and other unsanctioned online resources (UORs), as distinguished from instructor-sanctioned platforms like Canvas, Piazza, and Top Hat, have gained widespread use among undergraduate engineering students [1]. In an attempt to assess the prevalence and usage patterns of UORs in undergraduate engineering programs, two versions of a survey were designed—one for undergraduate engineering students and one for instructors of engineering courses. The survey aimed to 1) assess how often UORs are used in a spectrum of behaviors ranging from acceptable uses to clear violations of academic integrity, 2) assess whether instructors have an accurate gauge of how widely UORs are used, and 3) explore what strategies may prevent academic integrity violations using UORs.

Background

A number of broad studies on academic dishonesty in post-secondary institutions have indicated that, among all academic disciplines, engineering students are some of the most likely to violate academic integrity [2]–[4]. Other studies have focused specifically on engineering students and the factors that influence them to cheat [5], [6]. More recent studies have examined online plagiarism and cheating in contexts beyond the scope of engineering [7], [8], and some of these have considered the relationships between social media and cheating [9], [10].

A 2016 study published by Ryan et al [1] touches on engineering students’ use of UORs. In this study, approximately 50% of first-year students surveyed ($n = 17$) and 100% of upperclass students surveyed ($n = 31$) indicated that they had used “...Chegg or similar online solution sources to complete homework.” Although UORs were not the focus of this work, the numbers in response to this question clearly point to the widespread use of UORs among engineering students.

The present survey goes beyond previously published works by delving deeper into specific behaviors for which UORs may be used by engineering students, comparing how frequently students resort to UORs for performing specific tasks versus other means, comparing instructors' beliefs about students' average behavior with students' self-reported behaviors, and identifying which strategies professors are willing to implement that students believe would reduce the likelihood of academic integrity violation with UORs.

Methods

This study was approved by the Pennsylvania State University IRB (Study 13956). Two parallel versions of a confidential online survey were composed, one for undergraduate engineering students and one for engineering course instructors. In Part 1 of both surveys, a list of nine behaviors (List 1) ranging from acceptable actions (items 1 and 2) to clear violations of academic integrity (items 6 through 9) was presented twice. The first time the list was presented, the students were asked to indicate how many times in the previous semester they had performed each behavior *without* using UORs, and the second time the list was presented, they were asked to indicate how many times in the previous semester they had performed each behavior *using* UORs. Each behavior included a frequency scale with the options 0, 1, 2, and 3+, loosely based on a portion of the PACES-1 survey in [5]. Similarly, instructors were first asked to indicate how often on average they believed a single undergraduate engineering student engages in each of the behaviors per semester *without* using UORs, and the second time *using* UORs. The pronouns in the list were modified for the subject (first person for students, third person for instructors):

List 1

1. Receiving live tutoring on general course material
2. Finding worked examples outside of homework to increase understanding
3. Getting live help from other students or tutors on specific homework problems assigned for a grade
4. On assigned homework problems taken from a textbook, consulting solutions to increase understanding
5. On assigned homework problems written by an instructor, consulting solutions to increase understanding
6. Borrowing material from another student's lab report and turning it in as [my]/[his/her] own
7. On assigned homework problems taken from a textbook, copying solutions without understanding
8. On assigned homework problems written by an instructor, copying solutions without understanding
9. Using unapproved aids on an exam

In Part 2 of the survey, a list of ten actions was presented to all instructor respondents, but only to those student respondents who indicated in a filter question that they had used UORs to violate academic integrity. The list consists of actions that a course instructor could take in order to reduce the likelihood of students violating academic integrity. The students were asked which of the actions, if taken by an instructor, would make them "significantly less likely to violate academic integrity" using UORs in the future. The instructors were asked which of the actions they themselves would be willing to take. Respondents were instructed to check all options that applied,

and the list order was randomized survey-to-survey in order to reduce bias from choice order. Again, pronouns and verbs were modified for the type of respondent:

List 2, presented here in rank order from the largest to smallest number of student votes

1. Grade homework for attempted completion only.
2. Provide solutions for assigned homework problems in advance of the due date (allow students to use solutions).
3. Provide an approved social platform (like Piazza, for example), moderated by the instructor, where students can answer each other's questions.
4. Hold more office hours.
5. Weight homework less in the final grade to reduce the pressure to score well.
6. Write new homework problems, labs, and/or exams every semester.
7. Clarify what does and doesn't constitute violation of academic integrity using third-party online resources.
8. Weight homework more in the final grade to encourage students to take it seriously.
9. Inform the class that [he/she is]/[I am] aware of sites like Chegg, Course Hero, and Slader.
10. State penalties for violating academic integrity using third-party online resources.

Links to the two survey versions were emailed to administrators in the ten largest engineering departments at a large R1 mid-Atlantic university. The email to each department included a request to distribute the respective links to the department's undergraduate students and instructors. Potential respondents were incentivized to complete the survey through the opportunity to enter a drawing for one of five ten-dollar (US) gift cards. Surveys below a minimal completion threshold (less than 70% of the entire survey or 50% or less of the List 1 questions) as well as those completed in less than a minimum time threshold were removed from the study, leaving 258 valid student surveys and 46 valid instructor surveys.

One limitation of this survey was its voluntary format. Because of the shame surrounding violation of academic integrity and the fear of loss of confidentiality, students who have knowingly violated academic integrity may have been deterred from completing the survey. Professors who see cheating as a serious problem may have been more motivated than other professors to complete the survey. It should also be noted that all of the departments to which the survey was distributed have minimum grade-point average (GPA) requirements for entrance to major. Studies have shown that higher achieving students tend to violate academic integrity less often than lower achieving students [11]–[13]. Therefore, this student sample may exhibit lower frequencies of academic integrity violation compared to a sample without a lower bound on GPA. Students were asked to indicate their GPA range in order to assess whether an academically representative sample was obtained. This survey collected limited other demographic information in order to avoid inductive identification of student respondents, so a breakdown of results by major, gender, and year of study was not possible.

Results

Responses for each item in List 1 were binned into four histograms of frequency for each behavior: 1) student behavior without UORs, 2) instructors' beliefs about students' behavior without UORs, 3) student behavior using UORs, and 4) instructors' beliefs about students' behavior using UORs (Fig 1a). Student and instructor responses for each item in List 2 were accrued (Fig 1b).

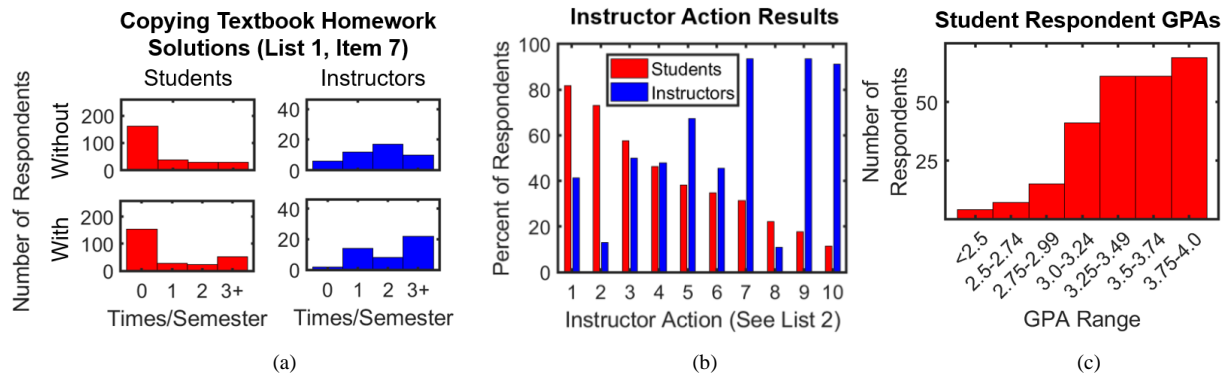


Fig. 1. Plots of survey results. (a) Histograms of student (left, red) and instructor (right, blue) responses for copying textbook homework solutions (List 1, question 7) without using UORs (top) and using UORs (bottom). The left and right vertical axes are normalized to the total number of valid student and instructor surveys, respectively. (b) Student and instructor responses to potential instructor actions. Values for students are expressed as a percentage of the number of student respondents who indicated that they had used UORs to violate academic integrity. Number labels on the horizontal axis correspond to the numbers in List 2. (c) Histogram of student respondent GPA ranges.

As expected, the student sample appeared to be strongly skewed toward higher GPAs (Fig. 1c). Students reported similar rates of activity without UORs and with UORs for all activities in List 1 except item 3. See, for example, Fig. 1a. Instructor estimates of students' frequency in violating academic integrity (List 1, items 6-9) far overshoot the student-reported levels; Fig. 1a shows a representative result for items 6-9. This may have been due in part to the possible response biases noted in the previous section.

Eight of the ten actions from List 2 received an affirmative response from more than 40% of the instructor respondents (Fig 1b), where an affirmative response indicated a willingness of the instructor to implement the action. Only four of the actions received an affirmative response from more than 40% of the student respondents, where an affirmative response indicated that the student believed the action would make him/her "significantly less likely to violate academic integrity" using UORs. The three actions that surpassed the 40% mark for both groups of respondents were grading homework for attempted completion only, providing an instructor-moderated social platform where students can answer each other's questions, and holding more office hours.

Discussion and Conclusion

This survey has added to existing knowledge by indicating that engineering students access UORs to assist with solving homework problems at about the same rate as they find the same type of assistance without UORs. This study also indicates that, contrary to anecdotal evidence, there appears to be a population of students who restrict their use of UORs to behaviors that do not flagrantly violate academic integrity. For engineering instructors and administrators seeking to mitigate the violation of academic integrity through UORs, this study provides student and instructor feedback on a list of proposed preventative strategies. Since the use of UORs extends beyond engineering programs, this study may be of interest to other academic disciplines as well.

Possible future work stemming from this study includes a future iteration of the survey in which both the student and instructor samples would be taken in a way that produces collections of respondents more likely to be representative of their respective populations.

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