

APPLICATION OF PLAGIARISM SCREENING SOFTWARE *in the ChE Curriculum*

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Most chemical engineering (ChE) departments require coursework involving written laboratory and/or design reports, especially as students enter their junior and senior years. A drawback of written assignments is the potential for plagiarism of outside materials by students. Plagiarism is problematic from an academic perspective for two commonly cited reasons: 1) the student(s) who plagiarize neither develop associated writing skills nor learn the intended lesson content,^[1] and 2) students within a class where other students are plagiarizing without knowledge of the instructor may receive comparatively poor grades even though they are learning and developing the intended skills.

Prior to word processing and the Internet, plagiarism required considerable effort; students must first locate a book, article, or old report, then write or type the outside text. However, in recent years convenient access to text and other materials via the Internet has increased the ease with which plagiarism can be committed. For instance, cutting-and-pasting pages of text into a word processor can be completed in seconds. Additionally, students raised during the Internet Age have relaxed views on intellectual property rights since illegal downloads of music, movies, and other media are more commonplace and difficult to police.^[1, 2] Carpenter, *et al.* review literature that correlates the likelihood of cheating to many psychological, demographic, and situational factors.^[3] While plagiarism is a growing concern of faculty in academic institutions, students often rationalize their cheating behavior and downplay its significance.^[4, 5] The concern of plagiarism is particularly relevant for engineering programs since previous research has suggested that engineering students may be especially likely to copy materials from textbooks and online sources for homework assignments and laboratory reports.^[3]

The most common method to identify plagiarism is the “I know it when I see it” approach, where faculty identify passage(s) of text they suspect are plagiarized during grading, typically by identifying text with quality exceeding that reasonably expected of the student, or targeting detailed descriptions with no citation. This method requires little effort on the part of the instructor, but it is not rigorous toward identifying plagiarism. An obvious drawback of this approach is that documents containing plagiarism that do not openly appear to be plagiarized can pass by faculty unnoticed, and students may then receive grades they did not earn. However, students who submit grossly plagiarized works can often be

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TABLE 1
Courses Utilizing Plagiarism Screening Software and Typical Student Deliverables

Course Number	Course Title	Level	Number of Students	Typical Writing Assignments
CHE 330	Unit Operations Laboratory I	Junior	152	Group laboratory reports
CHE 331	Unit Operations Laboratory II	Senior	98	Group laboratory reports
CHE 395	Professional Development Seminar	Junior	66	Individual technical writing assignments
CHE 450/451	Chemical Engineering Design I/II	Senior	292	Group design reports

identified by this method, and these students typically face harsh academic penalties including failed assignments/courses or even expulsion. An underlying drawback of this method is that the first set of students (those who plagiarized unnoticed) receives no punishment, while the second set of students (who were caught) is penalized, even though they displayed the same behavior. Without vigilance in identifying plagiarism, some offending students are able to pass off plagiarized works as their own, while others committing similar infractions are punished; this is not an equitable approach.

A more insidious drawback of the “I know it when I see it” method of plagiarism screening is exemplified by the situation encountered by Michael McAdoo and the University of North Carolina (UNC). McAdoo, a UNC student-athlete, submitted a paper for a UNC course that was later found to be “footnoted and sourced” by a tutor^[6]; the UNC honor court punished McAdoo by assigning him a grade of F on the paper and placing him on academic probation, removing him from the UNC football team.^[6] As part of McAdoo’s appeal of UNC’s decision, the paper in question was made public. When processed by a third party using plagiarism screening software, the paper was found to contain plagiarized materials that were not previously identified. The discovery of plagiarism in McAdoo’s paper eliminated his chances of reinstatement, raised questions about UNC’s honor court, and “produced more embarrassment for [the] university.”^[6]

McAdoo’s plagiarism was missed not only by the initial professor, but also the UNC honor court, the athletic department, and the NCAA.^[6] Although the plagiarism was well hidden and not identified without assistance from a plagiarism screening program, the story quickly became national news, and the academic reputation of UNC was attacked. This unfortunate event exemplifies the likely ineffectiveness of the “I know it when I see it” method of plagiarism screening and highlights the larger responsibility universities must bear to prevent plagiarism by their students. Many university admissions offices, including more than a dozen MBA programs, have started using plagiarism detection software to screen student applications,^[7] and others such as Ohio University routinely screen all M.S. and Ph.D. theses using plagiarism detection software.^[8] Sadly, students are not the only violators; high-profile academic plagiarism cases by faculty resulting in retracted journal papers are also common.^[9,10]

Use of plagiarism screening software has been shown to be effective in identifying plagiarism in student papers.^[1,11,12] However, a risk in the use of plagiarism screening software by instructors is the fostering of student distrust, due to students feeling that their instructor is “after them” or does not trust them.^[13,14] Literature studies have investigated student views on the use of plagiarism screening software by their instructors, generally concluding that the use of plagiarism screening software makes students uncomfortable and negatively impacts trust in student-instructor relationships.^[14] However, current literature studies on the topic of student views on plagiarism screening software are often subjective in nature and tend to discuss anecdotal evidence, such as student comments alone, as an indication of student distrust. In contrast, a comparatively objective approach is attempted in this study. Current literature studies also tend to focus on the application of plagiarism screening software to humanities courses, rather than for engineering courses requiring technical writing skills. It is possible that student views will vary depending on the type of writing they are assigned. The objectives of this study are 1) to investigate the effectiveness of plagiarism screening software in identifying plagiarism in ChE papers and 2) to identify the attitudes of undergraduate ChE students toward their instructors using plagiarism screening software. The authors note that portions of this material were originally published and presented by the authors at the 2012 ASEE Annual Meeting^[15] as paper #AC 2012-3315.

DESCRIPTION OF STUDY

Plagiarism screening software was applied to four courses in a university ChE curriculum during the Fall 2011 – Spring 2013 semesters: a required junior-level unit operations laboratory course (CHE 330), an elective senior-level unit operations laboratory course (CHE 331), a required junior-level professional development seminar course (CHE 395), and required senior process design courses (CHE 450/451). Students were informed on the first day of class and in course syllabi that their papers were being screened for plagiarism prior to submission. Additional information on the courses and written deliverables assigned in each course is given in Table 1.

All written assignments submitted by students in each course were screened for plagiarism using the plagiarism screening service Turnitin.com, which compares submitted

text against a database containing 1) current and archived internet pages; 2) periodicals, journals, and other licensed publications; and 3) assignments and papers submitted by other students to the Turnitin.com service. Many plagiarism screening software packages are available for use. In particular, Turnitin.com has been shown to be effective in identifying text in written documents matching outside sources while being resistant to technical “tricks” intended to hide plagiarism from the software, such as using Cyrillic equivalents for certain characters to avoid detection.^[15] It is assumed that the actual plagiarism screening software package chosen will not affect student views on use of the software by faculty.

The effectiveness of plagiarism screening software in identifying plagiarism in student reports was investigated by comparing the number of instances of plagiarism discovered in the four semesters prior to using the software compared to the number of instances of plagiarism found by the software during the four semesters the software was utilized. In order to investigate student attitudes toward faculty using plagiarism screening software, a brief questionnaire was given to students on the last day of class for each course. The questionnaire solicited student views on faculty use of plagiarism screening software to determine how ChE students view the use of such software and any resulting effects on student-instructor relationships. The questionnaire appears in Table 2. Students’ responses to Questions 1 – 3 used a Likert scale of 1 – 5, with 1 indicating a strongly negative response

and 5 indicating a strongly positive response. Question 1 was directed toward students’ level of comfort with their instructor using plagiarism screening software. Questions 2 and 3 probed the feelings of students toward continued future use of the software in the class in which they were currently enrolled as well as other courses in the ChE curriculum. Question 4 was open-ended, asking for additional written comments on the use of plagiarism screening software by instructors; this question was used in part to determine additional factors or views not considered when constructing the study.

Due to the period of time data were observed, some students may have submitted survey responses for multiple classes (*e.g.*, a student enrolled in CHE 330 as a junior at the beginning of the study, but also enrolled in CHE 331 as a senior later in the study). With this in mind, not all of the 608 student responses collected in the study were from unique participants.

RESULTS

Impact of plagiarism screening software on number of identified instances of plagiarism

This portion of the study compared the number of instances of plagiarism identified in previous semesters (*i.e.*, when plagiarism screening software was not used) to the number of instances identified in the semesters the software was used. Instances of plagiarism were placed into two categories: “malicious” and “non-malicious.” In brief, malicious plagiarism was characterized by use of a significant amount of text (*e.g.*, multiple sentences) from outside sources with little or no paraphrasing, as well as a lack of citation; these were cases where it was deemed the student(s) were deliberately attempting to pass off another’s material as their own in a malicious fashion. All instances of malicious plagiarism were referred to the Office of Student Conduct for further investigation. Non-malicious plagiarism was characterized by comparatively minor citation problems, such as not paraphrasing to an acceptable extent or not including a citation for a small amount of text; these were cases where it was deemed the student(s) made an “honest” mistake or could benefit from additional instruction on proper citation protocol. Instances of non-malicious plagiarism resulted in a private conversation by faculty with the student(s) involved and further instruction

Question	Text
1	How comfortable do you feel with your instructor using TurnItIn to screen written assignments for plagiarism?
2	Do you agree that the CBE Department should utilize TurnItIn to screen for plagiarism in future [course number] classes?
3	Do you agree that the CBE Department should utilize TurnItIn to screen for plagiarism in all future courses requiring written assignments (<i>e.g.</i> , CHE 330/331, CHE 395, CHE 450, etc.)?
4	Please provide any additional comments on the use of TurnItIn in this course.

Course Number	Malicious instances of plagiarism		Non-malicious instances of plagiarism	
	4 semesters prior to using software	4 semesters using software	4 semesters prior to using software	4 semesters using software
CHE 330	1	2	2	11
CHE 331	0	0	0	4
CHE 395	0	0	0	7
CHE 450/451	2	1	0	8

on citing. These definitions of malicious and non-malicious plagiarism are the opinions of the authors. Non-malicious plagiarism as defined here (such as inaccurate or otherwise “sloppy” citations) can also be interpreted as a significant plagiarism issue depending on instructor perspective. Other faculty may espouse a more aggressive approach, considering even instances described here as non-malicious to be suitable for referral to the Office of Student Conduct, a grade of zero on the assignment, etc.

Instances of identified plagiarism in the four semesters prior to using plagiarism screening software and the four semesters the software was used are compared in Table 3. Data show that application of plagiarism screening software did not significantly increase the number of instances of malicious plagiarism identified in each course, indicating that the “I know it when I see it” approach may be suitable for identifying gross instances of plagiarism. A complicating factor is that during the semesters that plagiarism screening software was used, students were informed in the syllabus and on the first day of class that their papers were being screened for plagiarism prior to submission. This information likely provided additional encouragement for students to avoid malicious plagiarism in fear of penalty, which may in itself be a benefit of the use of plagiarism screening software.

While the number of identified instances of malicious plagiarism was similar regardless of whether plagiarism screening software was used, the number of identified instances of non-malicious plagiarism increased for each class. This was expected since non-malicious plagiarism is typically better hidden within the text and difficult to identify during reading, but is readily identified when using plagiarism screening software.^[1] Although non-malicious instances of plagiarism are not necessarily a severe problem on their own, their presence indicates a lack of attention or understanding by students on proper citation protocol. The identification of non-malicious plagiarism and the resulting private conversation between faculty and student are important teaching opportunities that help students avoid making a similar mistake in the future when the effects of plagiarism may be more severe.

Responses from student questionnaires

Data describing student responses to Question 1 of the questionnaire are given in Table 4. Analysis of variance

(ANOVA) treatment of the data shown in Table 4 shows that the responses of students from each course are the same at a 99% confidence level. This finding implies that students had a similar comfort level with faculty using plagiarism screening software regardless of junior/senior class standing or whether the course was a laboratory, design, or seminar course.

Based on data in Table 4, it can be inferred that students were generally comfortable with their instructor using plagiarism screening software to screen student documents for plagiarism, as evidenced by mean Likert scores for each course in excess of 4.0. This is congruous with selected student responses to Question 4:

- “Please use this [software] to rid the [ChE] program of those who do not deserve the degree that so many work so hard for.”
- “Engineers are all about integrity right? So no one should have problems with this.”
- “Undetected plagiarism only hurts good students.”
- “I think it catches things that the professor might not and will help to make the grades more fair.”

Anecdotally, ChE students seemed to want “cheaters” to be caught, with the argument that honest students work hard for their degree and cheaters do not. However, there were also comments reflecting views of students who were uncomfortable with use of the software:

- “It is uncomfortable to feel like you’re getting analyzed for cheating even if you know that you did not. It makes the student worry that they may get in trouble even if they did nothing wrong and feel as if the department/instructor doesn’t trust them.”
- “This is just another example of the College of Engineering not trusting their students to have integrity.”
- “I don’t want this to turn into some kind of witch-hunt where I have to defend myself for even writing a similar sentence.”

These negative comments reflect the views espoused in other literature on the use of plagiarism screening software.^[13,14] However, in the selected sample of ChE students, these views were in the minority as indicated by the small fraction (<10%) of negative responses from each course. It is suggested by the authors that the focus of this particular ChE department

Course Number	Mean	Standard Deviation	Median	Mode	% of Negative Responses (Score < 3)	% of Positive Responses (Score > 3) Accompanied by Concern
CHE 330	4.20	0.95	4	5	5.9	8.6
CHE 331	4.49	0.79	5	5	2.0	9.2
CHE 395	4.17	0.99	5	4	9.1	18.2
CHE 450/451	4.17	0.95	4	5	6.5	8.9

TABLE 5
Student Responses to Question 2, Regarding Whether Students Agreed That Plagiarism Screening Software Should Be Used in Future Offerings of the Course
 (scored on a scale of 1 – 5, with 1 being strongly agree and 5 being strongly disagree)

Course Number	Mean	Standard Deviation	Median	Mode	% of Negative Responses (Score < 3)
CHE 330	4.11	0.82	4	4	2.6
CHE 331	4.44	0.67	5	5	1.0
CHE 395	3.72	0.84	4	4	7.6
CHE 450/451	4.16	0.81	4	4	3.1

TABLE 6
Student Responses to Question 3, Regarding Whether Students Agreed That Plagiarism Screening Software Should Be Used in Future Offerings of All ChE Courses Requiring Written Assignments
 (scored on a scale of 1 – 5, with 1 being strongly agree and 5 being strongly disagree)

Course Number	Mean	Standard Deviation	Median	Mode	% of Negative Responses (Score < 3)
CHE 330	3.86	0.89	4	4	5.9
CHE 331	4.28	0.82	4	5	3.1
CHE 395	3.64	0.87	4	4	9.1
CHE 450/451	4.07	0.86	4	4	4.5

on ethics throughout the curriculum may inform the more tolerant nature of students' views toward their instructor using plagiarism screening software. Similar views have also been identified in other studies pertaining to non-engineering students.^[17,18]

A considerable fraction of students who gave an overall positive response to Questions 1, 2, and 3 (*i.e.*, their mean score among the questions was greater than 3) also expressed concern in their responses to Question 4, as indicated by the “% of positive responses accompanied by concern” column in Table 4. These responses indicate a notable factor to be considered is the students' confidence in the judgment and discretion of the faculty using plagiarism screening software:

- “I have no problem as long as those who require [the software] know how to interpret the results properly and understand not to just use the match percentage response.”
- “As long as the professors look beyond the match percentage response and look at what Turnitin actually flagged as a match I think the software is great.”
- “It is a good tool for spotting plagiarism but there is always a problem with common information such as dates and figures making the match percentage skewed higher than it should be.”
- “As long as the teacher uses proper judgment on the program I have no problem with the use of plagiarism screening software. I have faith in [this instructor's] judgment.”

A lesson learned from responses to Question 4 is that many

students were concerned about instructors using the software incorrectly, specifically that their instructor would look only at the percentage of matching words in a document, rather than reading the paper and examining the matched phrases individually to determine if plagiarism occurred. The authors posit that it is critical that plagiarism screening software be used as a tool to initially identify matching text, but not to use the percentage of matching words in a document (a value automatically returned by the software) as the sole source of evidence when contemplating academic penalties. Words that match text in other documents but are not plagiarized, such as cited material or output from process simulation software, can raise the match percentage value even though plagiarism has not occurred. Interpretation of the output from plagiarism screening software should be the responsibility of the instructor.^[19] It is recommended that when using plagiarism screening software in a ChE course, faculty should show students at the onset of the course how the software is used and share examples of a writing sample that has a high match percentage but little actual plagiarism so that students understand they will not be accused of plagiarism without proper evidence. Other “best practices” for plagiarism screening software use are discussed later in this paper.

Questions 2 and 3 of the questionnaire investigated whether students agreed that use of plagiarism screening software in ChE courses should be continued; Question 2 was specific to the course, while Question 3 referred to the future use of plagiarism screening software in all ChE courses requiring written assignments. Student responses to Questions 2 and 3 are summarized in Tables 5 and 6, respectively. Responses

TABLE 7
Impact of Previous Plagiarism Screening Software (PSS) Use In CBE Classes on Student Responses to Questions 1-3

Previous PSS use in CBE?	Number of Students	Question 1 Mean	Question 2 Mean	Question 3 Mean	% of Negative Responses (Average Score < 3)
No	364	4.13	4.03	3.85	7.1
Yes	244	4.37	4.31	4.22	2.9

to Questions 2 and 3 indicate that the tested sample of ChE students agreed with continued use of plagiarism screening software in their specific course as well as the broader undergraduate ChE curriculum.

This study was performed over several semesters, so a number of students participated in multiple classes that used plagiarism screening software. In the third and fourth semesters of the study, students were also asked the question, "Have you previously been enrolled in any CBE courses that used Turnitin.com to screen written assignments for plagiarism?" in addition to the questions described in Table 2. Data describing student responses sorted by previous use of plagiarism screening software in CBE classes are shown in Table 7.

Pair-wise hypothesis tests for each of Questions 1 – 3 indicate that student perceptions of plagiarism screening software use by instructors improve after previous experience with the software at a 95% confidence level. There is also a reduction in the percentage of negative responses from students after an initial experience with plagiarism screening software. This conclusion is congruous with findings by Liberatore that showed that student approval of online homework (an analogous digital tool to plagiarism screening software) improved after an initial experience.^[2] It is posited that students are initially wary of the use of plagiarism screening software by instructors, but their concerns are mitigated once they observe the fairness with which instructors use the software (and after they successfully complete courses without incident).

BEST PRACTICES FOR INSTRUCTORS

Based on the authors' experiences using plagiarism screening software in undergraduate chemical engineering courses, the following "best practices" for instructors using the software are suggested:

- *Be transparent. Let students know in class that you are using plagiarism screening software to screen their documents for plagiarism, and also mention this in the course syllabus. Discuss why you are using the software and highlight the importance of engineering ethics.*
- *It is imperative that instructors personally review highlighted text in each document and examine suspicious matches to avoid inappropriate accusations of student plagiarism. More specifically, a high similarity score does not necessarily mean plagiarism has occurred! It is possible that student names, table of contents entries, salutations, output from software, and common phrases have elevated the similarity score. Be aware that students*

may have had negative experiences with plagiarism screening software due to instructors in previous courses not respecting this issue.

- *Spend a small amount of time in class to show students how plagiarism screening software will be used, along with examples of acceptable/unacceptable student text. It is important to teach students what constitutes malicious and non-malicious plagiarism and is especially critical for international students who may not be familiar with American standards for citing sources. The authors suggest projecting the software output on a screen in the classroom, while showing examples of papers with high similarity scores (but no plagiarism) as well as examples with low similarity scores (with plagiarism). This also shows students you will make an effort to give them fair treatment.*
- *It is an option to allow students to "pre-screen" their papers for plagiarism by enabling them to view the output from the software and then resubmit text, but this is not recommended. Disadvantages include that 1) students may attempt to "sneak" plagiarized materials past the filter and judge text they need to change in order to avoid raising suspicions; 2) students in industry or graduate school likely won't be able to pre-screen their written documents to prevent plagiarism. Students should be encouraged to develop and exercise self-editing skills to ensure proper citation.*

CONCLUSIONS

A study investigating the application of plagiarism screening software in the ChE curriculum was completed. Written assignments from laboratory courses, a professional development seminar course, and senior design courses were screened for plagiarism throughout the Fall 2011 – Spring 2013 semesters using the plagiarism screening software Turnitin.com. When comparing the number of identified instances of plagiarism during the semesters the software was used with previous semesters where no software was used, it was found that malicious (gross) plagiarism was identified with a similar frequency by faculty regardless of the use of plagiarism screening software. However, the number of identified instances of non-malicious plagiarism (such as poor paraphrasing or missing citations for small amounts of text) rose during the semester using plagiarism screening software. Based on this analysis, it appears plagiarism screening software is an important tool to identify when students need additional instruction on paraphrasing and other citation protocol.

Responses to a questionnaire soliciting student views on the use of plagiarism screening software by their instructors were examined. The questionnaire inquired about how comfortable students were with faculty screening written assignments for plagiarism using software, as well as whether students felt plagiarism screening software should be used in ChE courses in the future. Responses showed that students were comfortable overall with instructors using plagiarism screening software and agreed that the software should be used in future offerings of the studied courses; these views were corroborated by written student comments. This finding is in contrast to other literature^[14] that argues students had negative views of faculty use of plagiarism screening software; it is possible this finding is due to the focus of this particular ChE department on ethics throughout the curriculum. A minority of students polled in the study (<10%) had negative views of faculty use of plagiarism screening software; written comments addressing these views centered on students' fear of being unfairly accused of plagiarism and feeling they were not trusted by faculty. ANOVA analysis suggests that student views were similar regardless of class standing or course type at a 99% confidence level. Hypothesis testing indicates that student viewpoints regarding instructor use of plagiarism screening software improved after completing an initial class that used the software.

Questionnaire responses also indicated that students were wary of faculty using plagiarism screening software incorrectly, using only the number indicating percentage of matching words in a document as the basis for plagiarism accusations, rather than by analysis of matched words and phrases. This finding indicates that effective communication of how faculty use the information supplied from plagiarism screening software to students helps resolve student anxiety toward use of the software in the ChE curriculum. A number of best practices for instructors using plagiarism screening software are suggested.

NOTICE

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REFERENCES

1. Batane, T., "Turning to Turnitin to Fight Plagiarism Among University Students," *Educational Technology & Society*, **13**(2), 1 (2010)
2. Scanlon, P., "Student Online Plagiarism: How Do We Respond?" *College Lecturing*, **5**(4), 161 (2003)

3. Carpenter, D., T. Harding, C. Finelli, S. Montgomery, and H. Passow, "Engineering Students' Perceptions of and Attitudes Toward Cheating," *J. Eng. Ed.*, **95**(3), 181 (2006)
4. Park, C., "In Other (People's) Words: Plagiarism by University Students—Literature and Lessons," *Assessment & Evaluation in Higher Education*, **28**(5), 471 (October 2003)
5. Warn, J., "Plagiarism Software: No Magic Bullet!" *Higher Education Research and Development*, **25**(2), 195-208 (2006).
6. D. Cane, "UNC Honor Court Failed to Find McAdoo's Obvious Plagiarism," *News & Observer Online*, available at <<http://www.newsobserver.com/2011/07/17/1349691/mcadoo-paper-case-looks-bad-for.html>>, published July 17, 2011, last accessed Jan. 25 2014
7. Zlomek, E., "B-schools Use Turnitin Software to Crack Down on Plagiarism," Available at <<http://www.businessweek.com/printer/articles/110742-b-schools-use-turnitin-software-to-crack-down-on-plagiarism>>, published April 18, 2013, last accessed Jan. 11, 2014
8. Plagiarism, Copyright, and Publishing Information, Ohio University, available at <<http://www.ohio.edu/graduate/etd/copyright-plagiarism-and-publishing-information.cfm>>, last accessed Jan. 25, 2014
9. Frosch, D., "Court Upholds Dismissal of Colorado Professor," *New York Times Online*, available at <<http://www.nytimes.com/2009/07/08/us/08churchill.html?ref=wardlchurchill&r=0>>, published July 7, 2009, last accessed Jan. 11, 2014
10. Erdly, D., "Ex-Pitt Professor Given Sanctions for Plagiarism," *Pittsburgh Tribune Review Online*, available at <http://triblive.com/x/pittsburghtrib/news/pittsburgh/s_760320.html#ixzz1a7TUL25U>, published Oct. 6, 2011, last accessed Jan. 11, 2014
11. Sutherland-Smith, W., and R. Carr, "Turnitin.com: Teachers' Perspectives of Anti-plagiarism Software in Raising Issues of Educational Integrity," *J. University Teaching & Learning Practice*, **2**(3), 94 (2005)
12. Konstantinidis, A., D. Theodosiadou, and C. Papps, "Plagiarism: Examination of Conceptual Issues and Evaluation of Research Findings on Using Detection Services," *Contemporary Educational Technology*, **4**(3), 212 (2013)
13. Vanacker, B., "Returning Students' Right to Access, Choice, and Notice: a Proposed Code of Ethics for Instructors Using Turnitin," *Ethics and Information Technology*, **13**(4), 327 (2011)
14. Clanton, C., "A Moral Case Against Certain Uses of Plagiarism Detection Services," *International J. Applied Philosophy*, **23**(1), 17 (2009)
15. Cooper, M. L. Bullard, S. Peretti, and D. Ollis, "Application of Plagiarism Screening Software in the Chemical Engineering Curriculum," Proceedings of the 2012 ASEE Annual Conference & Exposition, ASEE (2012)
16. Kakkonen, T., and M. Mozogovoy, "Hermetic and Web Plagiarism Detection Systems for Student Essays—an Evaluation of the State-of-the-Art," *J. Ed. and Computing Research*, **42**(2), 135 (2010)
17. Dahl, S., "Turnitin: The Student Perspective on Using Plagiarism Detection Software," *Active Learning in Higher Education*, **8**(2), 173 (2007)
18. Ledwith, A., and A. Risquez, "Using Anti-plagiarism Software to Promote Academic Honesty in the Context of Peer-Reviewed Assignments," *Studies in Higher Ed.*, **33**(4), 371 (2008)
19. Turnitin. "Answers to Questions Students Ask About Turnitin," available at <https://turnitin.com/static/resources/documentation/turnitin/sales/Answers_to_Questions_Students_Ask.pdf>, last accessed Jan. 25, 2014
20. Liberatore, M., "Active Learning and Just-in-Time Teaching in a Material and Energy Balances Course," *Chem. Eng. Ed.*, **47**(3), 154 (2013) □