

# Plagiarism and Technology: A Tool for Coping With Plagiarism

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Cheating is currently one of the major problems in education (Singhal, 1982) and has long been recognized as such in higher education (Davis, Grover, Becker, & McGregor, 1992; Leming, 1978; McCabe, Treviño, & Butterfield, 2001). Research indicates that a high percentage of undergraduate students cheat (Collison, 1990; Jendrek, 1989; Singhal; Stern & Havlicek, 1986; Tom & Borin, 1988) and that this number has increased dramatically over the past 3 decades (McCabe et al.). Cheating is also prevalent among graduate students, with studies indicating that they are as likely to cheat as their undergraduate counterparts (Brown, 1995). Although students believe that there is less unethical behavior in the business world than in the classroom (Buckley, Wiese, & Harvey, 1998), two studies found a strong relationship between the severity of academic dishonesty among students who were undergraduates and the severity of dishonesty later when these same students were in the working world (Nonis & Swift, 2001; Sims, 1993). Thus, academic dishonesty has far-reaching ramifications beyond the field of higher education.

Our purpose in this article is to address the issue of plagiarism, a category of cheating that researchers suggest has increased over the past 2 decades (Ashworth, Bannister, &

**ABSTRACT.** In this study, the author evaluated an online plagiarism detection system to determine whether (a) it would be practical to use in an academic setting and (b) it would have an effect on student plagiarism. The author analyzed graduate student papers for plagiarism over the course of 5 semesters. Students in the last 3 semesters plagiarized significantly less than did students in the 1st semester, suggesting that students' awareness of the system and its use by the instructor may have acted as a deterrent to plagiarism. Results showed that the system was a viable means to detect and discourage plagiarism in an academic environment. The author provides conclusions, limitations, and recommendations for faculty use of a plagiarism detection system.

Thorne, 1997; Larkham & Manns, 2002; McCabe et al., 2001). In part, this increase in plagiarism is related to students' greater knowledge of and familiarity with information systems, the Internet, online electronic information sources, and the ease with which information can be downloaded and used (Ashworth et al., 1997; Campbell, Swift, & Denton, 2000). Although some researchers appropriately suggest teaching and assignment methods to combat the ubiquitous availability of plagiarized material (Mello, 2000), there is a paucity of research addressing the use of systems that automate the detection of plagiarism. Thus, it is important to explore the potential of using current

technology to identify and deter plagiarism. To be widely acceptable, these methods must not entail significantly greater time requirements than traditional grading procedures. As such, this study had a dual purpose. First, we wanted to conduct an exploratory study to determine whether the use of an online plagiarism detection system can reduce student plagiarism. Second, we sought to determine whether that system would perform in an acceptable manner in an academic environment.

## Method

We used the Turnitin.com online plagiarism detection system to evaluate graduate student research papers for plagiarism. Students were advised that their papers would be screened for plagiarism by a computer system and that their grades would be reduced if plagiarism was detected. We evaluated papers submitted to the system by using the computer-generated plagiarism reports. We recorded the additional time and effort required to use the system so we could evaluate it at the end of the data collection process.

## Sample

The sample consisted of 129 research papers by college of business graduate

students. These papers were submitted as part of class requirements during 5 semesters from 2002 to 2004 at a medium-sized university in the southeastern United States. Thirty-nine papers (30%) were submitted during the 1st semester, 42 (33%) in the 2nd semester, and 48 papers (37%) in the last 3 semesters.

### Procedures

During the 1st 2 class periods in each semester, we advised students that they would be required to provide electronic copies of their papers for review by a plagiarism program. Also, the syllabi for all semesters contained the following paragraph:

Reports should be submitted on or before the due date *both in paper copy and electronic media* (on a floppy disk or as an attachment to an email). These should be in Microsoft Word format as a .doc or .rtf file. All written material required for this course will be scanned electronically to detect plagiarism.

At the beginning of all semesters, we defined plagiarism and discussed proper documentation requirements related to plagiarism in class. Students in the 2nd and subsequent semesters were advised that the screening program had identified plagiarism in prior semesters and that the involved students' grades had been reduced.

We submitted papers to the plagiarism detection system for analysis during all 5 semesters. The plagiarism detection system search consisted of (a) the Turnitin.com internal database, which includes all material previously submitted to the system; (b) the ProQuest database, which includes a large number of periodicals; and (c) a search of the Internet. We compiled the results of the search into an online report for review within 24 hours. In the first section of each report, we listed all sources of plagiarism found in the corresponding paper, along with the percentage of plagiarized words from each of the sources relative to the total number of words in the paper. These source listings were color-coded and underlined. The next section consisted of a printout of the student's paper with the plagiarized text color-coded and underlined to match the colors for the source listings.

Thus, when it occurred, plagiarism was easy to identify.

We used two criteria to assess the validity of the text that we identified as plagiarized. First, we examined each set of color-coded text to determine whether it was in quotes. If the text was quoted and properly cited, we reduced the percentage of plagiarized words accordingly. Second, we further assessed each set of color-coded text that was not in quotes to determine whether the plagiarism was "meaningfully valid." If not, we reduced the reported percentage of plagiarism again.

Either of two criteria could render the color-coded text to be "not meaningfully valid." First, some of the color-coded text constituted commonly used word groupings. For example, the phrase "To attract, retain, and motivate the employees . . ." is frequently used by writers in the human resource field, including students. Second, some of the color-coded word groupings were true plagiarism from a technical perspective but were judged to be unintended or not meaningful, owing to the context of the student paper and the plagiarized source.

Because of the system's ability to identify every large and small grouping of words that had been published previously, it became obvious that assigning a failing grade to a paper containing any plagiarism would not be fair. Therefore, we used the following considerations to develop a graduated system of grading:

1. Evaluating plagiarism is complex; that is, papers contain different degrees of plagiarism, and it is "often difficult to distinguish between poor scholarship . . . or carelessness and deliberate intent . . ." (Larkham & Manns, 2002, p. 346).

2. Some meaningful examples of plagiarism were of an amount that did not overwhelm the effort that the student had put into the paper.

3. Research has shown that students generally perceive many of the typically assigned plagiarism penalties to be unfair and, if students believe that the penalties are unfair, they are less likely to learn from their mistakes (Ashworth et al., 1997).

The moral development of students was another important consideration in the grading process (Colby, Ehrlich, Beaumont, & Stephens, 2002; Guthrie, 1997; Lickona, 1992; Rest, 1993). To enhance moral development, we need to involve students in the learning process with their professors (Ashworth et al., 1997). Students whose plagiarism goes undetected lose the opportunity to practice and improve their research and writing skills (Lupton, Chapman, & Weiss, 2000). Students whose plagiarism is detected tend to become less involved in learning if they perceive the grade reduction resulting from plagiarism to be unfair (Ashworth et al., 1997). Thus, to promote students' moral development, in this study we attempted to grade plagiarism in a fair manner and support and encourage students to remain involved in the learning process.

### Results

In Table 1, we summarize the overall results of screening and evaluating the student research papers for the 5 semesters. We found that nearly 50% of the papers contained some amount of plagiarism. Although we did not find plagiarism in 18 of the 39 papers submitted

**TABLE 1. Amount of Plagiarism by Semester**

Semester	Papers		SD
	No.	Mean %	
1st	39	6.31	11.75
2nd	42	3.31	10.06
3rd	12	1.79	3.25
4th	12	1.83	3.13
5th	24	1.50	2.37

*Note.* Mean % is the mean of the percentage of plagiarized words in each document.

during the 1st semester, the amount of plagiarism in the remaining 21 papers varied greatly, ranging from 5% to over 50% of the words. Moreover, we manually checked every incident of plagiarism identified by the system and found each to be correct.

As we have mentioned, students in the 2nd and subsequent semesters were told that some papers submitted in prior semesters contained plagiarism and that the corresponding grades were reduced appropriately. Thus, students in the 2nd and subsequent semesters may have had a stronger belief that plagiarism would be detected than did students in the 1st semester. If students in the 2nd and subsequent semesters believed more strongly that plagiarism could be detected, the average percentage of plagiarism expected in the subsequent semesters would be lower.

Thus, we performed three *t* tests to examine the differences in plagiarism between the semesters. Because the amount of plagiarism for the last 3 semesters was substantially lower than in semesters 1 and 2, we combined the data for semesters 3, 4, and 5 for analysis. We present the results of the *t* tests in Table 2. Although the percentage of plagiarism found for the 2nd semester was not significantly lower than that found for the 1st semester, the plagiarism during semesters 3, 4, and 5 was significantly lower than that in the 1st semester that the test was used. Finally, the percentage of plagiarism for semesters 3, 4, and 5 was not significantly lower than that for the 2nd semester.

## Discussion

The results of the *t* test did not indicate a significant difference in plagiarism levels between the 1st and 2nd semesters. However, the *t* test between the 1st semester and the last 3 semesters did indicate a significant difference. Taken together, the two *t* tests support the notion that students who hold a stronger belief that plagiarism will be detected may be less likely to plagiarize. The average plagiarism in the 2nd semester reflects what may be considered a transition phase, during which some of the students may not have been convinced that the plagiarism detection

system would be able to detect all cases of plagiarism. The subsequent reduction in the last 3 semesters may indicate that, in general, the students were convinced. This finding supports the argument that using a credible method to detect plagiarism in a university classroom setting can reduce plagiarism.

As mentioned, the amount of plagiarism found in this study may be related to the increased opportunities that students have to plagiarize (Leming, 1978; Rawwas & Isakson, 2000), as a result of the emergence of computers, word processing, and the Internet during the past 2 decades (Ashworth et al., 1997). Considering the ease with which prewritten material can be obtained, a program such as the one used in this study has the potential to act as a significant deterrent to plagiarism. Such a step may cause students to conduct their own research and hone their writing skills by summarizing that research.

Students who plagiarize less are more likely to develop the skills needed to complete their writing and research assignments. Thus, they are more likely to become involved in the learning process and may have a greater propensity to develop morally compared with students who avoid becoming involved in the learning process by plagiarizing (Ashworth et al., 1997). We expect that a properly used plagiarism detection system, coupled with a grading system that is perceived by students as fair, would improve students' moral development over time.

A review of the processes used during this study indicates that effective use of such a plagiarism detection system in the academic environment does not require an excessive amount of time. After moving through the initial learning curve, an instructor would require from 2 to 4 hours per semester to complete these tasks. Such a time commitment, like the one that we made in this study, is minimal compared with the time that we spent previously conducting manual searches, many of which were futile. However, using the online system to submit files for analysis and to verify the output report for plagiarism did require some instructor time and effort. We had to accumulate and submit files to the plagiarism detection system, analyze the

**TABLE 2. Difference in Amount of Plagiarism by Semester**

Difference	Mean difference
1st vs. 2nd semesters	3.00
1st vs. 3rd, 4th, and 5th semesters	1.66*
2nd vs. 3rd, 4th, and 5th semesters	1.65

\**p* < .05.

resulting reports, and adjust grades according to the results of the analyses. We did not test a feature that allowed students to submit their papers into the system. If we had included this feature, we may have eliminated the time required to accumulate and submit student papers into the system. In summary, the online plagiarism detection system performed flawlessly and met all expectations.

## Limitations

This study, being exploratory in nature, did have some limitations. The potential to detect plagiarism was limited by the number of documents in the detection system's database, a search of ProQuest, and a search of the Internet. Another limitation was that the academic range of the student research papers in this study was limited to topics within the organizational behavior, organization development, and human resource management fields. We made no attempt to validate the results in other disciplines or at other universities.

Finally, we made no attempt to identify ways that could be used to circumvent the system of plagiarism detection. For example, if a person were to submit a previously published article after changing every fifth word in it, would the plagiarism system reveal that the article had been plagiarized? Although the Turnitin.com representative indicated that the system would detect attempts such as this, we did not seek to validate the asserted capability. Despite the fact that additional unidentified plagiarism may exist in the papers that were submitted for analysis, the plagiarism detection system met all

expectations in this study, and we determined that our results were useful and credible.

## Conclusions

Our primary conclusion is that students who have a stronger belief that plagiarism will be detected will be less likely to plagiarize. Concomitantly, students who plagiarize less will be more likely to develop better writing skills, more creativity, and greater self-confidence. In the long run, less student plagiarism may result in higher levels of student moral development.

Second, we concluded that the plagiarism detection system used in this study is a viable means to detect plagiarism in a university setting. Conducting the plagiarism review required minimal additional instructor time. Although the scope of this study was limited to the disciplines previously mentioned, the system's use would be likely to have a greater effect on students' moral development if the system were uniformly applied throughout an entire university. Under university-wide implementation, all written material would be submitted to a plagiarism detection system. Any material that matched material that had been submitted for credit in another course, department, or college in the university would be included in the comparison. Thus, students submitting the same, or a highly similar, paper for credit in more than one class would face a higher probability of discovery. This increased probability of detection likely would serve as a greater deterrent to plagiarism than a partial implementation.

## Recommendations

Although we recommend use of such a plagiarism detection system at the university-wide level, such a system also would have value if implemented in only selected colleges, departments, or classes. However, if implemented on less than a university-wide basis, some students may elect to opt out of classes or programs using the system.

To enhance students' moral development, the instructor should use a plagiarism grading plan that students perceive as fair and easy to understand. For

example, in such a plan the instructor would deduct twice the percentage of plagiarized text from the grade that would have been assigned to the paper if it had not contained plagiarism. Thus, if 5% of the paper consisted of plagiarized words, the grade would be reduced by 10%. Under this grading plan, when the percentage of the plagiarized words exceeds 20%, an otherwise perfect paper would receive a failing grade, assuming that less than 60% is a failing grade.

When using a plagiarism detection system, faculty members should consider the following guidelines:

1. State in the class syllabus that students will be required to submit written materials both in paper and electronic form and that their papers will be screened by a plagiarism screening program.

2. Define plagiarism in class, and use examples to show what constitutes acceptable and unacceptable attribution of sources.

3. Explain grading procedures regarding plagiarism in class.

Faculty members need to be exemplars of institutional values (Guthrie, 1997). This need can be cultivated by involving faculty members in the development and implementation of the policies and procedures related to plagiarism. Students also need to be involved in developing the ability to recognize and avoid plagiarism, to learn cognitive and writing skills, to interpret research in a manner that integrates the ideas of different authors, and expands or extends the extant knowledge in a body of research (Ashworth et al., 1997).

We recommend longitudinal research studies for determination of the causal relationships between student plagiarism, writing and research skills, and the level of students' moral development. Finally, further research should focus on determining whether the use of a system that detects plagiarism can have an effect on the level of moral development among students.

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