AC 2012-3970: 3RS FOR ENGINEERING SCHOLARS: RESPONSIBILITIES, REPERCUSSIONS, AND REMEDIES ASSOCIATED WITH PROFESSIONAL PLAGIARISM

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3Rs for Engineering Scholars:
Responsibilities, Repercussions, and Remedies Associated with Professional Plagiarism

Introduction

To history buffs, Stephen Ambrose is a cultural icon, a "history factory," as *Slate* magazine has characterized him.[1] Until his death nine years ago, Ambrose was a prolific writer, producing nearly a book a year for the past four decades,[2] an engaging, compelling author who has made history live for the average reader. His celebrated *Band of Brothers* is now a cable network mini-series, and his works are used as textbooks in college history courses.

In 2002, however, the Ambrose empire imploded amidst charges of plagiarism that revealed his curious style of writing: he would copy sentences from others, without quotation marks, and add a footnote indicating the source. While Ambrose defended his style as viable because of the footnotes, victim Joseph Balkoski had quite a different interpretation: "The bottom line is, he's giving the reader that impression that the words on the page came out of his mind—but they came out of *my* mind."[2]

Once accusations of plagiarism were validated, others joined the fray: Forbes.com, which four years earlier had exposed journalist Stephen Glass' flat-out fabrications in the prestigious *The New Republic*,[3] conducted a preliminary study of Ambrose's works, finding "dozens of passages" in six books that were clearly copied from other works[2] (Lewis); *The New Yorker* reached back into Ambrose's own history and examined his celebrated interviews with Dwight Eisenhower, discovering that Ambrose had met only briefly with the former president, relying instead on information gleaned from Ike's son and others close to the general, despite Ambrose's comments detailing face-to-face meetings with Ike that consumed "hundreds" of hours.[4] While Stephen Ambrose is but one among a number of noted historians who have reluctantly confessed to plagiarism,[5] hundreds of college professors toil away in ignominy, quietly embezzling the intellectual property of those who have gone before. The Ambrose saga is indicative of a much larger problem in academia, one that threatens to undermine the credibility of the professions and poses truly vexing problems for journal reviewers and editors: how to deal with plagiarism on a professional level.

The academic community understands the challenge to add to a discipline's body of knowledge, to generate original ideas, using previously acquired and disseminated knowledge, as foundations for building new perspectives, theories, and models. And what they produce as an extension of prior knowledge makes the world a better place and honors the contributions of their predecessors but only if given proper credit. However, if scholars do no more than regurgitate the words of others, no progress can occur. Those who violate ethical standards by pilfering intellectual property bring shame upon the entire academy and engender distrust in scholarship.

This paper examines professional plagiarism, including background information, a short literature review, authorial and editorial responsibilities, repercussions, the results of an

exploratory survey guided by stakeholder theory and the theory of planned behavior, and potential remedies.

Background

Plagiarism at the professional level and its companions, duplication publication and self-plagiarism, is a problem cutting across disciplinary lines and international borders. From China to Croatia, from Pakistan to Peru, from the Ukraine to the United States, examples abound of college professors from virtually all academic fields accused of plagiarism. Plagiarism—loosely defined as the use of another's words without quotation marks or proper attribution or, worse yet, falsified attribution—is certainly not a new problem. The Internet has proven to be an almost irresistible temptress, luring those under stress and pressure to simply cut and paste, collecting, rather than creating, text. "Plagiarism has never been easier than it is today," declare the sages at Plagiarism.org, a website established by the developers of the plagiarism detection software called Turnitin, to aid both instructors and students.[6]

According to the Institute of Electrical and Electronics Engineers (IEEE), plagiarism is a growing problem, with the number of cases detected in publications more than tripling between 2004 and 2006.[7] *The Journal of Optical Networking,* a publication of the Optical Society of America, similarly notes "a significant increase in the number of duplicate submissions and plagiarism cases."[8]

Recent studies confirm the growing trend: using eTBLAST to search some 7 million medical paper abstracts from the Medline database, University of Texas Southwestern Medical Center researchers reported in *Nature* than some 70,000 displayed disturbingly similar characteristics. They then manually examined 2,600 abstracts and discovered obvious plagiarism in 73.[9] Syed Shahabuddin, Central Michigan University, reports a number of studies that indicate an alarmingly high rate of plagiarism, including an Indian chemist who plagiarized and published more than 70 articles in western journals over a three-year period.[10] Cokol, Ozbay, and Rodriguez-Esteban examined the retraction rates of articles submitted to scientific journals, finding a "significant increase . . . in the number of flawed manuscripts."[11]

Plagiarism literature is littered with disturbing examples. While some of the more publicized cases have involved those in the humanities, sciences, and the social sciences, engineering and technology faculty are not immune to the temptation. For example, in 1999, the *IEEE Communications Magazine* devoted nine editorial pages to detailing the transgressions of a trio of Korean authors who copied passages, equations, and graphics from a doctoral dissertation morphed into a proceedings paper.[12] The editorial also included a letter of apology by the plagiarists, who stated that just one of them committed the deed. While that may be true, the other two authors are certainly complicit in the action, as their names also appear on the article. "Plagiarism," conclude the editors, "is a dirty thing, that can kill people's innovative capability and hurt fair competition in research"[12]

Ned Kock, who teaches management information systems at Temple University, recounts his experiences with confronting a plagiarist; the individual, whom Kock dubs Plag, had copied text and graphics from one of Kock's articles. Kock initially investigated legal avenues and, given the

expense and uncertain outcome, then decided to directly confront Plag and request a formal apology. After a series of email exchanges, Plag amazed Kock by denying the plagiarism, noting the similarities were "coincidental," threatening a defamation suit, and then proposing a course of collaborative research, since "we share some common research interests."[13]

A famous 2006 case at Ohio University involved at least 37 graduate students in mechanical engineering who had plagiarized parts of their master's theses or doctoral dissertations; accusations had been occurring over a 20-year period. One faculty member served as advisor for 11 of the students and, apparently, did not notice obvious similarities between the documents. He, as well as the department chair, was terminated and a third faculty member placed on probation. After a series of hearings, the university exonerated several students but rescinded the degrees of 20 others, allowing the students the option to revise and re-defend their theses.[14]

While plagiarism can affect the individual reputations of professors and institutions, a more insidious effect is on the profession itself. An increase in plagiarism can, as Lewis, Duchac, and Beets suggest, undermine our trust in the fruits of research: "the quality of empirical results, scholarly argument, and the resulting academic theory may be disrupted, deteriorating the fundamental value of academic research."[15]

Rationales

Faculty plagiarize for many of the same reasons that students do: stress, pressure, and time constraints. In addition, the "publish or perish" mentality at some institutions can push harried faculty over the edge: "The temptation of having to spend just a few hours rather than years of work to fulfill a publication quota," suggests Ned Kock, "can be very strong for some."[13]

Plagiarism is a conscious decision, according to Richard McCuen, a process consisting of five steps: "stimulus event," the pressure point, such as tenure; "identification of alternatives," spawned by the stimulus; "information gathering," usually incomplete and/or myopic; "evaluation and decision," the actual decision point accompanied by rationalizations; and "postimplementation assessment," a consideration of the ramifications. Ultimately, McCuen suggests, the decision to plagiarize is a selfish one, a path chosen by an "ethically immature character."[16]

Bulking up a dossier for promotion and tenure can also lead some faculty astray; the temptation to reuse bits and pieces of previous publications and republish in different venues to increase the quantity of publications is not uncommon. "Self-plagiarism" and duplicate publications certainly offer a shortcut; however, it is, as Stephanie Bird notes, deceptive, making a writer seem "more productive than is actually the case."[17] In science fields, duplicate publications not indicated as reprints also make the body of literature related to a certain topic seem larger than it really is, perhaps leading to false conclusions about significance.[18] Because originality is more or less required in scientific publications, duplicate publication runs contrary to an essential precept.[19]

Literature Review

For a behavior so universally and publicly condemned in all avenues of intellectual and creative activity, surprisingly little empirical research is available on the causes of plagiarism and even less on prevention, perhaps because plagiarism is but one behavior related to academic dishonesty in general, a panoply that includes cheating, falsification or fabrication of data or references, redundant publication, and many other acts of unethical or illegal behavior.[20, 21] Empirical studies on plagiarism in engineering journals are negligible; however, the results of studies in other disciplines readily translate to engineering and technology fields and provide valuable insights.

Collberg and Kobourov (2005) conducted a study on a phenomenon referred to as "self-plagiarism." While many argue that the word "self-plagiarism" is a misnomer because plagiarism is the appropriation of another's ideas and words and not one's own, Collberg and Kobourov suggest calling it "textual re-use."[22] Although the study sample was too small to be statistically viable, the authors gathered enlightening comments from the participants regarding definitions, their personal experiences, their concerns about committing this ethical violation themselves, and their assessments of the extent and seriousness of the problem in the computer science discipline. One respondent wrote, "I got a paper to review, looked up some references and found that the paper in hand was more than half a copy of one of the author's own references. I wrote this in my review. There was no PC [program committee] meeting, and I was astonished when the paper was accepted."[22]

Another respondent remarked, "I think it's a problem, yes, but mainly as a symptom of a deeper problem: the superficiality of the methods used to evaluate academic contribution." The authors concluded with this recommendation: "[W]e should hold ourselves to the same high standards as we do our students."[22]

Bretag and Carapiet (2007) examined the frequency of self-plagiarism in Australian scholarly publications, defining the term as "10% or more textual re-use of any one previous publication by the author without attribution."[23] Opinions vary among university faculty and administrators. At one end of the opinion continuum, there are those who defend re-use of a reasonable amount of one's own previous data and verbiage without attribution for several conference presentations and multiple published articles. In contrast, there are those who claim that self-plagiarism presents old research as new, misleading readers. In reviewing 269 published articles by 10 different authors, Bretag and Carapiet found that 60% of the authors had self-plagiarized in at least one paper and called for the academic community to develop "guidelines regarding textual re-use, not just in relation to self-plagiarism, but also in terms of evaluating the originality of the research."[23]

Titus and Wells (2008), on behalf of the Gallup Organization and the Office of Research Integrity (OIR) of the U.S. Department of Health and Human Services, conducted one of the most comprehensive studies of suspected misconduct in biomedical research. The exploration was limited to instances of fraud, fabrication (or falsification), and plagiarism, commonly known as FFP. Of the 2,226 scientists surveyed, 8.6% reported observing 265 incidents of research dishonesty. These included 201 suspected incidents involving 164 principal scientific

investigators, which qualified as actual errant behavior, according to the federal definition of plagiarism: "the appropriation of another person's ideas, processes, results, or words without giving appropriate credit."[24] One of the more important findings was, "Scientists of younger age and with fewer years in the current job are significantly more likely to have observed suspected misconduct."[25]

Enders and Hoover (2004) wrote a frequently cited paper on economics journal editors' beliefs about the scope of plagiarism, the appropriateness of penalties imposed, and the factors involved in editors' decisions to authorize and enforce punitive measures. The authors conclude with three important findings: about half of the editors surveyed believed that the use of another person's idea without attribution was not an instance of plagiarism; only 47% of the editor-respondents would be willing to report an act of plagiarism to the offenders' supervisors; and a majority of editors favored the adoption of a code of ethics for their field of economics in an effort to strongly discourage episodes of plagiarism.[26]

Responsibilities

It is obvious from the literature, including both the limited number of empirical studies as well as numerous opinion pieces, that plagiarism is an affront to the culture of academia. It is also apparent that what constitutes plagiarism is more opaque than transparent, as Michael Davis (2006) explains in his analysis of what he dubs a "gray plagiarism" case.[27] However fuzzy the definition may be, as educators and researchers we all share a common responsibility to safeguard the scholarship of our fields and ensure the authenticity of research.

The ultimate responsibility lies with authors, who, as educated professionals, have an inherent "higher duty to veracity," according to ethicist John Kultgen.[28] Authors have a duty to conduct and report research honestly and thoroughly, without fabricating or adjusting data to confirm preconceived hypotheses and without undue influence from affected outside parties. In some fields, data fabrication can result in the release of potentially dangerous products, as in the recent case of Scott Reuben, who produced and published a dozen bogus studies for Big Pharma. Reuben's clinical "studies" of Celebrex, Vioxx, and Bextra, which involved no patients, were subsequently used by the FDA in its drug approval process, and two of the three drugs have since been withdrawn from the market due to deleterious side effects that should have emerged in reliable clinical trials. Reuben received $420,000 from the drug companies for his efforts and now faces a hefty fine and jail time for health care fraud.[29, 30]

Authors also have the responsibility to give due credit to sources, both language and concepts. Borrowing the language of others is problematic only if authors do not properly punctuate quotations and cite sources. Borrowing concepts, however, is a grayer area, especially in some engineering fields. In software engineering, for example, reuse, that is, "the use of previously acquired concepts or objects in a new situation," is quite common and results in "increasing productivity, saving time, and reducing [the] cost of software development."[31] Professional organizations and publishers can become more proactive by offering guidance to authors on what constitutes acceptable reuse.

Other issues involving author responsibilities include order of author lists, based on contribution; international aspects involving writers who may be unfamiliar with western concepts of plagiarism; and, especially notable in engineering fields, collaborative work and appropriate attribution.[32] Avoiding the temptation to co-opt the work of graduate students is also an issue. Authors who follow the dictum of "giving credit where credit is due" should apply that to their graduate students as well as professional colleagues.

Peer reviewers are often a journal's first line of defense against plagiarism. Subject-matter experts, ideally, have the ability to recognize previously published material due to their knowledge of the field. Elsevier's Liz Smith, who heads the health and science publisher's journal development division, states, "Peer reviewers play a crucial role in helping identify cases of fraud and plagiarism."[33] Peer review is a tried-and-true system, judging by its longevity. Ironically, studies examining peer review effectiveness indicate that experience actually breeds ineptitude: "92% of peer reviewers deteriorated during 14 years of study in the quality and usefulness of their reviews (as judged by editors at the time of decision)."[34] A 2009 international study of more than 4,000 reviewers and authors reveals that while 81% of study participants think that detecting plagiarism is part of a reviewer's role, only 38% believe that they are able to do so.[35]

Because plagiarism is a growing problem, peer reviewers should be responsible for more than cursory comments on content and writing style; they should also investigate sources to verify authorial honesty, provided they are given access to the online tools necessary to accomplish this. This additional responsibility for volunteer reviewers might necessitate an incentive, for example, recognition in the journal, for devoting extra time to the review task.

Journal editors have the primary responsibility of ensuring the integrity of the peer review process as well as that of the entire publication. Accusing an author of plagiarism is an onerous task, and announcing it in a public arena is even more difficult. In a thoughtful commentary, Michael Grossberg, former editor of the *American Historical Review*, responds to a number of embarrassing public plagiarism scandals involving well-known historians. His remarks, however, apply to virtually any academic field that seeks to establish and maintain a credible body of scholarship:

> We must [attempt to identify and prevent plagiarism] to ensure that we all work within a common set of ethical standards as we write, teach, and edit. We must do so because ethical misconduct such as plagiarism is an offense against our entire community that undermines our scholarship and our teaching. And we must do so despite the difficulties and complications, because ultimately the only effective solution . . . is a renewed commitment to collective vigilance and collective action.[36]

Repercussions

Universities and professional journals vary widely in their responses to charges of professional plagiarism. Most, if they decide to press forward, include an initial investigation via a formal hearing, a publications committee, or editorial intervention. If allegations are verified,

disciplinary action may follow, dependent on institutional policies, the severity of the charges, and the position of the faculty member.

University sanctions tend to follow policies in place for ethics violations, since plagiarism is, at heart, an ethics issue. Sanctions may range from salary reductions and demotions to tenure denial and termination, as well as other prohibitions. To avoid legal entanglements, university policies must be transparent and fully detailed in the faculty handbook.[37]

Faculty plagiarists can receive very light "sentences," especially considering the draconian measures typically applied to student plagiarists. In 1996, for example, a University of Chicago historian published, under his own name, a book review actually written by a research assistant. He was merely barred from teaching graduate courses and advising graduate students for five years but was allowed to continue teaching undergraduate classes.[38] A University of Florida professor was suspended for five years but retired shortly after the case was settled. Even though he had confessed his plagiarism months earlier to his department chair, it wasn't until after a newspaper article appeared that the university took action.[39]

Depending on the extent of the plagiarism, perpetrators may be sued for copyright infringement. As Louisiana State University law professor Stuart P. Green explains, plagiarism is not really theft, in a legal sense but rather constitutes a breach of the "norm of attribution," which may deprive the original creator of property—royalties or acclamation. It may also violate the legal norm of fair competition. Curiously, though, societal norms differ from moral norms: "People whose internal moral codes would never allow them to walk into a store and steal a piece of merchandise apparently think there is nothing wrong with making an unauthorized copy of a videotape or downloading a bootlegged computer program."[40] The legal ramifications of plagiarism are far from clear, adding, perhaps, to a reluctance to pursue charges.

The responses of professional journals also vary widely, ranging from silence to precise policies that detail specific procedures, although publishers that do have policies do not always make them available for review on their websites. At one end of the spectrum is the case of Lior Shamir, whose conference paper was plagiarized multiple times. Shamir sent, by his estimate, about 30 emails to various editors, conference organizers, and interested others, including the plagiarists, alerting them of the problem. To his dismay, he received very few responses; one was from a plagiarist who apologized for the "overlap of some sentences," and another was from the editor of the Italian journal that published the plagiarized paper who stated, "The paper has been already published, and I cannot cancel it. I'm sorry for what happened." The experience left Shamir confused and shaken: "Science is based on sharing, and the sharing of results and ideas is protected by strict and well-defined ethics guidelines. If editors allow violating these guidelines, this whole sensitive structure might collapse."[41]

The other end of the spectrum is exemplified by the IEEE, which posts its policies regarding plagiarism and other professional misconduct on its website, in 53 languages; the site also includes a video that details the development of the guidelines as well as FAQs. IEEE acknowledges five levels of plagiarism, depending on the amount of text pilfered and the technique used. These range from "the uncredited verbatim copying of a full paper" or more than 50% of a paper to quoting short passages and omitting quotation marks.[42] Actions on verified

cases, including those involving unacknowledged self-plagiarism, depend on the severity of the offense and range from letters of apology from the plagiarist to the victim and the journal editor to prohibitions of publishing in IEEE publications for up to five years.[43]

The case of Thomas Hammons, an IEEE fellow in the United Kingdom, provides an apt example. Hammons published a plagiarized paper in *IEEE Transactions on Power Systems* in May 2006, using materials from six papers presented at a Power Engineering Society meeting the previous year. After inquiry, the society published, as part of its permanent bibliographic record, the following notice: "After careful and considered review of the content and authorship of this paper by a duly constituted expert committee, this paper has been found to be in violation of IEEE's Publication Principles. This paper is a near duplication of the original text from the papers cited below. The original text was copied without attribution and without permission."[44] Following the statement is a list of source articles, as well as a reprint of Hammons' plagiarism, including his picture. While this may seem somewhat humiliating, it is important to note that Hammons is a repeat offender.

Other journals, after confirming plagiarism, may contact the author's academic supervisor to report the incident. The plagiarism policy for the Association for Computing Machinery, for example, clearly states that in cases of copying without citation, the ACM "will inform the Department Chair, Dean, or supervisor of the authors."[45] Obviously, this may have detrimental effects on an instructor's career, in addition to any other publication sanctions imposed by the journal.

Empirical Study

Due to the paucity of empirical studies available on plagiarism, the authors developed two online surveys, one for faculty and another for journal editors, to gauge the current climate and level of concern regarding plagiarism in the fields of communication, psychology, engineering (including engineering technology and engineering education), technology, and biological sciences. A theoretical overview, survey methods, procedures, and results are reported below. The following theory section provides a framework for the study.

Theoretical Reflections

The few studies in the literature examining theoretical perspectives of plagiarism have focused on ethical and social psychological models. Gotterbarn, Miller, and Impagliazzo (2006) describe a dual framework of theoretical explanations for plagiarism occurring in journal articles, focusing on deontology to analyze plagiarism as it relates to duties between stakeholders.[46] Kaptein and Wempe (2011) summarize this duty-based ethical perspective simply: "Deontological ethical theories regard the action itself as the object of moral evaluation."[47] In other words, the act of plagiarism is a violation of absolute obligations to the academic community, including journal subscribers, the original author, the journal itself as copyright holder and beneficiary of the ranking and reputation that accrue from excellent scholarship, the editor, and the publisher. The editor and publisher are also obligated to these same stakeholders in the detection and prevention of plagiarism. Kaptein and Wempe explain this form of duty as a social contract.[47]

Gotterbarn et al. (2006) also apply a consequentialist-based theory, utilitarianism, to the analysis of plagiarism, suggesting that the potential for great loss might be responsible for the purposeful delay in or complete failure of detection. Acting on plagiarism is sometimes seen as a situation fraught with time-consuming investigation and follow-up, legal repercussions, financial costs, and more—a metaphorical stone begging to be left unturned. It is certainly in the publisher's best interests, both financial and reputational, to detect the problem during the review process rather than after publication.[46]

Harding, Mayhew, Finelli, and Carpenter (2007) authored a particularly relevant article about Ajzen's Theory of Planned Behavior (TPB) as applied to cheating among undergraduates in both engineering and humanities. The traditional TPB posits three factors that can influence the intention to behave in a certain manner: the subject's attitude toward the behavior; the subjective norm, or "the individual's perception that other individuals important to the respondent believe the respondent should perform the behavior of interest,"[48] and the subject's perception of his or her ability to implement the behavior.[48] Harding et al. add moral reasoning and moral obligation to the model to account for ethical considerations involved when making a decision at odds with the moral expectations of society or culture.

The authors also suggest that prior cheating behavior in high school was a significant forecaster of similar behavior at the university level and that past cheating is related to unethical behavior later in life, echoing two prior studies.[49, 50] The Harding et al. (2007) findings indicate that reports of academic dishonesty were higher among engineering college students than humanities students and that freshmen were more likely than seniors to engage in cheating activities.[48]

One other theoretical construct, which can be loosely mapped onto academically dishonest behavior as it intersects with the enterprise of scholarly dissemination of research findings, is instrumental stakeholder theory.[51] As Jones explains, "instrumental theory establishes (theoretical) connections between certain practices and certain end states. There is no assumption that the practices will be followed or that the end states are desirable." Essentially, it is a business and society theory with an economic dimension. Describing the theory in an academic publication behavior context, the firm (publisher) is "characterized by relationships with many groups and individuals ('stakeholders'), each with (a) the power to affect the firm's performance and/or (b) a stake in the firm's performance." The stakeholders in the scholarly publishing enterprise are the academic community and institutions, the editor, the publisher, the readership of the journal(s), the authors, the reviewers, the journal(s), the company's staff and officers, and any share- or stockholders in the firm, who stand to gain or lose as the value of the firm fluctuates.[51]

A social contract is established between the stakeholders and the firm. Embedded within it are the duties referred to in deontology. Jones summarized the third assumption of the theory by stating, "Firms exist in markets in which competitive pressures do influence behavior but do not necessarily penalize moderately inefficient behavior."[51] These markets could be likened to academic disciplines or perhaps to some other more appropriate scholarly component.

This theory offers much to a discussion of how to deal with opportunistic behavior within academic publishing by suggesting the implementation of cooperative processes despite

sometimes-conflicting objectives, disincentives for bad behavior, and real costs to bear for causing harm to the firm and its stakeholders. The theory could be useful in bringing ethics, efficiency, and integrity back to the academic enterprise—a paradigm that might stabilize and advance the scholarly establishment and its products.

Survey Methods

A total of 245 faculty members in the disciplines of communication and engineering from all over the United States took the online survey with 144 (58.8%) completing it. At the same time, 294 editors of scholarly journals representing the selected fields were contacted individually and requested to take the online survey. Response rate for 100% completion for social science editors was 17% ($N = 25$) of the 145 contacted and slightly lower for hard science editors at 16% ($N = 24$) of the 149 originally contacted.

Faculty members reported an average of 15.7 years of experience as instructors at the college level ($SD = 9.09$, $N = 143$), and editors reported an average of 7.53 years' experience as academic journal editors ($SD = 6.65$, $N = 51$). On a Likert-type scale ranging from "absolutely no problem at all" (0) to "very serious" (6), faculty rated the problem of plagiarism among professional or academic authors as just under "somewhat serious" ($M = 3.80$, $SD = 1.19$, $N = 137$), and editors concurred, reporting the problem to be almost "somewhat serious," ($M = 3.73$, $SD = 1.22$, $N = 48$). Table 1 shows the frequencies and percentages of editors' journals that have plagiarism policies and whether those policies are published on journal websites.

Table 1. *Descriptives for social science and hard science editors on plagiarism policies and display of them on the Internet*

Questions and Responses	Social Science Editors		Hard Science Editors	
Does your journal have a formal policy in place specifically for addressing the issue of plagiarism?	Frequency ($N = 26$)	%	Frequency ($N = 23$)	%
No, we don't think we need one.	9	34.6	4	17.4
We are considering the development of one.	3	11.5	6	26.1
We are in the process of creating/writing such a policy.	0	0.0	3	13.0
Yes, we already have one.	14	53.8	10	43.5
If you do have a plagiarism policy, is that policy posted on your journal's website (either as a downloadable PDF or as a webpage)?	Frequency ($N = 19$)	%	Frequency ($N = 14$)	%
No	11	57.9	8	57.1
Yes	8	42.1	6	42.9

Procedure

For the faculty survey, Enders and Hoover's 2004 study on plagiarism in economics served as a content guide, and email invitations were issued to potential respondents, using listservs

representing the selected fields. The second survey, designed specifically for editors in these fields, was distributed to emails posted on websites of journals representing these disciplines, with 145 emails sent to editors in the social sciences and 149 to editors in engineering (hard sciences) fields. Journals were chosen randomly from a range of top-, average-, and bottom-rated journals from Thomson Reuters' Institute for Scientific Information (ISI) Web of Knowledge Journal Citation Reports and also from smaller, unrated journals published by professional and academic associations.

Measures

Plagiarism Components Scale. Twelve statements about types of behavior that may or may not constitute plagiarism were included in each survey for evaluation by respondents on a 5-point, Likert-type scale ranging from "definitely not" (0) to "definitely yes" (4). A reliability test yielded an alpha co-efficient of .754, and the exclusion of any one or more of the items would not have increased the alpha. DeVellis (2003) considered alphas ranging from .70 to .80 to be "respectable."[52] (p. 95)

Response to Plagiarism Scale. Respondents for both surveys were queried on the appropriateness of five types of actions taken by editors in response to incidents of verified plagiarism: (1) notifying the original author, if possible; (2) notifying the plagiarizing author's department chair, dean, provost, etc. of the infraction; (3) notifying the plagiarist that the journal is banning future submissions because of plagiarism; (4) publishing a retraction statement in the journal indicating plagiarism as the reason (naming the offender); and (5) ensuring that the publisher removes the article (in the case of publication) from all of its online channels and from all future publications. Responses were reported on a 7-point, Likert-type scale ranging from "very inappropriate" (0) to "very appropriate" (6). An alpha reliability test yielded an acceptable .65.

Influence on Response To Plagiarism Scale. Respondents were asked to report their estimations, using a 7-point Likert-type scale (0-6), of the likely influence of each of the following four factors in their responses to a confirmed case of plagiarism: (1) the potential for litigation against the journal and/or publisher by the plagiarist; (2) the potential for the plagiarist to lose his/her job; (3) the potential for the plagiarist's reputation to be tarnished; and (4) the potential for the journal's reputation to be tarnished. A reliability test resulted in an extremely low alpha. According to DeVellis (2003), a score below .60 on a research scale is not acceptable.[52] The test output indicated that the removal of the last item would dramatically increase the reliability of the scale. A new alpha test examined the three items only, omitting the item about the journal's reputation being tarnished, and resulted in a more respectable alpha of .74.

Results

Hypothesis 1. Hypothesis 1 posited that social science editors would be more likely than hard science editors to report higher agreement scores for inclusion of the elements that constitute plagiarism. A Pearson correlation run between the two groups' scores (faculty coded as 0 and editors as 1) on the Plagiarism Components Scale tested this hypothesis, $r = -.048$, $p = .755$. There was no significant difference between the social science and hard science editors. Hypothesis 1 was not supported.

Research Question 1. Research Question 1 queried whether faculty members and journal editors would differ in their views about what constitutes plagiarism. A comparison was made between the two groups' scores (faculty coded as 0 and editors coded as 1) on the Plagiarism Components Scale, this time between faculty and editors' values. A Pearson correlation resulted in a near-significant finding, $r = -.139$, $p = 0.60$, indicating that faculty members found more of the 12 items on the scale to be components of plagiarism and at higher agreement levels than did the editors**.**

Upon review of the raw statistics for faculty and journal editors on the individual items belonging to the Plagiarism Components Scale, the set of scores for the item "Credit not given for using another author's idea is a form of plagiarism" appeared to represent a significant difference. A two-tailed, independent samples *t*-test between the faculty ($M = 3.43$, $SD = .842$, $N = 144$) and editors' ($M = 3.14$, $SD = .935$, $N = 49$) scores on this item indicated that faculty members were significantly more likely than journal editors to evaluate appropriation of another's idea as plagiarism, $t(191) = 2.024$, $p < .05$.

Research Question 2. Research Question 2a queried whether faculty members and journal editors would differ in their views about appropriate responses to plagiarism, comparing the two groups' scores on the Response to Plagiarism Scale. A Pearson correlation between faculty and editors showed no significant difference between the two groups of respondents, $r = -.098$, $p = .186$. Editors were not more likely than faculty to assess the listed responses to plagiarism as appropriate. Research Question 2b asked whether editors in the social sciences would differ from editors in the hard sciences in their views about appropriate responses to plagiarism. Results of a Pearson correlation revealed no overall significant difference between the two groups, $r = -.171$, $p = .268$.

However, the raw data in Table 2 indicated a potential significant difference between the two groups of editors in attitudes about the appropriateness of publishing a retraction notice. A two-tailed, independent samples *t*-test between the scores of social science editors ($M = 4.91$, $SD = 0.95$, $N = 23$) and those of hard science editors ($M = 3.91$, $SD = 1.77$, $N = 22$) indicated that social science editors were significantly more likely than hard science editors to view the publication of a retraction notice as an appropriate response to a confirmed case of plagiarism, $t(31.84) = 2.36$, $p = .022$.

Fascinated by the Titus and Wells (2008) discovery that scientists with fewer years of experience were significantly more likely than more experienced ones to have observed episodes of suspected plagiarism, the authors decided to explore the potential effect of experience on the editors' attitudes toward appropriate responses to plagiarism. A hierarchical regression was run on the Response to Plagiarism Scale, using three centered independent variables thought to have a good probability of sharing in the variance in the dependent variable (see Table 3). The type of editor variable (social hard science or hard science) was entered into Block 1. Block 2 was composed of the years-of-experience variable. After accounting for the contribution of one other independent variable to the variance in the dependent variable (appropriate responses to plagiarism), years of experience was still a statistically significant predictor of the scores on the assessment of which actions were appropriate in response to confirmed cases of plagiarism, $b =$

Table 2. *Statistics for faculty and editors' attitudes about appropriate responses to plagiarism in journal submissions on a scale from 0 to 6 (very inappropriate to very appropriate)*

Response	Faculty (Overall)			Editors (Overall)			Soc. Sci. Editors			Hard Sci. Editors		
	M	SD	N	M	SD	N	M	SD	N	M	SD	N
Notify the original author, if possible.	5.15	1.23	140	5.11	1.13	47	5.08	1.14	24	5.13	1.14	23
Notify plagiarist's department chair, dean, provost, etc.	4.16	1.63	140	3.83	1.49	47	4.00	1.35	24	3.65	1.64	23
Notify plagiarist that you are banning his/her future submissions to your journal	4.70	1.40	140	4.37	1.64	46	4.39	1.47	23	4.35	1.82	23
Publish a retraction notice in your journal naming the plagiarist	4.32	1.56	139	4.42	1.49	45	4.91	0.95	23	3.91	1.77	22
Make sure the publisher removes the article from all of its databases	5.22	1.09	140	4.93	1.24	46	5.04	1.08	24	4.82	1.40	22

-.231, $t(42)$ = -2.17, p = .036. The fewer the years of experience the respondents had, the greater their score on the Response to Plagiarism Scale. The r^2 *change* for experience was .101, indicating a contribution of 10.1% to the variance in the evaluations of appropriate responses after considering the influence of the other variable, a medium-sized effect.

Investigating further, the variable, appropriateness of publishing a retraction notice, was substituted for the Response to Plagiarism Scale as the dependent variable in the regression analysis. Block 1 included only the academic discipline of the editor variable, and Block 2 included only the years of experience variable. After controlling for the social science or hard science category of the editor, the years of experience of the editor remained a significant predictor of the dependent variable, b = -.338, $t(41)$ = -2.48, p = .017. Social science editors and less experienced editors were significantly more likely to find a retraction notice to be an appropriate measure to take in response to plagiarism. The results for both independent variables indicated medium-sized effects.

Research Question 3. Research Question 3a queried the differences between faculty and editors' attitudes toward factors that would influence their judgments regarding appropriate actions to take in response to plagiarism. A Pearson correlation between the two sets of scores on the Influence Scale indicated no significant difference, r = -.087, p = .243. Research Question 3b asked about potential differences between the two separate groups of editors. A Pearson correlation showed no significant difference on their evaluations of which factors would influence their use of specific responses, r = .150, p = .315.

Table 3. *Hierarchical regression of editors' scores on two dependent variables, response to plagiarism scale and on appropriateness of publishing a retraction notice, regressed onto two independent variables, editors' discipline and years of editorial experience*

	R	R^2	$\triangle R^2$	Beta	Sig.†
DV: Response to Plagiarism Scale					
Block 1	.186	.035	.035		
Editor type (social or hard)				-1.414	.343
Block 2	.369	.136	.101		
Years of experience as an editor				-.231	.036*
DV: Appropriateness of Publishing a Retraction Notice					
Block 1	.376	.142	.142		
Editor type (social or hard science)				-.953	.022*
Block 2	.503	.253	.112		
Years of experience as an editor				-.072	.017*

† *Note:* 2-tailed p values; *$p < .05$, **$p < .01$, ***$p < .005$, ****$p < .001$

Discussion

The purpose of this investigation is to extend the understanding of professional plagiarism beyond the simple descriptions and admonishments expressed in so many academic journal editorials. Reviewing the literature provides a full appreciation of the scope of the problem, the inconsistent penalties and treatment of perpetrators within and between disciplines, and the half-hearted efforts at deterrence. Beginning with the premise that editors of journals come chiefly from the ranks of faculty, the authors of the current study felt compelled to look into the attitudes of both groups and how they might differ in regard to what constitutes plagiarism, what responses are appropriate, and what factors might influence their judgments about how to respond. Further, it seemed even more plausible that there might be significant differences between those in the social sciences and those in the hard sciences.

One analysis found marginally significant disagreement between faculty and editors on their beliefs about the specific behaviors that should be deemed as plagiarism. Faculty members identified more of the listed behaviors as plagiarism, making them more stringent than editors. This could be due to the frequency with which faculty encounter plagiarism in their students' work. Routinely seeing this behavior might render them less tolerant and more likely to categorize more acts of general academic dishonesty as, simply, plagiarism. Another plausible explanation could be that faculty members are not as well trained as editors in the finer points of academic dishonesty. For instance, 28.9% of faculty respondents indicated that the act of citing an author in the text without including the reference in the bibliography is either probably or definitely plagiarism, whereas just 14.2% of editors felt this way. According to most definitions of plagiarism, this behavior is more likely to be an oversight, not plagiarism. In another example,

43.4% of faculty respondents felt that adding names of co-authors who had nothing to do with researching or writing of the paper is either probably or definitely plagiarism. In comparison, only 32.6% of editors thought that this would probably or definitely qualify as plagiarism. This act probably would be thought of as fraud, not plagiarism.

One of the most striking findings is the significant difference between faculty and editors' evaluations of whether using another person's idea without attribution is plagiarism. As noted earlier in this paper, faculty members were significantly more likely than journal editors to evaluate appropriation of another's idea as plagiarism. The presentation of another individual's idea as though it were one's own is at the core of every reputable definition of plagiarism. In addition to other definitions and policies, the website of the ORI at the U.S. Department of Health and Human Services posts the federal definition of plagiarism[31] used for evaluating the academic integrity of all federally funded works. Many universities prudently model their plagiarism policies on this definition. For example, the Massachusetts Institute of Technology policy of academic integrity states, "Plagiarism occurs when you use another's words, ideas, assertions, data, or figures and do not acknowledge that you have done so."[53] Considering that so much research literature appearing in scholarly journals is funded by U.S. government grants, it is truly remarkable and troubling that editors are so uninformed or unwilling to acknowledge that the "borrowing" of another's idea is plagiarism. This result contradicts the supposition that editors might be better trained than faculty in regard to plagiarism definitions.

A critical finding with clear implications for engineering journal policies regarding penalties for plagiarism is that editors in the social sciences were significantly more likely than hard science editors to see the publication of a retraction notice as an appropriate response to a verifiable case of plagiarism, $t(31.84) = 2.36$, $p = .022$. Intrigued by the findings of Titus and Wells (2008), the authors explored the potential influence of years of experience on an editor's assessment of the appropriateness of certain responses. As reported, analysis showed a significant difference: the less experienced editors were more likely to feel that all the responses on the scale, in general, were appropriate, $p = .036$, and social science editors and less experienced editors were more likely to find a retraction notice to be an appropriate measure to take in response to plagiarism.

Limitations and Future Research

The findings reported in this article should be considered in light of several limitations. Although many faculty and editors were invited to participate in the surveys, the response rate was quite low for editors representing journals from both categories of disciplines, resulting in a smaller sample size and lower power levels than desired. And yet, those editors who completed the survey were almost evenly split between the social sciences and the hard sciences. Furthermore, while correlational studies are useful starting points in research, surveys cannot confirm that statistically significant relationships are causal. It is possible, though, on the basis of certain theoretical assumptions, to make some credible, educated speculations about the direction of some few of these associations. One other important limitation that prevented optimal analysis was the inadvertent omission on the faculty survey of an item querying their most appropriate discipline category, i.e., social science or hard science.

These drawbacks, however, do not detract from the overall importance of the study or the findings, and more research is necessary to explore the potential causes of the differences between faculty and editors and between the two types of disciplines. What is it about research and academic writing education in the hard sciences, particularly the engineering fields, that results in perceptual differences about the definition of plagiarism and the consequences for those who engage in it? What is it about inexperienced editors that makes them more amenable than experienced editors to harsher penalties for unscrupulous behavior? What is the strength of the various stakeholder relationships, which might affect how an editor detects, punishes, and deters plagiarism? This study offers fruitful avenues for further investigation.

Remedies

Both the literature and the current survey results indicate a distinct lack of consistency across disciplinary borders in regard to the issue of professional plagiarism, specifically what it is, who identifies it, and which responsive action is appropriate. While various publishers, journals, and professional organizations publish guidelines and/or criteria on their websites, no coherent international approach exists to address the ethical threat that plagiarism poses to scholarship and research. Some have issued clarion calls for action. Iain Chalmers, editor of the *British Medical Journal*, calls for public castigation in an editorial discussing his experience of investigating the flagrant and recurring plagiarism of medical researcher Asim Kurjak: "unless perpetrators face greater sanctions the problem is unlikely to go away."[54] But six years have passed since Chalmers issued his challenge, with no appreciable changes. Clearly, the current piecemeal approach is not working; the problem continues to intensify. In fact, in a 2011 article, Lewis et al. include a list of some 30 professional journals that have published multiple retraction notices in the past decade; journals range from the classic professions of medicine and law to engineering, economics, theology, language, and literature.[14]

Those responsible for creating and detecting plagiarism can implement some short-term measures to help stem the rising tide of plagiarism. To prevent the incipient tsunami, however, more drastic measures are necessary.

Authors, both domestic and international, can further educate themselves about ethical standards and what constitutes plagiarism, especially in those fields where the interpretation is decidedly gray. Anyone submitting to a professional publication should, at a minimum, check the journal/publisher's website for honesty standards, in addition to the standard publication criteria. As an aside, though, we note that among our survey's editor-respondents, only 42.5% of the less than half who even had a plagiarism policy actually posted it to their websites. Publishers should conspicuously publish their codes of ethics.

In writing the article, authors can attend to such simple measures as avoiding the temptation to use pieces of prior publications, not submitting materials already published, being scrupulously attentive to citation and, if the piece includes previously published graphics, obtaining permissions. For non-native speakers submitting to English-only publications, making a friend in the university's English Department has two immediate advantages: enhancing the quality of the manuscript and improving the writer's use of English conventions.

Journal editors and publishers can be more proactive with the peer review process by adding plagiarism checking as a criterion, or by using, as some journals do, anti-plagiarism software to detect potential problems. The IEEE, for example, uses two systems, including one that checks for duplicate publications in a large database and on more than 6.2 billion websites.[55] (IEEEd) While the software packages available certainly have limitations, they are preferable to the current haphazard practice. Public censure of perpetrators, a ban on future publishing, and removal of their works from databases also act as disincentives.

A larger part of the problem, however, concerns the structure of academic institutions and research labs. The pressure to publish for promotion and tenure, as we have seen, is a significant element in a plagiarist's motivation. And fat checks from Big Pharma or other corporate entities are, apparently, irresistibly tempting, leading faculty to conduct specious research, fabricate studies, or sell their names to ghost-written reports. Dealing with these issues calls for a systemic approach, possibly orchestrated through professional societies on an international scale.

While it is beyond the boundaries of this paper to delineate an action plan, the authors do fervently believe that avoiding the issue via an unwillingness to act—out of fear of legal action or certain disinclination to "narc" on one's colleagues—is the wrong direction. It's true that no one wants to be the whistleblower. But that very reluctance allows plagiarism to propagate, taints research, and undermines the work of scholars who conscientiously adhere to ethical standards.

Conclusion

Professionals who plagiarize "make rational decisions to engage in specific behaviors based on their own beliefs about the behaviors and their expectation of a positive outcome after having engaged in the behaviors."[48] It follows, then, that if engineering college students more frequently engage in academic dishonesty than humanities or social science students,[48] and high numbers of engineering and technology faculty are similarly engaged, they are consciously and deliberately calculating the gains of such ethical trespasses as significantly greater than the odds of being caught and punished.[16] As a faculty respondent in this study asserted, "People plagiarize because the benefit outweighs the risk. The roof should fall in on them."

Perhaps they are less fearful of public humiliation because hard science editors are significantly less likely than social science editors to publish a retraction notice in their journals. Possibly, something unique to the hard sciences is giving academics the impression that plagiarism, particularly the "borrowing" of ideas, is either necessary or acceptable. One of our engineering faculty respondents put it this way:

> Typically, unencumbered by the nuisance of academic sensibility, industry folks scoff at the academic obsession with plagiarism . . . until, that is, someone steals their design idea and starts making money and grabbing market share. As engineering educators, our responsibility is to hone the fine line between fair use and theft . . . it is seldom the black & white issue that academics and armchair ethicists assume it to be.

Admittedly, plagiarism can be a gray issue. However, the critical challenge for professionals and academicians in the hard sciences is to refrain from further blurring the lines between fair use,

copyright infringement, and plagiarism and to actively promote and exemplify academic integrity. Responding to the lack of "systematic, comprehensive programs to promote academic integrity . . . in higher education institutions,"[56] Alschuler and Blimling (2005) wrote:

> [T]he mystery is not why cheating is wrong or why students cheat, but why there is so little passion about this massive assault on the highest values of the academy. Why no high profile investigations, and emergency programs to restore academic integrity?[56]

Plagiarists are parasites, establishing their reputations and maintaining their professional lives by cannibalizing their hosts. Or, to use a metaphor more amenable to the *Twilight* generation, "The plagiarist . . . steals the lifeblood of a colleague."[1] But rather than simply transfusing the victim, we need to discover a way to eradicate the leech and revitalize the host.

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