Does the Online Environment Promote Plagiarism?
A Comparative Study of Dissertations from Brick-and-Mortar versus Online Institutions

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Abstract

In recent years, there has been a concern that the Internet has been contributing to a growth in student plagiarism. This paper reports on a study aimed at investigating if there were differences between plagiarism levels in doctoral dissertations submitted by students enrolled at traditional, brick-and-mortar institutions and those by students attending online counterparts. A sample of 368 dissertations written between 2009 and 2013 (184 from traditional institutions and 184 from online institutions) were mined from an online database and uploaded to Turnitin for analysis. A Mann–Whitney U test was conducted on the similarity indices calculated by Turnitin. The test revealed no significant difference between the originality indices of dissertations from traditional institutions and those of dissertations from online institutions. Although dissertations from online institutions were slightly more likely to involve plagiarism, the traditional schools had more extreme cases of plagiarism. Thus, the notion that online education is more prone to plagiarism is not well supported. However, across both institution types, more than half of all dissertations contained some level of plagiarism. Suggestions for future research include a broader study as well as surveys of faculty and students concerning their understanding of plagiarism and how it could be circumvented.

Keywords: plagiarism, doctoral education, online institution, traditional institution, brick-and-mortar institution, thesis, dissertation, research training, ethics, Turnitin

Introduction

Academic misconduct is not a new phenomenon. Plagiarism, specifically, has been prevalent within higher education as long as records of such activity have existed (Grijalva, Nowell, & Kerkvliet, 2006; Postle, 2009). Within the literature there is considerable discussion concerning the negative influence of the Internet with suppositions of dramatic increases in plagiarism and other types of cheating in the online environment. This is especially of concern due to the rapid growth in online higher education since the 1990s (Grijalva et al., 2006; Hart & Morgan, 2010; Lanier, 2006). Several studies have purported that with the volume of data available online coupled with the ease of cut-and-paste features of computers, the Internet provides an irresistibly tempting means to conduct plagiarism (Ackerman & White, 2008; Gilmore, Strickland, Timmerman, Maher, & Feldon, 2010; Grijalva et al., 2006; Lanier, 2006; Logue, 2004; Schiller, 2005; Selwyn, 2008; Townley & Parsell, 2004). Selwyn found that three fifths of students reported plagiarizing online material over a 12-month period. Perhaps exacerbating the speculation of online integrity mayhem is the fact that many students do not recognize the cutting and pasting of source material to be plagiarism (Baker, Thornton, & Adams, 2008). This notion is supported by McCabe (2005) who found that, among a study of 70,000 undergraduate and 10,000 graduate students, 62% and 59%, respectively, of those individuals admitted to inappropriately cutting and pasting material from online sources.

Much of this discussion, however, has been based upon anecdotal evidence or self-report studies of faculty and students rather than empirical data. Moreover, the few quantitative studies that have been conducted comparing cheating in online to traditional courses have shown mixed results. A study of criminal justice students by Lanier (2006) indicated higher numbers of violations of academic integrity

among online students in comparison to traditional learners, albeit the source of the data was self-report by students. In contrast, Hollister and Berenson (2009) compared scores on exams given in person and online and found no statistically significant differences. Further empirical evidence supporting either premise is lacking (Gilmore et al., 2010; Martin, Rao, & Sloan, 2009, Walker, 2010).

Another area with little evidence of the conduct of plagiarism is investigations of indiscretions among graduate students. In light of recent scandals involving plagiarism among doctoral students at Ohio University as well as at various other U.S. and foreign institutions, it appears that more analysis is necessary as the fear that such activity may be rampant has only been reinforced (Martin et al., 2009; Pérez-Peña & Bidgood, 2012; Urquhart, 2011). In response to such concerns, researchers have called for further inquiry into advanced graduate milestones such as dissertations (Gilmore et al., 2010). Moreover, additional research has been noted to be necessary in comparing online and traditional courses and associated student work to identify differences, if any, that may exist (Hart & Morgan, 2010; Hollister & Berenson, 2009).

Plagiarism Defined

There is a wide range of definition or categorization of plagiarism. Some sources indicate a very clear division between the fair and the unethical use of text. Others provide more leeway, indicating that there are a variety of levels of plagiarism, while some make distinctions, namely in regard to whether the suspicious reuse of text was intentional or conducted out of ignorance of proper citation methods or inability to properly paraphrase (Batane, 2010; Walker, 2010).

Objective Definitions

According to the *Merriam-Webster Dictionary*, the verb *plagiarize* is given the following descriptions ("Plagiarize," 2014):

- to steal and pass off (the ideas or words of another) as one's own; use (another's production) without crediting the source;

- to commit literary theft; present as new and original an idea or product derived from an existing source.

The dictionary definition is very clear that the conduct of plagiarism is stealing or theft of work. Moreover, the attempt to pass another's work as one's own is unmistakably a requisite piece of the characterization. The definitions of *steal* and *theft* (see "Steal," 2014; "Theft," 2014) provide the connotation of intention of wrongdoing, thus, the true nature of plagiarism could arguably require maleficence or premeditation. Yet Babbie (2009) explicitly illustrated that copying, regardless of intent, is considered plagiarism. Along similar philosophies, Lanier (2006) stated that plagiarism is a form of cheating. Ercegovac and Richardson (2004) noted that the act of plagiarizing included the improper or lack of acknowledgement of use of material regardless of the media, including intellectual property and copyright. Some descriptions of plagiarism denote the types of activity necessary to be considered such an offense. Common descriptors include *cut and paste* as well as *mouse-click copying* (Auer & Krupar, 2001; Schiller, 2005). Howard (2009) uses the term *patchwriting* to describe a situation in which an author copies "from a source text and then deleting some words, altering grammatical structures, or plugging in one-for-one synonym-substitutes" (para. 1), though she does not consider such as plagiarism unless it involves intentional deceit.

Subjective Definitions

The exigent literature often is less clear about the delineation of what is considered plagiarism. Selwyn (2008) and Batane (2010) divided plagiarism into levels of severity – for example, "legitimate research" to "high-scale plagiarism" (p. 6). Even these categorizations vary from researcher to researcher. Batane purported that any work with more than 1% overlap should be considered to have plagiarized material. iParadigms (2013), creators of the Turnitin plagiarism detection software, divided findings into color codes with blue (no matching text), green (one word to 24% match), yellow (25% to 49%), orange (50% to 74%), and red (75% to 100%). Yet in light of the findings of Allan, Callagher, Connors, Joyce, and Rees (2005), such ranges were determined to be an unreasonable standard due to common language typical in academic papers, conventional phrases, formal nouns, and other sentence structures. Blackboard (2007) promoted a more liberal scale with less than 15% being considered legitimate research, with those with 15% to 40% in need of further review, and those with over 40% most likely to contain plagiarism. Following the recommendations of available research, a minimum threshold of 10%

text overlap was deemed a more reasonable threshold to be considered plagiarism. This was advocated to ensure that false-positive cases of plagiarism would be minimized and so as not to overstate the level of academic delinquency (Allan et al., 2005; Bretag & Mahmud 2009a, 2009b; Ison, 2012; Martin, Rao, & Sloan, 2011; Teesside University, 2013).

Additional descriptions of the nature of the plagiarism have been used in existing research. Walker (2010) described the type of text copying as either "sham" or "verbatim." Sham was defined as "citing a source for the material but presenting it as own paraphrase when it is copied verbatim" while verbatim was "copying material verbatim without citing the source" (p. 45). A third type, purloin, is also described by Walker, defining it as the copying of material from previous work from students previously participating in the curriculum. Through the premises made by the author, "sham" was generally viewed as a citation or writing error versus verbatim which insinuated a more serious or intentional transgression. Other authors purport a difference between "intentional" and "unintentional" plagiarism, albeit most admit it is difficult, barring admission by the offender, to determine whether or not the copying of text was by accident or deliberate (Auer & Krupar, 2001; Batane, 2010; Howard, 2009; Schiller, 2005; Selwyn, 2008).

The Temptation of the Internet

A wide range of the existing literature purports that there has been significant, negative influence on the rate of plagiarism due to the Internet. Auer and Krupar (2001) noted that "the proliferation of paper mills, full-text databases, and World Wide Web pages has made plagiarism a rapidly growing problem in academia" (p. 415). Some literature explicitly describes how something has changed in the way individuals copy text in the digital age:

> Until recently it required some effort and skill to plagiarise, but the advent of word processors and computer networks change the environment in which plagiarism occurs and "makes plagiarism easier to execute and harder to detect" (Martin, 1994). Huge and ever-growing mountains of material can now be obtained around the world at the touch of a button. Cutting and pasting a few sentences, paragraphs or even whole works is comparatively easy and requires little skill or imagination. The World Wide Web has given students and academics the opportunity to plagarise and to publish by allowing almost limitless journeys into cyberspace. (Logue, 2004, p. 41)

Speaking of students using the Internet, Ackerman and White (2008) indicated that while plagiarism has been "historically present in brick and mortar classes, [it has] now infiltrated online education" (p. 109). Postle (2009) stated "there is clear evidence that plagiarism is increasing among students in HE [Higher Education], greatly facilitated by access to Internet sources" (p. 352). Directly implicating the Internet as the provocateur of plagiarism, Howard and Davies (2009) declared "in an age when students gravitate to online sources for research – and when tremendous amounts of both reputable and questionable information are available online – many have come to regard the Internet itself as a culprit in students' plagiarism" (p. 64). Placing more blame on the individual than the Internet, Townley and Parsell (2004) identified that "the net may allow those already attracted to plagiarism to steal another's work more efficiently and, more critically, that the breath of the content available online may make disguising such dishonest appropriate far easier" (p. 272). It is important to note that most of these discussions rely on anecdotal evidence or assumptions.

There have been some studies that have been conducted on the prevalence of academic dishonesty in the online environment, albeit limited in number. A study of 80,000 graduate and undergraduate students attending 83 campuses in the U.S. and Canada revealed that an average of 60% had cut and pasted material from the Internet within their academic work (McCabe, 2005). Lanier (2006) conducted a survey of 1,262 university students and found that cheating of all types was more prevalent in the online learning versions of courses. In a study of students at 23 campuses of various sized institutions, 38% of respondents stated they had plagiarized material over the period of the preceding year (Schiller, 2005). In a study of 1,222 undergraduate students in the United Kingdom, Selwyn (2008) found that three fifths of them reported conducting plagiarism using Internet sources over the past year. Citing specific, empirical evidence, Roig (2010) described the recent scandal at Ohio University in which 30 theses and one doctoral dissertation at the University's Department of Mechanical Engineering "were found to contain unattributed verbatim text" ("Graduate Education Implications," para. 2). Further, "a review by two university officials found 'rampant and flagrant plagiarism' by graduate students in the mechanical engineering department" (Powers, 2008, para. 4). According to Gunter Wielage, CEO of the company

that developed the Plagiarism-Finder software, "statistics from established universities show that at least 30 percent of scholarly and academic papers are completely or partially copied from the Internet" (Mediaphor Software Entertainment, 2004, para. 2).

A variety of reasons for the conduct of plagiarism in the online environment is cited in the literature. One is the construct of the online world itself: "the very structure of the Internet allows for the easy storage, manipulation, and reproduction of ideas" (Townley & Parsell, 2004, p. 272). Perhaps fueling the issue, according to Jones (2009), is that "students believe that changing a few words constitutes writing the work themselves and does not constitute cheating [and that] students may not clearly understand that 'cutting and pasting' resources from the Internet is plagiarism" (p. 91). Baker et al. (2008) found that "73% of students consider academic integrity violations such as fabricating a reference list, failing to list all sources in a reference list ... or misquoting a source intentionally to be not serious" (p. 1). In a study cited by Schiller (2005):

> a large percentage of ... students considered anything on the Internet public knowledge that need not be cited. Almost half of those who responded to the survey said they considered "cutting and pasting" from the Internet trivial behavior or not cheating at all. (p. 1058)

It appears that students lack the skills required to evaluate and synthesize the research that they uncover, or are simply too lazy to do so.

The literature clearly notes systemic problems of plagiarism among students at all levels, which go beyond the scope of this study. However, what is of interest is the premise that online coursework is more likely to be subject to the temptation of plagiarism than in brick-and-mortar programs. Unfortunately, there has been little research in this area. Kennedy, Nowak, Raghuraman, Thomas, and Davis (2000) claimed that " because both students and faculty believe it is easier to cheat in a distance learning class ... as the number of distance learning classes increases so will academic dishonesty" (p. 309), yet the empirical research that has been conducted has provided mixed results. Lanier (2006) found "that cheating was much more prevalent in online classes compared to traditional lecture courses" (p. 244). However, Selwyn (2008) found that there was a high correlation between the self-reported incidence of plagiarism online and offline indicating that individuals who might be open to copying text will do so regardless off the educational media used. Hart and Morgan (2010) did not find evidence of a difference in cheating when comparing online nursing coursework to the work completed in the traditional classroom.

Considering the limited number of studies that have been completed on the differences between plagiarism rates in online versus traditional classes, it is difficult to conclude if the Internet and online courses are, in fact, a motivator to conduct plagiarism. Without further inquiry, this cannot be resolved. Numerous researchers have called for additional research in a variety of areas to compare online and traditional educational pathways (Batane, 2010; Hart & Morgan, 2010; Ison, 2012; Lanier, 2006). It is the intent of this study to shed light on this critical area of online graduate education, in particular, the potential for differences between the dissertations produced by online students and those produced by brick-and-mortar students.

Method

This quantitative, comparative study sought to gather data on the prevalence of plagiarism among the most significant of graduate capstone projects, the dissertation. Specifically, this study aimed to compare dissertations produced by students attending a virtual doctoral education program with those attending a traditional, brick-and-mortar institution.

Participants

- *Rationale for sample sizes.* An a priori power analysis using G*Power (a software package developed at Heinrich Heine University Düsseldorf) was conducted to determine the sample size requirements for the comparative analysis. It was determined that a Mann–Whitney U test would be conducted to show if a significant difference existed between dissertations from each type of institution. The minimum sample size for a two-tailed Mann–Whitney U assuming $\alpha = .05$, $1 - \beta = .80$, and a medium effect size ($r = .30$) was determined to be $n = 368$. At the conclusion of the study, all collected dissertations were able to be successfully analyzed by Turnitin and were used in this study. Therefore, there was confidence that the actual power of the statistical analysis would meet the generally accepted minimum threshold of $1 - \beta = .80$ (Cohen, 1992).

- *Online institutions.* One hundred and eighty-four doctoral dissertations were randomly selected from all full-text dissertations published from 2009 to 2013 in the ProQuest Dissertations & Theses (PQDT) database. The collection of dissertations was limited to those from regionally accredited institutions that had a primarily online program focus.

- *Traditional institutions.* One hundred and eighty-four doctoral dissertations were randomly selected from all full-text dissertations published from 2009 to 2013 in the PQDT database. The collection of dissertations was limited to those from regionally accredited institutions that had a primarily on-campus program focus.

Measures

Dissertations were uploaded and analyzed using the Turnitin plagiarism software. Turnitin was selected for a variety of reasons. Martin et al. (2009) advocated for "strictly defining the cheating behavior (plagiarism) and providing a strong criterion variable, Turnitin, which is not susceptible to self-report bias" (p. 48). Turnitin has also successfully been used in an assortment of research on plagiarism (iParadigms, 2010a, 2010b). Moreover, an inquiry into plagiarism detection technology by Scaife (2007) determined that among 11 such systems, Turnitin rated the highest. Lastly, the researcher was most familiar with Turnitin, as they have used the system for several years in an academic setting and in previously published research.

Procedures

Once the sample of dissertations were uploaded to Turnitin, the software was allowed to analyze the documents. Quotations, bibliographies, and definitions were omitted from the analysis. The initial similarity indices were examined for potential overlaps with work previously submitted by the author at the institution that awarded the doctorate and were subsequently removed if applicable. An Excel spreadsheet was used to track all similarity indices. SPSS was then used to determine descriptive and inferential statistics. Lastly, the dissertation similarity indices were organized into categories based on the recommendations of Bretag and Mahmud (2009b) and iParadigms (2013), with considerations of the studies by Batane (2010) and Walker (2010).

Results

The first step in the analysis process was to examine the data for normality. A Kolmogorov–Smirnov test determined that the data did not fit the assumptions for parametric analysis ($p < .001$). See Table 1 for the results of this test and Figures 1 and 2 for the display of the distribution of the originality indices. Distribution details are displayed in Figure 3.

Table 1. *Tests of normality*

Institution Type	Kolmogorov–Smirnov[a]			Shapiro–Wilk		
	Originality Index	*df*	*p*	Originality Index	*df*	*p*
Traditional	.157	184	.000	.806	184	.000
Online	.127	184	.000	.889	184	.000

[a]Lilliefors significance correction.

The mean originality index for online institutions was 13.5% (*SD* = 7.82). In contrast, the mean originality index for traditional institutions was 15.2% (*SD* = 12.82). The Mann–Whitney *U* test indicated that there was no significant difference between the originality indices of dissertations by students at online institutions (*Mdn* = 12) and those of dissertations by students at traditional institutions (*Mdn* = 12), *U* = 16758.500, *p* = .865, *r* = .01.

Plagiarism categories presented by Bretag and Mahmud (2009b) and iParadigms (2013) were used to categorize findings. Of the dissertations from traditional schools, 43% contained little or no evidence of plagiarism (≤ 10% similarity index). For the low-level similarity index range (11% to 24%), 39% of these dissertations fell into this category. For the remainder of the dissertations analyzed, the scales defined by iParadigms (2013) were utilized.

Slightly more than 17% of dissertations fell within the admonitory yellow (medium) category (25% to 49% of similarity). Less than 1% of the traditional sample showed evidence of high levels of evidence for plagiarism (papers fell in the orange range [50% to 74% similarity] or the red range [≥ 75% similarity]) (iParadigms, 2013).
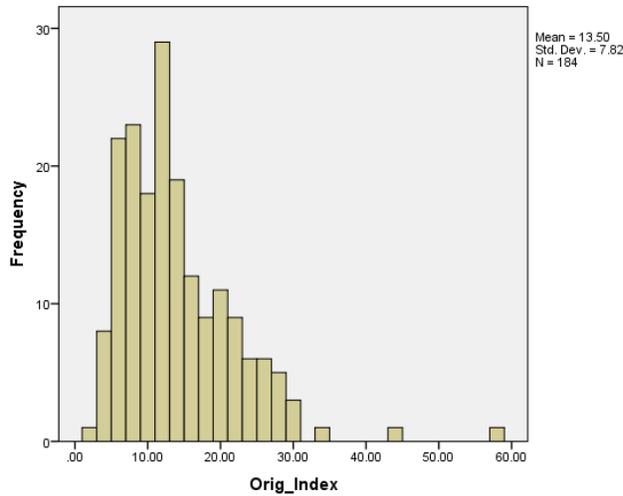
Figure 1. *Distribution of originality scores for dissertations from online institutions*
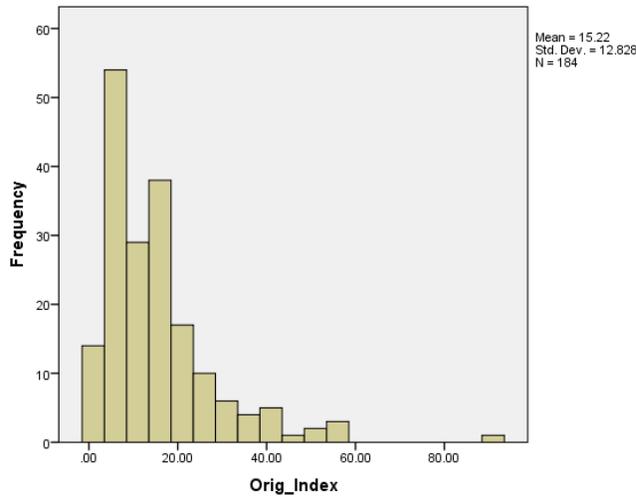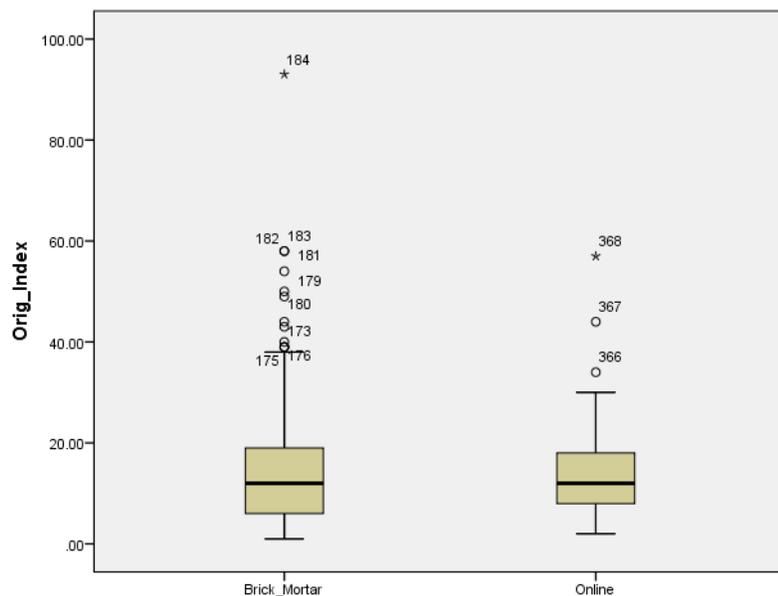

Figure 2. *Distribution of originality scores for dissertations from brick-and-mortar institutions*

Note. A circle indicates an extreme score and a star indicates an outlier.

Figure 3. *Distribution of originality indices (left – traditional; right – online)*

For online institution dissertations, 39% showed little evidence of plagiarism, 51% fell into the low-level plagiarism (11% to 24%), 10% had medium-level plagiarism, and only one paper (> 1%) can be considered to be in the high-level category. See Table 2 for a comparison of the data.

Table 2. *Comparison of similarity indices: Traditional vs. online*

Institution Type	None	Low	Medium	High	Total Plagiarism
Traditional	43%	39%	17%	1%	57%
Online	39%	51%	10%	1%	61%

The Marascuilo procedure was conducted on the percentage of plagiarism levels as indicated in Table 2. The Marascuilo procedure enables you to make comparisons between all pairs of groups within a chi-squared analysis (Prins, McCormack, Michelson, & Horrell, 2012). None of the pairs reached the critical values of the test, however, there was a mild, albeit not statistically significant, difference between institutional type at the low level of plagiarism.

Discussion

Considering the suggestions from the research literature, the fact that there was no statistically significant difference in the level of plagiarism between dissertations from traditional and online institutions is compelling. There are several potential contemplations. First, the notion that the Internet and online work are more likely to contribute to the instance of plagiarism appears to be unfounded. An alternative explanation could be that students at both traditional and online institutions utilize the same types of sources – that is, online databases and literature – thus plagiarism should be expected to be comparable across institution types. As such, the cutting and pasting of material are equally accessible to both traditional and online students.

What is perhaps more insightful are the details in Table 2. Traditional institution dissertations have a lower likelihood of academic indiscretions in terms of whether or not they may be considered to contain plagiarized material, while there is a higher likelihood of authors of online dissertations to be considered to have plagiarized. It is troubling that more than half of dissertations, regardless of institution type, contain plagiarized material. Traditional dissertations were more likely to contain medium levels of plagiarism than online counterparts. Among traditional dissertations, 17% had medium to high levels and online dissertations had 10% at the same levels. From this perspective, it appears that online learners either are more competent at citing and paraphrasing or simply are less likely to try to borrow text from sources. Although no demographic data was collected, previous research has indicated that online education generally attracts older, more mature learners that are less prone to commit plagiarism. Such counters the argument about the deleterious effects of the online environment and may help explain the distribution of similarity indices.

One concerning finding was the high level of incidence of self-plagiarism, for example, when authors reuse their previous papers, conference proceedings, books, and so forth. Certainly, if this is done with the proper citation and disclosure, it is generally considered acceptable among the research community, albeit if done in moderation. It is clear from the identified text overlaps that the reuse of text is common among graduate students working with their faculty mentors to produce one or more journal articles, or even a book, from their dissertation. The reverse is also true. Several dissertations were extensions of papers written in courses or those submitted to journals in collaboration with their faculty mentors. This seems to be an accepted practice in the graduate learning setting even in light of the fact that dissertations used in this study utilized copyrighted material from journals, without citation, in the final document. These dissertations were published *after* the appearance of the material in academic journals and did not include the appropriate citations. Bretag and Mahmud (2009a) noted that the heavy recycling of research is common. These authors argue that such is detrimental to scientific inquiry with the publication and conference venues being inundated with unoriginal literature.

There are limitations to the findings of this study. The very low effect size ($r = .01$) results in a lower power ($1 - \beta = .05$) of the statistical analysis. This could certainly explain why no difference was noted. However, the low effect size indicates that the performance of both groups is similar (Walberg, 1984). Clearly a much larger sample is needed to make a definitive conclusion concerning the presence of a significant difference between levels of plagiarism at brick-and-mortar versus online institutions. Another limitation was that Turnitin cannot with 100% certainty be capable of perfectly detecting all instances of plagiarism. Also, there may be cases of false positive results, although reviews of the findings in each

case within this research was examined by the researcher to insure errors, such as the inclusion of database information or the lack of the PDF file to have optically recognized text, were removed (Teeside University, 2013).

Conclusion

It is rather disconcerting that more than half of all sampled dissertations had evidence of plagiarism. Yet the perception that online learners are more prone to committing academic indiscretions appears to be unsubstantiated. In fact, contrary to the assumptions in previous research, there were more extreme instances of plagiarism in dissertations from traditional schools, as is clearly evident in Figure 3. Even though this study utilized a sample that was determined to be smaller than desired, the fact that online dissertations had a mean similarity index of 13.5% and the mean originality index for traditional institutions was 15.2% should be a wakeup call for academia. Better instruction on proper citation and paraphrasing is evidently necessary. Moreover, tighter oversight by faculty mentors is necessary to mitigate plagiarism. One would assume doctoral students would be the last individuals who need more education on these procedures however, this is clearly not the case. In addition, the findings of this study show that academia needs to address the issue of self-plagiarism. There is no reason why students are leaving out citations for previous work and publications. Such increased transparency does not degrade the quality or rigor of the subsequent products, in actuality, it does the opposite. It is hoped that this study will prompt discussions among faculty and administration to raise the standards of dissertations, the oversight of their production, and the education students receive on writing, citing, and paraphrasing.

Suggestions for Future Research

The results of this study have uncovered some needs for further investigation that include:

1) repeating the study with a larger sample over a wider timeframe;

2) conducting a larger study of plagiarism among dissertations to include trend data;

3) conducting a survey of doctoral faculty to examine how they address plagiarism, citation, and ethics in graduate students;

4) conducting a survey of doctoral committee members faculty to examine how they address plagiarism, citation, and ethics in graduate students.

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