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TRENDS IN PLAGIARISM

Is plagiarism changing over time? A 10-year time-lag study with three points of measurement.

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Abstract

Are more students cheating on assessment tasks in higher education? Despite ongoing media speculation concerning increased ‘copying and pasting’ and ghost-written assignments produced by ‘paper mills’, few studies have charted historical trends in rates and types of plagiarism. Additionally, there has been little comment from researchers as to the best way to assess changes in plagiarism over time. In this paper we discuss the relative strengths and weaknesses of research designs for assessing changes in plagiarism over time, namely: cross-sectional, longitudinal, and time-lag. We also report the results of our own time-lag study of plagiarism. We assessed self-reported engagement in, awareness of, and attitudes toward plagiarism in three comparable groups of students at the same university on three occasions, each separated by 5 years (2004, 2009, and 2014). The data from our study paints an encouraging picture of increased understanding and reduced occurrence of several forms of plagiarism, with no upward trend in verbatim copying or ghost writing. We suggest that technological and educational initiatives are counteracting the potential for increased plagiarism from online sources.

Keywords: Plagiarism, academic integrity, cheating, ghost writing, trend, time-lag, longitudinal

Recently in Australia (e.g., 2014-2015) there have been several dramatic and shocking reports on serious breaches of academic integrity. A prominent scandal was the discovery of the *MyMaster* paper mill, which provided custom-written assignments, mostly to Chinese-speaking students, at a number of universities across Australia (McNeilage & Visentin, 2014). This was followed by the Independent Commission Against Corruption's (ICAC, 2015) report into accusations of widespread cheating, particularly by international students, in Australia. Soon after, an internal report from the University of Sydney uncovered numerous instances and forms of academic misconduct among students. Among the documented breaches and allegations were instances of ghost writing, fabrication of data, and students employing others to sit exams in their place (Smith, 2015). Of course, such concerns and anecdotes are not limited to Australia and instances of, and responses to, plagiarism remain a serious concern for higher education globally.

Revelations such as those in Australia always raise the question in the media 'Is cheating at university on the rise?'. Such media stories inevitably suggest that cheating has been facilitated by the internet, where students can easily copy and paste electronic content, and make contact with paper mills and ghost writers. However, such stories often neglect the balancing effects that technology has afforded in counteracting academic misconduct (Park, 2003). To be sure, over the past decade the internet has afforded students increased and unique opportunities to engage in plagiarism. By the same token, the internet has also provided significant opportunities for universities and academics to counteract plagiarism with new forms of enforcement and educational interventions.

The balance between the internet facilitating and helping to prevent academic misconduct is akin to a co-evolutionary arms race. In the animal kingdom, as the weapons of hunters (teeth and claws) become more destructive, the defenses of prey (horns and thick hides) improve also (Vermeij, 1992). In the academic world, with the rise of internet communication technology, just as students can more easily find sources to copy and paste, academics can more easily find these sources too to catch the students who copy them (Park, 2003). For example, with the rise of text-matching technology such as *Turnitin*®, unattributed verbatim copying and sham paraphrasing are increasingly difficult for students to pass off as their own work (Batane, 2010). Moreover, internet technologies like Learning Management Systems have provided a platform for delivering educational interventions such as referencing skills mastery tasks, which recent studies suggest increase understanding of plagiarism, improve attitudes regarding plagiarism, and reduce instances of plagiarism (e.g., Belter & Du Pré, 2009; Curtis, Gouldthorp, Thomas, O'Brien, & Correia, 2013; Owens & White, 2013). Thus, it remains an open and interesting question whether plagiarism and cheating are really on the rise in the past decade.

In 2004, along with our, then, Masters student Amanda Maxwell, we conducted a survey of student plagiarism at Western Sydney University (WSU; see Maxwell, Curtis, & Vardanega, 2006, 2008). In the previous year, Park (2003) noted that '[l]ongitudinal and time series data on student cheating are thin on the ground' (p. 478). With this in mind, 5 years later, in 2009, the first author of this paper repeated the survey, with the assistance of another Masters student, to begin to chart trends in student plagiarism over time across similar groups of students (see Curtis & Popal, 2011). Thus, 2014 presented an opportunity to obtain a further 5-year snapshot of plagiarism trends at the same university with a similar group of students. In this paper

we report the data from the 2014 survey of student plagiarism at WSU and compare it with data from similar students from the 2004 and 2009 samples. Before we outline the methods and findings of this study, we believe a slightly broader discussion of design and methodology for examining trends in plagiarism may be helpful for interested readers.

Research Designs for Examining Changes in Plagiarism Over Time

The authors of this paper are both psychology academics. In the field of developmental psychology, the sub-discipline of psychology interested in changes in thinking and behaviour over the lifespan, three basic research designs are employed to examine changes over time: cross-sectional, longitudinal, and time-lag (Hartmann, 1992). These different research designs can answer different questions about changes in plagiarism behaviour over time, but each also has its limitations.

Cross-sectional research designs are the easiest to implement because they involve examining different groups of people at one point in time (Hartmann, 1992). A cross-sectional research design might be employed to answer a question such as: ‘Do current third-year university students plagiarize less than first-year university students?’. The researchers might then survey first-year and third-year students to compare their rates of plagiarism. Limitations of this design include the fact that the students in different years have different educational experiences. It may be the case that the third-years plagiarize less than the first-years, but the design does not allow the researchers to determine whether the same first-years would continue their higher rate of plagiarism in two years’ time when they are in their third year of study.

Longitudinal designs involve following the same people over time (Hartmann, 1992). For example, researchers may examine the plagiarism rates of the same groups

of students as they move from first-year to higher years of study, and even follow students beyond university to examine their ethical behaviour in the workplace.

Longitudinal designs can address interesting questions about the behavioural consistency of a group of students over time, but do not allow for analysis of historical trends in students at the same, or similar, stage in their academic careers.

Time-lag designs assess people of the same age (or, for higher education studies, the same year level) at different points in time (Hartmann, 1992). Thus, were a researcher to ask ‘Are students today plagiarizing more than students 10 years ago?’ a time-lag study could help to answer this question. The researcher would need data on plagiarism from 10 years previously, and would need to repeat the measurement of plagiarism in the same way now. Time-lag designs are limited in that differences between times of measurement may be attributed to various factors that are outside the control of the researchers. Nonetheless, to examine the question of whether plagiarism rates are changing over time, e.g., whether current students plagiarize more or less than students in the past, time-lag designs seem to be the most suitable.

Historical Trends in Plagiarism

Not much seems to have changed since Park (2003) lamented the lack of data charting historical trends in plagiarism. In examining the literature to assess trends in plagiarism we find very few studies that set out with the specific intent of examining such trends. Occasionally, studies incidentally report differences between year levels within a cross-sectional comparison (e.g., McCabe [2005] compared undergraduate and post-graduate students). But, even questions that lend themselves to longitudinal designs, such as links between educational and workplace cheating are typically only

examined cross-sectionally (e.g., Nonis & Swift, 2001). Nonetheless, there are some time-lag studies of note.

McCabe and Bowers (1994) examined data from students surveyed nearly 30 years apart, 1963 vs. 1991, and Diekhoff, LaBeff, Clark, Williams, Francis and Haines (1996) examined data from students surveyed 10 years apart, 1984 vs. 1994. Both of these studies found significantly increased plagiarism in the 1990s, as compared with the earlier data collection. Vandehey, Diekhoff and LaBeff (2007) repeated Diekhoff et al.'s survey another 10 years later, in 2004, and found that rates of cheating had stabilized, albeit after the introduction of an honor code for students. In addition, Curtis and Popal (2011) reported decreases in several forms of plagiarism comparing students 5 years apart in 2004 and 2009. Taken together these studies suggest a historical trend of plagiarism rising from before to after the internet age, but not increasing markedly in recent years.

As important as these studies are in providing some evidence of historical changes in plagiarism rates, with the exception of Vandehey et al. (2007), the other studies only include two points of measurement. As the saying goes, two data points don't make a trend, they make a line. Notably, also, Vandehey et al.'s study covers the historical period before, but not after, text-matching software such as *Turnitin*® came into widespread use.

More recently, Owens and White (2013) assessed plagiarism in a first-year psychology unit twice a year from 2007 to 2011, for a total of 10 semesters of sequential measurement. They reported a significant and sustained downward trend in plagiarism disciplinary cases in that unit; this change was attributed to educational interventions employed over the course of their study. Although this work is both laudable and encouraging, because it tracked a deliberate and sustained intervention, it

is less useful as an organic charting of trends over time. Furthermore, *Turnitin*® text-matching software was in use over the course of the whole of Owens and White's study, which does not provide an opportunity to compare plagiarism rates historically before and after its use. Additionally, this study only examined plagiarism disciplinary cases, omitting any examination the broader range of plagiarism behaviours that students may have engaged in.

Different measurement in different studies limits the utility of those studies and the conclusions that can be drawn from them. For example, although clearly a significant contribution to the literature in terms of charting historical change, Vandehey et al. (2007) only asked students three questions: whether they had cheated on: 1. exams, 2. quizzes, and 3. assignments. Such questions require students to recognize that they acted outside the rules of academic integrity and, therefore, do not assess inadvertent rule breaches where students were unaware that they had cheated.

It is important to recognize that plagiarism and cheating are not unitary concepts, and that engagement in plagiarism and understanding of plagiarism are different things. Illustrating this distinction, Maxwell et al. (2006, 2008) found that more than half of all students had inappropriately referenced paraphrased material, but less than half of the same cohort of students understood that this constituted plagiarism or cheating. Walker (1998) identified seven different forms of plagiarism ranging in seriousness from the felony of stealing another student's work with the intention of secretly copying it (purloining) to the relative peccadillo of failing to reference paraphrased material (illicit paraphrasing; see Table 1). In our study we examined the range of plagiarism behaviours described by Walker, and separated students' engagement in these behaviours from their understanding of them.

Table 1

Types of plagiarism

Type	Definition
Sham Paraphrasing	Material copied verbatim from text and source acknowledged in-line but represented as paraphrased.
Illicit Paraphrasing	Material paraphrased from text without in-line acknowledgement of source.
Other Plagiarism	Material copied from another student's assignment with the knowledge of the other student.
Verbatim Copying	Material copied verbatim from text without in-line acknowledgement of the source.
Recycling	Same assignment submitted more than once for different courses.
Ghost Writing	Assignment written by third party and represented as own work.
Purloining	Assignment copied from another student's assignment or other person's papers without that person's knowledge.

Note. From 'Student Plagiarism in Universities: What Are We Doing About It?' by J. Walker, 1998, *Higher Education Research and Development*, 17, p. 103. copyright © HERDSA, reprinted by permission of Taylor & Francis Ltd.

The Present Study

As mentioned, we conducted surveys of plagiarism at WSU in 2004, 2009, and 2014. These surveys used an anonymous self-report measure where students reported their understanding of various forms of plagiarism, the extent to which they considered these forms of plagiarism to be serious, and the extent of their engagement in these forms of plagiarism.

There were three specific interventions at Western Sydney University between 2004 and 2009 that we believe may be likely to have an effect on plagiarism. First, in 2007 WSU began the phased introduction of *Turnitin*®, this continued into 2009, by

which time its use was widespread, but not universal. Text-matching software such as *Turnitin*®, can reduce plagiarism rates via a formative-educational impact (Rolfe, 2011) and through a deterrent-enforcement impact (Batane, 2010). Second, in 2008, WSU began the phased introduction of mandatory criteria and standards based assessment, which provides students with clear expectations regarding assessment requirements (Thompson, 2013). Sterngold (2004) observed that students may use unclear assessment expectations as a justification for resorting to plagiarism, thus clarifying assessment expectations may mitigate this justification and therefore reduce plagiarism rates. Third, the students we surveyed were exposed to new educational interventions at the unit level. We principally surveyed business students, who undertook a new academic skills unit that commenced after our initial 2004 survey, and psychology students, who completed an on-line mastery module on academic integrity in their first year from 2007 onwards. Both of these interventions may have served to reduce plagiarism rates by increasing students' awareness of referencing expectations. All three changes that occurred between 2004 and 2009, we would expect, would increase students' awareness of plagiarism and decrease rates of plagiarism, and, indeed, this is what Curtis and Popal (2011) found in comparing survey results between those years.

The interventions put in place at WSU between 2004 and 2009 have since been sustained, and, in the cases of both *Turnitin*® and criteria and standards based assessment, expanded. However, *Turnitin*® can only detect matching text from previously-written work and is unable to detect freshly-written work that is not written by the student whose name is on the submitted assignment, i.e., ghost writing. The 2004 and 2009 data suggested a slight rise in the percentage of students who had ever engaged in ghost writing from 2.5% in 2004 to 3.5% in 2009 (Curtis & Popal,

2011; Maxwell et al., 2006). Given the notable media and academic interest in paper mills and other source of ghost writing we were particularly keen in 2014 to see whether this small, albeit non-significant, up-tick in ghost writing continued beyond 2009.

Method

Participants and Sampling Procedures

We compared data collected using an identical survey instrument from students at Western Sydney University at three times of testing: 2004 ($N = 425$; from Maxwell et al., 2006, 2008); 2009 ($N = 147$; Curtis & Popal, 2011), and 2014 ($N = 120$; newly collected for this paper).

In each year, the group of students tested had some differences in their demographic characteristics. Because higher-year students have completed more assessment tasks than early-year students, they have had, over the course of their studies, more opportunities to engage in plagiarism. The measure we used to assess prevalence of plagiarism is particularly sensitive to students' year of study because it asks if they have ever engaged in cheating behaviours that are described in various scenarios. Thus, significant differences in the year levels of students between the samples would distort the results. The original 2004 sample had many more higher-year students (4th-year and postgraduate) than the subsequent samples. Thus, to have more comparable samples, we decided to limit our comparative analyses to data collected from students in 1st-3rd-year undergraduate courses. In addition, a small number of students in 2004 and 2014 were enrolled in majors other than Arts, Psychology, Education, or Business, but none of the 2009 students were enrolled in other majors. Thus, we limited the sample analyzed to students in these majors. These

limitations, in order to have comparable samples, still left the total number of students analyzed in each year of data collection above 100 – samples above 100 are recommended for survey research (de Vaus, 1991). The demographic composition of our student samples that were analyzed are presented in Table 2.

Table 2

Demographics of the student samples analysed, as percentages, by year of data collection.

Year Level, Gender	Year of Survey		
	2004 N = 288 %	2009 N = 119 %	2014 N = 106 %
1 st year	43.4	63.9	47.1
2 nd year	25.3	31.9	23.5
3 rd year	31.2	4.2	29.2
Male	58.2	41.1	18.9
Female	41.8	58.8	81.1

As can be seen in Table 2, the year-level composition of the samples was similar across the three years of data collection (nearly identical in 2004 and 2014). The proportion of female students increased over time. Importantly, we did not find gender differences in our plagiarism measures (all $ps > .05$). In addition, the samples did not differ in average age, 2004: $M = 21.86$ $SD = 4.64$, 2009: $M = 22.18$, $SD = 6.25$, 2014: $M = 21.61$ $SD = 6.06$, $F(2, 511) = .32$, $p = .73$.

In 2004 and 2009 students completed the survey instrument either on paper or online. In 2014 the survey was administered entirely online. In all years the surveys were completed anonymously – no identifying information about students was

collected and they were informed of this anonymity before completing the surveys. In each year the surveys were collected in the early weeks of the second semester of the academic year. This timing of testing was to ensure that most students completing the survey had finished at least one previous semester of university study, thus allowing them to have had opportunities to both learn about and engage in plagiarism.

Materials

The survey instrument used in this research is presented in Appendix A of Maxwell et al. (2008). In the survey, students were presented with seven scenarios that represent the seven categories of plagiarism described by Walker (1998; see Table 1). For each scenario students were asked whether the behaviour described represents cheating, how often they have done a similar thing themselves, and how serious they believe the action to be. Prevalence of plagiarism was indicated by students' responses for each type of plagiarism, i.e., whether they had engaged in a similar action to that described in the scenario, using a 5-point scale from 'never' up through a range of frequencies. From this, we obtained the percentage of students who have engaged in the form of plagiarism described at least once (i.e., all students who selected a response other than 'never'), and a score on the 5-point scale as an indication of frequency of engagement in plagiarism. Understanding of plagiarism was determined by students indicating whether they consider the actions described in the scenarios to be cheating. Responses of 'yes' were taken as showing understanding, and responses of 'no' or 'not sure' were taken as indicating a lack of understanding. Perceived seriousness of plagiarism was measured by students indicating the extent to which they considered the actions described in each scenario as serious using a 3-point scale.

Results

Data Screening and Analysis Approach

Our principal aim was to assess differences between years. Significance of differences between frequencies (e.g., percentages of students engaging in plagiarism) were assessed with non-parametric Chi-square analysis, which does not require normally-distributed data. Significance of differences between continuous scores (e.g., mean ratings of plagiarism seriousness) were assessed using one-way ANOVA, with least-significant-difference post-hoc tests. Before ANOVA analyses were undertaken the data were screened for normality assumptions. The data were sufficiently normally distributed, given the sample size, for these analyses to be conducted reliably.

Prevalence of Plagiarism

We assessed prevalence of plagiarism in two ways: 1. The percentage of students who reported engaging in any form of plagiarism at least once (see Table 3), and 2. The average of students' ratings using the 5-point scale indicating the frequency with which they had engaged in the type of plagiarism described in the scenario (see Table 4). These two methods of quantifying plagiarism have relative advantages and disadvantages. The average score on the 5-point rating scale relies on students' memory of how frequently they performed the action described in each scenario, furthermore, this frequency should be influenced by opportunities to plagiarize, and thus, it would be disproportionately inflated by year level. However, as this measure produces continuous data it is able to be analyzed with sensitive parametric inferential statistics. By contrast, the percentage measure requires analysis with less sensitive non-parametric statistics, but it is less influenced by opportunity to

plagiarize and less reliant upon memory accuracy. Thus, taken together, given the pros and cons, both measures provide a rounded view of prevalence of plagiarism.

Table 3

Percentage of students reporting engaging in the various forms of plagiarism at least once, by year of testing.

Type of Plagiarism	2004 %	2009 %	2014 %
Any Form At Least Once	82.3 _a	74.7	64.2 _b
Sham Paraphrasing	59.4 _a	51.3	47.2 _b
Illicit Paraphrasing	60.8 _a	45.4 _b	34.0 _b
Other Plagiarism	18.1 _a	9.2 _b	4.7 _b
Verbatim Copying	30.2 _a	24.4 _a	11.4 _b
Recycling	28.1	28.6	20.0
Ghost Writing	3.1	3.4	2.8
Purloining	5.9 _a	2.5	0.9 _b

Note: Percentages with subscript _a significantly higher than percentages with subscript _b in the same row, $p < .05$, based on paired Chi-Squared analysis.

As can be seen in Table 3, overall, the percentage of students who engaged in any form of plagiarism was significantly lower in 2014 as compared with 2004. All the forms of plagiarism were engaged in by a smaller percentage of students in 2014 than in 2004. Of these, only two forms of plagiarism were not significantly lower in

2014 as compared with 2004: recycling and ghost writing. However, ghost writing was only engaged in by a very small percentage of students in all years of testing, and therefore there is a floor effect that makes detecting significant falls nearly impossible. Two forms of plagiarism (illicit paraphrasing and other plagiarism) were significantly lower in 2009 as compared with 2004. Only verbatim copying was significantly lower in 2014 as compared with 2009.

Table 4

Means, standard deviations, and one-way ANOVA results comparing prevalence of plagiarism as rated on the 5-point scale, by year of testing.

Type of Plagiarism	2004	2009	2014	<i>F</i> (2,510)	<i>p</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		
Total	1.59 _a (.55)	1.42 _b (.46)	1.24 _c (.29)	21.53	.000*
Sham Paraphrasing	2.28 _a (1.31)	2.01 _b (1.14)	1.65 _c (.84)	11.16	.000*
Illicit Paraphrasing	2.38 _a (1.34)	1.90 _b (1.20)	1.49 _c (.81)	22.11	.000*
Other Plagiarism	1.29 _a (.71)	1.13 _b (.47)	1.05 _b (.21)	7.81	.000*
Verbatim Copying	1.60 _a (1.05)	1.40 _b (.81)	1.14 _c (.43)	10.04	.000*
Recycling	1.45 _a (.84)	1.37 (.65)	1.27 _b (.58)	2.53	.081
Ghost Writing	1.06 (.35)	1.06 (.35)	1.05 (.29)	0.05	.949
Purloining	1.09 _a (.40)	1.03 (.22)	1.01 _b (.10)	2.76	.064

Note: Subscripts indicate significant differences between means in the same row $a > b$

$> c, p < .05$, based on post-hoc least-significant-differences tests.

As can be seen in Table 4, the overall amount of plagiarism, as well as all but one type of plagiarism, was lower in 2014 than in 2004. The only exception was ghost writing, where the decline was not significant. Total mean plagiarism was also lower in 2014 than in 2009 with four of the seven types also being significantly lower. In addition, total plagiarism and four of the seven types of plagiarism were significantly lower in 2009 than in 2004.

What we can see across Tables 3 and 4, looking at both measures of prevalence of plagiarism, is a general trend of decline across the three times of testing, which is mostly significant when comparing 2014 with 2004. Regardless of the measure used, these falls were significant for the global measure of plagiarism (having plagiarized at least once and total mean amount) and for five of the seven forms of plagiarism. Recycling was significantly lower in 2014 than 2004 using the 5-point scale measure but not the percentage measure. Ghost writing was not significantly different between the years, with stable, very low, reported rates of this type of plagiarism.

Understanding of Plagiarism

Table 5 shows the percentages of students who indicated that they believed the scenarios in the questionnaire represented a form of cheating, as well as the percentage of students who correctly identified that all 7 scenarios represented forms of cheating. Much as the prevalence results showed a general trend toward decreasing engagement in plagiarism, the understanding results showed a general trend toward more students identifying the actions described in the scenarios as forms of cheating.

Table 5

Percentage of students who understand that the scenario represents a form of cheating or plagiarism, by year of testing.

Type of Plagiarism	2004 %	2009 %	2014 %
Understand All	4.1 _c	14.3 _b	29.2 _a
Sham Paraphrasing	29.9 _b	58.0 _a	55.7 _a
Illicit Paraphrasing	62.5 _b	78.0 _a	84.0 _a
Other Plagiarism	86.1 _c	95.8 _b	100 _a
Verbatim Copying	94.1	95.0	92.5
Recycling	15.6 _c	26.9 _b	51.9 _a
Ghost Writing	71.5 _b	91.6 _a	91.5 _a
Purloining	95.8	99.2	98.1

Note: Subscripts indicate significant differences between percentages in the same row

$a > b > c, p < .05$, based on paired Chi-Squared analysis.

In all years of testing, both verbatim copying and purloining were understood by most students to be cheating, this created a ceiling effect and there was no significant difference in understanding of these forms of cheating over the three times of testing. For all other forms of plagiarism, and overall, a higher percentage of students in 2014 and 2009 understood them to be cheating than in 2004. The

percentage of students who identified all scenarios as forms of cheating was higher in 2014 than in 2009. Additionally, two forms of plagiarism were identified as cheating by a higher percentage of students in 2014 than in 2009: other plagiarism, and recycling.

Perceived Seriousness of Plagiarism

Table 6

Means, standard deviations, and one-way ANOVA results comparing perceived seriousness of plagiarism, by year of testing.

Type of Plagiarism	2004	2009	2014	<i>F</i> (2,510)	<i>p</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		
Mean of All	2.20 _c (.34)	2.45 _b (.28)	2.68 _a (.24)	97.17	.000*
Sham Paraphrasing	1.58 _c (.64)	1.95 _b (.69)	2.22 _a (.65)	41.40	.000*
Illicit Paraphrasing	1.90 _c (.66)	2.12 _b (.67)	2.62 _a (.51)	51.11	.000*
Other Plagiarism	2.55 _b (.60)	2.85 _a (.42)	2.97 _a (.17)	33.48	.000*
Verbatim Copying	2.57 _b (.60)	2.76 _a (.48)	2.85 _a (.38)	13.09	.000*
Recycling	1.45 _c (.64)	1.66 _b (.72)	2.25 _a (.70)	53.30	.000*
Ghost Writing	2.50 _b (.62)	2.86 _a (.42)	2.88 _a (.38)	28.75	.000*
Purloining	2.87 _b (.36)	2.94 _a (.24)	2.95 _a (.29)	3.43	.033*

Note: Subscripts indicate significant differences between means in the same row $a > b$

$> c$, $p < .05$, based on post-hoc least significant differences tests.

Consistent with reduced prevalence of plagiarism and better understanding of plagiarism, Table 6 shows a general trend toward plagiarism being considered to be more serious over time. All forms of plagiarism were considered to be significantly more serious by students in 2014 and 2009 than in 2004. Three forms of plagiarism were considered to be more serious by the students in 2014 than the students in 2009: sham and illicit paraphrasing, and recycling.

Discussion

This study sought to examine historical trends in plagiarism. To do this, we repeated our survey of student plagiarism with a similar student group at the same university where we had undertaken the survey 5 and 10 years previously. Taken together, the results of this 10-year time-lag study, with three points of measurement, indicate that plagiarism appears to be trending down in general. Consistent with this, both students' understanding of plagiarism and the extent to which they consider plagiarism to be a serious issue both trended upward over the decade.

Our results, while more recent than other time-lag studies, generally compare favourably with the results of those previous studies. In previous time-lag studies of plagiarism, plagiarism was found to either have increased from the initial measurement (Diekhoff et al., 1996; McCabe & Bowers, 1994) or, at best, stabilized (Vandehey et al., 2007). In contrast, the downward trend observed in our data is encouraging, and may suggest that the combination of efforts put in place to reduce plagiarism is having a demonstrable effect.

The only study that we are aware of that showed a recent downward trend in plagiarism over a sustained period (5 years) was that by Owens and White (2013). However, Owens and White's study only measured plagiarism disciplinary cases as

the outcome and was an analysis of a deliberate set of interventions to reduce plagiarism. In contrast, our study examined understanding, perceived seriousness, and prevalence of seven different forms of plagiarism, including low-level engagement in plagiarism that would not necessarily result in disciplinary action and forms of plagiarism, such as ghost writing, that would not necessarily be detected. In contrast to Owens and White's study, our study includes surveys from before and after the application of *Turnitin*®. In addition, although our study did not deliberately track the effect of an intervention to reduce plagiarism, it does allow some speculation on the effectiveness of interventions.

As outlined earlier, several changes between 2004 and 2009, which were bedded down by 2014, may have influenced rates of plagiarism at WSU. As noted above: 1. *Turnitin*® was not used in 2004 but was in 2009 and 2014, 2. Criterion and standards based assessment was introduced (Thompson, 2013), and 3. Educational changes were implemented in psychology and business courses, from where the bulk of our student sample was drawn. Specifically an academic skills unit was added to first-year business and a plagiarism and referencing mastery task was added to first-year psychology.

Other studies have shown that the implementation of text-matching software such as *Turnitin*® can reduce plagiarism (Barrett & Malcolm, 2006). Such software can be used formatively, allowing students to check their work for improper or inadequate referencing before submission (Rolfe, 2011). Moreover, it increases the ability of academics to detect plagiarism and apply penalties for rule breaches. Thus, it is likely to have both an educational and enforcement effect on reducing engagement in plagiarism. A key reason to believe that the use of *Turnitin*® has contributed to the decrease in plagiarism in our study is that we have specifically

observed a significant reduction in the types of plagiarism that are detected by text-matching software (i.e., sham and illicit paraphrasing, other plagiarism, and verbatim copying).

Other educational interventions, too, such as those implemented at WSU, are often successful in reducing plagiarism (Teh & Paull, 2013). Interventions that deliberately teach referencing and other academic writing conventions, such as the academic skills and referencing mastery modules introduced at WSU, typically increase students' awareness of plagiarism while simultaneously either explicitly or implicitly delivering to students the message that plagiarism is to be taken seriously (Curtis et al., 2013).

As we noted earlier, students may plagiarize if they feel that assessment expectations are unclear (Sterngold, 2004), but widespread availability of pre-assessment criteria-and-standards-based grading rubrics may significantly aid students' understanding of assessment expectations (Thompson, 2013). However, apart from the previous comparison of our 2004 and 2009 results (Curtis & Popal, 2011), we are aware of no other evidence that a systematic institution-wide implementation of criteria and standards based assessment may help to reduce plagiarism. Thus, targeted and specific further evaluation of the effect of such interventions on plagiarism is warranted.

As we noted at the start of this paper, there has been significant recent concern that the internet has facilitated plagiarism. As Park (2003) did before us, we argued that the internet provides both opportunities for students to plagiarize, but also for universities to detect plagiarism and to educate students about academic integrity more effectively. Online mastery tasks (e.g., Belter & du Pré, 2009) allow academics to teach students about referencing conventions and *Turnitin*® allows such breaches

to be detected. Thus, it could probably be expected that we found increased understanding of internet-detectable forms of plagiarism such as sham and illicit paraphrasing and reduced prevalence of these forms for plagiarism. Optimistically, and importantly, in addition to the reductions in the teachable and detectable forms of plagiarism, we found no significant corresponding increase in students' engagement in relatively-undetectable forms of plagiarism, specifically, ghost writing.

Limitations

This study makes a unique contribution to the literature on historical trends in student plagiarism. It covers a 10-year period, before and after the introduction of *Turnitin*®, with three points of measurement, and assesses students' awareness of, attitudes toward, and engagement in, seven forms of plagiarism separately.

Nonetheless, as with all research, it has limitations. We believe the principal limitations of this research are the self-report measurement, that the research was conducted at a single university, and that we did not control the interventions that may have influenced plagiarism awareness, attitudes, and prevalence.

Although we found in every year of the survey that more than 60% of students reported engaging in at least one form of plagiarism on at least one occasion, it is possible that the self-report nature of the survey may underestimate the true extent of students' engagement in plagiarism. Although the surveys were anonymous and this anonymity was made clear to students, there is evidence that people will under-report undesirable behaviours even when they cannot be identified (e.g., MacDonald & Nail, 2005). Although such social-desirability biases in responding may reduce overall rates of reporting of plagiarism we do not believe there is any systematic response bias that

would be different in the three different years of testing, thus, we do not believe this would account for the trends we observed among the three years of testing.

Examining a single university allows us to compare students of similar demographic backgrounds and institutional experience, and we note that other time-lag studies are single-university studies also. Nevertheless, it is appropriate to acknowledge that it we cannot necessarily generalize the trends we have observed to other higher education institutions. Finally, by organically taking snapshots of plagiarism at three points in time we are only able to speculate on the causes for the trends observed, rather than reach the solid conclusions that may be drawn from a better-controlled study of plagiarism intervention strategies.

Summary and Conclusion

This paper reports a unique time-lag study that provides an interesting perspective on the historical trends in plagiarism in the decade 2004–2014. Promisingly, we found that understanding and perceived seriousness of most of the forms of plagiarism rose and the prevalence of all forms of plagiarism either fell or remained stable over the 10 years of the study. We draw hope from the findings presented in this paper that although there is evidence that students are engaging in plagiarism, technological and educational interventions are significantly helping to counteract the opportunities to plagiarize that are afforded by the internet.

Nonetheless, we do not believe the message from this paper should be that academics or institutions should rest on their laurels. Even in the most recent of our three surveys, 2014, under 30% students recognized that all seven forms of plagiarism outlined by Walker (1998) are types of cheating. In a study that used the same measure as we used in this paper, only 25% of a group of first-year students at

Murdoch University recognized all seven forms of plagiarism (Curtis et al., 2013). However, at the end of the semester, after completing an online mastery task on academic integrity this rose to over 50%. Therefore, it is clear that further educational interventions at WSU may yet see more improvement in students' awareness of academic integrity. Of course, given the wider evidence of the effectiveness of educational interventions to improve academic integrity (Teh & Paull, 2013) we believe such interventions should be implemented at other higher education institutions also. Moreover, educational strategies like academic integrity mastery training should be combined, in university-wide approaches to the problem of plagiarism, with a range of other policies and interventions including, but not limited to: text-matching software, clear assessment expectations for students, and robust enforcement measures for breaches of academic integrity standards.

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References

- Barrett, R., & Malcolm, J. (2006). Embedding plagiarism education in the assessment process. *International Journal for Educational Integrity*, 2(1), 38-45.
- Batane, T. (2010). Turning to Turnitin to fight plagiarism among university students. *Journal of Educational Technology & Society*, 13, 1-12.
- Belter, R. W., & du Pré, A. (2009). A strategy to reduce plagiarism in an undergraduate course. *Teaching of Psychology*, 36, 257-261.
- Curtis, G. J., Gouldthorp, B., Thomas, E. F., O'Brien, G. M., & Correia, H. M. (2013). Online academic-integrity mastery training may improve students' awareness of, and attitudes toward, plagiarism. *Psychology: Learning and Teaching*, 12, 282-289.
- Curtis, G. J., & Popal, R. (2011). An examination of factors related to plagiarism and a five year follow-up of plagiarism at an Australian university. *International Journal for Educational Integrity*, 7(1), 30-42.
- de Vaus, D. A. (1991). *Surveys in social research* (3rd ed.). London: Allen & Unwin.
- Diekhoff, G. M., LaBeff, E. E., Clark, R. E., Williams, L. E., Francis, B., & Haines, V. J. (1996). College cheating: Ten years later. *Research in Higher Education*, 37, 487-502.
- Hartmann, D. P. (1992). Design, measurement, and analysis: Technical issues in developmental research. In M. H. Bornstein & M. E. Lamb (Eds.), *Developmental psychology: An advanced textbook* (2nd ed., pp. 59-154). Hillsdale, NJ: Lawrence Erlbaum Associates.

- ICAC (2015). *Learning the hard way: Managing corruption risks associated with international students at universities in NSW*. Sydney, NSW, Australia: Independent Commission Against Corruption NSW.
- Maxwell, A. J., Curtis, G. J., & Vardanega, L. (2006). Plagiarism among local and Asian students in Australia. *Guidance & Counselling, 21*, 210-215.
- Maxwell, A. J., Curtis, G. J., & Vardanega, L. (2008). Does culture influence understanding and perceived seriousness of plagiarism? *International Journal for Educational Integrity, 4*(2), 25-40.
- McCabe, D. L. (2005). Cheating among college and university students: A North American perspective. *International Journal for Educational Integrity, 1*(1). Retrieved from <http://www.ojs.unisa.edu.au/index.php/IJEI/index>
- McCabe, D. L., & Bowers, W. J. (1994). Academic dishonesty among males in college: A thirty year perspective. *Journal of College Student Development, 35*, 5-10.
- MacDonald, G., & Nail, P. R. (2005). Attitude change and the public-private attitude distinction. *British Journal of Social Psychology, 44*, 15-28.
- McNeilage, A., & Visentin, L. (2014, November 21). Students enlist MyMaster website to write essays, assignments. *The Sydney Morning Herald*. Retrieved from <http://www.smh.com.au>
- Nonis, S., & Swift, C. O. (2001). An examination of the relationship between academic dishonesty and workplace dishonesty: A multicampus investigation. *Journal of Education for Business, 77*, 69-77.
- Owens, C., & White, F. A. (2013). A 5-year systematic strategy to reduce plagiarism among first-year psychology university students. *Australian Journal of Psychology, 65*, 14-21.

- Park, C. (2003). In other (people's) words: Plagiarism by university students - literature and lessons. *Assessment and Evaluation in Higher Education*, 28, 471-488.
- Rolfe, V. (2011). Can Turnitin be used to provide instant formative feedback? *British Journal of Educational Technology*, 42, 701-710.
- Smith, A. (2015, August 11). Students at Sydney University use impersonators to sit their exams. *The Sydney Morning Herald*. Retrieved from <http://www.smh.com.au>
- Sterngold, A. (2004). Confronting plagiarism. *Change*, 36, 16-21.
- Teh, E. C., & Paull, M. (2013). Reducing the prevalence of plagiarism: A model for staff, students, and universities. *Issues in Educational Research*, 23, 283-298.
- Thomson, R. (2013). Implementation of criteria and standards-based assessment: An analysis of first-year learning guides. *Higher Education Research & Development*, 32, 272-286.
- Vandehey, M., Diekhoff, G., & LaBeff, E. (2007). College cheating: A twenty-year follow-up and the addition of an honor code. *Journal of College Student Development*, 48, 468-480.
- Vermeij, G. J. (1992). *Evolution and escalation: An ecological history of life*. New Jersey, NJ: Princeton University Press.
- Walker, J. (1998). Student plagiarism in universities: What are we doing about it? *Higher Education Research and Development*, 17, 89-106.