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Abstract

Methods of detecting plagiarism and teaching skills relating to the use of secondary sources are matters of increasing contention within academia. The project presented in this paper melds the use of a detection tool (Turnitin) with a multi-strategy educational programme. The results show that using percentage of secondary sources usage as an indicator of plagiarism is unreliable, that a one-on-one tutor clinic may be a useful part of any educational programme, and that students' inability to reference correctly may be based on an inadequate understanding of the process of academic writing, rather than a misunderstanding of the conventions. This suggests that students would benefit from interactive teaching or teaching materials which focus on the process of using secondary sources, rather than teaching which focuses solely on definition of terms and conventions of secondary source usage.

Scaffolding Academic Integrity: Creating a Learning Context for Teaching Referencing Skills



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Abstract

Methods of detecting plagiarism and teaching skills relating to the use of secondary sources are matters of increasing contention within academia. The project presented in this paper melds the use of a detection tool (Turnitin) with a multi-strategy educational programme. The results show that using percentage of secondary sources usage as an indicator of plagiarism is unreliable, that a one-on-one tutor clinic may be a useful part of any educational programme, and that students' inability to reference correctly may be based on an inadequate understanding of the process of academic writing, rather than a misunderstanding of the conventions. This suggests that students would benefit from interactive teaching or teaching materials which focus on the process of using secondary sources, rather than teaching which focuses solely on definition of terms and conventions of secondary source usage.

Introduction

Research suggests that plagiarism rates amongst students in most English-speaking countries are now of epidemic proportions. Fulwood (2003) cites a study in the U.S. by the Center for Academic Integrity showing 80% of students have cheated in some way during their course of study. Graham et al (1994) suggests the number of students who have engaged in some form of cheating (including plagiarism) during their course of study to be as high as 90%, with almost 14% saying they had copied from another student's assignment. Cummings et al (2002) cite numerous studies which report cheating rates at over 70% and Rennie and Crosby (2001) report that 61% of the students they surveyed said they did not see a problem with copying from a source as long as the reference was in the reference list. In a UK study (Franklyn-Stokes and Newstead, 1995) 66% of students surveyed said they had paraphrased without acknowledging the source and 64% said they had copied another student's work. Given that these studies are based on self-reporting (Brown, 1995), we may conjecture that the rates are actually higher. The causes of plagiarism have been characterised in manifold ways but range from a rejection of academic values (Cameron, 2004) which may lead to intentional misconduct, through to misunderstanding of the complexity of terms and conventions (Price, 2002) or inadequate language skills and cultural misunderstandings (Angelova & Riazantseva, 1999; Ashworth & Bannister, 1997) which may lead to misuse of sources.

Since plagiarism is an issue that goes to the heart of academic integrity, it behoves academic institutions to consider the causes and nature of the problem and to consider how the issue should be addressed. However, any long-term strategy on plagiarism needs to accommodate not only improved assessment practices but also both an educational and detection strategy (Carroll and Appleton, 2001; Park, 2004). We need to distinguish between students who intentionally plagiarise for whatever reason: who actively buy an essay from a cheat site, knowingly copy from a journal article or from another student, and those students who genuinely do not understand what plagiarism is and/or how to integrate sources effectively into their assignments. The first group of students needs to be faced with a deterrent, whether that is in the form of a detection system and/or a well publicised and executed plagiarism policy. For the second group of students a deterrent alone is unlikely to be effective – indeed, unless it is used in conjunction with quality instruction on the positive skills of integrating sources and developing an understanding of the place of secondary sources within academic work, the deterrent alone may lead to more problems than benefits (Hall, 2005).

The project discussed in this paper aims to integrate a complex perspective on plagiarism as discussed in the literature into a pragmatic context, by providing both an educational scaffold for students to acquire the skills of academic integrity as they relate to plagiarism, and a deterrent. The project went through two iterations, with a key intervention introduced in the second iteration. The project findings point to new directions for teaching of referencing conventions and identify a key pedagogical tool for reducing plagiarism. Conclusions are also drawn on the use of Turnitin not only as a plagiarism-detection system, but also as a tool for helping academic staff to analyse student problems in using secondary sources.

Background

In 2004, Massey University, New Zealand, purchased a licence to use Turnitin® for a 12 month trial period, as a part of the University's re-framing of its academic misconduct policy and procedures. Turnitin is an online system for detecting plagiarism by mapping the binary code of assignments against that of internet sites and other previously submitted assignments. The project discussed in this paper was a part of this Massey University Turnitin trial and combined the work of the University's Academic Quality Manager (who was tasked with managing the Turnitin trial), the work of one academic staff member whose field of research is academic writing, and her teaching team.

The first part of the project took place in the first semester of 2004 and the second part in 2005 in a first year communications course for science students. The course is compulsory for all students enrolled in a science qualification through the College of Science. Student numbers in each cohort (the course is offered in every semester and as a distance course) range between 180 and 250, with an even gender split, and very low numbers (5-8%) of ESOL (English as a second language) students. Most students (greater than 90%) in the internal course are recent school leavers. The inclusion of a compulsory communications course within a science degree is unusual and controversial, but senior management of the College have a strong commitment to developing science students' communication skills in the face of stated employer concern about their need for employees with strong communication skills (Anderson, 1995; Gray, Emerson & MacKay, 2005). The course is designed to provide a baseline of essential communication skills and academic writing skills for science students, and referencing skills and use of secondary source material was an existing, and valued, aspect of the College-designed curriculum. Prior to the Turnitin trial, the course coordinator was concerned about the level of plagiarism in the class (which she had been unable to quantify, but which she felt to be high), and hence the efficacy of her approach to teaching these skills

Although the Turnitin trial originally focused only on the detection programme, a decision was made in this specific project to integrate the detection programme with a comprehensive education programme, largely because of the course coordinator's conviction that plagiarism was more often a factor of misunderstanding rather than misconduct. Thus, the project included a dual approach to teaching students skills relating to the use of secondary sources: an educational framework and a detection device. The aim of the project was to eliminate or reduce plagiarism through this dual approach.

Part 1: Providing the Educational Scaffold

Part 1 of the project took place during 2004 and involved all 142 students enrolled in the course. The educational programme described below was integrated into the course curriculum and pedagogy, and a single assignment for each student was submitted through Turnitin. The assignment, a report (1200-1500 words) on a topical issue related to science and ethics, conformed broadly to the pedagogical principles outlined by Carroll and Appleton (2001) for deterring plagiarism in that it required students to relate the issues discussed in the assignment both to a local, New Zealand context, and to the specific material on ethics taught within the course.

The following education programme for part 1 of the project was conducted two weeks before the assignment was due:

1. A 50 minute lecture in the main lecture time on using secondary sources in general and APA referencing in particular. Part of the lecture included a definition of plagiarism, reasons why it was ethically unacceptable, and how to integrate sources into a text. Ten minutes of the lecture were spent discussing and illustrating the differences between quoting and paraphrasing, and methods of effective paraphrase.
2. That same week, students spent a compulsory two-hour tutorial working on APA referencing. This included interactive exercises that were designed to illustrate the differences between paraphrasing and quoting. During this week tutors talked the students through the purposes of the project and answered any queries or concerns.
3. The following week, students engaged in a guided peer review exercise on the assignment, with directed questions and discussion focused on each student's use of sources.
4. Students also had available to them a 10 page chapter in the study guide on integrating sources and using APA referencing.

The detection device employed was Turnitin¹, a system for detecting electronic copying. We also used Turnitin as a data collection tool, for the purposes of identifying and categorising plagiarism problems.

For the purposes of this study, we established three categories of plagiarism: major (nine sentences or more of consecutive or inconsecutive copied material with no form of in-text citation); moderate (six-eight sentences of consecutive or inconsecutive copied material with no form of in-text citation); and minor (less than six sentences of consecutive or inconsecutive copied material with no form of in-text citation, or quotations treated as paraphrases, i.e. quoted with an in-text citation).

Results

Turnitin provides the user with a colour coded Originality report of each assignment linking each segment copied to its electronic source. The cumulated percentage level of copy is calculated and expressed as a colour coded similarity index. Thus, a simple report is produced which shows how many students have included copy level in the following categories: 75-100% (red), 50-74% (orange), 25- 49% (yellow), 0-24% (green), and < 20 words (blue). Each submitted assignment is also colour coded so that someone can see at a glance how much copy is present, where it is copied from, and whether it is an acknowledged source or not. It is important to be aware that Turnitin does not distinguish between acknowledged and unacknowledged quotations – individual scrutiny of each assignment is required².

The results were analysed in two steps.

¹ <http://www.turnitin.com>

² The recently released revised form of Turnitin (released mid 2005) does attempt to differentiate between acknowledged and unacknowledged quotations, but individual checking is still required because of uncertainties in the system.

In the first step of the detection aspect of the project, assignments were submitted to Turnitin and the similarity index was scrutinised. The results were as follows.

Table 1. Level of secondary source usage (%) within one cohort of students (2004; n =142)	
Secondary source usage	Number of students (%)
<20 words	30 (21.1)
0-24%	107 (75.4)
25-49%	2 (1.4)
50-74%	3 (2.1)
75-100%	0 (0)

As Table 1 shows, only 5 students (3.5%) showed source usage above 25% and in each of these cases the system had indeed flagged a serious plagiarism problem (nine or more sentences unacknowledged) according to our criteria. The results of one of these students suggested either that he had copied from another student or that two students had colluded. Interviews with these students confirmed that intentional copying had taken place – that one student who understood the definitions of plagiarism had made a deliberate decision to act outside of these conventions - and so the action was classified as misconduct, and the student received zero for the assignment.

The four remaining students, all ESOL students, had included extensive passages in their text (nine or more sentences) that were copied without acknowledgement from another source. They had all marks for referencing (25% of the grade) and some of the marks for content (depending on the extent of the plagiarism) deducted from their grade and were issued with a warning. While it is important to be sensitive to cultural differences regarding use of source material, and while language barriers may impede the development of new skills, these students had been exposed to at least three hours of tuition on the correct use of sources in a New Zealand university as well as having available, in the study guide and text book, lengthy explanations of what was required. We therefore felt that while the errors technically fell into the category of misuse or misunderstanding, students could not convincingly claim no knowledge of what was required of them and so some penalties were imposed.

Initial results from the first stage of analysis, therefore, suggested that Turnitin had identified intentional plagiarists. Furthermore, the approach we had taken, combining the use of a plagiarism detection tool with constructive teaching on the topic of integrating secondary sources, seemed to have been effective: over 96% of students had produced work with less than 25% copy. While no valid comparisons were possible with earlier cohorts, the course coordinator felt confident that this represented a considerable decrease in the amount of plagiarism in the class.

However, closer analysis raised issues and doubts, suggesting that while a simple glance at the amount of secondary sources used might identify the intentional plagiarisers, a more in-depth approach is needed for identifying those students still struggling with the issues.

The bulk of our students (107 students – 75.3% of the cohort) fell into the category 0 – 24% source material. For step two of the analysis, we sorted these results into percentage copy categories (Table 2) and then inspected each report to identify how each student had used that source material.

Table 2. Breakdown of secondary source usage level (%) within the 0-24% category for one cohort of students in 2004 (n = 107)

Secondary source usage (%)	Number of students (%)
1-5	58 (54.2)
6-10	33 (30.8)
11-15	12 (11.2)
16-20	2 (1.9)
21-24	2 (1.9)

The inspection of each report showed that 18 (16%) of these 107 students demonstrated plagiarism problems. Nine students showed minor plagiarism problems (i.e. quotations not acknowledged as quotations, but treated as citations, or inclusion of less than six sentences of unacknowledged material) and nine demonstrated moderate problems (i.e. 6-8 sentences of unacknowledged material). None of these 18 students were ESOL students.

A key finding to note here is that, within this group, it was not possible to classify the extent of the problem using percentages alone. A student who included 24% secondary sources demonstrated no evidence of plagiarism; she had used quotations far too extensively for a scientific report, but her management and acknowledgement of sources was competent. By contrast, two students with only 8% secondary source material showed minor plagiarism problems. Close inspection of these reports suggested that these were cases of unintentional plagiarism, of misuse or misunderstanding rather than misconduct where, despite the educational programme, students had failed to distinguish between paraphrasing and quoting, or had failed to indicate a quotation in their notes prior to writing the essay.

What conclusions, then can be drawn from the complete analysis of this cohort of students? First, as stated Turnitin proved a simple and effective method of identifying misconduct, for locating the intentional plagiarisers who, for whatever reason, had chosen to contravene the standards of the academy. It had also effectively identified students exhibiting the more serious forms of misuse or misunderstanding.

The fuller analysis, however, also suggested that Turnitin could be a useful way of identifying students who were still struggling to understand and apply adequate referencing techniques – *as long as the level of secondary source usage was not used as a method of identifying problems*. Identification of problems requires extensive and time consuming analysis of reports, not a simple glance at which students fit into the categories offered by Turnitin.

With regards to the educational programme, it was concluded that while anecdotal evidence suggested that rates had fallen as a result of the combined strategy of detection and the educational programme, the rate of plagiarism could be further reduced if the educational programme were more fully developed.

Part 2: Strengthening the Project

The second part of the project was undertaken in 2005 in the same course but with a new cohort of first year students with a similar demographic to the 2004 cohort. Turnitin was retained as a form of detection, but the educational programme was adjusted in the light of part 1 to include an additional feature. This added feature was a “tutor clinic”: a 10-15 minute individual meeting with the tutor, compulsory for every student, which was held one week before the submission of the essay. Students were required to bring a completed draft of the essay to the individual meeting, where the tutor discussed key aspects of their assignment and, in particular, looked at their referencing. Every student was asked “are you confident that you have not copied from an original source without referencing?” and “do you feel you understand the rules of APA referencing?” Tutors took notes from the meeting, which were shared with the student, and each student wrote a response to their tutor’s comments about their essay. Students were expected to revise the essay in the light of the discussion and feedback.

Results

171 students submitted their assignments through Turnitin in 2005. Again the results were sorted according to the Turnitin Similarity Index (Table 3) and then the green reports were sorted as for part 1 (Table 4).

Table 3. Level of secondary source usage (%) for one cohort of students ($n=171$) in 2005

Secondary source usage	Number of students (%)
<20 words	20 (11.7)
0-24%	147 (86.0)
25-49%	3 (1.8)
50-74%	1 (0.6)
75-100%	0 (0)

Table 4. Breakdown of secondary source usage (%) within the 0-24% category for 2005 cohort of students ($n=147$)

Secondary source usage (%)	Number of students (%)
1-5	72 (49.0)
6-10	48 (32.7)
11-15	18 (12.2)
16-20	4 (2.7)
21-24	5 (3.4)

This time only one student (with 52% secondary source usage) showed plagiarism rates high enough to warrant a serious reduction in grade, and other rates of plagiarism were considerably lower than in the earlier iteration (Table 5).

Table 5. Occurrence of students (<i>n</i>, %) within three levels of plagiarism for two cohorts in 2004 (<i>n</i>=142) and 2005 (<i>n</i>=171) for the same assignment		
Plagiarism level	2004	2005
Severe	5 (3.5)	1 (0.6)
Moderate	9 (6.3)	5 (2.9)
Minor	9 (6.3)	5 (2.9)
Total	23 (16.1)	11 (6.4)

Three significant points arise from these results. First, in this second part of the project, all the students who were identified as having plagiarism problems had attended a tutor clinic prior to submission of their assignment. However, all but one had attended with an incomplete assignment draft and had been identified by their tutors as not having completed in-line citations. Tutors discussed the issue with these students, who assured the tutor that they would attend to the needed in-line citations. The fact that they were identified in this way, and that they did not successfully complete inline citations, suggests an error not of understanding but of technique and process. Most writers of academic documents would complete in-line citations, and identify quotations, while writing the document, rather than adding them in after the draft was completed. This finding has implications for the teaching of referencing skills within academic courses.

Second, in this iteration, percentage copy was again not an adequate method of identifying plagiarism. Several students in the 16-20% range and the 21-24% range, and even one with 34% secondary source usage, did not show plagiarism problems. They did show problems of using quotations far too extensively than was appropriate for scientific writing, but they did not plagiarise. By contrast, three students in the 1-5% copy range showed minor plagiarism problems. Users of Turnitin need to be aware of the dangers of using percentage of secondary source usage as an indicator of plagiarism.

Third, none of the students in this cohort showing plagiarism problems of any kind were ESOL students. Instead, ESOL students were more likely to show over-extensive use of quotations. While this over-use of quotations may be something that needs to be addressed, it is interesting that the introduction of the tutor clinic, rather than the introduction of Turnitin, proved to be the decisive factor in almost eliminating plagiarism in our (admitted small) sample of ESOL students. Analysis of the assignments and tutor clinic sheets failed to clarify whether the tutor clinic was successful in addressing the issue because tutor-student discussion in tutor clinics addressed overseas students' understanding of referencing conventions or because the tutor clinics motivated them to undertake correct identification of source material. It would certainly be useful in future studies to clarify whether plagiarism is present or not in the drafts ESOL students take to the tutor clinic.

Discussion

Like Soto and McGee (2004), we were disappointed that we were only able to reduce rather than eliminate plagiarism through the use of Turnitin as a detector combined with an educational programme. The underlying reasons for intentionally plagiarising under these circumstances, when students are aware that a detection device is being used, were not explored as part of this project³. Interviews with intentional plagiarisers may be a possibility for further research.

However, our results confirm the findings of Vernon, Bigna and Smith (2001), Junion-Metz (2000), Carroll and Appleton (2001) and Malouff and Sims (1996) that multiple teaching strategies are required to reduce the plagiarism rates. Within this context we can make more specific suggestions.

The most important finding is that misuse of secondary sources is likely to be an outcome of poor processes, rather than a misunderstanding of the conventions. The second part of this study found that, with the possible exception of one student, all those with unacknowledged quotations in their assignments after the tutor clinic lacked reliable *processes* for integrating secondary sources into their work (i.e. adding in-line references once the document was completed, rather than as they wrote the document). This has implications for the way we teach how to reference secondary sources, suggesting that teachers should focus on process as well as on the placing of the citations and other technical aspects of referencing. It also gives a clear indication that simply referring students to handbooks on APA (or similar) referencing, or providing material in study guides which focuses on the conventions of referencing will not solve the errors made by these students. While the material on conventions is important, it needs to be supplemented either by active teaching on process, or by study material with examples and discussion of effective process, in terms of how to integrate secondary sources into an academic text. This issue of process is so closely linked to understanding the academic writing process in general, that it may be advisable to integrate such teaching into the context of a course on academic writing or writing within the disciplines where the pedagogy is focused on process rather than product (Hall, 2005).

Another key finding of this study is that a one-on-one tutor clinic in which students directly discuss their use of secondary sources with their tutor does have a considerable impact on plagiarism rates. We may speculate that the impact of the tutor clinic is two-fold. First, it has an educational impact: it allows tutors to spend time talking with students about referencing and addressing their immediate concerns; and since it is a two-way dialogue, it provides an opportunity for students to discuss any issues they are struggling with. Second, it acts as a deterrent. Research has shown (Cummings, 2002) that students are more likely to plagiarise if they are in big classes, have little contact with teaching staff, and feel anonymous. It may be easier for a student to hand in a flawed piece of work to a distant teacher with whom the student has no personal contact than to sit in front of someone who is talking about their work and say “there are no unacknowledged quotations in this assignment” when they know there is a problem. Tutors reported several incidents where students, when asked this question, looked worried and said they would check their work again, and then wrote on their tutor clinic sheets that they would address this issue.

³ However, this has been explored elsewhere— See, for example, Baggaley and Spencer, 2005

Of particular significance was the impact of the tutor clinic on ESOL students. The literature on plagiarism as it pertains to ESOL students shows mixed results (Thompson and Williams, 1995; Hyland, 2001, Soto and McGee, 2004) but this study found that, after completing a tutor clinic, ESOL students were less likely to plagiarise than native speakers of English. This confirms the findings of Soto and McGee, whose work also focused on a large science class, rather than an English language class. They state:

At first, we expected ESL students to have more difficulty with technical text and therefore to plagiarise more than native speakers. However, most of the students who plagiarised in our study were native English speakers....We speculate that native speakers opted for expediency, perhaps thinking they could easily blend their own text with the plagiarised material....ESL students, perhaps through experience, feel uncomfortable blending their writing with improperly paraphrased technical text. (2004, pp. 45-6)

Our study's findings, that ESOL students were more likely to over-rely on quotations, certainly supports their suggestion. In our study, however, it is clear that the tutor clinic made a real difference to the likelihood of ESOL students plagiarising. It is not clear whether the tutor clinic, and facing up to a tutor, helped to motivate these students or whether the tutor clinic itself was a vital part of the tuition – or whether, as discussed above, these two factors worked together. Further research is needed to focus this issue. Ideally this research would take place in a class with a larger component of ESOL students – our sample is too small for us to draw confident conclusions.

Two findings are significant in relation to Turnitin as a tool for working with plagiarism. Because of the way the tool is designed, to categorise assignments according to percentage copy (and, in this study, without distinguishing between plagiarised material and acknowledged quotations), there is a danger of educators relying on percentage copy as an indicator of plagiarism. This study has shown that this is an inaccurate measure of plagiarism. Some students with only 5% copy showed signs of minor plagiarism, while students with 34% copy showed no evidence of plagiarism. Turnitin, then, should be used with caution, and as a complex rather than simple tool. Failure to recognise that Turnitin is a blunt instrument that can only be effective if used with care and subtlety could lead academic staff, especially those working from a detect and punish perspective only, to punishing students who are guilty only of excessive use of quotations (which is poor style rather than misconduct) while allowing students with substantial plagiarised copy, to remain undetected⁴. Scrutiny of individual reports is required for an accurate assessment of plagiarism.

A second outcome of this study in relation to Turnitin is the finding that it is a valuable source of information for educators teaching into the field of academic writing skills, and in particular those teaching students how to use secondary source material. By examining reports in detail, teachers can identify the kinds of problems students are experiencing in employing secondary sources as part of their work, and then teach directly to those skills. The process is time consuming, since all Turnitin reports need to be scrutinised, but the colour coded reports make analysis by the teacher easy and clear, and allow students to see immediately, under direction from the teacher, where their problems lie.

⁴ This is especially the case if academics use the large class report and accept the work of all green reports – which would allow students 24% copy.

Conclusions

What, then, are the implications of this study for tertiary institutions concerned with matters of academic integrity?

First, universities should be concerned with academic integrity, and hence with the detection of plagiarism, through their policies and procedures; and a detection device such as Turnitin is a useful device as part of a procedure in deterring students from engaging in intentional plagiarism. This study has shown that Turnitin is an effective system for identifying problems with plagiarism, but only if used with care and subtle observation. However, it is essential that its limitations be acknowledged. Some limitations are acknowledged and well documented, such as its inability to identify sources material from written materials or to identify the author (Carroll and Appleton, 2001). This study, however, suggests that its limitations are more pervasive than this, that its method of identifying plagiarism (through percentage copy and then categorisation) is flawed and may allow unacceptable amounts of plagiarism to pass undetected while flagging problems with assignments which do not contain plagiarism. If Turnitin is used, universities should be putting training in place, which includes reference to this design flaw and how academic teachers should handle the problems of using percentages alone. More research is needed on how to more efficiently manage the flaws in this detection system.

Second, universities need to integrate into their strategy and policies for dealing with plagiarism an educational strategy, based on sound pedagogical principles. These issues have been documented elsewhere, and include issues around assignment design and submission of drafts. However, this study has pointed to two useful elements of such an educational strategy. First, active teaching on use of secondary sources should include a focus on process, not just on conventions. Further research is required to ascertain whether the ideal place for such teaching is a dedicated academic writing course, or whether such instruction would be just as effective within a content course. And, second, the study suggests that a short, one-on-one tutor clinic can have a dramatic impact on rates of plagiarism, especially by ESOL students. Again, more research is needed with a larger sample size and broader demographic base. It would also be interesting to experiment with different forms of one-on-one tuition – for example, it would be useful to ascertain whether voluntary or compulsory meetings with a learning advisor (in a Student Learning Centre or Learning and Language Service) would have a similar impact to meeting with a course tutor.

Earlier in this paper we described Turnitin as a “blunt instrument that can only be effective if used with care and subtlety”. We might extend this metaphor to the broader context of dealing with perceived increases in the rates of plagiarism. Plagiarism is a complex matter, difficult to define (Price, 2002), and a consequence of a range of student attitudes and skills. This study has shown that both detection and a multi-focused education approach should be a part of the strategy for dealing with this complex issue, and that both aspects of this strategy need to be designed and handled with care and discrimination, as an acknowledgement of this complexity.

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