Weapons of mouse destruction: A 3D strategy for combating cut-and-paste plagiarism using the JISC Plagiarism Advisory Service

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Abstract

This article describes an action research project undertaken in the Business Information Technology (BIT) subject group of a post-1992 University Business School to combat the growing menace of cut-and-paste plagiarism. The authors regard plagiarism—the passing off as one's own, the words and ideas of another—as an academic malpractice that should be *deterred*, *detected* and *dealt with appropriately* (Park, 2004; JISC, 2005). We use these three themes, or dimensions, to structure our account here of an expanding portfolio of tools and techniques we have deployed over a

period of three years. Recently the Joint Information Systems Committee's (JISC) Plagiarism Advisory Service (PAS) has become central to our efforts, and whilst it is certainly useful in structuring student perceptions, detecting and highlighting sections of cut and paste, and providing professional disciplinary evidence, we draw attention to the potentially pivotal role it can play in structuring student perceptions of plagiarism. In particular, we advise that the JISC PAS is used carefully as part of a more considered approach to student plagiarism rather than as a quick and easy panacea. Pilot studies carried out across six undergraduate and postgraduate units have revealed a growing awareness, amongst both academic and student enthusiasts, of the strengths and limitations of this service. Potentially, these limitations, combined with the restricted sanctions available according to university regulations, could constitute a small risk that some students may calculate and be willing to take (Woesnner, 2004). We feel it is important whilst working within this framework to adopt other complimentary strategies in order to make the wholesale or part copying of another's work an irrational choice, even for the desperate student. This article draws upon current plagiarism literature, field observations and a survey of plagiarism perceptions conducted on over 150 final year undergraduate students. We present the findings from our ongoing action research in the form of a '3D' strategy that attempts to share best practice in *deterring, detecting,* and *dealing appropriately with* cut-and-paste plagiarism. Our findings indicate that students do perceive the JISC PAS as effective across all three dimensions, but this perception can be altered significantly depending upon how the service is presented as part of a broader set of strategies to combat student plagiarism. In particular, we have found that allowing students to see the comparison report output from the JISC PAS, not only heightens student anxiety regarding speculative accusations of plagiarism, but also significantly reduces their confidence in the service as a reliable and effective detection method.

Background

The authors' use of information systems to supplement and enhance the judgement of lecturers making decisions regarding the authenticity of student work has its beginnings in the development of an information system to support a first year technical unit. This information system was developed by the authors to analyse completed programming assignments and use pattern matching algorithms to detect similarities between submissions in order to prompt tutors to examine work further and possibly call for a face-to-face explanation or viva. The focus in that unit of assessment was to reduce the significant overhead of running vivas for every student whilst ensuring that students were aware that plagiarism could be detected and would be acted upon in a unit culture that promoted code sharing, but ultimately stressed individual understanding (Stubbs, Martin & Endlar, 2006).

Indeed we began to observe that not only was the student culture informed by code sharing at a local level, but also by wider issues that could potentially encourage plagiarism in other units and had been reported elsewhere. These were: the ease at which material could be copied and pasted from Internet resources; the growing file-sharing culture and blurring of ownership and copyright issues; the increase in

incidences of graduates selling dissertations on eBay and access to 'paper mills'; a possible lack of confidence with the English language; and previous educational environments failing to emphasise plagiarism as deviant behaviour. See Bennett (2005) for a more comprehensive review.

Whilst we acknowledge that incidences of plagiarism are sometimes more sophisticated than simply cutting and pasting work from unreferenced sources, and that others have quite rightly debated the definition of plagiarism (see for instance Johnston, 2003), the fuzzy nature of the concept is not of central concern in this paper. Within our subject group we made an early decision that the direct copying and pasting of another's text or code as a shortcut to writing and understanding the work oneself was for pragmatic reasons the most sensible to tackle. The electronic detection tools at our disposal both pre- and post- the JISC PAS could readily highlight instances of this type of plagiarism and as such structured our approach. Although this was recognised as a less than 100% solution for all instances of plagiarism, it did however neatly circumvent the numerous referencing style issues that students were finding particularly difficult and which were being tackled by other initiatives elsewhere in the Business School and across the University as a whole.

The increasing potential of software other than the Turnitin UK software used by the JISC PAS to provide a more expert comparison between submitted work (Clough, 2000; Lancaster & Culwin, 2004) was also acknowledged and we have been watching these developments with interest. Nonetheless, the packaged JISC service that presents a "whole product" (Moore, 1999) and the impressive growing scope of its document base meant that, although we were aware of the long-term risks of over-reliance on proprietary software, for the short-term this service provided the most effective

information system to augment our 3D response to the cut-and-paste plagiarism problem.

Deterrence

Whilst a student may unwittingly commit academic malpractice through ignorance of rules and norms, the increasingly commodified nature of Higher Education in the UK means that a student might well knowingly plagiarize when the apparent rewards for breaching rules and norms outweigh the sanctions perceived for being caught (Saltmarsh, 2004). These perceived rewards include time saving, mark improvement, failure mitigation, or language improvement. A review of the literature suggests this type of plagiarism is becoming more common and that those students studying at business faculties could be most inclined toward this type of offence (Park, 2003). It is important therefore to discourage students from plagiarising not only by reinforcing institutional policy sanctions consistently, but also by designing assessments at the unit level that make plagiarism the more difficult option and so act as an effective deterrent.

With this in mind, our first year unit using our bespoke plagiarism detection software made use of a holistic assessment redesign that emphasised individual understanding and a brief that, by the very nature of its currency (the unit dealt with emerging technologies and issues), was changed year upon year. The brief also included a marking grid that spelt out plagiarism sanctions, in line with institutional tariffs, as percentage penalties for a failure to demonstrate understanding when requested. This was reinforced collectively in lectures and individually in tutorials to stress that personal understanding of the work presented was paramount and this understanding would be tested at a viva if necessary. This, coupled with the requirement to submit the work electronically, and repeated written and verbal reinforcements that sophisticated

tools would be used to compare submitted work acted as a useful initial deterrent. It was found on this first unit that simply requesting electronic submission raised the perception of detection. Further demonstrating to the students, by means of a selective viva process, that their submissions were being scrutinised systematically ensured that student-to-student communication, both horizontally across the unit and vertically back to subsequent years, reinforced the intended message that plagiarism was taken seriously by tutors on this unit.

Following in the footsteps of good plagiarism practice reported in other technical units within the University (Eskins, 2004) we then broke down a second assessment, in a more advanced second year unit, to include a summative assessment that tested knowledge using a multiple choice questionnaire. This test was scheduled early on after the distribution of the assignment brief with the aim of encouraging students to start work early and hopefully militate against the last minute submission culture that could encourage students to plagiarise out of panic. Students were also provided with comprehensive written and electronic resources in tutorials that acted as milestones against which they could check their progress with tutors. This carrot and stick combination proved effective for those students who were willing and able to engage fully.

As our institution trialled the JISC PAS, which we saw as an opportunity for sophisticated comparison of traditional essay type assignments, we took the opportunity to use electronic submission to further structure a wider body of students' perceptions toward plagiarism. Electronic submission was rolled out to two units. A double-weighted final year dissertation unit where the perceived rewards for plagiarism in terms of time and effort appeared greater than any others. And also a postgraduate

unit with a greater proportion of international students where we had observed, in line with the findings of others (Larkham & Manns, 2002; Park, 2003), that cultural differences and the challenges of mastering a second language had the potential to significantly alter individual perceptions of plagiarism and what constituted accepted academic practice. Varied methods of submission were trialled across these two units including email to tutor, saving to a network drive, submission to WebCT, as well as submission direct to the JISC PAS. Whilst all were not without teething problems, submission direct to the JISC service proved to be most effective in raising the profile of serious plagiarism detection and therefore acted as the most effective deterrent.

Last year, the Electronic Commerce final year option was redesigned to include submission of a 3,000-word business report direct to this service and, in addition, JISC advisory material was distributed to students at lectures and via the Business School Intranet. The best practice recommendations of Carroll & Appleton (2001) were incorporated into an assignment brief that focused on application of concepts to a specific business problem, which encouraged individual ownership and creativity and resulted in 85 unique solutions within the same assignment framework. Deterrence was not only reinforced through assignment design, electronic submission, and penalties on the marking grid, but also an in-class exercise inspired by a JISC workshop that required students to agree upon a shared definition of plagiarism. The students literally drew the line under what was deemed unacceptable (Swales & Feak, 1994). As long as this line was well below our limits of cut-and-paste plagiarism then it was stressed—in order to ease other students' heightened anxieties—that for this unit referencing was important, but small syntactical mistakes did not carry the same level of penalties as verbatim copying either with or without acknowledgement.

Having outlined key initiatives undertaken to deter plagiarism, we now describe efforts directed towards its detection as experience has shown that a credible deterrent requires a real risk of being caught.

Detection

Detection within paper submissions very much depends on an assessor's knowledge of, and access to, relevant texts or their ability to recognise plagiarism signatures, such as style changes, within a text. Whilst the increased use of the Internet has afforded easier opportunities for student plagiarism it has also allowed assessors ready access to relevant texts via search engines for comparison and plagiarism detection purposes. Tutors have in the past often used this mechanism informally when their suspicions have been aroused whilst marking an assignment. Electronic submission makes this comparison more efficient and so routinely extends an assessor's powers of comparison and pattern matching to include a wider base of source material.

The automation of this comparison process in order to detect suspected instances of plagiarism was initially attempted in our first year unit. A bespoke set of utilities compared all submissions with each other and then against all previous years' submissions for this unit. Copied material was highlighted and presented to assessors within an easily navigable web-based marking system that allowed assessors to select suspected students for an informal viva or interview. These powers of detection were further enhanced in our second year unit that combined the results from the early multiple-choice test with both virtual and physical attendance statistics in order to build up a profile of those who might be more inclined to plagiarise. Previous research has shown that it is likely to be the weaker students that do not engage and identify with the learning outcomes that are most likely to plagiarise (Bennett, 2005). It must

be stressed however that this profile was used only to give more attention to those students in order to examine their work more carefully for evidence of plagiarism; under no circumstances did it lead to the tutors pre-judging a student as guilty.

Whilst a comparison of student submissions within the unit both horizontally and vertically was achievable with this made-to-order system, it had its limitations. These were: the absence of an ability to do external comparisons; it was only designed to compare programming assignments; and it relied heavily on the technical expertise of the authors. The advent of the institution's subscription to the JISC PAS provided a convenient solution for automating the detection process to encompass both technical and non-technical units and widened the scope of comparison to: 3.5 billion websites; a subset of research paper databases; and submissions from all other subscribing institutions. However for non-technical assignments the culture of electronic submission and potential viva was not well established and we found that careful management of the submission process was required to ensure that an electronic copy was received for detection purposes. To be effective this meant that students were informed via the brief that penalties would be applied unless both paper and electronic submissions were received. We had trialled electronic-only submission on the ISO unit, but had found that tutors generally found marking online more restrictive than traditional paper-based marking and often resorted to printing out student submissions which led to an unacceptable administrative overhead and frequently a sometimes unacceptable loss of formatting for the majority of submissions that were in Microsoft's Word rather than Adobe's Portable Document Format (PDF).

It was also observed that some students became aware not only of the sophistication of the detection process, but also of the limitations between both electronic and paper

submissions. General weaknesses inherent in this method and some specific to the functionality of the JISC PAS meant that tutors could be lulled into a false sense of security if they relied solely on the JISC plagiarism reports for detection purposes whilst marking. Whilst the JISC service has seen improvement in its ability to handle embedded objects such as graphics and spreadsheets, text within these objects is excluded for comparison purposes. We found that students who were intentionally trying to beat an assignment word count would convert tables to images, and this had the unanticipated (we hope) consequence of this text bypassing the plagiarism detection process. The Turnitin UK software used by the JISC PAS also currently only allows a student to submit one file per assignment. Students who lacked sophisticated document production skills often produced a paper assignment from more than one electronic document and so, without the support of any prior advanced document design and production training, were advised just to submit their largest file. Conscientious students would worry about these limitations and we spent considerable time managing this process because we had repeatedly stressed the importance of electronic submission to the students as part of the deterrence phase. More worryingly though, were reports of at least one student who had removed offending plagiarized material from his electronic submission safe in the knowledge that we could not realistically compare all paper versions with electronic copies with a staff/student ratio of 1/25. Until enhancements are made to the service to include digital watermarks that can reassure tutors of the authenticity between paper and electronic submissions, or a move is made towards robust PDF generation and electronic-only submission with industrial-strength secure printing then we advise caution in using the JISC service as a primary method of detection. Rather, in our subject group we have gently introduced the JISC PAS as a tool to enhance rather than replace a tutor's expert judgement.

This softly, softly approach is not without its own issues. General findings indicate that some academic staff feel uncomfortable confronting plagiarism or simply do not have time to deal with the perceived increased administrative overhead (Park, 2003). Leaving the exploitation of the JISC service to a few enthusiasts does mean that some students, depending upon which units they take, are scrutinised more closely than others. This is a disparity that can only be addressed by institutionalising the use of the JISC PAS together with good practice plagiarism recommendations for assessment design so that the detection of plagiarism is as consistent as the penalties imposed for plagiarism offences set out to be.

We will return to some of the issues of detection and submission in our conclusions, but it is important to say something first of actions taken in response to plagiarism.

Dealing Appropriately

Use of the JISC service provided tutors with a valuable extra tool to supplement their professional judgement, and whilst disciplinary hearings have been relatively few and far between, producing evidence has now become a matter of printing the JISC reports. Hearings consider intent, but with the extent of plagiarism now more readily apparent it is important at this stage that the evidence is acted upon in a consistent and well-publicised manner. An assessor's willingness to manage the plagiarism deterrence and detection process and subsequently escalate instances of cut-and-paste plagiarism depends upon the gathered evidence being dealt with in an appropriate way that not only deters a student from re-offending, but also communicates to the student body at large that the penalties for academic malpractice are not worth the risk. Some would argue that the limited sanctions available according to university regulations would not appear to send this message (Woesnner, 2004). However, working within this sanction

framework we recommend that institutional policy is reinforced within the assignment brief and that all students are encourage to engage with a shared definition of plagiarism so there is no room for doubt about intent if an incident does occur. We would encourage institutions to keep their penalty regime under review as efforts to design out plagiarism become more sophisticated.

While it has been reported elsewhere that some staff do not act on suspected plagiarism because of the extra work involved (Park, 2004), we feel that the time saved by using the JISC PAS to generate reports for a plagiarism hearing, far outweighs the small amount of extra time required to review the initial reports. Of course additional work is required to redesign units holistically to deter plagiarism and to manage the electronic submission process, but we hope in the first instance the pedagogical rationale of an application of concepts rather than explanation wins out, and in the second that the submission process can be improved to become part of an integrated submission service to provide further benefits for both staff and students.

Measuring Student Perceptions

Whilst our field observations have been invaluable in providing valuable feedback regarding the efficacy and effectiveness of our efforts to combat student plagiarism, we have recognised the potential for a more measured manner of determining student perceptions of our efforts. To that end this year we formalised our observations in two ways. Firstly, in the spirit of ethnographers we worked with a final-year student researcher who recorded a series of participant observation memos over a period of three months. Because of the potential limitations concerning reliability and validity with this method, (for a summary see Cohen, Manion & Morrison, 2005), we triangulated this approach with a questionnaire designed to gather quantitative and

qualitative data regarding student attitudes towards plagiarism and the JISC service. The questionnaire was administered to a total of 158 students representing 66% of the total final year population. A high response rate was assured by a considerate questionnaire design and using five minutes at the end of a lecture in which to administer the survey. Anonymity was important in order to encourage honest and useful responses. Rather than phrasing our questions to ask if they *personally* had plagiarised knowingly, we used technique similar to Bennett's (2005) study. Questions were phrased so that a respondent was asked if he or she knew any *fellow students* who had plagiarised. This hopefully increased our chances of receiving more open answers. We also eased students concerns by using a fellow student to administer the survey.

The sample of 158 contained three distinct sub groups. The first and largest group of 80 was a mixed population who had taken a broad spectrum of final year units, some requiring assignment submission to the JISC PAS and some not. All in this sample had been briefed on the issues surrounding plagiarism and academic malpractice and the institutional penalties available for those who fell foul of the rules.

The second sub group of 39 contained students who had all submitted their assignment for the unit to the JISC PAS. They had not seen the output from the comparison reports for that unit, but the tutor had stressed the role of the JISC service in plagiarism detection. The third sub group of 39 also had submitted to the JISC PAS, but in this case they had been allowed to see the output of the comparison reports. Data analysis is currently in a very early stage, but the following preliminary findings from the surveys and the field observations gathered over the three-month period are worth reproducing here.

The students in our survey overwhelmingly perceived the JISC PAS as an effective deterrent to plagiarism. In all three groups approximately 80% of students said that they thought the service would discourage student plagiarism; see figure 1. However confidence in the service dropped amongst those students who had been given access to the comparison reports when they were questioned as to whether they thought the service was a valid tool for plagiarism detection. This drop in confidence, shown in figure 2, was backed up by qualitative data gathered from free-form responses on the questionnaires. Typical replies from those who did not believe in the reliability of the JISC service for plagiarism detection were "no because it highlights things I've put in quotes" or "no because it's highlighted my references". Comments to this effect can also be seen in the following excerpt from one of participant observation memo:

Participant B: *… Still don't understand how it works though, on mine it's highlighted quotes that I've cited!*

Participant A: *It has on mine as well.*

Observer: *Why does it highlight one's that you've quoted?*

Participant B: *Not sure why it does.*

Participant A: *It's scary getting the results back though; can you imagine getting caught by it?*

Participant B: *Yeah, even though you know you're not guilty it's still a bit worrying.*

Participant A: *Especially when it's highlighting things you've quoted …*

Perhaps it was no surprise then that we found this same sub group to be generally more anxious regarding the JISC PAS than the other subgroups. See figure 3. It would appear that letting this group see the comparison report output without careful explanation of a tutor's role in the interpretation of that output was leading some to believe they would be falsely accused of plagiarism based on the highlighted portions of the report.

The Way Forward

The ad-hoc enthusiast model we have described thus far as our '3D' strategy to combat cut-and-paste plagiarism needs to be replaced with something more convenient for mainstream use. We recommend that in the longer term an integrated online submission service be developed with e-submission going to e-portfolio, e-print and e-detection services. This development will of course require appropriate investment in both students and staff to make it work. A cultural shift may also be needed to re-frame assignment submission from loaning a piece of work to an assessor to receive a mark, to making an individual contribution to a community of practice, in which the contribution is held in perpetuity to uphold academic norms of integrity and originality.

In the medium term, if the JISC PAS is to become part of university infrastructure for assignment submission, then just as with any other key information system, consideration must be given towards its accuracy, reliability and transparency (Lancaster & Culwin, 2004) and the levels of support offered to support 24x7 assignment submission. Improvements are required to the software to allow manifold multi-type file submissions per assignment and more flexibility is required to allow multiple assessors on a unit team to view the same plagiarism reports. While the JISC PAS is well suited to identifying cut-and-paste plagiarism it is hoped that its sophistication will continue to grow. To mitigate these improvements not taking place, universities need to give consideration to creating an e-detection framework that will prevent their institution becoming locked into the JISC service and allow a graceful move to alternatives should the need arise.

In the short term although we do recommend the JISC service as a useful tool as part of a more holistic approach to combating cut-and-paste plagiarism, it should by no means be viewed as a universal remedy. The consequences of adopting the service in terms of affecting not only student but also staff perceptions of plagiarism require careful consideration. In particular our findings indicate that for students, their perception of the service as an effective strategy for detection and deterrence can be *decreased* if they are allowed to see too much of its inner workings. Whilst we do wish to see the use of the service institutionalised to ensure equity in the treatment of students, we do not want to see assessors removed from the process of deterring, detecting and dealing appropriately with instances of plagiarism. It is our belief that not only is it important to preserve professional judgements like this within the realms of those best placed to make them, but it is also important that the message 'plagiarism is unacceptable' is delivered by those closest to the students whilst they are here rather than being institutionalised and potentially lost amongst many other impersonal communications. Crucially, given the preliminary findings from our survey, it is also important that if the JISC PAS is to be most effective in its role of plagiarism deterrent then tutors must also adopt the role of gatekeeper between the JISC PAS comparison output and those students who have submitted work. Allowing students to see this output can potentially undermine faith in the system for some and also can heighten their anxieties to an unacceptable level.

Whilst we acknowledge the importance of the hitherto not-made-explicit fourth dimension of *discussion* in framing and shaping student perceptions of plagiarism, we are advising that the output from the JISC PAS is not used to drive this discussion without very careful consideration as to how the context of report delivery affects the

student perception of the service as a valid tool for *deterrence of, detection of,* and *dealing appropriately with* plagiarism. If students must see their comparison output then we advise that they are given training regarding the interpretation of the reports and that tutors allocate extra time to cater for an increased number of queries from anxious students.

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List of Figures

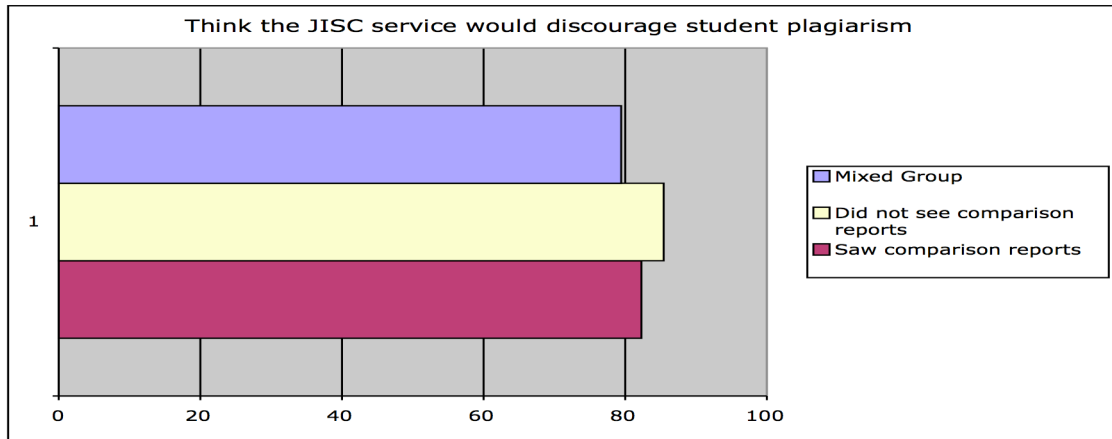Figure 1: Percentage of students believing the JISC PAS would discourage plagiarism

Think the JISC service would discourage student plagiarism

Mixed Group
Did not see comparison reports
Saw comparison reports

Figure 2: Percentage of students believing the JISC PAS would detect genuine plagiarism

Believe the JISC service is valid for plagiarism detection
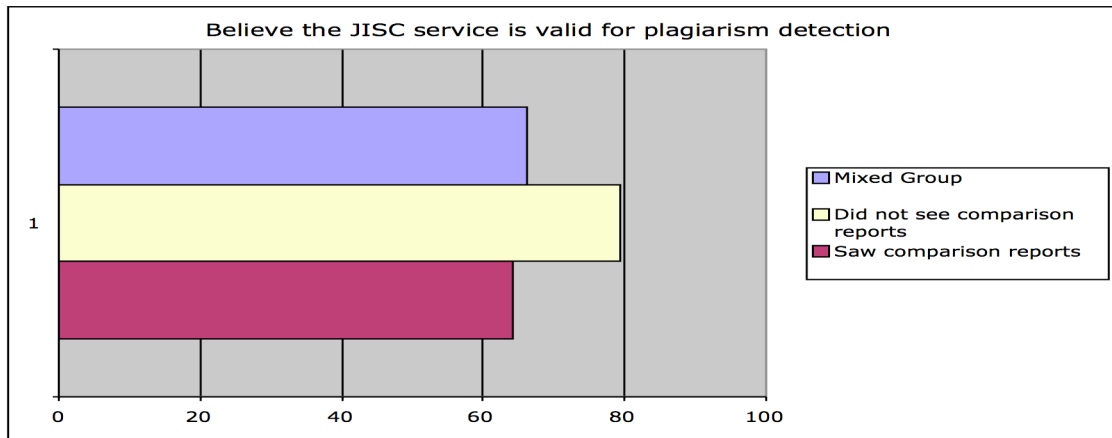
Mixed Group
Did not see comparison reports
Saw comparison reports

Figure 3: Percentage of students worried about the JISC PAS

Were worried about the reports from the JISC service

Mixed Group
Did not see comparison reports
Saw comparison reports