

# A roll-out of the JISC plagiarism detection service with biological sciences students

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## **Abstract**

Two pilot studies led to the adoption of the JISC Plagiarism Detection Software, TurnitinUK, in the School of Biological Sciences at the University of Leicester. Successful implementation relied on well established systems and procedures for dealing with plagiarism. The rate of detection of plagiarism increased with the initial introduction of automatic scanning, though recent data suggest that the incidence of plagiarism is now in decline. Our results on the rates of plagiarism detected over the last three academic years suggest that the JISC PDS is an effective means of both detecting and deterring plagiarism. However, self-plagiarism by students now appears to be occurring in a significant number of cases and offers a new challenge to our policies and teaching.

## **Introduction**

Since Franklyn-Stokes and Newstead opened the debate on plagiarism in Higher Education in 1995 with their study of cheating behaviours, there has been increasing interest in the press and amongst the public in the issue. More recent studies have acknowledged increases in student plagiarism (Park 2003). Culwin and Lancaster (2001) observed that institutions were taking two different approaches to this problem, either 'proactive' or 'reactive'. Increasing use of online submission systems for assessed coursework has led us at the School of Biological Sciences at Leicester University to take a proactive approach. A carefully worded plagiarism statement had been included in course booklets for several years, and well-trying disciplinary procedures were already *in situ*. We therefore felt it appropriate to look at measures to detect and deter student plagiarism before online submission became widespread within School.

The School of Biological Sciences at the University of Leicester comprises four departments with 600 undergraduate and 100 taught postgraduate students taking a total of 13 degree streams. In operational terms for undergraduate teaching, these four departments act as a federal structure with the Board of Studies at its heart. The School has employed a dedicated Web Resources Development Officer who provides support for online learning technologies to all academic staff. This has provided the School with the facility to thoroughly investigate new technologies without distracting from teaching time and to provide local dissemination and advice on policies and procedures.

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The JISC Plagiarism Detection Service ([www.submit.ac.uk](http://www.submit.ac.uk)) was adopted at an institutional level in October 2004 and the School of Biological Sciences was first at the University of Leicester to use it.

### **Piloting of the JISC PDS**

The JISC Plagiarism Detection System (JISC PDS) was trialled initially through a retrospective survey of previously submitted coursework. The work was carried out using a combination of direct submission through the submit.ac.uk website and the early building block available for Blackboard (a piece of third party software which provides a seamless link between the Blackboard virtual learning environment and the JISC PDS TurnitinUK service). The pieces of work were checked for any identifying information and student names and usernames were removed. The work was then coded by number and submitted anonymously to the JISC PDS. The items submitted included second and third year undergraduate essays, second year undergraduate practical write-ups, all collected during the previous academic year, and a small number of PhD first year reports. In addition, some test material was created that contained extracts copied from online sources, including peer-reviewed journals, with copy-pasting and some poorly worded paraphrasing.

The undergraduate work had already been marked and, in some cases, plagiarism had been detected. The JISC PDS found all but one of the cases found by the markers, confirmed one suspected case and alerted us to two previously undetected cases. In this initial small-scale trial, the detection rate was 2.06% (n=2 out of 97 submissions tested), representing 18% of the total cases of plagiarism detected that year. The plagiarised sections of the specially created samples were all detected as expected.

Following this success, a second 'live' trial was carried out. Nine module convenors volunteered to use the system on coursework during their modules. A total of 12 undergraduate (first, second and third year) and 2 postgraduate modules were involved in the study. Two methods of collection and submission were used. All courses had a Blackboard site in use and in all cases the students used Blackboard to submit their work for marking (in addition to a hard copy). Some of the modules employed the Blackboard building block for Turnitin (version 1.05), which allows the students to submit their work directly to JISC PDS for scanning, others used the assignment feature to collate the work and then the module convenor submitted the files manually to the submit.ac.uk website. Submission was not anonymous by either method. Students were notified of the purpose of the trial and completed an online submission form that included the School's standard agreement statement regarding plagiarism.

In all, 513 pieces of work were collected from approximately 465 students. The majority of the assessments were essays, though the study included some practical reports, mini reviews, assessed online discussion board postings, final year projects and tutorial essays, written under open book conditions live online.

Results were viewed and interpreted by the module convenor. In this first proper year of use, the detection rate rose to 2.73% (n=14 out of 513 submissions tested), representing 40% of the total number of cases detected. As this was still a trial year,

not all work was universally submitted to the TurnitinUK system; therefore cases were still detected using traditional assessment and marking methods.

Convenors commented that the JISC PDS appeared to prevent plagiarism during the trial. In one module, the convenor had demonstrated the system, showing the coloured matching text and side-by-side view in an early lecture in his module. Students were told that this system would be used for all their work for that module. Three timed tutorial essays were written online, under open book and 'open computing' conditions. This meant that students were faced with being able to copy and paste during the tutorial. However, not a single case of plagiarism was detected on this module.

### **Full Implementation**

The results of the live trial were presented to the School's Board of Studies. This led to a recommendation that all second and third year coursework, where possible, should be submitted to the system for scanning. It was felt important that all work be submitted in order to provide fair treatment for all students. The subject was raised at Staff-Student Committee where students gave the system their overwhelming support, agreeing that severe penalties be imposed when plagiarism was discovered.

This policy of scanning all second and third year work was implemented in October 2005. All students were given copies of the documentation recommended by JISC Plagiarism Advisory Service for the TurnitinUK service in their module handbooks and Returners packs at the start of the academic year. First year students received teaching about plagiarism, citation and referencing in a key skills module at the beginning of the first semester. Teaching is specifically directed at prevention of plagiarism (Willmott and Harrison 2003). Students were also shown an example originality report from Turnitin to demonstrate how the system can detect copying. Students are reminded about plagiarism and good citation practice throughout their degree and our own feedback surveys demonstrate that 97% of students report that they understand both what plagiarism is and the School's policy on plagiarism.

Students submit their work electronically through Blackboard (using the new TurnitinUK building block 2.05.02) in addition to providing a paper copy. Spot checks are made to ensure that paper and electronic copies match. Paper copies are collected primarily to comply with existing feedback mechanisms and because the majority of academic staff still read paper copy when marking. Convenors check the originality reports prior to marking in order that any plagiarism can be dealt with in an expeditious manner. Full details of the procedure for reporting cases were made available to staff and students on the School Office Blackboard information site and circulated widely throughout the School via the degree teaching teams which report to the Board of Studies. Any suspected case is passed to the Chair of the Board of Examiners and the Director of Studies who provide a consistent level of analysis of the originality reports and keep a record of all cases. Penalties depend on the year of study and extent of the offence, though the standard agreed penalty is to reduce the mark for the work to zero. When a case is confirmed, the student is notified by letter of the identification of the plagiarism and the decision regarding the marks. The letter also includes an official warning that is recorded on the student's file and he or she is directed to their personal tutor to discuss the matter. The student is also offered the opportunity to attend a hearing, if they believe they have grounds for

appeal. Where a student is a repeat offender, they will be required to attend a hearing and the case is sent to the University Registrar as a university disciplinary matter. In cases of collusion between students, a hearing may be necessary to determine the direction of the copying.

Good progress has been observed to date. The total number of cases and the detection rate fell to 0.94% (n=10 out of 1060 submissions tested), representing 71% of the total number of cases detected (Badge, Cann *et al.* in press).

All third year undergraduate projects were submitted to the JISC PDS for scanning in May 2006. This a culmination of a 3 month laboratory or literature-based project to research in depth a particular topic and gives the students experience at academic research. The reports are up to 12,000 words in length and are written in the style of a doctoral thesis. Students were instructed to remove their reference list and submit a single file of less than 10 Mb (the upload limit of the system). The majority of projects were laboratory-based and therefore many of the write-ups contain images which have been scanned from photographs or produced digitally by research equipment. These files are usually of high resolution and can become very large in size when inserted by inexperienced students into their write-up. We therefore recommended that students remove all images from their work, leaving figure legends in place. This was a simple instruction for the students to follow and ensured that the upload limit was met. Students were required to submit two bound paper copies of their completed project containing all references and images. Clear instructions were given that only submission of both paper and electronic copies by the deadline would constitute full submission of the project and that both formats should be identical.

Spot checks were carried out and 13 of 144 submitted projects (~10%) were examined in detail to establish that paper and electronic copies were identical. All but one of those checked were identical. One copy had a few extra sentences included in the paper copy, but this was not a significant change to the overall project. Of the 157 undergraduates submitting projects, 144 were uploaded to the system by the deadline. A further 7 students were granted permission for a deadline extension by the Director of Studies and four students failed to submit within the deadline. Only two students provided a paper copy without an electronic copy.

The resulting originality reports were all checked by the Web Resources Development Officer and the project co-ordinator for each department involved. Overall, only one student was found to have substantial plagiarism in their report and this was dealt with through the usual disciplinary procedures. This reflects a detection rate of 0.69%, which is much lower than that detected in regular coursework. In general non-originality scores were very low with 48% of students submitting reports that generated a non-originality score of less than 3.8%. The spread of scores can be seen in the histogram in Figure 1.

As is often the case when using TurnitinUK, simple scores of non-originality cannot be used as a direct indicator of plagiarism. For example, several students did not follow the instructions and submitted reports with a full reference list. Some adjustment within the TurnitinUK system can be made for this if the student has used the header 'references' at the start of their list. However, not all students did

this and so the highest scores are those reports which could be manually adjusted within the system to remove the reference list. The report which did contain plagiarism had a non-originality score of 28% (and no reference list) and contained several copy and paste paragraphs from outside material. Higher scores (up to 20%) were obtained in some reports simply by the coincidence of technical language, results tables or materials and methods sections.

Interestingly, 11 reports showed some degree of self-plagiarism where students had re-used extracts from their own coursework essays (which accounted for between 2 and 5% of the total project report). This was only possible to detect since all coursework had been submitted to TurnitinUK and retained as part of its comparison database. These students were not penalised in this instance as this type of plagiarism had not been detected before and would be unlikely to be detectable by non-electronic methods. It has also never been discussed with students or staff and raises another area for use to reflect on and modify our practices in the future.

### **Conclusions**

This paper presents a case study where careful implementation of an electronic detection system in combination with focused teaching and well thought out policies and disciplinary procedures have resulted in a reduction in the incidence of plagiarism to levels well below those reported in the press (Shepherd 2006) and through academic questionnaire and attitudinal surveys (Franklyn-Stokes and Newstead 1995; Marsden, Carroll et al. 2005).

While the incidence of copying from external sources has decreased, an interesting trend for self-plagiarism has been detected. This has been recently highlighted in the academic world by high-profile journals seeking to use electronic detection methods to scan papers submitted to them (Giles 2005). A recent evaluation of the TurnitinUK used only voluntary submission work and recorded a score 1.5% of papers submitted containing serious plagiarism (Evans 2006). In this study we required that all assessed work submitted for plagiarism detection, whether in the live trial during the pilot phase or during the full scale implementation during 2005/6, was submitted. Our reported rates are therefore a true and accurately measured reflection of the degree of plagiarism in the work of our students. Deterrence, combined with detailed teaching regarding plagiarism itself and also guidance regarding note-taking and referencing, is clearly leading to a decrease in incidence and new, previously undetectable behaviours, such as self-plagiarism, are now being observed. Reflection on these new data will provide us with evidence to shape future teaching practice and disciplinary policy within the school.

Successful implementation has come from a combination of thorough testing, in-house specialist technical support, high-level policy commitment and careful monitoring. It is widely recognised that a holistic approach throughout the institution is now required when dealing with plagiarism (MacDonald and Carroll 2006). To this end, this study has served as a case study to disseminate practice throughout the rest of the institution.

We have presented clear evidence that this system and the publicity associated with it has a marked deterrent effect on the incidence of plagiarism in electronically composed and submitted work. Whether this effect will be continued in the long

term is impossible to say at the present stage. Are we entering into an arms race with students where software products will be introduced to overcome these electronic policemen?

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Figure 1: Histogram showing the spread of non-originality detected in student project dissertations. Only one report was deemed to have sufficient plagiarised content to warrant disciplinary procedures, its position in the spread is annotated with a red arrow.

**Histogram of non-originality scores**

