LTC15D162

Title:	**Report on the operation of a 'pilot' of batch screening in MED using SafeAssign**
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Issue

In 2014/15 University LTC endorsed a 'pilot' of batch screening using the University's approved text-matching software (SafeAssign). The pilot was carried out during the 2015/16 academic year, with the activities focused in the spring semester (Jan-March) 2016. Prior to the pilot, the ADTP set-out for the School a set of parameters for the pilot which were intended to ensure that the usefulness and value of the pilot's 'outputs' were maximised. These were communicated to the School in October 2015, and again in April 2016. The parameters set-out were as follows:

The report should address the following:

> 1) Which modules SafeAssign was 'piloted' on during 2015/16.
> 2) Means employed to train markers on use of SafeAssign for batch screening purposes.
> 3) Means employed to train students on how to self-check using SafeAssign prior to submission.
> 4) Means employed to ensure that students and staff were properly briefed on the 'Pilot' – e.g. understood the rationale/purpose of it etc.
> 5) Feedback from students on the Pilot.
> 6) Feedback form markers, moderators and other staff in MED on the Pilot – e.g. on using BB for online marking, effectiveness of SafeAssign itself as an additional 'check' on possible infringements of the P & C Policy.
> 7) Comments/feedback from the Plagiarism Officer, focused especially on:
>> a. Things that went well during the pilot
>> b. Things that went less well – learning lessons for the future?
>> c. Initial plans for use of batch screening in MED for 2016/17.
>> d. Things that MED has learnt that will be particularly useful for other Schools of Study to be aware of in terms of wider use/roll-out of batch screening outside of FMH".

An initial draft of the pilot report was considered by TPPG on 2 June 2016. At this meeting TPPG members expressed some concern that the report was somewhat imbalanced, with a greater emphasis on the online marking process and the technical issues associated with this, and drawing comparisons between the respective performance of SafeAssign and Turnitin.

There was less emphasis on the learning lessons associated with the operation of batch screening (using SafeAssign in this instance) which might prove useful for other Schools wishing to utilise batch screening in the future.

The ADTP conveyed these concerns to the Deputy Head of School and requested a revised draft for LTC. A revised draft of the report on the batch screening pilot has been provided by the School accordingly (attached). University LTC is asked to consider the content of the report.

The report's contents remain largely focused on the operation of online marking, and the comparisons between SafeAssign and Turnitin. The final section (Section 5) has been slightly revised and includes some limited conclusions and recommendations. These are summarised below.

Online marking
- MED's experience of using online marking has been positive, though the need for some enhancements in reporting within BB has been flagged, both regarding completion rates of marking, and for merging of results with email.
- Turnaround times worsened mainly due to dependency on IT support to extract results for reports, but once these issues have been addressed some efficiencies could be gained and quicker turnaround times achieved.
- The need for improved computer facilities was highlighted.
- MED provided a help-sheet to students explaining how to self-submit coursework to SafeAssign and how to interpret the OR. It also provided a drop-in guidance session which was very poorly attended. Only around a quarter of the students consequently took advantage of the self-check opportunity by accessing the MED Feedback BB site.

SafeAssign vs Turnitin
The report highlights the following:
- Use of SafeAssign for detecting matches to a student's own submitted text was more useful where the text was submitted unchanged.
- Where text was edited before resubmission the performance of SafeAssign was variable.
- Turnitin was more consistent in terms of display of matching or partial matching than was SafeAssign, and Turnitin's matching scores seemed to reflect more closely the observed highlighted text within scripts.
- Use of SafeAssign for detecting copying of external text has not been successful: detection of known copied text in some scripts was poor and inconsistent, varying both within and among scripts.
- The School has expressed concerns about the effectiveness of SafeAssign as an educational tool for students, and as a tool for detection of possible plagiarism.
- Use of text-matching software whose results are more interpretable and consistent than those produced by SafeAssign would possibly have some educational value for students and be more conducive to wider staff involvement in screening of coursework.
- The value as a deterrent to intentional plagiarism or collusion may also be greater if a more effective software were used.

Batch screening
- The operation of batch screening is likely to be software-dependent – i.e. the value gained from submitting whole batches of student coursework to a TMS system will be largely determined by the effectiveness (performance) of the TMS system employed.
- The feasibility of screening the whole cohort of 168 scripts for matched text was positively established.

- The PO and the Module Lead reviewed a 10% 'sample' of the Originality Reports (ORs). This included 3 scripts with OR scores of 10% or higher. This approach – i.e. only considering a small sample of ORs – may not meet the needs of some Schools, who will prefer to look at all ORs in modules where batch screening has been utilised.
- The time taken to review the ORs for each script was 4.5 mins. Analysis of 168 scripts would take 12 hours and 40 minutes. Time taken would be greater still if more 'matches' were detected.
- The main issue for Schools considering use of TMS in this way seemed to be the resources needed to evaluate the results of the matching.
- There might be some value in submitting whole cohorts ('batches') of scripts to SafeAssign for crude detection of between- and within-student copying. However, since looking at all ORs may be impractical for some courses and considering the problems interpreting SafeAssign's overall scores, doing this would present practical (resource) difficulties.
- If we assume the experience in MED is likely to be instructive, and assume 5 mins to review each OR, an average cohort size of 50 scripts the time taken to review all the ORs would add just over **4 hrs (total)** to the marking time

Recommendations:
The report provided by MED on the pilot of batch screening has flagged some important issues that LTC will need to take into account when considering how best to 'roll-out' batch screening more widely within the University. Several Schools has already expressed a desire to utilise routine batch screening in 2016/17, but it is important to consider the **implications** for students and staff.

1) **Which modules?** – Schools will need to consider the extent to which batch screening needs to be employed in order to achieve an appropriate balance between academic rigour/scrutiny and staff workloads. Batch screening will add additional tasks (and therefore staff time) to the marking process and will require staff to access appropriate training. It will also require appropriate briefings for students and the use of self-checking using TMS systems is likely to need to be 'embedded' in the teaching of modules. It is strongly recommended, therefore, that Schools consider 'targeting' a small number of <u>key modules </u>for batch screening. Batch screening can only be employed using SafeAssign where scripts are submitted to the GradeCentre in Blackboard, and will only, therefore, be available in modules which employ online marking via Blackboard.

2) **SafeAssign or Turnitin?** – LTC may wish to note MED's comments about the respective strengths of SafeAssign and Turnitin. However, it is strongly recommended that LTC delay making a decision about which TMS system to adopt as its preferred system until its meeting on 6 July 2016, when the ADTP will be submitting a summative report on the outcome of a wider comparative analysis of the two TMS systems which is involving all School POs.

3) **Student self-checking of ORs** – take-up of this opportunity was low. Schools will need to consider how other strategies can be employed to support and encourage students to utilise the self-check facility in the University approved TMS system in future, if the latter is to be truly useful as a developmental 'tool' for students.
   For example:
   o It may be more effective to build-in sessions on using TMS systems into the timetable or integrate (embed) this as a study-skills learning exercise in a key module.
   o Students might also be given the opportunity of using the TMS self-check as the basis of a formative assignment?

4) **Who considers the Originality Reports?** – In the pilot only the PO and MO looked at the ORs in any detail. Only a 'sample' was considered. However, this is unlikely to be 'scalable'. Schools using batch screening will need to consider how the process of accessing and reviewing the ORs is addressed. There are several different models of practice that could be employed:
   - Model 1 - MO accesses a 'sample' of ORs and flags for the PO any which raise concerns regarding P & C. *This has the advantage of reducing the number of staff who need to be trained to analyse/interpret ORs (only the MO), but means that many instances of malpractice will not be identified in relation to scripts which fall outside the chosen 'sample'.*
   - Model 2 - School POs access a 'sample' of ORs and investigate any which raise concerns regarding P & C. *This has the advantage of reducing the number of staff who need to be trained to analyse/interpret ORs (Only the POs), but means that many instances of malpractice will not be identified in relation to scripts which fall outside the chosen 'sample'.*
   - Model 3 - MO accesses all the ORs and flags for the PO any which raise concerns regarding P & C. *This has the advantage of reducing the number of staff who need to be trained to analyse/interpret ORs (Only the MO), and ensures that all ORs are scrutinised, thus maximising the likelihood of instances of academic malpractice being identified across the whole cohort.*
   - Model 4 - Each marker access the ORs for the scripts allocated to them for marking. Each marker subsequently flags for the PO any which raise concerns regarding P & C. *This has the advantage of ensuring that all ORs are scrutinised, thus maximising the likelihood of instances of academic malpractice being identified across the whole cohort. It also means that all markers take responsibility for scrutinising ORs, so the process become a collegial one. However, it means that the time taken to analyse ORs will add c.5-10 mins to the marking time for each script.*

   LTC may wish to propose that all Schools adopt a single Model (e.g. Model 4), or it may wish to allow greater flexibility, and allow Schools to adopt whichever 'model' they wish. When doing so, LTC will need to weigh the conflicting benefits of allowing some variance in approach with the need to ensure that students are treated consistently.

   Although the implications for marking time are not under-estimated, the ADTP's view is that Model 4 constitutes the most sustainable and desirable approach. It is one that is also widely employed in other HEIs.

5) **Training implications** – It will be important for Schools to recognise that whichever 'model' of facilitating access/scrutiny of ORs they choose, there will be training implications for staff and students.
   - Models 1-3 greatly reduce the training implications, limiting it to only <u>one</u> key staff member (PO or MO).
   - Model 4 will require <u>larger teams</u> of markers to be trained so that they are confident in accessing, scrutinising and interpreting the ORs generated by the University'.
   - Regardless of which 'model' is adopted, students will need to be briefed appropriately on accessing/interpreting ORs, and using the latter as a learning or developmental tool.

Resource Implications
The wider roll-out of batch screening will involve significant resource implications. These include:
1) Need to provide training to staff on accessing/interpreting ORs.
2) Need to develop high quality training materials for use in dedicated staff training.
3) Need to provide briefing to students on accessing/interpreting ORs (self-checking).

4) Staff time involved in accessing/interpreting the ORs during the marking process – in a cohort of 200 students this would add at least 16 hours to the marking time required (i.e. minimum of 5 mins per script). If there scripts were divided between 5 markers this would involve an additional 4 hrs per marker.

Risk Implications

There is a risk involved in not roll-out batch screening – namely that examples of academic malpractice will be less likely to be identified in the future.

This could pose serious risks to public safety, for example, on programmes like the MBBS and other vocational programmes where students progress into health-related professions.

Several external examiners have highlighted the importance of Schools being able to use batch screening in future as a means of checking for possible cases of P & C.

Equality and Diversity

The recommendations set out in this paper are unlikely to have any disproportionate impacts on students with protected characteristics.

Timing of decisions

Any recommendations approved by LTC will inform the operation of batch screening from 2016/17 onwards.

UEA Pilot trial of Screening submitted coursework for matched text:
Use of SafeAssign in Blackboard
Report to LTC from MED, June 2016

1. Background
The University agreed that MED be a pilot School for use of Text-matching software (TMS) in screening-mode to help detect possible cases of plagiarism and collusion in submitted coursework. This is currently approved for Year1 MB BS (a cohort of around 168 students). LTC agreed in October 2015 that the Blackboard product SafeAssign would be the only TMS available for use in UEA. Student submission of scripts for marking was required to be directly into Blackboard (BB), and marking to be done online in BB, as a pre-requisite for this trial of screening coursework using SafeAssign. None of these had been done previously in MED. Conclusions made about screening coursework using TMS are likely to be dependant on the software used in this pilot.

The MB BS Curriculum Delivery and Design group were informed, and the MB BS Assessment Group was updated with plans at every meeting since July 2015. In the Nov 2015 meeting it was agreed that the screening using SafeAssign would be limited initially to the Portfolio Report assignment (a personal reflective account). This was because the ability to have several markers per script, as done previously with another Year1 assignment, could not be achieved using online marking in BB. The only other coursework assignment in Year1 is an oral presentation after submission of Powerpoint slides.

The original plan was to start with the summative assignment in April 2016, however a test run was able to be carried out with the formative Portfolio report (submitted Feb 2016). The summative assignment was double in length and was allowed to include the text submitted for the formative assignment.

2. Online marking
Although there are advantages to marking online in BB, some unexpected disadvantages emerged during planning discussions with the CTEL IT team. These included lack of:
(i) a facility to link reports on a student's marks to any system which would allow mail-merge with emails to both students and their advisors (who are often external to UEA and cannot access BB to look at their advisees' marks);
(ii) a system for recording the marks attained by individuals for each sub-section of an assignment, as required by the MED Assessment team;
(iii) an internal verification in the online marking system that each section of an assignment had been marked. It would therefore not be possible to detect whether marking of any assignments was incomplete.

The IT team worked to adapt the BB system to accommodate MED needs in these areas. A working group was established for year 1 portfolio report marking which consisted of Jessica Bray (MED Module lead), Ian Davis (IT), Alicia McConnell (IT),

Emma Ogle (HUB) and Paula Didwell (MED), with Jessica Hinton (MED) and Sarah Reynolds (HUB) joining as required.

Through discussion around the current system for marking the IT staff were able to develop the BB system as follows:

- The current mark sheet was converted into two separate Rubric formats, one to grade and one for feedback;
- Data were collated from marking in BB several times during marking by Ian Davis, and transferred into spreadsheet format for checking of marking completion, and for email merge;
- Since laptops were to be used for marking and the small screens allowed only 1 rubric to be opened at any one time, a paper version of the mark sheet was to be made available for assessors as prompts -- the view on screen was adjusted to maximise space for script text;
- 'Smart groups' in the grade centre were allocated to PBL groups, analogous to   previous allocation of paper scripts to markers.

Due to the lack of availability of computer rooms for Portfolio report team-marking days, the CTEL team kindly made their new facility and several laptops available.

Online submission into BB required the LTS team to develop a set of new instructions to students for submission.

All students accessed the site and submitted documents in good time; those asking for a second attempt were able to contact Emma (HUB) and arrange this. Three submitted scripts were discovered on marking day to be blank upon opening. There was no pre-warning of this problem, but subsequent resubmission by the students was successful.

Online marking was carried out on the formative Portfolio report assignment on 3 February 2016, led by Jessica Bray. Assessors were informed by email about the changes to marking upon recruitment; none declined to take part in the marking as a result of the change from paper to online medium. All assessor training took place on the marking day, which did not include viewing SafeAssign Originality Reports, due to time constraints. Markers were, however, asked to report any SafeAssign originality scores over 10%. The Module lead developed a flowchart for assessors to use on the day which gave stepwise instructions on how to use the new system. Nine assessors attended marking day, most completing 20 papers each in half a day. Full IT support was available all day by the CTEL team. Assessors found the system straightforward to use: they were able to read scripts and open rubrics.

Several BB glitches emerged during the marking process which required IT team assistance:

- the option to view with names hidden often did not work – an alternative view using full screen was used to cover the student names
- BB seemed to move the assessor out of their allocated smart group and into the grade centre without warning – as a consequence the assessors were marking

randomly within the grade centre, and could not go back and check their marking. This also caused confusion for allocation of marking.
- Data collation into spreadsheet to check rubric completion was time consuming and required the IT team to complete this multiple times during the day.

Answering queries and working through these glitches occupied Ian Davis (IT) and Jessica Bray (MED) all day – no moderation of papers was able to be done on the day as would be usual practice, however all marking was completed on the day.
All assessors were positive regarding the move to online format – they appreciated the close resemblance to paper format and found the rubric easy to use. Some assessors commented that reading on screen was more tiring than paper format and requests for larger, and ideally double, screens seem appropriate.

Review of the formative trial by the working party led to some additional developments for the summative day:
- Change to flowchart steps to cover issues with hiding names
- Paper list of allocated marking for assessors with PBL groups with student numbers so they could check off and keep record of which papers had been marked
- Reduce word count of spreadsheet headings to speed up collating of data

Summative marking day on 16/3/16 worked well overall – some assessors were new but some had marked on the formative day; strategies to help with glitches worked well. There were evidently few problems with student submission; 1 blank document was found, but the student successfully resubmitted. Moderation was able to take place on the day as there were fewer assessor queries. Access to scripts for moderating is good, but there is no system for indicating which papers have been moderated and recording of the process for the moderator report has to be done manually. There was some delay with release of results due to Easter holidays and the dependency on IT support to produce the spreadsheet.

Recommendations for possible future use:
- Data collation into spreadsheet needs to be in a format so that MED/LTS staff can produce it for email merge, but it would also be ideal if each assessor could check completion of their own marking or at least if the Module lead could run a report at any point.
- Larger screens are essential to make reading text and rubric completion easier.

3. Student access to SafeAssign
Students were notified in the lecture on avoiding plagiarism in Week 3 (Oct 2015) that their work might be screened using TMS in a trial of this procedure in MED. The MB BS Student-Staff Liaison Committee (SSLC) had been consulted on the idea of the screening pilot in May 2015 and were in favour, as long as they could self-check their work with the same software before submission. The chair of the SSLC was invited to a planning meeting (Jan 2016) with academic, LTS and CTEL staff, and was invited to comment on the accessibility and usefulness of SafeAssign, as well as to broadcast to all students that this facility was available for self-checking. She did not provide any comments, despite a prompt a few weeks later.

The IT Team set up a section of the 'MED FEEDBACK' BB site for students to use to check drafts of their work via SafeAssign before submitting it to be marked. This was available to all MB BS students to use on a continuous basis. It was set up in 'Draft Mode', in which scripts are compared with, but not submitted to, the SafeAssign database. Students' summative assignment would therefore not be compared against their own formative submission.

The IT team included some instruction on the BB site, based on information available online from BB, on how to submit a document to SafeAssign, how to access the Originality Report (OR), and some basic information on interpreting the OR. The PO added caveats that the tool is not perfect, may not detect all copied text, and that highlighted matched text may not necessarily be plagiarised. The 'overall' and 'sentence-by-sentence' matching scores produced by SafeAssign are uninterpretable even with the information available from BB, and so it was difficult to provide any further useful information for either staff or students using the software.

Yr1 students were emailed a week before their formative submission date that this facility was available, and that a support session would be held in a computer room two days before submission date, in case they needed help with submission or with interpreting the results of the OR. Three students attended. In total, 45 (27% of cohort) Yr1 students accessed the MED FEEDBACK site between the time of the email and the assignment submission time. No comments or queries were received from students about use of SafeAssign, nor at the feedback lecture on the assignment.

Opinions of the entire cohort of Year1 MB BS Students are being asked on the usefulness of Safe Assign in the pre-checking pilot, but the results of this wave of the annual course evaluation survey will not be available until July 2016.

4. Screening of work using SafeAssign
Readers of this report should note that this evaluation did not assess plagiarism, which requires a judgement as to sufficiency of acknowledgement of use of sources. Instead, it assessed effectiveness of matching, and of display of matching, of verbatim-copied text.

4.1 Online display and accessibility of Originality Reports (OR's)
The online submission into BB enabled the original aim of screening of the whole cohort of students' work with SafeAssign. SafeAssign allows viewing of the entire cohort's 'overall SafeAssign scores' (percentages which have unclear meaning), and for instructors to click on any score to view the OR. This display includes student names. The formative assignment OR's were instead accessed via the GradeCentre, which allowed hiding of student names, but is a more laborious process.

Between submission and formative marking day, the Module lead and PO randomly selected 10% of the cohort, and together looked for their ORs on the Grade Centre

(names hidden), accessing them by Reg ID. Overall SafeAssign scores ranged from 0 to 9% in this random sample of the formative assignment. 0% was the result in 11/17 (65%) scripts. In addition the three scripts reported by markers to have a score above 10% were examined (maximum score in the cohort was 30%). The time taken to review the OR's averaged 4.5 mins per script. At this rate of review, looking continuously at a whole cohort of 168 scripts would take 12 hours and 40 minutes. It would take longer if more matched text were detected. In view of the questionable value of examining ORs produced by SafeAssign (see below) wider staff involvement was not sought in the summative assignment.

4.2 Display of matching in OR's

Clarity of SafeAssign's ORs leaves much to be desired. SafeAssign highlights a whole sentence wherever it finds a match, even if the match were only a fragment in the sentence. A 'sentence matching score' (a percentage) is assigned whose meaning is also unclear. It is left to the user to determine which part of the sentence has been copied, by comparing the student's sentence against an excerpt of the suggested source. Clicking on a highlighted section on-screen can take the user to the suggested source, but the downloaded version of the report is not clearly labelled as to which source was identified for which highlighted section of text.

4.3 Detection of matches to external source material

SafeAssign demonstrated poor performance for detecting external sources. The overwhelming majority of what SafeAssign detected, in both formative and summative assignments, was in the reference lists (bibliographies) of the students' scripts, and in the text a few commonly used phrases, and section headings. **Detection of copied text was inconsistent**: in one script one verbatim-quoted sentence and two section headings from a General Medical Council (GMC) online document were highlighted, but in five other scripts, sentences and phrases copied verbatim from GMC websites were not detected – despite being freely available via a search with Google or Bing. GMC website URLs appearing in the reference lists were highlighted in some scripts but not highlighted in others. This inconsistency in matching text was also observed *within a single script* where only some of the phrases copied from the same online source were detected. Such inconsistent matching raises concerns about fairness in detection, and does not provide a healthy educational experience for students learning about plagiarism.

The highest overall SafeAssign score in the formative assignment was 30%. In this script, all but one of the matches were in the reference list. The only match occurring in the text of the script was "*However, I have begun to work on strategies to become more efficient*". SafeAssign matched this with (at 66% probability), something in 'another student's paper': "*However, I have begun to work on them*". This OR was a 'red herring'.

In the summative assignment, the distribution of overall SafeAssign scores over the whole cohort ranged from 0% to 36%, median around 8%. In the script with the highest score all the matches found were fragments in the reference list, also a 'red herring'.

Due to SafeAssign's propensity to match items in the reference list rather than in the text (documented also by other users elsewhere) it seems that higher values of SafeAssign's matching scores actually indicate good, rather than poor, referencing practice for this assignment.

4.4Detection of matches to students' own previously submitted text
In a separate evaluation, deputy-PO for MED, Jane Skinner, submitted a small random sample of scripts from the formative assignment back into SafeAssign. When originally submitted by students these were not stored in the SafeAssign database. Scripts from the summative assignment were, however, stored. Re-submission of the formative scripts would allow matching of these against the same student's summative scripts, which were allowed to include text from the formative assignment. The aim of this test was to evaluate the ability of SafeAssign to detect matches within- or between students (eg. in sharing of material across years of the course, or for self-plagiarism). This is a major concern for this particular assignment, and has occurred in previous years.

Access to Turnitin, a very commonly used TMS in UK HEI's, was also available for this evaluation, and the same sample of scripts was submitted to Turnitin as to SafeAssign, in the same order. Reference material was included in setting up the matching in Turntin, to compare fairly with SafeAssign's default (and unmodifable) situation. Turnitin provides a percentage 'similarity index' for each script which is the percentage of text in the document which has been matched to another source in its database.

The overall matching scores resulting from these test-submissions to the two Text-matching Softwares are shown below:

Student	Formative vs summative		Summative only		Formative only
	Turnitin	SafeAssign	Turnitin	SafeAssign	SafeAssign
1	45%	62%	8%	25%	0%
2	88%	100%	8%	11%	2%
3	90%	100%	12%	30%	7%
4	43%	65%	5%	7%	0%
5	50%	62%	4%	2%	1%
6	43%	56%	5%	11%	0%
7	37%	45%	10%	6%	0%
8	50%	45%	11%	23%	0%
9	55%	74%	11%	32%	9%
10	96%	100%	15%	23%	22%
11	58%	69%	5%	0%	1%
12	98%	100%	6%	1%	0%
13	35%	53%	9%	19%	13%
14	54%	76%	8%	2%	4%
15	76%	100%	1%	5%	4%

In the comparison of scores for summative assignments without comparison to the students' own formative assignments ('Summative only'), SafeAssign scores were universally higher than Turnitin's. However, comparison of detected material in the text of the scripts did not correspond with the scores: SafeAssign and Turnitin appeared to be detecting similar amounts of matched text in these scripts.

Upon re-submission of the students' own formative assignments, the scores for the formative assignments ('Formative vs. summative') rose as expected in both softwares, reflecting detection of the student's previously submitted material. Again, oddly, scores displayed by SafeAssign did not seem necessarily to reflect the highlighted matches: for instance those with scores of 100% did not highlight the entire text. In contrast, for those scripts with near-100% 'similarity index' Turnitin highlighted almost the entire script, apart from a few scattered words or phrases which can be seen to have been altered between formative and summative submission.

Where sentences in the summative assignment had been edited slightly (as might be expected where students re-submit others' or their own work), Turnitin showed matching (or lack thereof) with highlighting on a word-by-word basis while still maintaining the impression that the accounts came from the same source. In contrast, SafeAssign would highlight the edited sentence either wholly, or not at all.

5. Conclusions and recommendations
In summary, the experience in MED has been favourable for online marking, with some needs for improvement of systems for reporting within BB on completion rates of marking, and out of the BB system for merging of results with email. The former reporting system would need to be improved, so that we can ensure our assignment turnaround times reduce, which is one key reason for moving to online marking. Unfortunately, in this trial our turnaround times worsened mainly due to dependency on IT support to extract results for reports. Finally, the need for improved computer facilities was also highlighted.

The feasibility of screening the whole cohort of 168 scripts for matched text was positively established in principle in MED. The main issue for Schools considering use of TMS in this way seemed to be the resources needed to evaluate the results of the matching. However, based on results of the parallel sample evaluation using SafeAssign and Turnitin described in section 4.4 above, the effectiveness of the screening is likely to be software-dependent. Use of SafeAssign for detecting copying of external text has not been successful: detection of known copied text in some scripts was poor and inconsistent, varying both within and among scripts. This can not be recommended as an educational tool for students, nor as a fair tool for detection.

Use of SafeAssign for detecting matches to a student's own submitted text was more useful where the text was submitted unchanged. Where text was edited before re-

submission the performance of SafeAssign was variable at detection. Turnitin was more consistent in terms of display of matching or partial matching than was SafeAssign, and Turnitin's matching scores seemed to reflect more closely the observed highlighted text within scripts.

There might be some value in submitting whole cohorts ('batches') of scripts to SafeAssign for crude detection of between- and within-student copying. However, since looking at all ORs may be impractical for many courses and considering the problems interpreting SafeAssign's overall scores, doing this would present practical (resource) difficulties as to how to use the results.

Use of text-matching software whose results are more interpretable and consistent than those produced by SafeAssign would possibly have some educational value for students and be more conducive to wider staff involvement in screening of coursework. The value as a deterrent to intentional plagiarism or collusion may also be greater if a more effective software were used.

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