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SCOF: A Standardised, Customisable Online Feedback Tool

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Abstract: Increasing pressures on staff, combined with increased requests for feedback from students mean that there is less time to do more things. Investigation into potential methods to assist the staff of the School of Engineering and Mathematical Sciences at City University London in their feedback activities identified that a combination of bespoke feedback combined with a standardised scheme (or rubric) may give the best results. The stand-alone SCOF tool was developed to address this observation and allows staff to create formatted feedback sheets quickly in different environments, using tools ranging from desktop computers to mobile telephones and tablets. It is currently about to undergo an institution-wide evaluation and will subsequently be made freely available to other institutions. This paper outlines the requirements of the tool, its usage, evaluation progress and future work to be undertaken, and includes a link to a public demonstration version of the tool.

Background

Many institutions are finding that worsening staff-to-student ratios; increased student demands for more feedback and formative assessments; and additional demands for outreach and knowledge transfer means that there are increased demands for useful, high-quality feedback yet less time for lecturers to grade and feedback on assessments. At City University London, a further pressure has been added: all grades and feedback must be returned to students within three weeks of the deadline. This so-called "three-week turnaround" will be monitored and staff who consistently fail to achieve this target will be disciplined.

For these reasons, it is becoming increasingly important to find ways that allow highly pressured academics to provide high-quality personal feedback to students efficiently. City University London has recently switched VLE from WebCT Vista to Moodle, and the new system provides a variety of ways to increase the efficiency of providing feedback, such as instant results from quizzes and improved workflows provided by electronic submissions. However in the School of Engineering and Mathematical Sciences (SEMS) there are many assessments that are unable to be submitted online, such as technical presentations, scale models, working compressor pumps, etc. This made it imperative that a method of rapidly providing feedback that was not tied to Moodle was created for use within SEMS.

Investigation into different feedback mechanisms that could supply the requisite flexibility, including audio feedback, electronic handwritten documents, and screen-casts, showed that the current, traditional method of writing individual feedback is the only one that would be suitable for the full range of assessment types used within SEMS. However, it was also noted that standardised feedback schemes (also called "rubrics") provide the necessary rapidity but typically lack the required ability to customise the feedback given to individual students (Stevens & Levi, 2004). To this end, it was decided to create a tool that combines the efficiency of schema-based feedback with the personalisation of traditional feedback methods.

Project Strategy

Investigation of Current Practice / Tool Requirements

The initial investigation prior to the development of the tool was to identify the various types of assessment that take place within SEMS. Assessment within the school is varied and ranges from traditional essays and reports

through to graded practical sessions and the physical construction of engines, aerodynamic test models and models for use in earthquake simulations. Written assessments are well provided for in the Moodle VLE through integrations with external tools, such as Turnitin for plagiarism checking; however, there is less support for the more esoteric assessment types used within SEMS.

The tool needs to be used in a variety of environments, from the desktop computer in a staff member's office through to a tablet computer or Smartphone outdoors (such as when assessing students on field trips) and so a native (e.g. Windows, or iPad) application was not a suitable option; therefore a web-based system was chosen. This meant that the tool would require an Internet connection for use, but with increasing Wi-Fi and cellular coverage this is less of an impediment to the use of the tool than it would have been only five years ago.

The investigation into current practice within SEMS also highlighted the variety of different feedback cover sheets that were in use with the school (and a limited investigation of the rest of the institution showed even more). Therefore, it was necessary that, as well as being able to customise the tool by allowing different criteria to be rated for different assessments, the tool should be able to create output that would fit well with existing formats.

The use of Moodle within the institution is now thoroughly embedded, with students typically expecting to receive their grades through the system. Therefore, any tool developed would need to produce output that can be returned via Moodle. A somewhat related issue is that, within SEMS, students and staff use a wide range of computer operating systems, including Windows, MacOS and Linux, meaning that the output file must be in a common format that looks as similar as possible on all of these platforms.

Feedback schemes are typically used to provide transparency regarding the expectations of graders for a particular assessment in order to guide students towards higher grades (Andrade & Du, 2005). However, there were concerns that the use of traditional 'checkbox' schemes would cause students to question the thoroughness of the marking process and the amount of effort made by staff. For this reason, it was decided that the final output that students received should obscure the fact that a feedback scheme had been used. The use of the scheme would become obvious when students share their comments with each other and notice that they have similar text, but the amount of work performed still feels more substantial when presented with paragraphs of text including links and images.

Tool Overview

The SCOF (Standardised, Customisable Online Feedback) tool was designed to be as quick and simple to use as possible. In order to use the system, it is necessary to have created the required schema through the editing interface. This is shown in Figure 1 and is relatively simple with a tab for each category in the scheme and a text box for each of the five possible levels attainable for the category. There is also an optional set of boxes that allow the range of marks available for each level to be set within the scheme. If the scheme uses 'grade-related feedback' then selecting a value for the category when creating the feedback will allow the user to select the required grade from the relevant range of possible marks, meaning that it isn't possible to give the feedback text from the 'Good' level together with a mark from the 'Poor' level. This helps to ensure consistency between the marks given and the feedback selected.

The editing interface also allows links and images to be included within the feedback text. This is a very important aspect of the tool because the digital nature of the document that is created makes it very easy to provide visual information that would be difficult with a paper version of the feedback form. Links can be used to easily direct students to remedial or interesting resources that can help them to improve their future work.

Title: SCOF demo

Grade related feedback?

Half-marks?

	1	2	3	4	5
Title:	Use of references				
Excellent:	<p>You have selected your sources well. They are varied and of a high quality. You have also used the required style consistently in your paper with few errors. Well done.</p>				Maximum Mark: 10
Good:	<p>Your references are generally of a good standard and there is a good variety of sources used. You make occasional mistakes when writing the references into your paper, but these are relatively minor. You should read these notes on referencing to improve your consistency and achieve higher grades.</p>				Maximum Mark: 8

Figure 1: Creating a New Feedback Scheme

A new scheme can be derived from an existing one, which means that a library of schemes can be assembled over a relatively short time span. This feature also allows for the creation of a core scheme for a particular group, such as a department, and then the specific requirements of individual teaching modules or assessments can be added without needing to re-enter the categories from the core scheme. For example, a core scheme is created with categories related to referencing, strength of argument, etc. and additional, customised schemes can automatically reuse these categories. This increases the efficiency of staff setting up schemes, but also ensures that students receive consistent information across all of their assessments for the core categories, making it easier for students to track their own development.

The fundamental principle of the tool is to work in a streamlined way to optimise the efficiency of the grading and feedback process. For this reason, the process of producing feedback using the tool is broken down into three stages: completing the scheme and generating the basic feedback text (Figure 2); customising the generated text (Figure 3); and producing the final output version of the feedback (Figure 4).

Having selected the scheme to be used the user is shown the scheme in the top half of the screen and works their way through the different categories. If a category is not relevant, it can be left blank or set to 'Not Applicable' and nothing related to it will be shown on the generated feedback. If 'grade-related feedback' was selected when setting up the scheme the grade for each category will be shown at the extreme right of the table for each category (this is not used for the scheme shown in Figure 2). The individual grades and a total grade are then displayed in the relevant position within the generated feedback. Once the selections on the scheme are complete, the user clicks the 'Generate Feedback' button.

After pressing the 'Generate Feedback' button attention moves to the bottom of the screen where the results of the selections (and grades) are added into a rich-text editor for customisation. As shown in Figure 3, the formatting of this generated content can be quite complex with tables, images, links etc. The formatting shown in Figure 3 allows the file to be printed and added to the existing cover sheet for the assessment without it looking out of place – other users of the tool have used their own formats for the same reason.

The generated content is fully editable and can be customised entirely; however, the majority of users so far have tended to perform only minor customisations to increase the relevancy of the text to a particular submission. This is consistent with the need for a tool that allows the rapid creation of feedback and will be most effective when used for large cohorts.

	Excellent	Good	Satisfactory	Poor	Not Applicable
Written paper is clearly and logically presented	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
References use the Harvard referencing system	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comprehensive introduction which provides a clear and concise overview of pertinent information relevant to the chosen patient which has been gathered from the assessment process	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstration and application of thorough biological knowledge which underpins the two chosen aspects of care	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exploration and critical evaluation of current evidence in relation to two aspects of nursing care related to the chosen patient	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Synthesis of theory to promote evidence based care within future practice	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[Generate Feedback](#)

Figure 2: Example Feedback Scheme within SCOF

After editing the generated text to their satisfaction, the user finally clicks on the ‘Create PDF File’ button at the bottom of the page to create the final output file that is returned to the student.

References use the Harvard referencing system

Referencing generally accurate and citations used fairly well throughout the essay.
See link below for further information on referencing.
http://moodle.city.ac.uk/file.php/1610/SCHS_Library_LTC_information/referencing_guides/quick_ref_guide_-_final_version_with_journal.pdf

Overall comment (referring also to the grade related criteria):

This was generally a **well constructed** piece of work, slightly let down in a few areas. You should try to **find sources from a wider sample of the literature** in future because all of yours came from the same journal issue. Your **argument is sound**, and your **position well supported** but take a look at [this paper](#) for a counter-example. Overall I am very pleased with your work here. Keep it up!

MARK	83%
PENALTIES	Penalty Awarded

Late submission per day for 4 days (-5 marks)
Exceeding the word limit will incur the following penalties:
0-10% over word limit - no penalty
11-20% - minus 5 marks.

B I U ABC | | Styles | Format

[Create PDF File](#)

Figure 3: Customisation of Generated Feedback

Figure 4 shows the part of the final PDF file that corresponds to the section of the feedback shown in Figure 3 and highlights how it looks almost identical to the edited content. It was essential that the final file that the students receive be in a commonly used format and look nearly identical on all of the different platforms used in SEMS. The only realistic option for this requirement was the use of PDF files, which also have the additional advantage of being more difficult for students to tamper with and edit. This file can then be sent to the student in a way that is suitable for both the assessment type and the student, such as being printed and attached to the front of a hard-copy submission, being emailed to the student immediately, or being uploaded into Moodle along with any other graded files.

As has been shown, the process of using SCOF has been made as simple as possible in order to reduce the training and support issues associated with the introduction of new tools. One feature not shown in the preceding figures is the ability to upload a Moodle grade book export (in CSV format) in to the tool. This allows the user to select the name of the assessment and of the student and automatically have these entered into the relevant points of the feedback text; the PDF file will also be created with the student's name as the filename instead of the generic default one. One feature, requested by some staff from the School of Health Sciences, was to rank the categories in the generated feedback so that all those with the 'Excellent' level are grouped together followed by all of the 'Good' ones, and so on. This has been implemented in a special version of the tool because it is a very specific request and, until others also raise it, it will not be added to the main version of the tool due to the added possibility of creating confusion when grading.

References use the Harvard referencing system	
Referencing generally accurate and citations used fairly well throughout the essay.	
See link below for further information on referencing.	
http://moodle.city.ac.uk/file.php/1610/SCHS_Library_LTC_information/referencing_guides/quick_ref_guide_-_final_version_with_journal.pdf	
Overall comment (referring also to the grade related criteria):	
This was generally a well constructed piece of work, slightly let down in a few areas. You should try to find sources from a wider sample of the literature in future because all of yours came from the same journal issue. Your argument is sound, and your position well supported but take a look at this paper for a counter-example. Overall I am very pleased with your work here. Keep it up!	
MARK	83%
	PENALTIES Penalty Awarded
Late submission per day for 4 days (-5 marks)	
Exceeding the word limit will incur the following penalties:	
0-10% over word limit - no penalty	
11-20% - minus 5 marks	
21-40% - minus 10 marks	
41-60% - minus 20 marks	
Over 60% - to be resubmitted	
Word count inaccurate or not disclosed (- 5 marks)	
Breach of confidentiality /Dangerous practice (0%)	

Figure 4: Section of Output PDF File

A test version is available at <http://staff.city.ac.uk/~sbbf700/scof-demo/> and can be used to get an understanding of how the tool works and how it would fit into an individual's workflow.

Possible Use Cases

For the current version of the tool, there are several suggested use cases, including:

- Producing feedback during presentations for the student to collect as they leave the room. (Magin & Helmore, 2001)
- Providing links to useful remedial resources to students who are below average in areas of their work.
- Rapidly creating overview feedback to supplement detailed feedback on the original submission.
- Student peer review using directed comments and appropriate language.
- Self-assessment for critical reflection.
- Ensure consistency in the grading and feedback by groups of people, such as Teaching Assistants or less-experienced members of a course team.
- Encouraging the use of positive feedback where work is of a high standard, as well as highlighting areas of weakness.

The last of these is particularly important as the increasing pressure on staff means that there is less opportunity to praise students as the majority of their time will be spent on highlighting errors to the students. Nevertheless there is evidence that providing praise to students when they are doing well can help to further motivate them, though it may have negligible effects on learning itself (Orsmond & Merry, 2011). However, given that the provision of praise through SCOF requires minimal effort, even if the educational benefits are slight there is little penalty in including it.

The flexibility of the tool makes other uses, not listed above, possible for specific subjects. One suggestion from the Mathematics department is to use the tool to provide responses for common mistakes to mathematical problems. In this situation, the user will only select items on the scheme when the related error is made and the students will be given information on their mistake and how to work out the correct solution.

Technical Information

The tool is designed to be as transferrable between web servers as possible and so has relatively simple software requirements with the main one being for a web server with PHP support, including SQLite. The tool uses SQLite, a simple file-based relational database, because it is very lightweight and requires no configuration making it very easy to package as a zip file and move it to a new server.

TinyMCE provides the rich text editing features. This is the same editor used within City University London's Moodle installation, which means that the majority of staff are familiar with it and are comfortable in using it. The PDF generation feature uses the domPDF library and is a pure PHP solution that requires no installation, making it the ideal option to fit with the 'zero-configuration' nature of SCOF. The majority of the functionality of the tool uses simple JavaScript with some actions enabled by the use of jQuery.

As the tool does not have a content management system, it is necessary for any images that are to be used within the feedback to be publicly accessible on the web. These images can then be included in the document by using the 'Insert Image' option in the editor and entering the full URL of the image. While some content management features would be beneficial to the tool, they would come at the expense of simplicity and the ability to easily move/archive/migrate live versions of the tool because additional configuration would be required and the use of a more traditional database server, such as MySQL, would be required.

Evaluation

The tool was developed with input from academics from the Electrical Engineering department, and their comments have helped to shape the initial version of the tool. Extensive promotion of the tool within the institution has recently been undertaken with presentations at school meetings and attendance at school and institutional showcases generating lots of interest across the university. As a result, there are pilot projects running in most of the other schools to investigate how the tool fits with existing practice and the reaction of students to the feedback produced. One school in particular, the School of Arts and Social Sciences, has made the tool a central part of their strategy to encourage the use of Android-based tablet PCs for grading and feedback.

The initial reaction from the Electrical Engineering students was that they appreciated the links to other resources that were embedded within the document. They were not concerned that the bulk of the text was identical for most students, and they were particularly appreciative that they were able to receive high-quality feedback in a time-scale that meant that their work was still fresh in their minds. This is all very encouraging feedback and the few minor issues that were identified (such as link colour, font type and size) have been resolved for future pilot projects.

An institution-wide evaluation will take place early in the next academic year (2012/13), but in the meantime, lecturers are being encouraged and supported in developing schemes for use within the tool. The creation of a comprehensive feedback scheme is a difficult and time-consuming activity as it is essential to cover all of the main aspects of an assessment and to produce high-quality feedback text for each of the possible levels. Some of the academics who have expressed interest in the tool after trying it at events around the institution have been discouraged by the amount of work required to set up their schemes. However, when the efficiency of 'front-loading' the majority of feedback writing during a quiet period of the academic year and reusing it for multiple assessments over the year and beyond is outlined to the person in question they become much more receptive to the idea.

Future Work

There is strong support among staff who have used the tool so far for a version that is more fully integrated with Moodle. Typically, the suggestion is that the tool should be able to place the feedback file directly into the student's record in the relevant module grade book automatically. This would be a beneficial development for most users of the tool, as it would greatly improve the workflow for the main use of the tool. An alternative option would

be to enable the tool to email the output file to students directly, though this might cause problems with any moderation of grades. However, another request has been that the tool store the values entered for each student so that the output document can be regenerated and/or edited later. This is an important feature as it would enable users to pause in their grading work and come back to it later and would further support moderation processes.

Another aspect of saving the values relating to the students' levels of attainment is that it becomes possible to track student progress across modules and years. For example, a report could be created that identifies all of the students who consistently achieve below-average results for specific categories, such as referencing, and this information could be used by personal tutors to support the student and recommend actions to be taken by the student to improve their average (Nicol & Macfarlane-Dick, 2006). This use would help realise the 'Feed-forward' projects that are currently gaining support in many parts of the educational community (Duncan, 2007). This would also enable staff to quickly identify common areas of misunderstanding within a cohort and prepare supplementary material to address this deficiency prior to further assessments; this would be especially useful for courses where there are very large cohorts and more than one person grades the assessments.

A mechanism to import schemes from spreadsheets would help to remove the barrier to entry for many people, as it would make the tool seem less like a completely new process. Instead, SCOF would appear more of an extension to existing practice, which can be utilised when appropriate with minimal effort. Additional work on the interface is also planned as the current interface is primarily functional and it would help to increase motivation to use the tool if this were more streamlined and had an improved aesthetic.

A further improvement would be to support multiple, equivalent pieces of feedback text for each item in a category with SCOF randomly selecting one of the relevant pieces. This would mean that there would be more variation in the output files given to students, which would further the impression that the feedback was all created/compiled specifically for each individual.

Following the initial evaluation and subsequent development based upon the results, it is intended that the tool be released to the community as Open Source. This will allow other institutions to make use of the tool and adapt it to their own needs. Prior to this, however, it is necessary to add some additional functionality to the tool. The most important of these is an authentication mechanism to prevent unauthorised users from using the tool and/or creating and editing schemes. An announcement of the release to the wider world will be made in due course on the SCOF page of the Technology & Educational Development team blog at <http://blogs.city.ac.uk/ted>. However, if there are people who are interested in testing the tool prior to the Open Source release they should contact the author.

Conclusion

The SCOF tool was created in response to increased demands on academic staff from both students and the institution, and is intended to help increase the efficiency of the grading/feedback process while still maintaining the personalisation that students require and expect. Following a very limited pilot and subsequent modification of the tool, it is now being promoted to the entire university in order to identify enthusiastic staff members who wish to test it with their own students. The initial pilot suggested that there were benefits to using the system, both in terms of overall staff time saved and in student response to the feedback file produced by the tool.

SCOF was developed to be as simple to use as possible and contains only three main steps when being used to grade work, yet it also contains a large amount of flexibility and can be used to produce complex feedback forms as well as very simple ones. The tool can also be used to enter grades for each of the categories within a feedback scheme and to generate the total grade.

As a tool developed initially for the Engineering and Mathematics school, SCOF is designed to be used easily on a variety of platforms and environments, and this has also been utilised by other schools with City University London. It is not tied to a particular VLE and so can be used in many institutions to support a variety of feedback and grading activities. The tool is currently being formally evaluated and will subsequently be made available as Open Source software; however, interested parties can try the demonstration version and can contact the author if they would like to evaluate the tool prior to this release.

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SCOF uses the following Open Source projects: TinyMCE online hypertext editor from <http://www.tinymce.com/>; jQuery from <http://jquery.com/>; and domPDF from <http://code.google.com/p/dompdf/>.