



## Evaluation of alternative feedback mechanisms on student engagement with assessment feedback

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This study examined students' perceptions of the usefulness of assessment feedback provided by ReMarksPDF and provides a summary of positive and negative aspects of different types of feedback annotations. Students randomly received one of 7 different combinations of feedback. 74.9% of students found ReMarksPDF feedback better than that they have received in the past and 73.2% of students agreed or strongly agreed that other units should adopt the ReMarksPDF system. Students found the mark tally table, assessment rubric, spider chart, spider chart (with average), colour coding and smileys to be significantly valuable feedback in that order of preference. Females gave higher ratings than males on all feedback types, except spider charts, which were equally highly rated by males. Respondents indicated that ReMarksPDF feedback was easy to read and understand and that it was beneficial to have comments appear in a side column note.

Keywords: Assessment feedback, Electronic marking, ReMarksPDF, Electronic Assessment.

### Introduction

Assessment drives student learning and effort (Kendle & Northcote, 2000) and in turn influences the direction and quality of student learning (MacLellan, 2004). Numerous literature reviews indicate that feedback is critical to improving the standard of student work and learning (Black & William 1998a; Hattie 1999; Heinrich 2006, Huber & Mowbray 2011) and that both formative and summative assessment directly affect student engagement. The structure of assessment designs often includes formative feedback. Feedback, at its best is individual in focus, outlining strengths and weaknesses and avenues for self-improvement (Linn & Miller, 2005; Heinrich 2006). Electronic feedback management systems such as ReMarksPDF offer opportunities for improvement in assessment practice and outcomes for students, including:

4. E-submission, allocation, marking, moderation and assessment return via a learning management system
5. Extensive annotation and commentary features, including rubrics, stamps, electronic dashboards and charts
6. Links to electronic portfolios classified by learning outcomes or graduate attributes
7. Quality management including consistency, reporting, and self-reflection

The purpose of this research was to determine students' perceptions of the usefulness of alternative forms of feedback provided using ReMarksPDF, an advanced PDF annotator for Windows, Mac and Linux, developed

with the assistance of the ALTC – see [www.remarkspdf.com](http://www.remarkspdf.com). ReMarksPDF is an enterprise system (Blackboard 9.1 and Moodle 2.1) enabling e-submission, allocation to markers, marking (text, audio and video comments, colour coding, smart charts, stamps etc), extensive moderation, and return of assessment to students and marks to gradebook.

Figure 1 depicts the three main types of feedback examined in this study - Spider Chart, Spider Chart (with average) and Smiley (Highly negative, Negative, Neutral, Positive, Highly positive). Refer Figure 1.



Figure 1: Spider chart, Spider chart (with average), Smiley scale

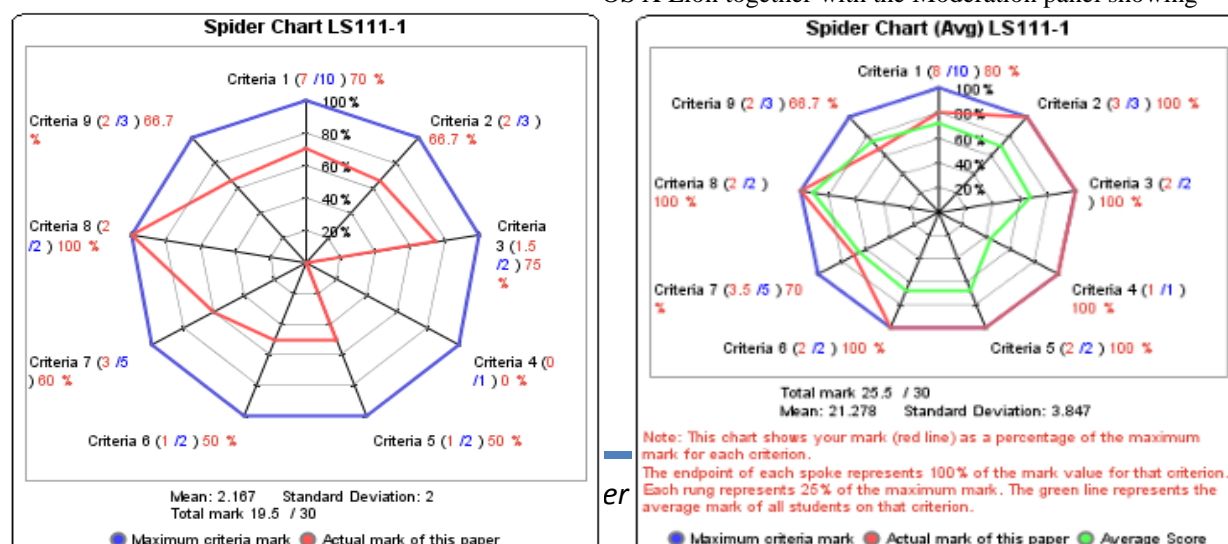
## Method

A total of 154 (61 male, 93 female) Law students out of a single cohort of 210 students enrolled in LS111 Civil Procedure during Semester 2, 2010 at UNE voluntarily completed a survey on feedback received in relation to a draft Statement of Claim submitted in satisfaction of 30% of their grade. Each of three markers was randomly assigned 7 groups of 10 students who had randomly received one of seven distinct types of assessment feedback. Each group had a maximum of 30 participants. Refer Table 1. All assessment and requests for participation in the survey were returned at the same time.

Table 1: Groups, Feedback type and Response rate

Groups	Feedback type	Male	Female	n	Response rate
Group 1	Spider chart	9	16	25	83.3%
Group 2	Spider chart (with average)	11	8	19	63.3%
Group 3	Smiley	9	12	21	70.0%
Group 4	Spider chart + Spider chart (with average)	8	13	21	70.0%
Group 5	Spider chart + Smiley	12	12	24	80.0%
Group 6	Spider chart (with average) + Smiley	6	13	19	63.3%
Group 7	Spider chart + Spider chart (with average) + Smiley	6	19	25	83.3%

All students were provided with additional feedback consisting of an assessment rubric, colour coding according to a colour key, a marking tally, and pre-prepared comments based on a marking guide. Marking was done electronically using ReMarksPDF <[www.remarkspdf.com](http://www.remarkspdf.com)>. Figure 2 shows the ReMarksPDF interface in Mac OS X Lion together with the Moderation panel showing



the distribution of grades. An actual student paper is open, on the right, showing their Smiley rating, Average Spider Chart indicating achievement on each criterion, Mark Tally Table, Colour coding and Auto Text comments. A survey instrument, ethics approval HE10/165 was prepared and administered on-line using Qualtrics <[www.qualtrics.com](http://www.qualtrics.com)> - see <http://remarkspdf.com/research>. The survey instrument was designed to elicit student responses to different types and combinations of annotations.

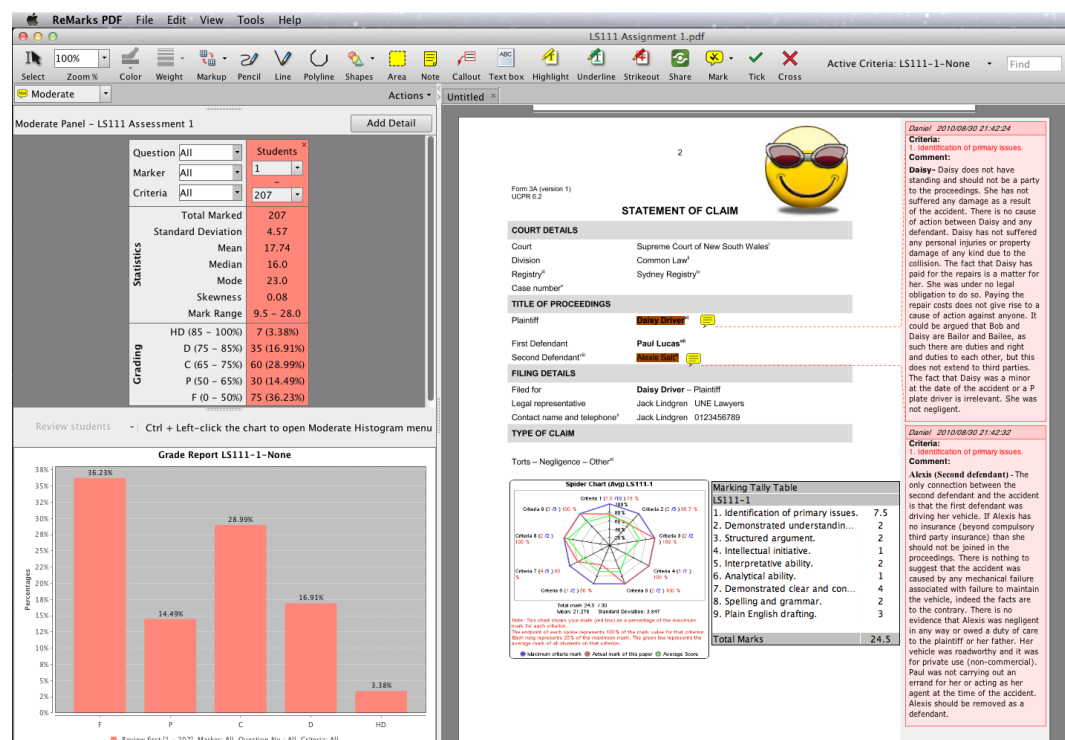


Figure 2: ReMarksPDF interface

## Results

Students were asked to rate the overall value to them of the types of feedback annotations received. The results appear in Figure 3 and were significant at the 5% level ( $p = 0.000$ ). A one-way ANOVA and post-hoc multiple comparisons did not reveal any association with equivalent full-time year, age or group.

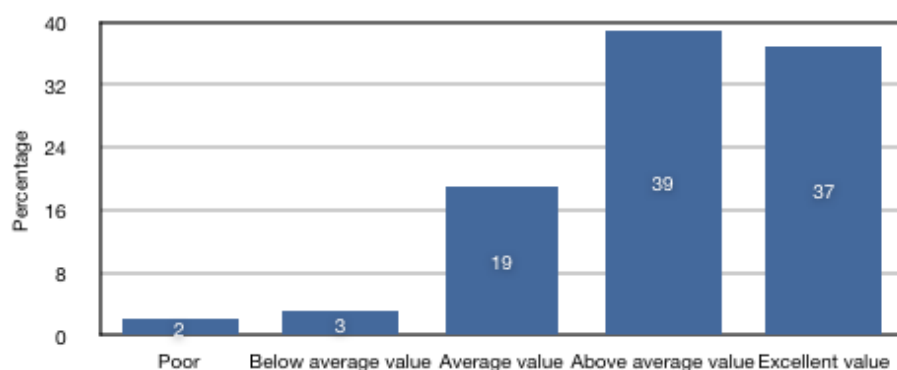


Figure 3: Overall value of Feedback

A  $t$ -test indicated females rated overall value more highly than males ( $p = 0.044$ ). Neither mode nor attendance had any significant effect on the results.

Students were asked to rate the different types of annotations they received on a 5-point LIKERT scale from 1 Useless, 3 Neutral, through 5 Very Useful. The mean ratings in order of usefulness appear in Table 2.

**Table 2: Annotation data**

Annotation	n	1	2	3	4	5	Mean	<i>t</i>	<i>p</i> *
Mark Tally Table	140	2 (1.4%)	6 (4.3%)	14 (10%)	52 (37.1%)	66 (47.1%)	4.24	16.257	0.000
Assessment rubric	141	5 (3.5%)	4 (2.8%)	20 (14.2%)	67 (47.5%)	43 (30.5%)	3.94	11.458	0.000
Spider Chart	82	3 (3.6%)	7 (8.5%)	12 (14.6%)	32 (39%)	28 (34.1%)	3.91	-3.97	0.000
Spider Chart with average	78	5 (6.4%)	8 (10.3%)	9 (11.5%)	26 (33.3%)	30 (38.5%)	3.87	-5.77	0.000
Colour coding	139	3 (2.2%)	15 (10.8%)	27 (19.4%)	53 (38.1%)	41 (29.5%)	3.82	8.611	0.000
Smiley	82	11 (13.4%)	14 (17.1%)	16 (19.5%)	26 (31.7%)	15 (18.3%)	3.24	-8.07	0.000

6. Sig. (2 tailed) One-Sample *t* test based on a neutral response of 3. **n** indicates the responses from students in all groups who received that type of annotation.

An independent samples *t*-test confirmed females rated annotations more useful than males at the 5% level for all variables except for spider charts. There was no association between age and responses. Part-time students rated the assessment rubric as more useful than full-time students at the 5% level ( $p = 0.035$ ). There were no significant differences for on-campus or off-campus students. A one-way ANOVA and post-hoc multiple comparisons did not reveal any association with equivalent full-time year or age.

Students were also asked a series of questions on what they thought of ReMarksPDF based on a 5-point LIKERT scale from 1=Strongly disagree, 3=Neutral, through 5=Strongly agree. The results are shown in Table 3.

**Table 3: Question data**

Question	n	1	2	3	4	5	Mean	<i>t</i>	<i>p</i> *
The ReMarks system provides better feedback than I have experienced in the past.	139	6 (4.3%)	7 (5%)	22 (15.8%)	49 (35.3%)	55 (39.6%)	4.01	11.06	0.000
Other units should adopt the ReMarks feedback system.	138	10 (7.3%)	7 (5.1%)	20 (14.5%)	42 (30.4%)	59 (42.8%)	3.96	8.88	0.000
ReMarks feedback is easy to read.	137	10 (7.3%)	7 (5.1%)	20 (14.6%)	42 (30.7%)	58 (42.3%)	3.96	8.77	0.000
It is beneficial to be able to view side column comments.	137	4 (2.9%)	4 (2.9%)	14 (10.2%)	43 (31.4%)	72 (52.6%)	4.28	14.20	0.000
ReMarks feedback is easy to understand.	138	9 (6.5%)	5 (3.6%)	21 (15.2%)	51 (37%)	52 (37.7%)	3.96	9.97	0.000

- ▲ Sig. (2 tailed) One-Sample *t* test based on a neutral response of 3.

An independent samples *t* test did not reveal any gender differences at the 5% level, except for question 1, where females more strongly agreed than males. Part-time students rated 'ReMarksPDF feedback is easy to understand' higher than full-time students at the 5% level ( $p = 0.028$ ). Off-campus students significantly rated 'ReMarksPDF feedback is easy to read' and 'ReMarks feedback is easy to understand' higher than on-campus students at the 5% level ( $p = 0.019$ ,  $p = 0.016$ ). A one-way ANOVA and post-hoc multiple comparisons did not reveal any association with equivalent full-time year or age.

Open-ended questions sought to elicit positive and negative aspects of ReMarksPDF and the types of feedback annotations. Selected results appear in Table 4.

**Table 4: Annotation positive and negative aspects**

<b>ReMarksPDF</b>	
<b>Positive</b>	<b>Negative</b>
<ul style="list-style-type: none"> <li>• Avoid unnecessary delay of results and it is legible.</li> <li>• Clear and able to read the comments.</li> <li>• Being online saves paper.</li> <li>• Combination of graphs and annotation makes it easy to understand the feedback.</li> <li>• Brilliant! I have never received more cohesive and detailed results in any other subject.</li> <li>• Legible feedback. It shows that a lot of thought was put into the correction. Like the breakdown of the marks to the different areas so we I can see where to improve for next time. Its shows that the assignment was marked objectively rather than subjectively.</li> </ul>	<ul style="list-style-type: none"> <li>• Was a bit overwhelmed at first. Being a new system, I wasn't expecting it. Once I took a deep breath and started reading, was not so overpowering.</li> <li>• I do not have any negatives about any of the marking system.</li> <li>• Sometimes difficult to match the comments to the relevant area of the paper.</li> <li>• Marker's comment windows sometimes difficult to get open so that comments can be read.</li> <li>• When you print the document the comments are not completely visible.</li> <li>• None that I can think of.</li> <li>• Use of colour scheme a bit over the top.</li> </ul>
<b>Spider Chart</b>	
<p>5. You can visibly see where each mark is sitting against the maximum so you can work on weaknesses and see the strengths.</p> <p>6. It provides a snapshot of my strengths and weaknesses.</p> <p>7. Easy to understand, easily read.</p>	<ul style="list-style-type: none"> <li>• Nil. excellent way of seeing how marks were awarded.</li> <li>• Confusing to interpret and understand.</li> <li>• I am old and staid. I just do not like being confronted with new things...like learning to work a computer before I could consider enrolling at unit.</li> </ul>
<b>Spider Chart (with Average)</b>	
<ul style="list-style-type: none"> <li>• Found this very useful and would like to see other subjects adopt the same approach.</li> <li>• Excellent system.</li> <li>• It provides a clear illustration of the students strengths and weaknesses.</li> <li>• It was quick and easy to understand.</li> <li>• Good to compare against the average.</li> <li>• Excellent idea, highly useful, makes it easy to understand my position in relation to my class.</li> </ul>	<ul style="list-style-type: none"> <li>• Can be complicated to read, but I do not think there is a negative aspect.</li> <li>• The overall average is shown, but the average for each criteria spoke is not shown. This would be helpful.</li> <li>• Need a second degree to understand it. Don't get carried away with academics, this is the real world out here.</li> </ul>
<b>Smiley</b>	
<ul style="list-style-type: none"> <li>• Its a visual cue as to how your assignment went e.g. happy sad in the middle.</li> <li>• Something different.</li> <li>• I smiled then went on to read the comments regarding my paper.</li> </ul>	<ul style="list-style-type: none"> <li>• If you get a frown it could be discouraging.</li> <li>• A sad face lowers a student's self esteem.</li> <li>• Don't really think it is needed.</li> <li>• Too open to interpretation.</li> <li>• Perhaps a scale of what level of smileyness.</li> </ul>

## Comment

While there were both positive and negative aspects to ReMarksPDF and the three types of annotations discussed, ReMarksPDF was nevertheless a valuable new tool for assessment feedback. 74.9% of students found ReMarksPDF provided better feedback than they had received in the past. 73.2% encouraged wider adoption of the tool. Students found the mark tally table, assessment rubric, spider chart, spider chart (with average), colour coding and smileys to be significantly valuable feedback in that order of preference. It would appear that quantitative annotation and classification schemes were perceived by students as more useful than more subjective schemes involving colours and depictions of emotions.

Females gave higher ratings than males on all feedback types, except spider charts, which were equally highly rated by males. Software such as ReMarksPDF offers the opportunity to use types of feedback, which would be otherwise impractical to manually implement - such as dashboard charts and auto comments. It is anticipated that e-marking software will have a positive affect on student engagement and learning outcomes by enabling markers to efficiently provide detailed individual feedback, outlining strengths and weaknesses of the student assessment submission and avenues for self-improvement.

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<http://www.ascilite.org.au/conference/hobart11/procs/Colbran-concise.pdf>

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