

## ***Maximising student participation in optional assessment***

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*This paper outlines an innovative approach to flexible assessment introduced into an undergraduate finance subject taught at an Australian University. Students were given a range of mid-semester assessment tasks and encouraged to attempt as many assessment tasks as possible. An important way in which this was encouraged was by automatically giving students the combination of marks that maximised their final mark. Student feedback, both anecdotal and by way of a feedback survey, was strongly supportive of this approach. Statistical analysis of student results found evidence for statistically significant positive relationships between mid-semester assessment results and final exam results and between the number of assessment tasks undertaken and both exam results and overall final results.*

### **Introduction**

Traditional assessment methods in higher education have been characterised by standardisation and lack of flexibility. There is a rapidly growing school of thought that suggests that students differ in their ability to express their knowledge and understanding of course material using different assessment methods, and that assessment schemes should take these differences into account.

This paper describes an innovative approach to flexible assessment taken in a finance subject taught at an Australian University. A variety of optional assessment tasks are made available to students, including flexibility in terms of the weighting placed on each assessment task. The key innovative approach in this subject is that students do not need to decide in advance which tasks they will undertake or what weighting they would like placed on each assessment task. Students are strongly encouraged to participate in ALL assessment tasks and, within predetermined parameters, are automatically given the combination of marks that maximises their final mark for the subject.

### **Flexible assessment**

As educators strive to improve their ability to educate, there has been an increasing focus on the integral role that assessment plays in the learning process. Brown and Knight stated:

*Assessment defines what students regard as important, how they spend their time, and how they come to see themselves as students and then as graduates. It follows, then, that it is not the curriculum that shapes assessment, but assessment that shapes the curriculum and embodies the purposes of higher education. (Brown & Knight, 1994, p. 12)*

Although the ostensible role of summative assessment is to measure the extent to which students have mastered the course material, the influence of assessment on how students undertake their learning, how they structure their time and how they prepare for various assessment tasks makes assessment design a crucially important element of subject design.

A critically important characteristic of assessment is *validity*. Validity is defined by Brown and Knight as “measuring what you set out to measure” (Brown & Knight, 1994, p. 14). This important concept is at the heart of assessment design. We must be cognisant of two critical questions – what do we want to measure, and how is this best measured?

The “what” that we are measuring is clearly guided by the student learning objectives for the unit of study. Brown and Knight stated that in order for this aspect of validity to be achieved, assessment tasks must be “related to the goals of universities, programs and courses” (Brown & Knight, 1994, p. 26).

Ramsden stated:

*Just as our choice of teaching methods should be informed by the nature of the subject matter we are teaching, so our choice of assessment methods should be conditioned by our goals for student learning. (Ramsden, 2003, p. 184)*

Similarly, Heywood (2000), Brown and Knight (1994) and Crooks (1988) all highlight the need to align different forms of assessment to different subject objectives and to offer a range of different forms of assessment.

The focus of this study is not so much the “what” that we are measuring, but the “how”.

Flexible assessment goes beyond tailoring assessment tasks to the needs of the subject. It involves tailoring assessment tasks to the needs of the individual student, in order to enhance his or her learning experience. Flexible assessment entails giving students an element of choice regarding assessment tasks. Typically this entails making some assessment tasks optional and/or giving students flexibility in terms of the weighting to be placed on each assessment component.

The underlying premise of flexible assessment is that students differ in their ability to demonstrate their knowledge and understanding using different assessment methods.

Another important concept in assessment design is equity. Some educators have expressed concern that equity is compromised if students are assessed in different ways. However, it is arguable that equity is in fact enhanced if students are given the opportunity to demonstrate their knowledge and understanding using methods that suit their particular abilities and preferences. According to Wood and Smith (1999):

*Equity does not mean that we are all the same. For example, one student may perform excellently at oral presentation but not in written examinations, while another may perform better in examinations. Both students may be able to demonstrate achievement in the course objectives, but in different ways. It is more equitable to allow choice in assessment style.*

Much of the time flexible assessment explicitly requires students to choose the assessment tasks and/or the assessment weights they would like to have included in their final result, or implicitly gives them the opportunity to make such choices by providing a range of optional assessment tasks and allowing students to choose from amongst them. For example, Jamieson (2005) describes an assessment scheme under which students are given the opportunity to decide in advance the weighting to be placed on various assessment components. There is much to be said for placing the responsibility on students of directing their own learning and making explicit choices about the assessment tasks that best match their abilities and preferences.

This study takes a different approach. It is based on the premise that students learn from the very process of preparing for and undertaking assessment tasks, and from the feedback they get from each assessment task. Their learning is also enhanced because of the discipline imposed by undertaking regular assessment tasks. Hence, although flexible assessment is desirable for the reasons described above, to cater for diversity within the student cohort, it also seems desirable to encourage students to participate in as many assessment tasks as possible.

Maximisation of participation in optional assessment tasks has been attempted in this study by automatically giving students the best possible combination of marks, within academically rigorous predetermined parameters, based on the assessment tasks that they undertook and their results in each of those tasks. Students clearly understand that they have nothing to lose, and much to gain, by attempting as many assessment tasks as possible.

Williams (1999) describes a remarkably similar assessment scheme to the one that is the subject of this study, whereby a range of optional assessment tasks were available to contribute up to 50% of each student's final mark, and the best combination of marks were automatically calculated in order to encourage participation. The advantages of such an assessment scheme are neatly summarised in the paper by Williams, apply equally to the assessment scheme that is the subject of this study, and succinctly enunciate the philosophy behind the development of the assessment scheme for the subject in question:

1. It provides students with numerous assessment options. In so doing, it accommodates student diversity and caters for different learning styles.
2. It is a very forgiving system in that it is possible for summative continuous assessment items to be treated as formative assessment. In short, students can learn from their mistakes. If a student performs poorly in an item of continuous assessment, the mark for this item need not necessarily contribute to their final mark. The student can take advantage of the feedback he or she receives and avoid making the same mistake in the final examination.
3. The fear is taken out of assessment. Students find it comforting knowing that, unlike conventional assessment systems, they can complete an assessment item under the (flexible assessment model) and not worry that a poor performance will have an irreversible effect on their final grade. (Williams, 1999)

## **Description of the subject and the assessment scheme**

### *The subject*

This case study is based on the assessment scheme and outcomes for a first-year subject taught at an Australian university studying financial markets, institutions and instruments. The subject presents an overview of the financial system and its various components and is designed to familiarise students with the nature and role of the main financial markets within the domestic and global environment and the financial instruments traded within those markets. Students are expected to gain an understanding of how those markets operate, how prices are determined, and which markets and instruments should be utilized depending on the circumstances and objectives of different participants.

### *The assessment scheme*

There are four different kinds of assessment in the subject. These are listed below, followed by a brief description of each:

- A 3-hour final examination.
- A multiple choice test
- Two assignments
- Five online quizzes

Only the final examination is compulsory. There is a "hurdle" requirement, in that students must pass the final examination (pass mark 50%) in order to pass the subject. If they do not achieve a mark of 50% on the final exam, all mid-semester assessment results are disregarded and the exam mark becomes the final mark.

All components of mid-semester assessment are optional. However, they are available to give students the opportunity to improve their mark beyond the minimum of 50%. To the extent that mid-semester assessment results are included in the final mark, the weighting of the final exam is reduced accordingly. These weightings are discussed in more detail below.

### *Assessment weightings*

As explained above, the key feature of the optional assessment available in this subject is that students do not need to decide in advance what weightings will be used. They are strongly urged to attempt all assessment tasks. The result for each assessment component will only be incorporated into a student's final mark if it improves his or her final mark.

### *Final examination*

If a student attempts some or all of the mid-semester assessment and achieves a mark on any of them greater than the mark on the final exam (in percentage terms) then those results are incorporated into the final mark and the weighting on the final exam is reduced accordingly. This means that the final exam could be worth any value between 50% and 100%.

### *Multiple choice test*

If it is incorporated in the final mark, the multiple choice test is worth 20%.

### *Assignments*

During the semester students participate in two practical sessions designed to give them exposure to the types of treasury trading activities undertaken in the finance industry, and are given the opportunity to submit a group report based on the practical session.

The assignments have a nominal weighting of 10% each, totalling 20%. However, a further innovative approach to assessment in this subject gives students the ability to vary this weighting, and effectively distribute the marks available amongst the students within each team, as follows.

Each team of three is given 30 “Assessment Credits” to distribute amongst themselves. They can divide the assessment credits equally, or they can decide to award a greater proportion of the credits to the student or students contributing most to each assignment. Because the assignments are optional, but they are designed to be group assignments, this feature effectively extends the optional nature of the reports to each individual student, rather than the team as a whole. Students negotiate amongst themselves and, if they decide they don’t wish to contribute equally to the assignment, they determine the contribution that each student will make to the assignment and the distribution of the assessment credits accordingly. Some students have the freedom to choose not to contribute at all, while still allowing other team members to submit an assignment and benefit from their mark by distributing assessment credits amongst those who have contributed.

The assessment credits determine the weighting of the mark given to each assignment. Since the assignment marks are only incorporated into the final mark if they are better (in percentage terms) than the exam mark, the greater the weighting placed on the assignment mark the greater the benefit to the student.

In other words, if a student is given X assessment credits, the weighting given to the assignment mark for that student is X% of his or her final mark (if the assignment mark is high enough to warrant inclusion).

### *Online quizzes*

There are five online quizzes available to students, consisting of a variety of objective questions that exhaustively examine approximately one-fifth of the course material.

These quizzes are marked immediately by the computer and the results are shown to the student, along with feedback as to which questions are correct. **Students are able to attempt each quiz as often as they wish.** Only the most recent mark is retained. The reason for this is that the quizzes are seen to constitute formative assessment and are a valuable learning process. Students who attempt the quizzes repeatedly in an attempt to achieve a perfect score are bound to learn a great deal in the process.

If it is incorporated into the final mark, each quiz is worth 2%.

### *Calculation of final mark*

Although the assessment may seem complicated at first glance, the calculation of the final mark for each student is straightforward.

- If the student achieves a mark of less than 50% on the final exam, the exam weighting is 100% and all

- mid-semester assessment results are ignored.
- If the student achieves a mark greater than or equal to 50% on the final exam, each mark for the mid-semester assessment components is compared with the exam mark (in percentage terms). If the mid-semester mark is greater than the exam mark, it is included and the weighting on the final exam is reduced accordingly.
  - In rare cases a final adjustment is necessary in order to comply with the constraint that requires a minimum 50% weighting for the final exam. If a student does sufficiently well on the multiple choice test, the quizzes and the assignments, and receives more than a total of 20 assessment credits for the assignments, it is possible for the combined weightings of the mid-semester assessment components to fall between 50% and 70%. If these weightings exceed 50%, the total mark for mid-semester assessment is scaled back to 50% and the exam is weighted at 50%.

Table 1 provides some examples that serve to illustrate this process.

Student	Exam Mark	Test Mark	Assignments				Quizzes					Final Mark
			1		2		1	2	3	4	5	
			Mark	Wght	Mark	Wght						
A	42	58	75	10	55	10	90	80	85	95	30	42
B	60	58	75	10	55	10	90	80	85	95	30	63.1

Table 1: Illustrative examples of the calculation of the final mark (all marks are in percentage terms)

In Table 1, Student A has scored less than 50% on the final exam and has failed to meet the hurdle requirement. Hence, his mid-semester assessment results are disregarded and his exam mark becomes his final mark.

Student B has passed the final exam with a score of 60%, but otherwise has the same mid-semester results as Student A. All of Student B's mid-semester assessment results in excess of 60% are included in the final mark. (i.e. Assignment 1 and the quizzes). These components have a combined weight of 20% and hence the exam will be worth 80%. The final mark is  $60 \times 80\% + 75 \times 10\% + (90 + 80 + 85 + 95 + 30) \times 2\% = 63.1\%$ .

These represent final marks, as there are no supplementary examinations within the Faculty in question.

## Student feedback

At the end of the semester in question, students were invited to complete a feedback survey regarding the subject. One of the questions was:

*Please indicate whether you Strongly Agree, Agree, Don't Know, Disagree or Strongly Disagree with the following statement:*

*"The flexibility of the assessment tasks was appropriate and beneficial to me."*

The results of the feedback in response to this question are displayed in Figure 1.

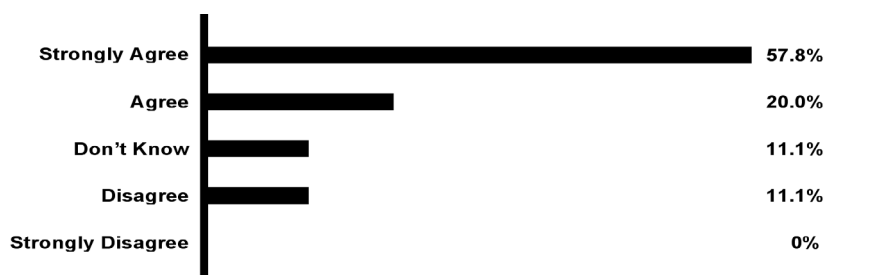


Figure 1: Student responses to the proposition "The flexibility of the assessment tasks was appropriate and beneficial to me."

Anecdotal evidence was also strongly supportive of the approach taken toward assessment in this subject, and provided interesting feedback. For example, the following comments were made by students in relation to the flexibility of assessment in the subject:

*Great idea!!! I wish all of my subjects had an option like that. It really helped me distribute my learning over the course of the semester, and I actually learned the subject matter without having to cram it all in at the end for a final.*

*According to me every student should complete all of the possible assessments as they each have plenty to offer.*

*In order to achieve a score of (100%) in the online quizzes you are forced to understand absolutely everything. The incentive of 2% to the final mark for each quiz was influential in me completing the first 2 quizzes before the mid-semester test. I believe the 2% incentive is the only reason why we strive to get (100%) on the quizzes.*

Some negative comments indicated that optional assessment doesn't suit the studying habits of all students. For example:

*It's better to make every assessment mandatory. If they're not mandatory, I don't do them.*

*I had other commitments that were compulsory, so when it came to ruling out a commitment, I chose the non-compulsory one.*

## Analysis of student results

### Description of sample

The analysis was based on all students enrolled in the subject for a particular semester who sat the final exam at the end of the semester. There were 184 students in the sample.

### Analysis of mid-semester assessment results

Table 2 shows the percentage of students attempting each mid-semester assessment component, the percentage of the total number of students who had each assessment result included in their final mark, and the percentage of students who attempted each assessment component who had the assessment result included in their final mark.

Assessment Component	Students attempting each assessment task		Number of students where the assessment result was high enough to be included in the final mark			
	No. of students	% of all students	No. of students	% of all students	% of students who attempted the task	
Multiple choice test	160	87	105	57	66	
Assignment	1	111	60	101	55	91
	2	96	52	87	47	91
Quiz	1	82	45	78	42	95
	2	77	42	72	39	94
	3	75	41	68	37	91
	4	65	35	61	33	94
	5	64	35	57	31	89

Table 2: Analysis of students attempting each assessment component.

The following should be noted from the information in Table 2:

- It can be seen that more students (87%) attempted the mid-semester test than any other assessment component. The most likely explanation is that this assessment task required less investment of effort than any other.
- Whilst only 66% of the results for the multiple-choice test were high enough to be included in the final result, much higher percentages of the results for the other assessment components were high enough to be included in the final mark. These percentages range from 89% to 95%.

Two possible explanations for the higher marks on these assessment components could be suggested:

- The nature of these assessment tasks makes it easier to get higher marks compared to the multiple choice test.
- There is an element of self-selection occurring, whereby students are more likely to attempt the assignments and quizzes if they believe they can score well and justify the effort involved.

### *Regression analysis of mid-semester assessment against exam mark and final mark*

A number of analyses were conducted using Ordinary Least Squares regression, in an attempt to investigate the relationship between marks on optional mid-semester assessment, the number of optional mid-semester assessment tasks attempted, and results achieved.

#### i. Mid-semester assessment results and final exam result

A number of regression analyses were conducted where the dependent variable was the exam result and the independent variable, in each case, was the result for each mid-semester assessment task. The purpose of the analyses was to investigate the relationship between how each student performed in each mid-semester assessment task and how they performed on the final exam.

The model used in each of these analyses was of the form:

$$E_i = \alpha + \beta A_i + \varepsilon$$

where  $E_i$  is the exam result for each student,  $A_i$  is the result for each student for the mid-semester assessment task being analysed,  $\alpha$  is the intercept term and  $\varepsilon$  is the error term.

Table 3 shows the results of these analyses.

Assessment Task	$\hat{\beta}$	R <sup>2</sup>	Correlation coefficient	p-value
Test	0.4874	32.46%	0.57	0.0000 ***
Assignment 1	0.2846	8.43%	0.29	0.0010 ***
Assignment 2	0.3786	19.49%	0.44	0.0000 ***
Quizzes	0.0913	3.50%	0.19	0.0528 *

Table 3: Regression analysis between final exam result and mid-semester assessment results.

- \* Indicates statistical significance at the 10% level
- \*\* Indicates statistical significance at the 5% level
- \*\*\* Indicates statistical significance at the 1% level

It can be seen from Table 3 that there is a very strong relationship between results in the first three assessment tasks and the result on the final exam. P-values indicate a significant positive relationship, even at the 1% level of significance. The R<sup>2</sup> values and correlation coefficients also indicate that results on these three assessment tasks explain a significant amount of the variation in final exam results.

The one exception is the analysis involving quiz results, which shows a much less significant relationship. This is probably caused by the fact that students can attempt the quizzes as often as they wish in order to strive for a perfect score. Unlike the other assessment tasks, where students are likely to perform equally well in both mid-semester assessment and final exam, the nature of the quizzes is such that poor students have the opportunity to get higher marks on the quizzes than their exam results would otherwise indicate.

ii. Number of mid-semester assessment results attempted and final results

Two analyses were designed to investigate the relationship between the number of assessment tasks attempted, the final exam result and the overall final result. The models tested were of the form:

$$E_i = \alpha + \beta N_i + \varepsilon \quad \text{and} \quad R_i = \alpha + \beta N_i + \varepsilon$$

where  $E_i$  is the final exam result for each student,  $R_i$  is the overall final result for each student and  $N_i$  is the number of mid-semester assessment tasks attempted by each student (i.e. from 0 to 4).

Table 4 shows the results of these analyses.

Dependent variable	$\hat{\beta}$	R <sup>2</sup>	Correlation coefficient	p-value
Exam Result	1.6971	1.57%	0.13	0.0451 **
Overall Final Result	4.8200	13.84%	0.37	0.0000 ***

Table 4: Regression analysis between the number of assessment tasks attempted and, respectively, exam result and overall final result

- \* Indicates statistical significance at the 10% level
- \*\* Indicates statistical significance at the 5% level
- \*\*\* Indicates statistical significance at the 1% level

At the 5% significance level, there is evidence of a statistically significant positive relationship between the number of assessment tasks attempted and the result on the final exam. This supports the underlying premise of the assessment scheme in this subject – that maximising the number of assessment tasks will be beneficial to students and improve their learning outcomes.

The second result in Table 4 is to be expected. The assessment for this subject is structured in such a way that mid-semester assessment tasks are available for students to improve their overall mark beyond their raw final exam mark (and only contribute to their final mark if they do so). The clearly significant positive relationship between the number of assessment tasks attempted and the overall result for the subject indicates that these assessment tasks are indeed being effectively used by students to boost their overall mark.

## Conclusion

This paper outlines an innovative approach to flexible assessment, whereby students are given a range of mid-semester assessment tasks and encouraged to attempt as many assessment tasks as possible. An important way in which this is encouraged is by automatically giving students the combination of marks that maximises their final mark. In other words, mid-semester assessment results will only be counted in their final mark if it improves their final mark.

Student feedback, both anecdotal and by way of a feedback survey, is strongly supportive of this approach. A total of 77.8% of students responding to the feedback survey were of the view that this approach was beneficial to them.

A number of regression analyses were undertaken to investigate relationships between mid-semester assessment results, the number of mid-semester assessment tasks undertaken and final results. Evidence was found for statistically significant positive relationships between mid-semester assessment results and final exam results and between the number of assessment tasks undertaken and both exam results and overall final results.

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