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# **An Analysis of the Questions on University Teaching Surveys and the Universities that Use Them: The Australian Experience**

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## **ABSTRACT**

*This paper is the first attempt to perform an analysis of the internal Quality of Teaching Surveys (QTS) used in all Australian Universities by investigating how they compare across Universities. We categorize the questions on each university's QTS into one of 18 types and then define a proximity measure between the surveys. We then use an agglomerative cluster analysis to establish groupings of these institutions on the basis of the similarity of their QTSs as well as groupings of question types by their frequency of use. In addition, we also determine if the form of the survey is related to the responses recorded by the Course Evaluation Questionnaire (CEQ) that is administered to all graduates of Australian Universities. This was done by the use of regression analysis to establish if the form of the questionnaire is related to the overall good teaching scores earned by the universities from the CEQ.*

**Key words:** Tertiary Education, University Rankings, CEQ

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## 1. INTRODUCTION

While quality assurance in Australian higher education once relied on institutional self-assessments and discipline reviews, recent trends have placed a much greater emphasis on quantitative measures of institutional performance. One of the most important developments has been the incorporation of data from the Course Experience Questionnaire (CEQ) (Ramsden, 1991a, 1991b; Ramsden & Entwistle, 1981) into national benchmarking and funding decisions. Since 1993, the CEQ has been conducted annually across the graduates of all Universities in Australia by the Graduate Careers Council of Australia.

Despite the role it has assumed in the evaluation of higher education quality, the CEQ has limitations. The lagging and aggregate nature of the data make it difficult for institutions to use CEQ data alone in their internal continuous, locally-responsive quality improvement activities. The key aim of the CEQ is to measure student perceptions of their courses of study and to assess differences between academic units in terms of those perceptions (Lizzio, Wilson, & Simons, 2002; Ramsden, 1991b). While often of primary interest to institutions and teaching staff, the CEQ is not designed to measure student perceptions of individual lecturers or units of study.

In order to gain an understanding of student perceptions of individual lecturers or units of study nearly all Australian higher education institutions have, in recent years developed institution-specific instruments and surveys to provide context-relevant data. These Quality of Teaching surveys (QTS), with names such as QOTs, SETs, LETs, TEVALs, have grown to play an important role in quality assurance in Australian higher education. QTS are used in almost all of the thirty-nine public and private tertiary institutions in Australia and in sixteen their use is compulsory. In the remainder their use is virtually mandatory for promotion and advancement purposes. While QTS surveys are

subject to influences outside the control of lecturers (Davies, Hirschberg, Lye, McDonald, & Johnston, 2007), they are more sensitive to specific aspects of local educational contexts than the CEQ. Like the CEQ, virtually all tertiary institutions rely on the QTS for regular annual performance measures in relation to student satisfaction. However, they rely on them for different reasons. Where the CEQ allows for cross-institutional measurement of the quality of courses; the QTS allow for intra-departmental and university-level comparisons of teaching quality.

In this study we attempt to perform the first systematic analysis of QTS applied in tertiary institutions. By examining the nature of the surveys employed in Australian tertiary institutions we attempt to determine if the nature of the surveys can lead to clues as to how the different institutions monitor the quality of their instruction. In addition, we examine the nature of the locally administered QTS to establish if there is a relationship with CEQ outcomes.

Section 2 of this paper discusses the data collected regarding QTS and the CEQ. In Section 3 two regression models are estimated to determine if there is a relationship between the form of QTS and the CEQ. Section 4 uses cluster analysis to classify the Universities on the basis of the questions used in their QTS. In Section 5 cluster analysis is used to categorize the types of questions used in the QTS. Section 6 presents conclusions.

## **2. THE DATA**

We conducted an email survey of all 39 universities Australian Universities (37 public and 2 private) over the period May-June 2006. In addition, we posted notices seeking information in the HERDSA and Unilearn. There is only 1 University that does not currently conduct a QTS. For the 2 Universities that did not respond we obtained

sufficient information from their website. A summary of the data collected is given in Appendix A.

## 2.1 The Institutional Practices

Appendix A outlines the range of variation in institutional practice concerning the implementation of the QTS. We surveyed institutions to obtain information on: the name of their survey; whether there was a separate survey for courses and lecturers; whether evaluation was conducted online, in paper-based form or both; the period of data collection; whether the QTS was compulsory, effectively mandatory or optional<sup>2</sup>; whether the data was available for research purposes; the name of Unit responsible for collecting the data; the number of core questions in the survey and whether there were other questions/question banks or open response questions.

## 2.2 The Questions

The questions within the surveys were classified according to the type of information that was sought. There were two distinct groupings: 1) questions about the lecturer and the subject; and 2) questions about the student and their learning. The details of each question type are given below.

### *Questions about the Lecturer and Subject*

#### **1. Clear Aims:**

This refers to the clarity of the *aims of the class or subject or course* in terms of standards and objectives, not the clarity of the lecturer or the teaching (the latter is captured under “Clear Explanations”).

For example: “*The subject objectives were made clear to me*”.

#### **2. Clear Explanations:**

This captures the clarity of the lecturer in giving explanations either a) in general terms, or b) in outlining expectations of the course.

For example: “*The lecturer was able to communicate concepts clearly*”.

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<sup>2</sup> “Compulsory” was defined as being a systematic, institution-wide practice mandated by the university and conducted on a regular, or semi-regular basis for all teaching staff. “Effectively mandatory” was defined as being necessary for promotion or advancement purposes.

**3. Organised:**

This refers to the extent to which either the lecturer or the subject or unit was well-organised, well-prepared and well-structured.

For example: *"The teaching of this unit is well-organised"*.

**4. Motivation/Enthusiasm of Lecturer:**

This refers to the level of teacher's enthusiasm in teaching.

For example: *"The lecturer was enthusiastic about the subject"*.

**5. Respect:**

This refers to the lecturer's sensitivity to students' problems, politeness and friendliness to students and their cultural backgrounds and/or their different views and opinions.

For example: *"The lecturer was sensitive to students' cultural backgrounds"*.

**6. Access:**

This refers to the extent to which lecturers were available for consultation outside normal lecturing times.

For example: *"The lecturer was available to answer students' inquiries"*.

**7. Teacher knowledge:**

This refers to the *perceived understanding by students* of the lecturers' knowledge of the content/subject matter that he or she was teaching.

For example: *"The lecturer had a sound knowledge of the topic"*.

**8. Overall Teaching Quality**

This captures the overall teaching quality of the lecturer.

For example: *"This teacher communicates effectively with students/This subject is well-taught"*.

***Questions about the Student and their Learning*****9. Motivation/Enthusiasm of Student:**

This refers to the level of student motivation and enthusiasm.

For example: *"I am motivated to achieve learning outcomes"*.

**10. Student knowledge:**

This refers to whether the students felt that—as a result of the lecturer's classes—they had gained an understanding of the subject matter.

For example: *"In this teacher's class I have gained a good understanding of the concepts covered"*.

**11. Stimulating/Interesting/Motivating:**

This refers to the level of interest generated on the part of the student from the classes. Did the lecturer inspire the students? Motivate them? Get them to think, Challenge them?

For example: *"The teaching staff motivated me to do my best work"*.

**12. Gave Feedback:**

This refers to whether the lecturer made time to assist students with the learning needs and problems.

For example: *"The feedback on my work is provided promptly"*.

**13. Assessment:**

This refers to the nature and effectiveness and clarity of the assessment tasks requested by lecturers in assessing students' understanding of the subject content.

For example: *"Overall the assessment in this unit is fair"*.

**14. Students' Needs and Learning Skills:**

This refers to whether lecturers were sensitive to students learning needs and to the extent to which the lecturer actively developed learning skills (critical thinking, discursive knowledge, understanding rather than memorizing, etc).

For example: *"My learning in this subject was well supported"*.

**15. Receives Feedback:**

This captures the extent to which student feedback was encouraged and whether the feedback was used to improve teaching.

For example: *"The teacher shows genuine interest in improving his/her teaching".*

**16. Teaching Methods/Material/Aids Used:**

This refers to the students' perception of teaching aids and methods used for teaching. Were they useful, effective, relevant?

For example: *"The teacher related the course materials to real life situations". "I found the teaching methods used in this subject were effective in helping me to learn".*

**17. Workload:**

This refers to the workload expected. Was it commensurate with expectations, fair or unreasonable?

For example: *"The workload was appropriate for a subject at this level".*

**18. Overall Effectiveness:**

This is an overall judgement by the students on the lecturer's effectiveness and/or the effectiveness of the unit or subject taught.

For example: *"Overall how would you rate the learning experience in this course".*

**Miscellaneous:**

This is for questions, open comment, etc., that does not naturally fit the other categories.

For example: *"Work marked by this teacher is returned in a reasonable time".*

Table B.1 in Appendix B provides a summary of the questionnaires obtained from each university. If the university uses a question of a particular type (from 1 to 18) then a "1" appears in the appropriate column, otherwise it is registered as a "0".

### 2.3 CEQ Data

In addition to the surveys we also obtained the most recent results (2003) of the national survey of students who have finished a course of study as recorded in the CEQ from Dest (2004). The CEQ asks graduates to rate their perceptions using six aspects of their recently completed course. These are: good teaching; clear goals and standards; appropriate assessment; appropriate workload; generic skills; and overall satisfaction. In this paper we concentrate on the "Broad Agreement %"<sup>3</sup> from the CEQ result for the Good Teaching Scale (GTS). The GTS focuses on practices such as providing students with feedback on their progress, explaining things, making the course interesting, motivating students and understanding students' problems. Here we use what is labelled

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<sup>3</sup> "Broad Agreement" combines item responses neutral, agree and strongly agree.

as the “crude” % of agreement as opposed to the adjusted version. This was done so that the characteristics of the institution are not removed by the use of the conditioned or adjusted version.

### **3. A RELATIONSHIP BETWEEN THE FORM OF THE QTS AND TEACHING PERFORMANCE?**

In this section we construct two regression models to determine if the form of the QTS is an indication of the quality of the instruction at the university as measured by the “Broad Agreement %” from the CEQ result for the Good Teaching Scale (GTS) from the most recent results available (2003).

#### **3.1 The number of questions in the QTS and the CEQ**

The first analysis we conducted was to establish whether the number of questions on the QTS for a university has an impact on the CEQ. We use the number of questions asked on the QTS as an indication of the intensity with which a university attempts to measure the quality of teaching. In Figure 1 we have plotted the number of questions asked in the current QTS against the results from the CEQ. From Figure 1 we can see that the lowest CEQ scores were earned by institutions with the shortest questionnaire while none of the universities that asked more than 13 questions scored lower than 80 on the CEQ.<sup>4</sup>

In order to investigate this phenomenon further we employ a multiple regression analysis in which the dependant variable is the CEQ score with the independent variable as the number of questions on the QTS and the membership in the “Group of Eight” to shift the intercept.<sup>5</sup> The results of this regression are reported in Table 1<sup>6</sup>:

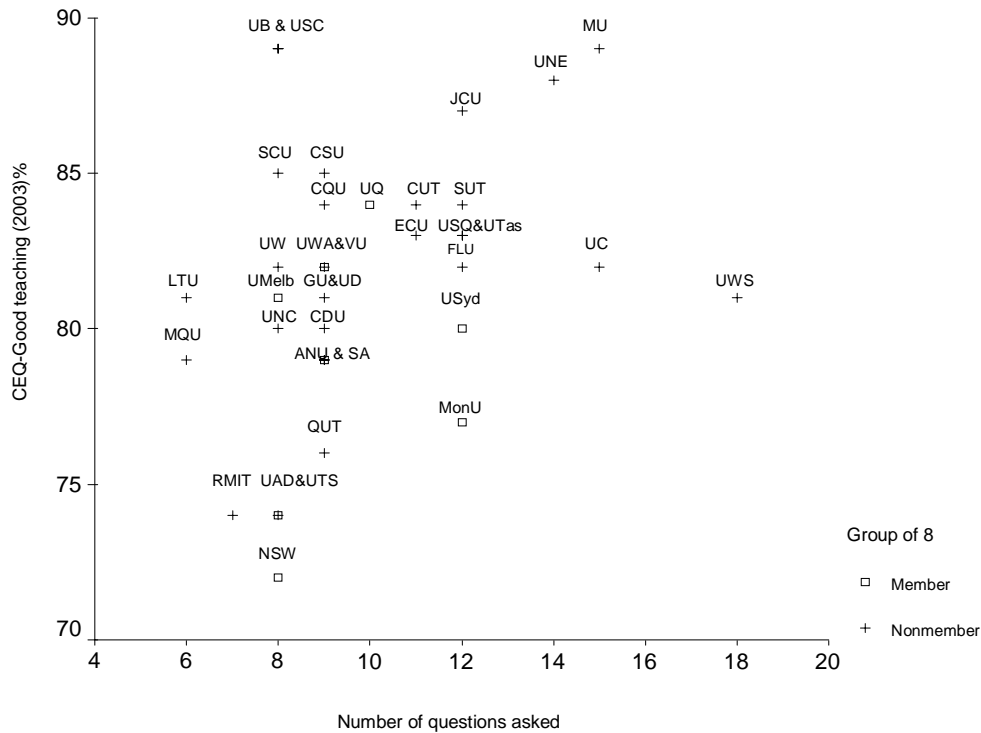
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<sup>4</sup> Abbreviations used in this Figure are given in Appendix A.

<sup>5</sup> The Group of Eight are the eight major research institutions in Australia they include, The University of Sydney, The University of New South Wales, The University of Queensland, Monash University, The



From Table 1 we note that once we have accounted for the negative impact of the membership in the Group of 8 we find that the larger the survey the greater the impact on the CEQ up to a point. This implies that the CEQ will be influenced by the number of questions until the number of questions is approximately 14.



**Figure 1** The CEQ for good teaching as related to the number of questions on the QT

This analysis demonstrates that there well may be an indirect link between the interest in measuring teaching quality as indicated by means of the number of questions on the QTS and the overall measures as found by the CEQ. However, once the questionnaire reaches 14 questions there is little gained from adding additional ones. This is illustrated in Figure 2.

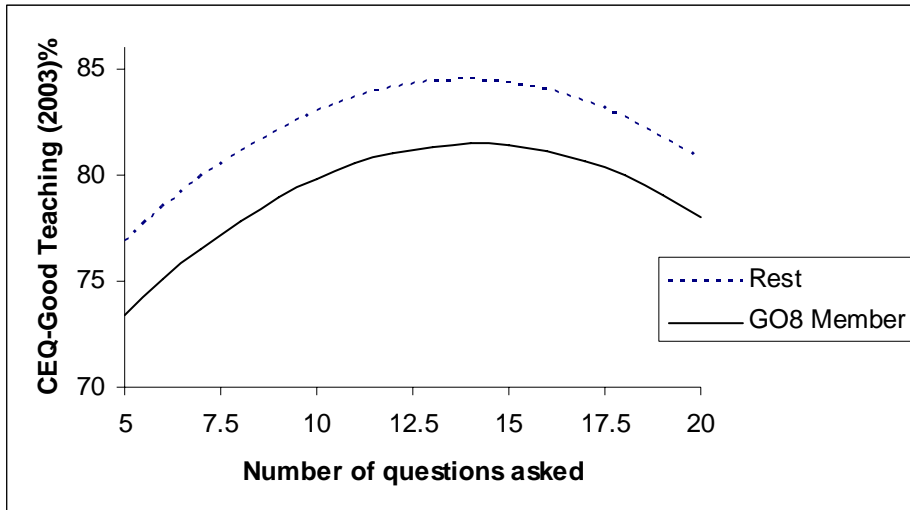
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Australian National University, The University of Melbourne, The University of Adelaide, and The University of Western Australia.

<sup>6</sup> Note that regression in Tables 1 and 2 do not include Notre Dame and Bond Universities.

Dependent Variable: CEQ Method: Least Squares Included observations: 36 White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Member Group of 8	-3.761219	1.539762	-2.442727	0.0203
# of Questions	2.706726	1.047805	2.583234	0.0146
# of Questions squared	-0.098009	0.043328	-2.262019	0.0306
C	65.76267	6.271667	10.48568	0.0000
R-squared	0.269510	Mean dependent var		81.50000
Adjusted R-squared	0.201026	S.D. dependent var		4.279519
Log likelihood	-97.26027	F-statistic		3.935398
		Prob(F-statistic)		0.016939

**Table 1** The results of a regression with the 2003 CEQ for good teaching as the dependent variable.



**Figure 2** The estimated relationship between the number of questions on the QTS questionnaire and the CEQ for good teaching.

### 3.2 The types of questions in the QTS and the CEQ.

An alternative regression analysis was run to determine if the nature of the questions asked on the QTS questionnaire was related to the CEQ scale for good teaching. Here we use the type of questions as an indication of how different universities approach the measurement and control over their teaching performance.<sup>7</sup> In performing

<sup>7</sup> The table showing the categories and types of questions from each institution is too large to include here. It is available on request from the authors.

this analysis we are assuming that different universities will monitor different aspects of their teaching quality to reflect differences in the mission and culture of the institution. Consequently the “good teaching” CEQ score may be acting as a summary measure for these variations in institutional culture. In order to perform this analysis we define a set of dichotomous or dummy variables that take on the value of “1” if the question from the QTS falls within a certain category and “0” otherwise. Table B.1 in the appendix lists the values for each university.

Dependent Variable: good teaching score from CEQ Included observations: 36				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
<b>Q1-Clear Aims</b>	0.570	1.476	0.386	0.704
<b>Q2- Explanations</b>	-2.645	1.648	-1.605	0.128
<b>Q3-Organised</b>	3.311	1.773	1.868	0.080
<b>Q4-Motivation/Enthusiasm of Lecturer</b>	0.796	1.764	0.452	0.658
<b>Q5-Respect</b>	-2.068	1.847	-1.120	0.279
<b>Q6-Access</b>	0.970	2.207	0.440	0.666
<b>Q7-Teacher Knowledge</b>	5.731	1.596	3.591	0.002
<b>Q8-Overall Teaching Quality</b>	0.473	1.742	0.271	0.790
<b>Q9-Motivation/Enthusiasm of Student</b>	-2.781	1.310	-2.122	0.050
<b>Q10-Student Knowledge</b>	5.495	2.740	2.006	0.062
<b>Q11-Stimulating/Interesting/Motivating</b>	-4.157	1.541	-2.698	0.016
<b>Q12-Gave Feedback</b>	3.759	2.009	1.871	0.080
<b>Q13-Assessment</b>	-1.937	1.907	-1.016	0.325
<b>Q14-Students Needs and learning Skills</b>	1.068	2.390	0.447	0.661
<b>Q15-Receives Feedback</b>	2.632	2.100	1.253	0.228
<b>Q16-Teaching Method/Material/Aids used</b>	-0.399	1.375	-0.290	0.775
<b>Q17-Workload</b>	2.923	1.642	1.780	0.094
<b>Q18-Overall effectiveness</b>	0.725	1.844	0.393	0.699
<b>Member of Group of 8</b>	-0.982	1.916	-0.513	0.615
<b>Constant</b>	77.692	3.628	21.417	0.000
R-squared	0.765	Mean dependent var	81.500	
Adjusted R-squared	0.486	S.D. dependent var	4.280	
Log likelihood	-76.836	F-statistic	2.743	
		Prob(F-statistic)	0.023	

**Table 2** Regression results for a model of the CEQ good teaching score and dummy variables for which question is asked (the significant parameter estimates are highlighted).

In Table 2 listed below we report the estimated regression coefficients. From this table we find that questions of type 7 (measuring teacher knowledge) and type 10 (measuring whether a student felt they learned something) have a positive influence on

the CEQ good teaching score, where the significance of the latter is just under 95%. This result implies that universities that ask these questions perform better on the CEQ than those that do not. However the questions relating to the student's motivation (type 9) and the ability of the teacher to stimulate the student's motivation (types 11) appear to be associated with lower CEQ good teaching scores.

Can we conclude from this result that the institutions that are concerned with the knowledge of the instructor and the student are more likely to achieve higher CEQ good teaching scores than those that are interested in enthusiasm? Probably not, since the order of causation is not shown by these results. However, it is an indication that some questions elicit responses that are more consistent with the CEQ than others.

#### **4. A CLASSIFICATION OF UNIVERSITIES BASED ON THE QUESTIONS USED IN THEIR QTS.**

In order to determine the relationship between the various QTS of the universities surveyed we use a cluster analysis based on a measure of the similarity between the surveys from each university. The similarity measure we use is defined as the number of questions of the same type that each university's survey used. This type of measure of similarity between binary variables is often referred to as a Russell and Rao metric for binary data (Russell & Rao, 1940). From Table B.1 (Appendix B) one can compare the universities to each other by counting the number of 1's that are in each of the 18 columns that coincide for each row by row comparison.<sup>8</sup> Table B.2 is the 38 by 38 table of the count of the number of questions that each university has in common with each other university in the set. Thus, we find that of the 7 questions asked by ANU 6 of them

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<sup>8</sup> Note that there are a number of methods that could be used to measure the similarity between binary series and this is only one of a number of possible methods. A list of alternative measures for binary data can be found elsewhere (Kaufman & Rousseeuw, 1990). The measure used here only counts the questions used and does not infer information from those that are not employed.

are the same as the questions that Bond University asks in its survey. However we also find that ANU only asks 2 questions in common with the survey conducted by Charles Sturt. The diagonal values in Table B.2 are the total number of classified questions for each university's QOT survey (the miscellaneous questions are not compared here). Table B.2 is referred to as a similarity or proximity table.

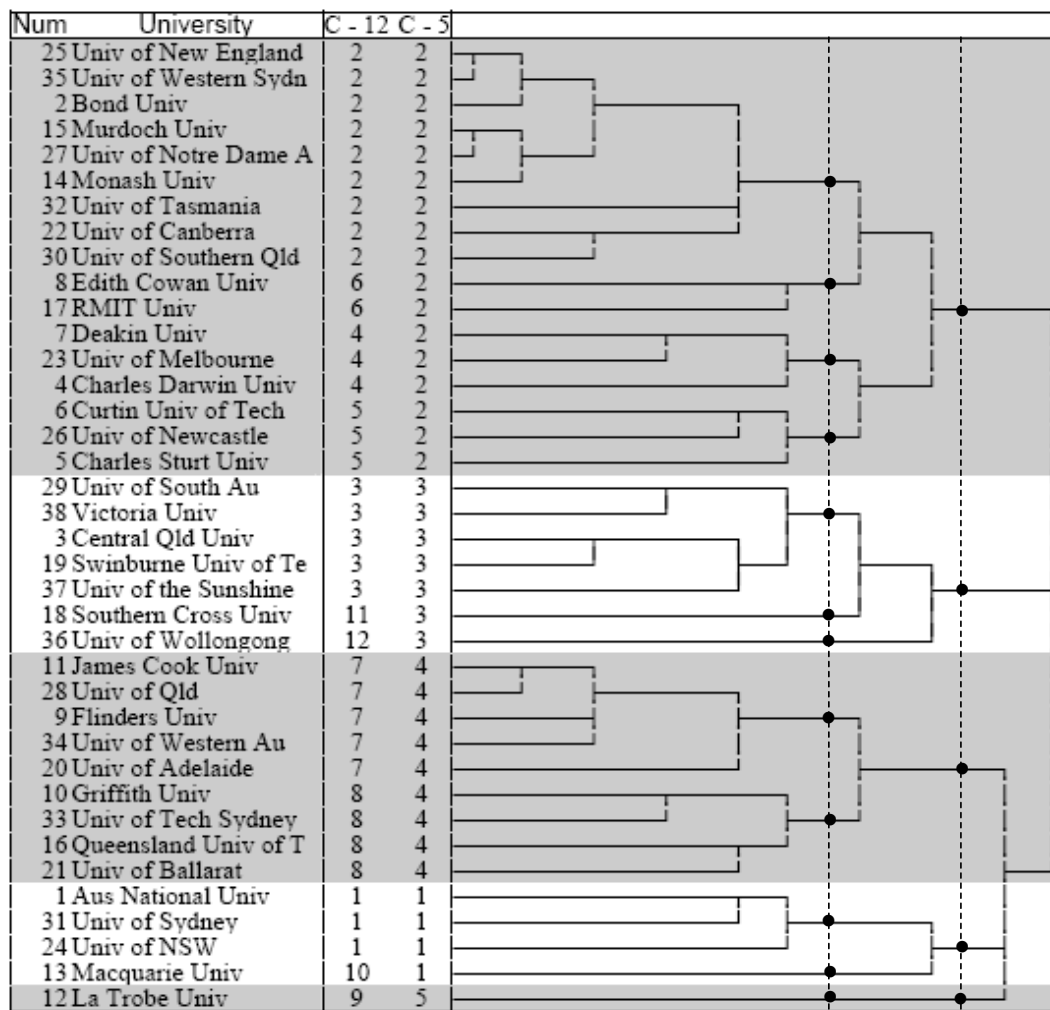
The proximity matrix in Table B.2 provides the starting point for our cluster analysis. The method we employ is referred to as an agglomeration or a hierarchical cluster analysis. This method starts with all the universities in a cluster with a membership of one then it builds a series of clusters based on how close or similar the universities are to one another (in this case using the measures we have defined in Table B.2). Once a cluster has more than one member the distance to that cluster from another cluster is determined using the complete linkage (sometimes referred to as the “furthest neighbour”) approach. This approach computes the distances between all pairs of the members of the clusters that are to be considered as potential new members and combines those clusters where the maximum distance between all the members of the proposed new cluster is the smallest of all the potential combinations that would form a new cluster. When there is more than one with the same distance (as often found in this case) the order of the data is used to form the clusters.<sup>9</sup>

The first step in the agglomeration cluster analysis is to combine the closest two universities into one cluster. Then in step two the next two closest or the one university that is closest to the cluster formed in the first step is combined to form another cluster. Progressively, all possible clusters are checked and the one with the smallest distance between the members of the new cluster becomes the next cluster to be formed. This process continues until all the universities are combined into one cluster. The progressive

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<sup>9</sup> More detail as to the process by which the agglomeration cluster method operates can be found in Kaufman and Rousseeuw (1990).

formation of these clusters of universities into these groups is conveniently described by a dendrogram (or tree diagram). Figure 3 provides a dendrogram for the clustering based on the distances in Table B.2.



**Figure 3.** The Dendrogram of the Hierarchical Cluster Analysis of the Universities based on a complete (or furthest neighbour) linkage method. C – 5 indicates the membership in the 5 cluster case and C – 12 indicates the membership in the 12 cluster case.

Figure 3 shows how the clusters of universities can be defined. In the far left of the figure we have the case where each university is in a cluster with only one member. As the clusters are formed the individual universities are combined. The closest universities are combined first then the next. The University of New England and the

University of Western Sydney are combined into one cluster; Murdoch University and Notre Dame are also combined at this point indicating that the distance between these universities is the same as those in the UNE and UWS cluster. The next round of clusters are formed by adding Bond University to the UNE and UWS cluster and adding Monash to the cluster formed by Murdoch and Notre Dame. Also with this distance a cluster can be formed with James Cook and The University of Queensland in the same cluster. Just as a family tree presents the relationships between relatives in a family the dendrogram shows how all universities are related on the basis of the measure we have chosen to compare their QTS.

The agglomerative cluster process can be stopped once a specific number of clusters have been formed. From the results of these clusters we can find the membership of those clusters defined when there are 5 clusters. The membership in these clusters is given in Figure 3 where each cluster group is given in the shaded area and identified in Column C-5. From Figure 3 we note that for the case of 5 clusters the largest group of similar QTS contains 17 universities. In this case La Trobe University remains in a cluster by itself standing out as the most different in the form of the QTS questionnaire. Figure 3 also displays the membership in the 12 clusters. Column C-12 indicates the membership in the 12 clusters. These members can also be shown to be those sub parts of the dendrogram that are cut by the vertical line at C-12. Note that due to the nature of the hierarchical cluster analysis the 12 cluster groupings sub-divide the 5 cluster groupings. Thus cluster #2 that is composed of 17 universities under the 5 cluster grouping now has 4 sub-clusters (#2, #4, #5, and #6). Those universities that are in a cluster by themselves or members of a small cluster should investigate whether they are missing out on information that other universities are using in their measurement of teaching effectiveness.

To appreciate further what these clusters represent we have summarized the nature of the questionnaire for each cluster in Table 3. In Table 3 we report the proportion of the members of each of the 12 clusters and the 5 clusters that use a question from each of the 18 types of questions. From Table 3 we note that of the universities in cluster #2 the largest of the set of 12 clusters none of the universities ask question type 15 relating to feedback. In the second set of columns we list the same information for those universities in the set of 5 clusters. Again from this table we can find which question types are most typically asked and which are not asked in the surveys conducted by the members of each cluster.

<i>Question Types</i>	<i>12 Clusters</i>												<i>5 Clusters</i>				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>1 Clear Aims</i>	.3	.9	.6	1	1	1	.5	1	1	1	1	1	.3	.9	.7	.2	1
<i>2 Clear Explanations</i>	1	.9	.8		.5	1	.8	1	1	1	1	1	1	.5	.7	.9	1
<i>3 Organised</i>	.7	.9	.3	.3	.5	1	.8				1		.5	.6	.1	.9	
<i>4 Motivation/Enthusiasm of Lecturer</i>		.4	.4		.5	1	.5		1				.3	.3	.3	.8	
<i>5 Respect</i>	.3	.7	.2				.4						.3	.4	.1	.2	
<i>6 Access</i>		1		.7	1	.8								.8	.4		
<i>7 Teacher Knowledge</i>		.4	1				.8			1			.2	.9	.4		
<i>8 Overall Teaching Quality</i>	.3	1	.6	1	1								.3	.9	.4		
<i>9 Motivation/Enthusiasm of Student</i>	.3	.2	.4	.3	.7	1	.2	.3				1	.3	.4	.4	.2	
<i>10 Student Knowledge</i>		.2		.3								1	.2	.1			
<i>11 Stimulating/Interesting/Motivating</i>	1	.7	.6	1	.3	1	1	.5					.8	.7	.4	.8	
<i>12 Gave Feedback</i>	1	1	1	1	1	.5	.4	1	1	1	1		1	.9	.7	.7	1
<i>13 Assessment</i>		.7	.6	.3	1			1				1	.6	.6	.4		
<i>14 Students Needs and learning Skills</i>	1	.7	1	1	.3	.5	1	.8		1	1	1	1	.6	1	.9	
<i>15 Receives Feedback</i>			.2		.5	.8							.1	.1	.3		
<i>16 Teaching Method/Material/Aids used</i>		.3	.4	.7	.7	.2	.8						.4	.3	.4		
<i>17 Workload</i>	.3	.2		.7	.2								.3	.2	.1		
<i>18 Overall effectiveness</i>	1	.6	1	.7	.7	1	1	1	1		1	1	.8	.6	1	1	1

**Table 3.** Proportion of Universities in the two Cluster sets that use different type Question



## **5. A CLASSIFICATION OF THE QUESTION TYPES USED IN THE QTS.**

In order to determine the relationship between the various questions asked in the surveys we use a cluster analysis based on frequency that these questions are employed. The proximity matrix in Table B.3 provides the proximity measures of the question types in a similar manner to the proximity matrix constructed for the different universities in Table B.2. In this case the values are based on the columns of Table B.1 instead of the rows—by matching the columns for two questions we use the count of the number of universities in which both questions are asked as the measure of proximity. Thus for question type 1 and question type 2 there are 14 universities where both of these questions are asked together. The diagonal elements of this matrix indicate the number of university QTS that contain this question.

Again we use the hierarchical agglomeration method to cluster the data. As before, the inter-cluster distance is measured using the complete linkage or the maximum of the distances between the elements of the clusters that are considered. Figure 4 below is the dendrogram formed from this analysis. From Figure 4 we note that if we stop the clustering algorithm when there are six clusters questions Q9 (Motivation/Enthusiasm of Student), Q17 (Workload), Q10 (Student Knowledge), and Q15 (Receives Feedback) are placed in their own cluster. The remainder of the questions are placed in either of two clusters consisting of 4 and 10 questions each. Interestingly, from the regression analysis reported in Table 2, asking question type 10 is indicative of higher teaching CEQ scores, whereas asking question type 9 is indicative of lower teaching CEQ scores.

Question	Cluster	
Q14 Students Needs and learning Skills	2	
Q18 Overall effectiveness	2	
Q12 Gave Feedback	2	
Q2 Clear Explanations	2	
Q11 Stimulating/Interesting/Motivating	2	
Q3 Organised	2	
Q6 Access	2	
Q4 Motivation/Enthusiasm of Lecturer	2	
Q7 Teacher Knowledge	2	
Q5 Respect	2	
Q1 Clear Aims	1	
Q8 Overall Teaching Quality	1	
Q13 Assessment	1	
Q16 Teaching Method/Material/Aids used	1	
Q9 Motivation/Enthusiasm of Student	3	
Q17 Workload	6	
Q10 Student Knowledge	4	
Q15 Receives Feedback	5	

**Figure 4.** The Dendrogram of the Hierarchical Cluster Analysis of the QTS questions based on a complete (or furthest neighbour) linkage method.

Again as in the clusters of the universities we can also report the proportion of the questions in each cluster that show up in each university's questionnaire. Table 4 shows how the question combinations are used by each university. The rows in this table report what proportion of the questions in each cluster of question types are used in each university's questionnaire. For example, ANU uses .7 of the questions in cluster 2 but no questions from any of the other groups of questions. In another case, the University of Western Sydney has one of the longest questionnaires and uses all of the questions in clusters #1, 3 and #4 and .9 of the questions in #2.

## 6. CONCLUSIONS

In this study we have examined the QTS used by Australian Universities. We have attempted to categorize the questions used in these surveys so that we can determine if the form of the questionnaires can be used to identify how different universities approach the measurement of teaching effectiveness by their academic staff.

<i>University</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
<i>Australian National University</i>		.7				
<i>University of New South Wales</i>	.3	.5				
<i>University of Sydney</i>	.3	.6	1			1
<i>Macquarie University</i>		.4				
<i>Bond University</i>	.8	.8				
<i>Monash University</i>	.8	.8				
<i>Murdoch University</i>	.8	.7		1		
<i>University of Canberra</i>	.8	.6				1
<i>University of New England</i>	1	.7				
<i>University of Notre Dame Australia</i>	.8	.7				1
<i>University of Southern Queensland</i>	.5	.6				
<i>University of Tasmania</i>	.3	.7	1			
<i>University of Western Sydney</i>	1	.9	1	1		
<i>Charles Darwin University</i>	.8	.4				
<i>Deakin University</i>	.8	.4	1			
<i>University of Melbourne</i>	.8	.4				
<i>Charles Sturt University</i>	1	.3		1		1
<i>Curtin University of Technology</i>	1	.3	1			1
<i>University of Newcastle</i>	.8	.4	1			
<i>Edith Cowan University</i>	.3	.6	1		1	
<i>RMIT University</i>	.3	.5	1			
<i>Central Queensland University</i>	.8	.6				
<i>Swinburne University of Technology</i>	.8	.7				
<i>University of South Australia</i>	.5	.5	1			
<i>University of the Sunshine Coast</i>	.5	.6				
<i>Victoria University</i>	.3	.6	1		1	
<i>Southern Cross University</i>	.3	.5				
<i>University of Wollongong</i>	.5	.2	1	1		
<i>Flinders University</i>		.9				1
<i>James Cook University</i>	.3	.9				
<i>University of Adelaide</i>		.6				
<i>University of Queensland</i>		1				
<i>University of Western Australia</i>		.8	1			
<i>Griffith University</i>	.5	.6			1	
<i>Queensland University of Technology</i>	.5	.5	1		1	
<i>University of Ballarat</i>	.5	.5			1	
<i>University of Technology Sydney</i>	.8	.5				
<i>La Trobe University</i>	.3	.3				

**Table 4** Proportion of Questions from each cluster group used by University.

As part of this study we used the good teaching scale from the Graduate Careers Council of Australia CEQ to establish if the form of the QTS is indicative of teaching performance as measured by the CEQ. In this analysis, we find that institutions with the shortest QTS often score lower on the teaching indicator of the CEQ than universities that have more questions. We have no indication that this reflects any causation, this relationship may only mean that the number of questions and CEQ are both indicators of the culture of an institution.

We also determined which type of questions were most closely related to higher CEQ scores and we found that those that questioned the students' improvement in

knowledge and those that questioned the instructor's knowledge were most positively associated with the CEQ outcome (Q10 and Q7). It was also found that the presence of questions relating to student's motivation and the ability of the instructor to increase the student's motivation (Q9 and Q11) were asked by those universities that received lower CEQ outcomes.

In addition, to the CEQ outcomes we also explored how different universities were similar to each other based on which questions were used. In order to establish these groupings we employed a cluster analysis to provide groupings of universities based on the types of questions they include in their QTS. The result of this analysis found that universities are quite different in the QTS that they use from the majority of the others. This is important information for Universities and could be used by them to inform any redesign of their internal QTS in order to align themselves with clusters that they identify most closely.

Besides the analysis by university of the QTS, we also investigated if there was a pattern to the particular types of questions that are used in these surveys. To accomplish this we defined a matrix of similarity between the question types based on the number of universities that asked the same questions. The outcome of this analysis was to reveal that questions relating to increases in student knowledge and degree to which the student's feedback to the instructor is encouraged or not (Q10 and Q15) were not commonly included in the types of questions asked.

Even though a form of QTS is used in almost all Australian universities we find that the questionnaires vary from institution to institution. Based on the survey results and the analysis conducted here it is anticipated that Australian institutions can be better informed as to how their QTS compares to the surveys conducted by other tertiary institutions and can consider adjusting their QTS based on the analysis done here.

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## APPENDIX A: INSTITUTIONAL PRACTICES <sup>10</sup>

University name	Name of survey	Separate survey for Units/Subjects	Online or paper-based	Data collection period	Is survey compulsory?	Data available?	Number of questions on survey	Other questions?
Australian National University (ANU)	SET	Y SET (Large group teaching) SET (course evaluation)	PB	Up to 11 years for some questions	No, but universal over a 2-3 year cycle.	No. Raw data is confidential.	7 Likert (1 = very poor; 7 excellent)	2 open questions
Bond University (UBd)	TEVALS	N	PB	16 years	Yes. (collected 3 times a year)		16 Likert qs: strongly agree – strongly disagree)	4 open questions plus an open response box
Central Queensland University (CQU)	Teaching Evaluation Questionnaire	N	PB		Yes. Once per year.		10 fixed Likert questions plus 10 other questions	
Charles Darwin University (CDU)	Student Experience of Learning and Teaching (SELT)	Yes. HE and VET use marginally different surveys.  Previous systems were: Questionnaire on Student Perceptions on Teaching (OSPOT); and Questionnaire on Unit/Module Evaluation Feedback (QUMEF)	Both	2 years	No, except for promotion purposes.  There is also a separate Teacher Evaluation survey which is not compulsory.	No	8 Likert qs (7 = strongly agree; 1 strongly disagree)	2 open questions
Charles Sturt University (CSU)	Student Evaluation System (SES)	No.	Online	1 year	Yes every year.	No. If there is a Memorandum of Understanding	11 Likert Qs 7 point scale	2 open questions
Curtin University of Technology (CUT)	eVALUate	Y  Unit and teacher survey	OL	3 semesters from new system (Around 10 years old system)	Unit – Y Teaching – N	Unit – Y Teaching -No	For unit, 11 Likert (1 = strong disagree, to strong agree)	2 open questions
Deakin University (DU)	Student Evaluation of teaching and Unit	Y. There is one survey of 18 questions; questions 1-7 relate to the teaching of the unit (although not named teaching staff) while questions 8-18 are about the unit	OL. Phased in from 2004.	3 years	Yes. All units every semester	Case by case basis. Will need to run past Executive	5 Likert (1 = strongly disagree, 5 strongly agree)	One open question
Edith Cowan	Unit and Teaching Evaluation	Y. UTEI in three-parts:	PB	2002. "Authenticated"	Yes.	Raw data confidential	11 Likert (strongly	2 open questions

<sup>10</sup> This information was correct when surveyed (May-June 2006). Of course, institutional practices change regularly. A web-based database allowing institutions to regularly record changes to their QOT practices is in preparation. The Australian Defence Force Academy uses the same evaluation form as the University of New South Wales. The Australian Catholic University does not currently evaluate teaching at present. Neither RMIT or UTS responded to the survey. Information about their surveys was obtained from their web site.

University name	Name of survey	Separate survey for Units/Subjects	Online or paper-based	Data collection period	Is survey compulsory?	Data available?	Number of questions on survey	Other questions?
University (ECU)	Instrument (UTEI)	Unit, lecturing and tutoring		data since 2004.		but available for approved research.	disagree; strongly agree)	
Flinders University (FLU)	Student Evaluation of Teaching	N	PB	10 years	Yes, effectively mandatory. No SETs no tenure or promotion. 2 year intervals.		11 Likert ( 7= strongly agree; 1 = strongly disagree)	2 open questions
Griffith University (GU)	Student Experience of Teaching (SET)	N	PB	One year	Yes	Would need permission granted by DVC (Academic)	10 Likert qs, 10 optional from question bank	3 open questions for comment
James Cook University (JCU)	Student Feedback about Teaching (SFT)	N	PB	6 years	Yes.		16 Likert (1 = completely unacceptable; 5 = outstanding) 4 additional qs	
La Trobe University (LTU)	Student Evaluation of Teaching	Y- Quality Assurance of Units (QAU)	Both	12 years	Yes. Compulsory for new staff and those who are applying for promotion. Optional for existing staff.	No standard form. Staff choose own questions	Lectures choose to make own survey from q bank. 20 maximum. 5 Likert scale (5 = True all the time, 1 = True none of the time	One open question.
Macquarie University (MQU)	Learner Experience of teaching (LET)	Y – Learner experience of Unit	PB and OL	13 years.	No. In some divisions it is compulsory.	Confidential.	6 core Likert questions, up to 6 additional qs	2 open questions.
Monash University (MonU)	MONash QUEstionnaire on Teaching (MonQueST)	Y- Student Evaluation of Units	OL	16 years	No. But needed for promotion	DVC permission needed	23 Likert questions (All or almost all – Entirely inappropriate)	1 open comment box
Murdoch University (MU)	Student Surveys of Teaching	Y. Student Surveys of Units	PB	Since 1993. (13 years)	No.	Confidential	15 Likert questions: strongly agree – strongly disagree	3 open-ended questions
Queensland University of Technology (QUT)	(New) Student Evaluation of Teaching (Individual) (SET)	Y. Combined teaching and Unit Survey (SEUT) Quality of Unit and Teaching Student Survey (OUTSS). OUTSS is a mini-evaluation for each student and unit enrolled in	Both	9 years	Mandatory for all teaching staff who teach for minimum of 14 hours in a semester. Once a semester	Confidential	10 mandatory Likert questions and 10 optional 5 point scale?	Three open-ended comments
RMIT University (RMIT)	Student Experience Survey	N	PB	Did not respond to survey			6 Likert qs on good teaching scale	Other likert questions on generic skills, clear goals, overall satisfaction, workload, assessment, etc
Southern Cross University	SET	N	OL	2 years	Yes	No, but future data may be made	6 Likert qs (1 = strongly disagree; 5	2 open questions.

University name	Name of survey	Separate survey for Units/Subjects	Online or paper-based	Data collection period	Is survey compulsory?	Data available?	Number of questions on survey	Other questions?
(SOU)						available.	strongly agree). 8 additional likert qs from question bank	
Swinburne University of Technology (SUT)	Teaching Evaluation	Y – Student Feedback on Subjects	PB, moving to OL	More than 10 years for SFS, SFT from 2006	No for Teaching Evaluation. Yes for Subject Evaluation	Raw data not available. Aggregated data may be made available.	12 Likert. Strongly disagree; strongly agree	4 open comment boxes (2 with Likert selection)
University of Adelaide (UAd)	Student Experience of Learning and Teaching (SELT). (Prior to 2001, SET)	Y (Course SELT)  Introducing a program SELT that makes to CEQ questions.	PB	13 years	<b>Mandatory for promotion applications</b> Teacher SELT every second year, course SELT every 3 <sup>rd</sup> year.	Y	7 Likert (1 = very poor-7 = outstanding)	2 comment boxes.
University of Ballarat (UB)	SET	N	PB	7 years	<b>Virtually compulsory</b> within a rolling one-year period. Required for Performance Review and Development Plan	No – used for internal reporting only.	10 Likert questions	
University of Canberra (UC)	Teaching Questionnaire	Y. A Units questionnaire	PB	10 years	No.	No.	15 Likert qs. 12 optional questions.	5 open comment questions.
University of Melbourne (UMelb)	Quality of Teaching (QOT)	N	PB	10 years	Yes	Yes – with ethics clearance	9 Likert qs (strongly agree – strongly disagree)	Additional comments box
University of New England (UNE)	Evaluation of Lecturer Teaching Performance	Y Student Feedback on Unit	PB	9 years	No – conducted at the request of the lecturer. <b>But must be used for promotion</b> and becoming more widespread for performance reviews.	No, but permission may be granted with all identifying information removed	15 Likert (1 = strongly disagree; 6 = strongly agree)	2 comment boxes.
University of New South Wales (NSW)	Course and Teaching Evaluation and Improvement (CATEI)	Y. CATEI Evaluation of a Course	PB	10 years	Yes. Every year in one course. Courses every two years.	N. Looking into deidentified data for course review.	10 Likert (strongly agree; strongly disagree)	2 comments boxes
University of Newcastle (UNC)	SET	N	PB	10 years	No.	No - Confidential	8 Standard question (Likert 5 = strongly agree; m1 = strongly disagree) Plus 4 + additional from question bank.	A separate page for written comments.
University of Notre Dame Australia (UND)	Teacher and Course Evaluation (TCE)	N	PB, OL in 2-3 years	9 years (since 1997)	TCEs should be administered in all regular classes, but department chairs make the final decision. (In 2006 95% of courses were evaluated).	Confidential	13 Likert 5 scale: (No improvement needed; Major improvements are called for)	1 yes/no q. 4 additional Likert qs. 1 4 scale (Much more than average, less than average) 3 Likert 5 scale (Excellent, very poor)
University of Queensland (UQ)	Student Evaluation of Teaching (TEVAL)	Y.	PB	6 years	No. Only Course evaluation compulsory	No. Only if MOU	11 Likert questions (5 = strongly agree; 1 = strongly disagree)	
University of South	SET	Y. Course Evaluation	Both	More than 6 years	Effectively mandatory	Generally	10 Likert	2 Open-ended



University name	Name of survey	Separate survey for Units/Subjects	Online or paper-based	Data collection period	Is survey compulsory?	Data available?	Number of questions on survey	Other questions?
Australia (USA)		Instrument				confidential, but can possibly be used	5-point scale -- Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree.	questions
University of Southern Queensland (USQ)	Student Feedback on Teaching and Courses (SFTC)	N	PB	10 + years	Until 2006 compulsory. Now "as appropriate"	No	11 Likert questions ( 5 = strongly agree; 1 = strongly disagree)	5 open comment questions
University of Sydney (USyd)	Unit of Study Evaluation (USE)  * does not focus on one teacher specifically. Uses "feedback for teachers" survey for teaching feedback.	Y. Student Course experience Questionnaire (SCEQ) and Course experience Questionnaire (CEQ)	PB	5 years.	No, however SET is compulsory for subjects.	No. ILT staff only	11 Likert questions (1 = strong disagree, 5 = strongly agree)	Each question asks for comments to explain the reasons for ranking.
University of Tasmania (UTas)	Student Evaluation of Teaching and Learning (SETL)	Y	PB	13 years	Yes Teaching staff every 2 years Units every 3.	No.	10 Likert qs (1 = strongly disagree; 5 strongly agree)	3 open questions.
University of Technology Sydney (UTS)	Did not respond to survey						8	
University of the Sunshine Coast (SCU)	Student Feedback on Teaching (SFT)	Y	PB	5 years (informally); 5 years formally	Yes Once per year.	No	20 Likert questions 10 core items and up to 10 from item bank 5 point scale	3 open questions.
University of Western Australia (UWA)	Student Perceptions of Teaching (SPOT)	Y – Student Unit's Reflective Feedback	PB	Since 1992 (14 years)	N – strongly endorsed but not mandatory	N	3 core Likert questions, rest chosen from item bank	
University of Western Sydney (UWS)	Student Feedback on Teaching (SFT) (SEQ Survey)	N	PB	10 years	Yes Once per year.	N.	31 Likert. 1 = strongly disagree; 9 strongly agree) plus additional qs if wanted	2 comments boxes
University of Wollongong (UW)	Teacher Evaluation Student Questionnaire	Y- Subject Evaluation Survey	PB, recently obtained approval for OL	14 years (since 1992)	Yes, compulsory. 4-6 surveys when going for promotion/probation	Y, permission from DVC	14 Likert. Strongly agree; Strongly disagree	2 open questions in separate mid-term Teacher Evaluation Student Questionnaire
Victoria University (VU)	Student Evaluation of Teaching (SET)	Y – Student Evaluation of Subjects (SES)	PB	6 Years	SET – Not compulsory, but recommended SES - Compulsory	No, but permission may be granted with all identifying information removed	Likert. 10 mandatory; 20 total.	

**APPENDIX B.**

University	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Total Questions	Classified Questions	Is Survey compulsory	Separate Survey	Years used
<i>Aus National Univ</i>	0	1	1	0	1	0	0	0	0	0	1	1	0	1	0	0	0	1	9	7	0	1	11
<i>Bond Univ</i>	1	1	1	0	0	1	1	1	0	0	1	1	1	1	0	0	0	1	16	11	1	0	16
<i>Central Qld Univ</i>	0	1	0	0	1	0	1	1	0	0	0	1	1	1	0	1	0	1	9	9	1	0	.
<i>Charles Darwin Univ</i>	1	0	1	0	0	0	0	1	0	0	1	1	1	1	0	0	0	0	9	7	0	1	2
<i>Charles Sturt Univ</i>	1	0	0	0	0	1	0	1	0	1	1	1	1	0	0	1	1	0	9	9	1	0	1
<i>Curtin Univ of Tech</i>	1	0	0	0	0	0	0	1	1	0	0	1	1	1	0	1	1	1	11	9	0	1	10
<i>Deakin Univ</i>	1	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	9	8	1	1	3
<i>Edith Cowan Univ</i>	1	0	1	1	0	1	0	0	1	0	1	0	0	1	1	0	0	1	11	9	1	1	4
<i>Flinders Univ</i>	0	1	1	1	1	1	1	0	0	0	1	0	0	1	0	0	1	1	12	10	1	0	10
<i>Griffith Univ</i>	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	9	9	1	0	1
<i>James Cook Univ</i>	0	1	1	1	0	1	1	0	0	0	1	1	0	1	0	1	0	1	12	10	1	0	6
<i>La Trobe Univ</i>	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	6	4	1	1	12
<i>Macquarie Univ</i>	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	6	4	0	1	13
<i>Monash Univ</i>	1	1	1	1	1	1	0	1	0	0	1	1	0	1	0	1	0	0	12	11	0	1	16
<i>Murdoch Univ</i>	1	1	1	1	1	1	0	1	0	1	0	1	1	1	0	0	0	0	15	11	0	1	13
<i>Qld Univ of Tech</i>	0	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	0	1	9	9	1	1	9
<i>RMIT Univ</i>	1	1	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	1	7	7	0	0	.
<i>Southern Cross Univ</i>	1	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	8	6	1	0	2
<i>Swinburne Univ of Tech</i>	0	1	0	1	0	0	1	1	0	0	1	1	1	1	0	1	0	1	12	10	1	1	10
<i>Univ of Adelaide</i>	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	8	6	0	1	13
<i>Univ of Ballarat</i>	1	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	1	8	8	1	0	7
<i>Univ of Canberra</i>	1	1	1	0	0	1	0	1	0	0	1	1	1	0	0	0	1	1	15	10	0	1	10
<i>Univ of Melbourne</i>	1	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	0	1	8	7	1	0	10
<i>Univ of NSW</i>	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	1	8	6	1	1	10
<i>Univ of New England</i>	1	0	1	0	1	1	1	1	0	0	0	1	1	1	0	1	0	1	14	11	0	1	9
<i>Univ of Newcastle</i>	1	0	1	0	0	1	0	1	1	0	0	1	1	0	0	0	0	1	8	8	0	0	10
<i>Univ of Notre Dame</i>	1	1	1	1	1	1	0	1	0	0	0	1	1	1	0	0	1	0	13	11	1	0	9
<i>Univ of Qld</i>	0	1	1	1	1	1	1	0	0	0	1	1	0	1	0	0	0	1	10	10	0	1	6
<i>Univ of S A</i>	1	0	0	0	0	0	1	1	1	0	1	1	0	1	0	0	0	1	9	8	1	1	6
<i>Univ of Southern Qld</i>	1	1	1	0	0	1	0	1	0	0	1	1	0	0	0	0	0	1	12	8	1	0	10
<i>Univ of Sydney</i>	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	1	1	12	9	1	1	5
<i>Univ of Tasmania</i>	0	1	1	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	12	9	1	1	13
<i>Univ of Tech Sydney</i>	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	0	1	8	8	0	0	.
<i>Univ of Western Au</i>	0	1	1	1	0	1	1	0	1	0	1	0	0	1	0	0	0	1	9	9	0	1	14
<i>Univ of Western Sydney</i>	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	18	15	1	0	10
<i>Univ of Wollongong</i>	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	1	8	6	1	1	14
<i>Univ of the Sunshine Cst</i>	1	1	0	1	0	0	1	0	0	0	0	1	1	1	0	0	0	1	8	8	1	0	4
<i>Victoria Univ</i>	1	1	0	0	0	0	1	0	1	0	1	1	0	1	1	0	0	1	9	9	1	1	6

**Table B.1.** The data used for each University.



Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
Q1-Clear Aims	<b>25</b>	14	14	7	5	12	7	15	10	4	15	22	14	18	3	8	5	20
Q2-Explanations	14	<b>27</b>	17	13	9	13	12	11	7	2	19	23	11	21	3	8	4	22
Q3-Organised	14	17	<b>22</b>	10	8	14	8	10	5	1	16	17	10	17	3	5	4	17
Q4-Motivation/Enthusiasm of Lecturer	7	13	10	<b>15</b>	6	9	7	5	4	2	9	11	7	15	3	5	2	11
Q5-Respect	5	9	8	6	<b>10</b>	8	6	7	2	2	6	9	5	9	0	4	2	6
Q6-Access	12	13	14	9	8	<b>17</b>	8	11	6	3	13	14	8	11	1	5	4	12
Q7-Teacher Knowledge	7	12	8	7	6	8	<b>14</b>	7	5	1	10	11	6	13	1	5	1	13
Q8-Overall Teaching Quality	15	11	10	5	7	11	7	<b>19</b>	6	3	13	19	12	14	0	9	4	13
Q9-Motivation/Enthusiasm of Student	10	7	5	4	2	6	5	6	<b>13</b>	2	9	10	5	10	3	4	2	12
Q10-Student Knowledge	4	2	1	2	2	3	1	3	2	<b>4</b>	2	3	4	3	0	2	1	2
Q11-Stimulating/Interesting/Motivating	15	19	16	9	6	13	10	13	9	2	<b>25</b>	21	8	19	3	9	4	21
Q12-Gave Feedback	22	23	17	11	9	14	11	19	10	3	21	<b>32</b>	17	24	4	13	5	25
Q13-Assessment	14	11	10	7	5	8	6	12	5	4	8	17	<b>18</b>	14	3	9	4	14
Q14-Students Needs and learning Skills	18	21	17	15	9	11	13	14	10	3	19	24	14	<b>30</b>	5	11	4	25
Q15-Receives Feedback	3	3	3	3	0	1	1	0	3	0	3	4	3	5	<b>5</b>	2	0	5
Q16-Teaching Method/Material/Aids used	8	8	5	5	4	5	5	9	4	2	9	13	9	11	2	<b>13</b>	2	11
Q17-Workload	5	4	4	2	2	4	1	4	2	1	4	5	4	4	0	2	<b>6</b>	4
Q18-Overall effectiveness	20	22	17	11	6	12	13	13	12	2	21	25	14	25	5	11	4	<b>31</b>

**Table B.3** The similarity or proximity matrix for the questions in the QTS questionnaires which shows the number of universities that use questions from each type. Note that the diagonals indicate the total number of universities that ask each question (these are the Russell & Rao (1940) similarity measures multiplied by 38).



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