

Random sampling project

2012 Report on random sampling of assessment in Authority subjects



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Queensland Studies Authority

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1. Summary

Random sampling of school judgments of student achievement in Authority subjects (the random sampling project) is one of the Queensland Studies Authority's (QSA) quality-assurance procedures for senior certification. It has been conducted annually since 1994.

The principal purpose is to evaluate the quality of school-based assessment programs and the comparability of teacher judgments of student achievement in Authority subjects across the state after senior education profiles (SEPs), including Queensland Certificates of Education (QCEs) and Senior Statements, have been issued. The key question for the random sampling project is, therefore:

How consistently do teachers apply statewide standards in determining students' levels of achievement in Authority subjects?

The focus for this 2012 report was students completing Year 12 in 2011.

For selected Authority subjects, a random sample of schools submitted the exit folio of a stratified random sample of seven students. Where the subjects selected had either 13 districts or a number of combined districts, review panellists for that subject from a panel in another district reviewed each school submission of folios. From 2010, small and intermediate (fewer than 14 students) subject groups were included in the sample.

Panellists were asked to allocate a Form R6 rung placement to each sample folio and to comment on each submission.

1.1 Findings

- 2649 folios were reviewed from 394 school submissions involving a total of 231 schools across 21 subjects.
- Random sampling review panels generally found that, overall, there was substantial agreement between panels and schools: 92% of the folios were placed in the same level of achievement (LOA) by both the random sampling panel and the school; 92% differed by no more than one-third of a level of achievement (three rungs or fewer).
- At 92%, the percentage agreement within a level of achievement was higher than in most other years.
- The greatest variances were recorded for Visual Art, Music and Information Technology Systems. In 2012, a smaller percentage of subjects had a higher than average variance than in 2011. Visual Art and Music were above the average variance for agreement for the second consecutive year.
- There were no districts or schools within districts where large differences between school and panel judgments were evident. Small differences were found across most of the subjects sampled.
- Serious disagreement (defined as eight or more rung differences, with a level of achievement difference) was recorded for 1% of folios, a result better than in the previous three years.
- The subjects with the highest number of folios with rung differences of three or more were Visual Art, Information Technology Systems, Mathematics B and Music.
- Based on the level of disagreement recorded by random sampling panels, 24 submissions were requested for further review by state review panellists (SRPs) and senior education officers (SEOs) from the QSA. Subjects where a further review was requested were Ancient History, Biology, Economics, Information Technology Systems, Japanese, Mathematics A, Mathematics B, Modern History, Music and Visual Art.
- Following the review by SRPs and SEOs, the number of folios with rung differences of three or more fell most for Biology, Visual Art and Economics. Conversely, there was an increase in the number of folios with a rung difference of three or more for Japanese and Mathematics A after the additional review of these submissions. Further follow-up was recommended for some subject areas.

1.2 Conclusion

- The random sampling project supports the view that the school-based assessment and moderation process for Authority subjects continues to be an effective quality-assurance process, valued by schools and panels.

1.3 Recommendations

- Continue to provide professional support materials for review panellists involved in random sampling as introduced in 2012.
- Panel training to be conducted for Visual Art and Music.

2. Background

2.1 Purpose

Random sampling of school judgments of student achievement in Authority subjects (the random sampling project) contributes to the processes of moderation for the levels of achievement awarded on the Senior Statement. The random sampling project has been conducted each year since 1994. Its purposes are to:

- evaluate the quality of school-based assessment and the comparability of teacher judgments of student achievement in Authority subjects across the state; that is, to assess the strength of school decision making in the system of school-based assessment for senior certification
- provide information on the quality of assessment procedures and assessment judgments in various subjects
- identify, at a systemic level, any issues concerning assessment and moderation that need further investigation.

The process of reviewing student folios for the random sampling project occurs in the year after the students have left school and after they have been issued with their SEP. The outcome does not therefore influence the levels of achievement awarded to that cohort of students. Rather, the random sampling project checks the quality of school-based judgments after they have been made. However, the findings can contribute to further improvements in moderation processes.

2.2 Contribution to senior moderation

Moderation is the set of processes designed to:

- support the integrity of school-based assessment in Authority subjects
- strengthen the quality of teacher judgments of student achievement in Authority subjects
- ensure a high degree of comparability in certified levels of achievement in Authority subjects
- maintain the credibility and acceptability of the SEP.

Moderation begins with the approval of work programs for Authority syllabuses. Other key processes of moderation are **monitoring**, **verification**, **confirmation** and **random sampling**.

Monitoring of Year 11 folios occurs at the end of the first half of a course, at the end of February. Review panels consider evidence of the school's delivery of their courses of study and of their programs of assessment. They also consider school judgments of student achievement in Authority subjects, based on a sample of student folios from each school. Advice is given to schools early in Year 12 so that schools can be reassured about, or helped with, their delivery of approved courses of study and their standards judgments.

Verification occurs towards the end of Year 12. Schools submit sample student folios in September each year for the verification meeting in October. School submissions of a sample of student folios in each Authority subject offered by the school are sent to the relevant (usually district) review panel. These submissions consist of a sample of folios of work for students about to complete the course of study, together with the school's judgments of interim levels of achievement for those students. Panellists survey the folios for evidence to confirm the school's judgments, confer with other panellists (and in the case of different opinions, the chair), and formulate advice to the school. If the panel cannot confirm a school's proposal, consultation between the school and the district review panel chair (DRPC) takes place. Where agreement cannot be reached between the school and the DRPC on all sample folios in a submission, the complete submission is sent to the relevant state review panel for further consideration.

The role of the state review panel is to check that comparable standards are maintained in their subject across all districts. They do this by examining sample submissions from each district and validating the judgments of the district panels.

Confirmation occurs following completion of Year 12. Schools forward their exit proposals for levels of achievement to the office of the QSA immediately after the finishing day for Year 12 in November. The

period between receipt of schools' proposals for exit levels of achievement and the printing of SEPs is referred to as the confirmation period. SEOs review any changes to the levels of achievement that had been agreed to at verification. Legitimate changes can occur as a result of assessment in the final term of Year 12. The confirmation phase concludes when the QSA reaches agreement with the school on its proposed results for recording on students' Senior Statements.

Random sampling focuses on student *exit* folios. This means that it occurs after the issue of SEPs. No changes in the recorded results in SEPs occur as a consequence of random sampling.

Random sampling refers to the process of sampling schools and students. However, subjects are not randomly selected, and some (smaller) subjects were not previously randomly sampled at all. Subjects typically have been selected on the basis of their size (total number of students), stage of implementation or implementation issues.

Schools are chosen randomly within each subject. In the past, to be included, the school needed to have a large group (14 or more students) in that subject. Small (nine students or fewer) and intermediate (10–13 students) groups were generally not included because most of these students' folios of work were assumed to have already been reviewed by their district or state panel. However, this discounted the value of including such groups to allow these groups to be reviewed by other districts, which is a key aspect of the random sampling project.

For each chosen group, a random sample of students is selected, stratified by levels of achievement awarded to the students. The school is asked to provide the exit folios for these students including each student's level of achievement and rung placement (recorded on the Form RS, see Appendix A). These folios are called the random sampling submission.

Random sampling submissions are allocated randomly to other districts. The other district panel is referred to as the random sampling review panel when it is reviewing random sampling submissions.

District review panels (DRPs), acting as random sampling review panels, review random sampling submissions in February at the same time that panels meet for Year 11 monitoring.

3. Project design

3.1 Sampling procedure

This random sampling project focused on the Year 12 cohort of 2011.

Subjects were selected deliberately to include those with large statewide enrolments as well as other subjects of interest, such as those that had not previously been sampled or had not been sampled in recent years. Strategic interests included subjects:

- not selected for two or more years (e.g. Film, Television & New Media)
- with Year 12 for the first time on a revised syllabus
- with Year 12 for the second time on a new or revised syllabus
- that have had high “inter-rater” variation in previous random sampling reviews (e.g. Music and Visual Art).

For subjects with 13 QSA district panels, schools were selected randomly within each of the districts across the state under the following constraints (where possible):

- no more than three subject groups from one school
- a maximum of 26 school subject groups for any one subject.

A stratified random sample of student folios was selected within each school subject group (submission) with the following specifications:

- folios are selected by the QSA, not the school
- if there are fewer than the required number of folios at any given level of achievement, folios are selected from the next level of achievement (moving towards the centre)
- if there are fewer than two SA folios, folios are selected, in turn, from HA, VHA, LA, or VLA.

The outcome of this selection process is shown in Table 1.

Table 1: Requested and received submissions and folios for the selected subjects

	Number of schools	Number of folios requested	Number of folios received	Number of folios reviewed
Accounting	26	182	182	182
Ancient History	26	182	180	171
Biology	26	182	181	180
Business Communication & Technologies	26	182	178	178
Business Organisation & Management	12	84	84	84
Chinese	6	42	38	32
Economics	17	119	118	111
Film, Television & New Media	18	126	116	97
French	8	56	56	56
German	6	42	42	42
Hospitality Studies	8	56	56	56
Information Technology Systems	14	98	97	97
Japanese	22	154	154	153
Marine Studies	12	84	77	77
Mathematics A	26	182	180	180
Mathematics B	26	182	182	182
Modern History	26	182	179	174
Music	26	182	174	174
Physical Education	26	182	180	180
Study of Religion	12	84	84	84
Visual Art	26	182	173	159
Total	395	2765	2711	2649

The final number of submissions was 395. The number of folios received was 2711. Of the 2711 folios received, 62 were not reviewed by a random sampling review panel as there was insufficient evidence or information to make a judgment.

Subjects were distributed across 198 panels. A full list of all subjects sampled for the past nine years is contained in Appendix D. Most schools were required to provide only one submission. No school was requested to provide more than three submissions (see Table 2).

Table 2: Number of submissions requested from schools

Number of submissions	Number of schools
1	115
2	68
3	48
Total schools	231

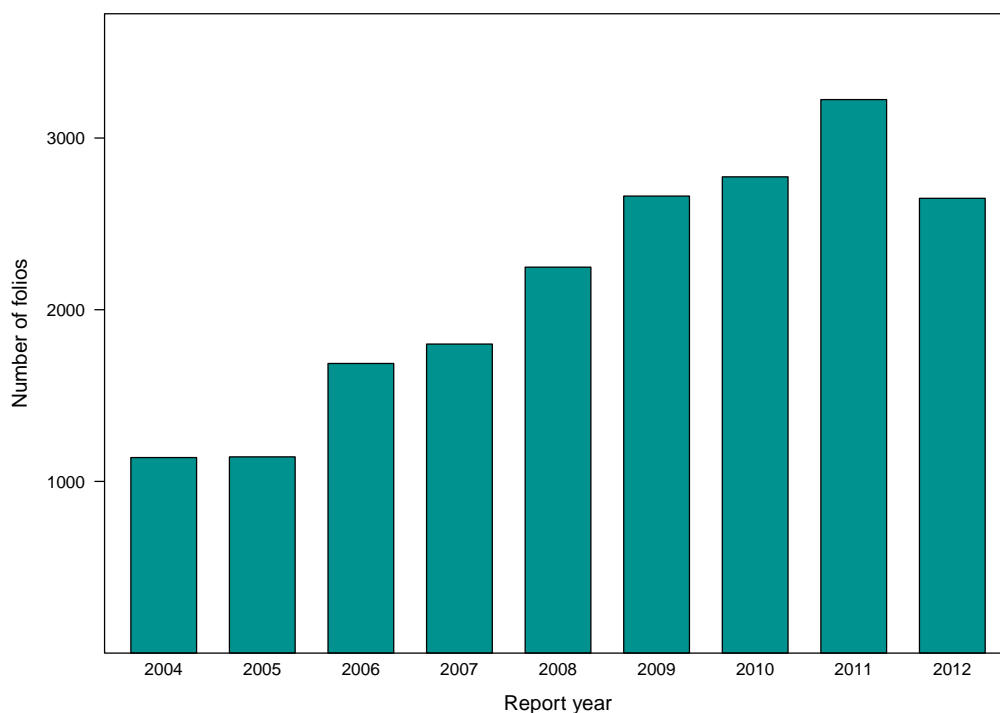


Figure 1: Number of folios sampled for review by random sampling review panels by year

3.2 Random sampling review panel procedures

Members of the district review panels (acting as random sampling review panels) examined each of the folios in the school submissions allocated to their panel and decided a specific rung placement (ten rungs within each level of achievement). Two panellists, selected by the DRPC, reviewed each submission independently. Panellists then met with the DPRC to reach consensus on each submission.

District review panellists and DPRCs were provided with advice about how to ensure that two independent reviews of the two submissions allocated to their district took place.

3.3 Analysis of results

Rung-achievement placements allocated by schools and random sampling review panels were converted to a numerical scale of 1–50. The rung or level difference was calculated by subtracting the school's exit rung (or level) placement from that of the panel. Negative differences therefore mean that the panel judged the schools' placement to be lower.

3.4 Review by state review panellists/senior education officers

Folios with a significant difference (defined as eight or more rungs difference) between school judgment and panel judgment were identified and the following criteria were used to select submissions for

further review by SRPs and SEOs:

- highest proportion of subjects with eight or more rungs difference
- three or more students identified as having a change to rung level and/or level achievement.

State review panellists independently reviewed these submissions and, after comparing the school judgment with the panel judgment, determined the appropriate action to be taken.

The information gained from this review informs future professional development in specific subject areas.

4. Findings

4.1 Overall differences

The random sampling panels were asked to comment on the standards evident within each school submission as applied by schools. As shown in Figure 2, 68.4% of folios had no rung difference and 92.2% were found to be either “same rung” or within three rungs on the Form R6 by their schools. As noted in previous studies, there is a greater tendency for random sampling review panels to rate folios lower than the schools.

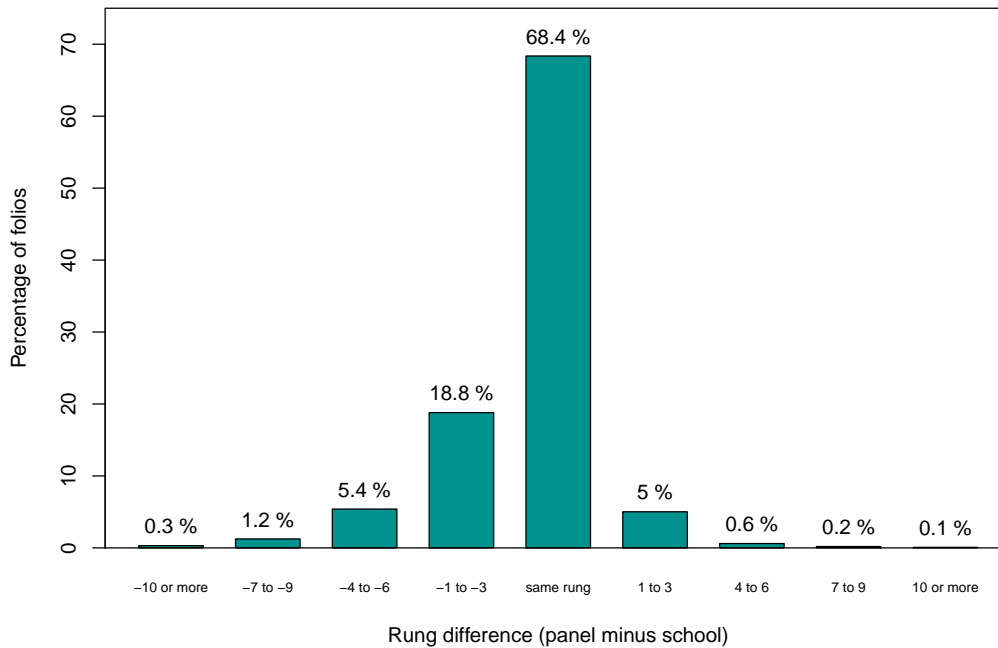


Figure 2: Distribution of rung differences for folios¹

There was a high level of agreement between the random sampling review panels and the schools about **levels of achievement** awarded to folios. Figure 3 indicates that reviewers found that 91.6% of the levels of achievement awarded by the school were able to be supported. While 7.4% of folios were judged to have been placed 1–2 levels of achievement too high at exit, 1% of folios were found to have been awarded 1–2 levels too low.

¹Due to rounding, the total may not equal 100%.

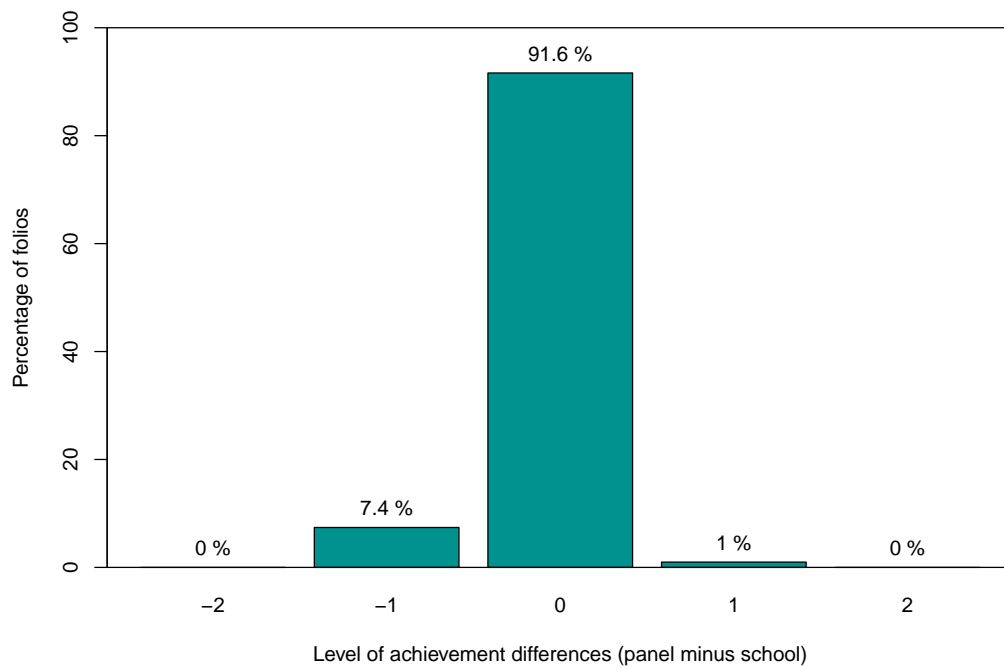


Figure 3: Distribution of level of achievement differences for folios²

Figure 4 shows that there has been some variation over time (between 84% and 93%) in the percentage of folios considered by random sampling review panels to have been placed appropriately in terms of level of achievement overall. The current result is the second highest achieved — 92% — since the first year of random sampling in 1994. The highest was 93.1%, recorded in 2004.

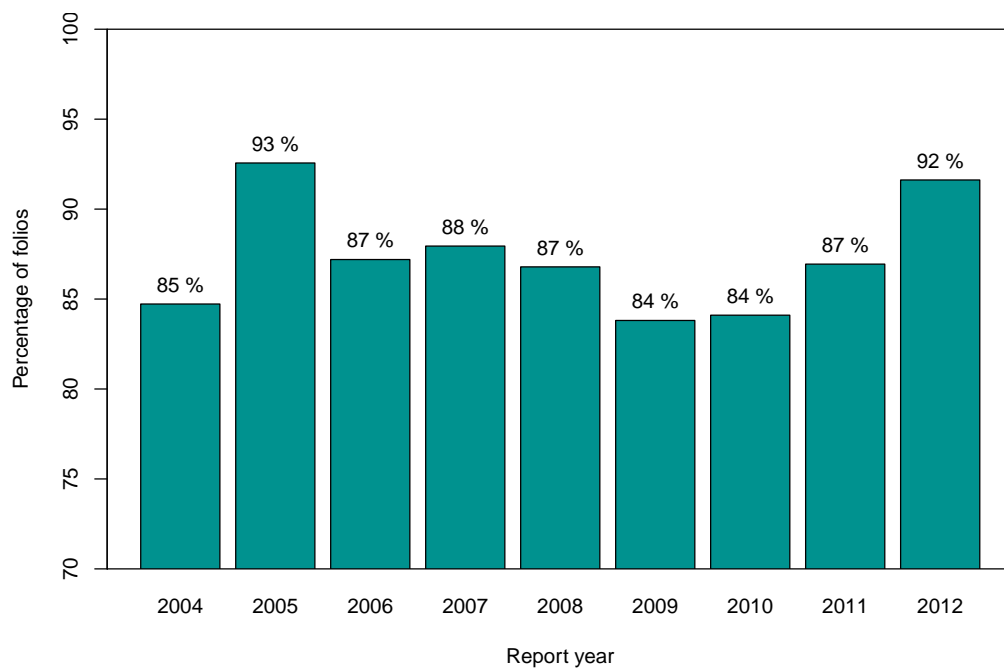


Figure 4: Comparison of percentage placed in same level of achievement

²Due to rounding, the total may not equal 100%.

Figure 5 shows the historical comparisons for rung differences from 2004 to the present. While the 2012 results are generally consistent with past results, the percentage of 8+ rung differences in this sample remains lower than all other years except 2004.

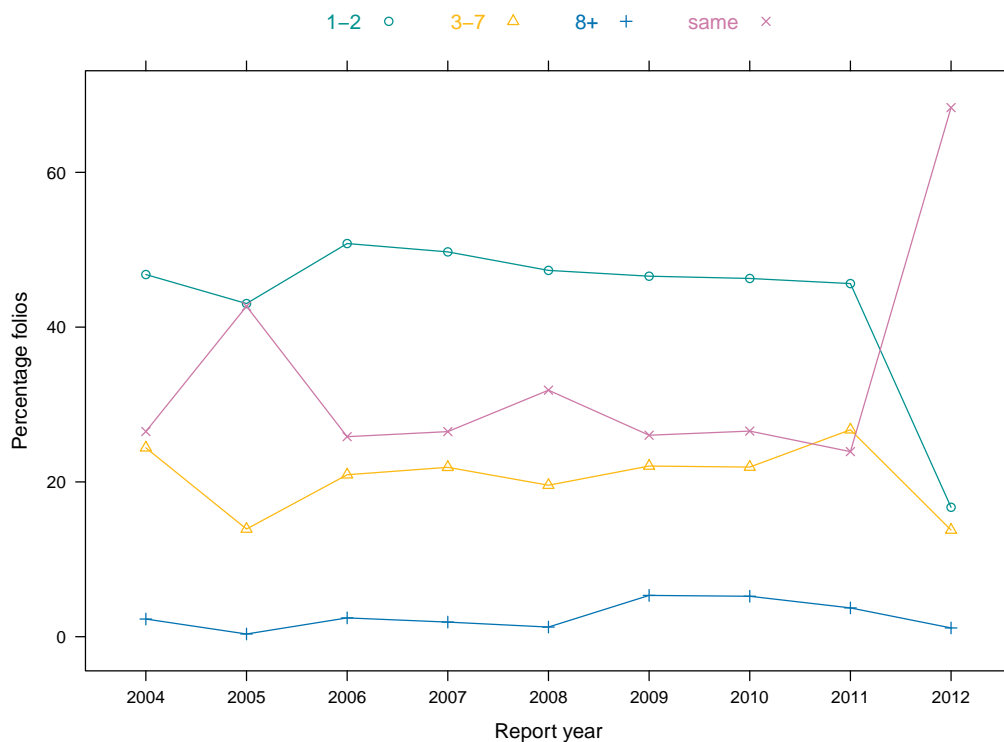


Figure 5: Comparison of rung differences across years

4.2 Subject analysis

Table 3 summarises the absolute mean rung differences by subject, over time. The absolute mean does not take into consideration the direction of difference and therefore provides an overall indication of the degree of consistency in judgment based on rungs. The overall mean and standard deviation is for all subjects sampled in that year (not just those appearing in the table).

The table reinforces the trend noted in Figure 5, in which there has been one of the highest levels of agreement of standards as reflected by the lowest absolute mean value than for any year. It also highlights the fact that there were 13 common subjects in the 2011 and 2012 samples (Accounting, Biology, Business Communication & Technologies, Chinese, Economics, French, German, Japanese, Mathematics A, Mathematics B, Music, Study of Religion and Visual Art).

The 2012 random sampling for Music and for Visual Art showed a higher than average absolute mean difference for the second consecutive year.

Visual Art, Music and Information Technology Systems have the largest average mean differences, while Business Organisation & Management; Film, Television & New Media; Ancient History; Mathematics B; and German also have larger than average mean differences.

The absolute mean for most subjects is lower than for any previous year, whereas the results for Visual Art have been above the absolute mean in each year it has been included, between 2004 and 2012.

Mathematics A, Business Communication & Technologies, Hospitality Studies and Economics have the smallest absolute mean rung differences.

Table 3: Comparison of absolute mean rung differences by subject

Subject name	2004	2005	2006	2007	2008	2009	2010	2011	2012
Accounting			1.08			1.45		1.52	0.56
Ancient History				2.16	1.45		1.76		1.19
Biology		0.70			1.49	1.86		1.68	0.79
Business Communication & Technologies			1.80			1.89		1.76	0.30
Business Organisation & Management			1.43				1.13		1.43
Chinese		1.76						1.47	0.72
Economics	1.93			1.55		1.90		2.25	0.45
Film, Television & New Media					1.59	1.60			1.21
French					0.98			1.70	0.79
German								1.86	0.93
Hospitality Studies		1.29			0.98		1.84		0.45
Information Technology Systems		2.53	2.87	1.37		2.30	2.71		1.66
Japanese			1.55		1.22			1.88	0.66
Marine Studies					1.45		1.68		0.87
Mathematics A	2.00			1.94		2.12		2.24	0.29
Mathematics B	1.75			1.49		1.82		1.81	1.03
Modern History				1.75	2.17	2.71	2.34		0.83
Music		1.00			1.89	2.28		2.72	1.71
Physical Education	1.75			1.18	1.11		1.43		0.61
Study of Religion	2.11		1.57			2.43	2.30	2.11	0.57
Visual Art	2.87		2.62		2.25	2.64		3.43	1.80
Standard deviation	2.09	1.44	2.01	1.89	1.79	2.72	2.71	2.35	1.69
Overall mean(abs)	1.88	1.15	1.78	1.70	1.55	2.11	2.09	2.12	0.90

4.3 District analysis

Figure 6 compares absolute mean rung differences for random sampling panels in each district. Panels in the Toowoomba, Gold Coast, Mackay and Brisbane North districts had the highest level of disagreement with the decisions made by schools about student placement across all subjects reviewed by the district.

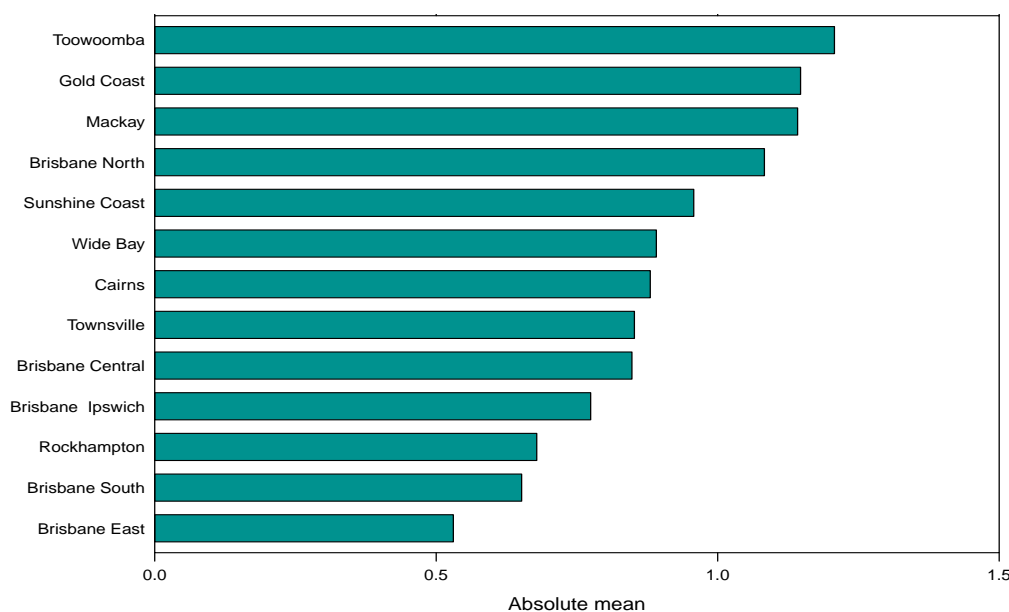


Figure 6: Absolute mean rung differences by district of the random sampling review panel

Figure 7 compares absolute mean rung differences for schools in each district. Mean rung differences across all subjects were largest for schools in the Rockhampton, Wide Bay, Sunshine Coast and Townsville districts.

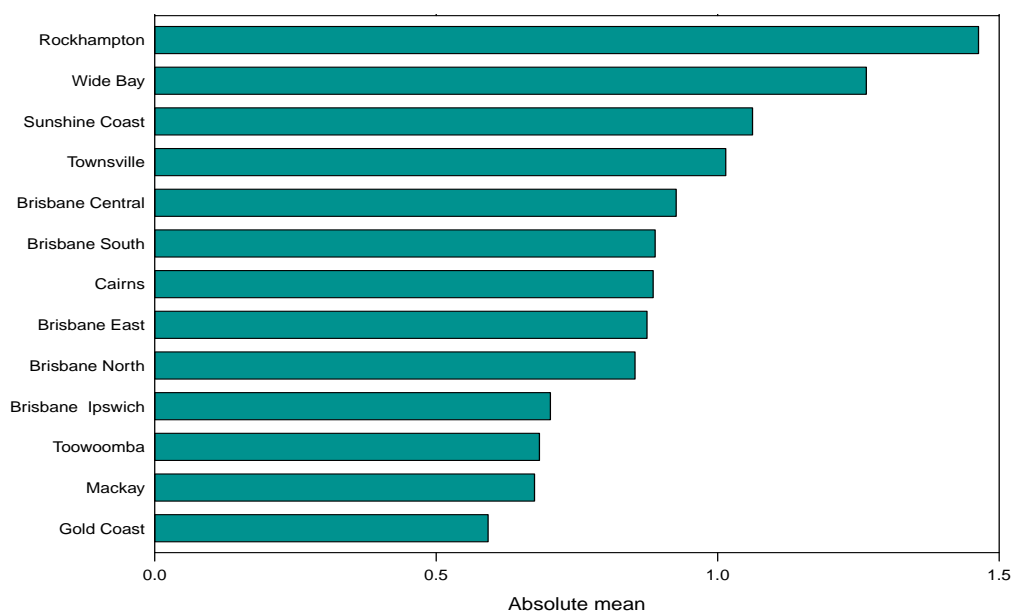


Figure 7: Absolute mean rung differences by district from which schools originate

Table 4 compares absolute mean rung differences for random sampling panels in each district with those of the schools' districts. Differences have been classified as large, medium or small to facilitate this analysis (where large is equivalent to greater than 1.5 rungs absolute mean difference and small is equivalent to less than one rung absolute mean difference). It should be noted that sample sizes received by district panels ranged from 161 to 259 folios and each district reviewed a different range of subjects. The most evident patterns to emerge from this table were:

- no large differences were found by random sample district panels or in schools within districts
- Mackay, Toowoomba, Brisbane North and Gold Coast districts found medium differences in the folios they reviewed while other panels found small differences for schools in their districts
- while Gold Coast district panels had one of the highest levels of disagreement with folios they reviewed, schools in the Gold Coast district had the lowest level of disagreement when reviewed by panels from other districts
- more than half of the districts showed only small differences for panels and schools.

Table 4: Comparison of random sampling and home district mean differences

		Random sampling district panels		
		Large	Medium	Small
School's district	Large			
	Medium			Rockhampton Wide Bay Sunshine Coast Townsville
	Small		Gold Coast Brisbane North Toowoomba Mackay	Brisbane East Brisbane Ipswich Cairns Brisbane Central Brisbane South

4.4 Serious disagreement

Earlier random sample reports quote figures for the level of serious disagreement over the exit level of achievement awarded to folios. Table 5 summarises the rung differences where there has been a level of achievement difference. Over the years, the percentage of folios considered to have serious disagreement has ranged from 1% to 3%. This remains consistent in 2012 and at 1%, is among the lowest levels since the first year of sampling.

Table 5: Cases of rung differences affecting level of achievement

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sample size	1139	1143	1687	1800	2248	2662	2774	3224	2649
Different LOA with 1–2 rungs	55	46	79	80	114	150	146	130	79
	5%	4%	5%	4%	5%	6%	5%	4%	3%
3–7 rungs	94	36	99	105	160	191	209	198	116
	8%	3%	6%	6%	7%	7%	8%	6%	4%
8+ rungs	25	3	38	32	23	71	68	93	26
	2%	0%	2%	2%	1%	3%	2%	3%	1%
Total with different LoA	174	85	216	217	297	412	423	421	221

4.4.1 Reviews forwarded to the office of the QSA

Twenty-Four submissions (containing 113 folios) were recalled for additional review. SRPs and SEOs were asked to provide an independent assessment of the selected folios. The results of this review are summarised in Table 6.

Table 6: Summary of SRP/SEO review (number of folios)

	After random sampling	After second review
Rung differences (8+)	63	43
Rung differences (3–7)	25	30
Rung differences (1–2)	22	39
Different LoA	59	42
Mean rung difference	2.6	1.2
Absolute mean rung difference	9.7	7.44

Following the additional review, the mean rung difference has declined. Despite an increase in the number of folios with small differences to rung placement, there is a smaller number with a level of achievement difference. Further review of additional folios is more likely to reduce the amount of

disparity between the schools' and the random sampling review panels' judgments.

Table 7 summarises the subjects reviewed by SRPs and SEOs. Visual Art had the largest number of folios requiring additional review, followed by Information Technology Systems, Mathematics B and Music. Following the additional review there were fewer folios with disagreements, indicating that the state panellists were more likely to have been in agreement with the schools' placement of students.

After the review by SRPs and SEOs, the greatest number of discrepancies remained for Information Technology Systems, Visual Art, Music and Mathematics B.

Table 7: Subject submissions selected for review by SRPs/SEOs (number of folios)

Subject	Submissions	Total folios	Folios with 3+ rung difference	
			Before SRP review	After SRP review
Ancient History	2	9	5	5
Biology	2	8	6	3
Economics	2	8	4	1
Information Technology Systems	3	21	11	10
Japanese	1	3	2	3
Mathematics A	2	5	1	2
Mathematics B	3	21	8	8
Modern History	1	3	3	3
Music	3	13	8	8
Visual Art	5	22	16	13
Total	24	113	64	56

A. Form RS – School recording form

Form RS

School recording form

School		School code	
Subject		Subject code	
District		Panel code	

The following **school recording form** is to assist in the preparation of the random sample submission. For each of the students, the complete exit folio of responses is required. Please ensure that the level of achievement (LOA) and rung placements are recorded in the space provided (e.g. VH7). As each of the items is collected, please tick them off in the school column. Upon completion attach this form to the submission and send to the district coordinator.

	LOA and rung placement	School	District coordinator
• Student A			
• Student B			
• Student C			
• Student D			
• Student E			
• Student F			
• Student G			
• A copy of the school's work program			
• The set of assessment instruments used in the school's determination of the exit levels of achievement, with conditions identified, criteria sheets attached and expected responses where appropriate			
• Particular material required by syllabuses, e.g. audio and/or visual recordings			
• Any letters, signed by the principal, that may explain atypical situations			
• A profile of each selected student's achievement with the exit relative achievement indicated			

This information is collected so that the legislated functions of the QSA concerning random sampling can be carried out. Personal information is not disclosed to anyone other than relevant QSA staff unless required or authorised by law, permitted under the *Information Privacy Act 2009*, or so that the legislated function can be completed. | **Form no:** RS



B. Form RS1 - Panellist recording form

Form RS1

Panellist recording form

School		School code	
Subject		Subject code	
District		Panel code	

After making judgments about the evidence in the student folios, indicate the level of achievement and the rung placement for each student that reflects the relative achievements at Exit.

Student	Name	Rung placement by school	Rung placement by panellist
A			
B			
C			
D			
E			
F			
G			

Comments:

Signature:

Date: / /

This information is collected so that the legislated functions of the QSA concerning random sampling can be carried out. Personal information is not disclosed to anyone other than relevant QSA staff unless required or authorised by law, permitted under the *Information Privacy Act 2009*, or so that the legislated function can be completed. | **Form no:** RS1



C. Form RS3 – Consensus form

Form RS3

Consensus form

School		School code	
Subject		Subject code	
District		Panel code	

After making judgments about the evidence in the student folios, indicate the level of achievement and the rung placement for each student that reflects the relative achievements at Exit.

Student	Name	RS1	RS2	Consensus	School rung placement
A					
B					
C					
D					
E					
F					
G					

Comments:

Signature:

Date: / /

This information is collected so that the legislated functions of the QSA concerning random sampling can be carried out. Personal information is not disclosed to anyone other than relevant QSA staff unless required or authorised by law, permitted under the *Information Privacy Act 2009*, or so that the legislated function can be completed. | **Form no:** RS3



D. All subjects reviewed by year

Subject	2004	2005	2006	2007	2008	2009	2010	2011	2012
1 English		*	*		*	*		*	
5 French					*			*	*
6 German								*	*
8 Italian		*							
9 Japanese			*		*			*	*
11 Chinese		*						*	*
20 Ancient History				*	*		*		*
21 Modern History				*	*	*	*		*
23 Aboriginal & Torres Strait Islander Studies		*							
24 Geography	*		*			*	*	*	
27 Economics	*			*		*		*	*
28 Study Of Society									
29 Legal Studies	*			*		*	*	*	
36 Mathematics A	*			*		*		*	*
37 Mathematics B	*			*		*		*	*
38 Mathematics C	*			*		*	*	*	
40 Chemistry					*		*	*	
41 Physics					*		*	*	
42 Biology		*			*	*		*	*
43 Earth Science		*							
45 Marine Studies					*		*		*
46 Science21							*		
51 Agricultural Science					*		*	*	
60 Accounting			*			*		*	*
62 Business Organisation & Management			*				*		*
63 Business Communication & Technologies			*			*		*	*
65 Information Technology Systems		*	*	*		*	*		*
67 Health Education		*					*		
68 Physical Education	*			*	*		*		*
71 Home Economics		*			*	*	*		
72 Hospitality Studies		*			*		*		*
74 Engineering Technology		*				*			
76 Graphics	*		*	*			*	*	
78 Technology Studies			*				*	*	
80 Visual Art	*		*		*	*		*	*
85 Dance		*			*		*		
86 Study Of Religion	*		*			*	*	*	*
87 Information Processing & Technology				*		*	*	*	
88 Drama	*		*		*		*	*	
91 Music		*			*	*		*	*
93 Film, Television & New Media					*	*			*