

SMC&PA Submission 149
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Teaching Challenging Transforming

BRISBANE CATHOLIC EDUCATION RESPONSE

PARLIAMENTARY INQUIRY INTO ASSESSMENT METHODS IN MATHEMATICS, PHYSICS AND CHEMISTRY

May 2013

INTRODUCTION

Brisbane Catholic Education (BCE) is a community of 137 primary, secondary and P-12 colleges across South East Queensland. This response represents the views and experiences of both office and school based role holders with responsibility for the learning and teaching of senior Mathematics, Physics and Chemistry in our schools. In particular, it draws on the experiences of 40 Mathematics and Science Coordinators who are responsible for the design, implementation and quality assurance of assessment in these areas within their colleges.

To be effective, the Parliamentary Inquiry must consider its submissions within the current broader educational context and the full range of subjects offered to and engaged with by students in our schools and across Queensland. Our teachers' support for assessment methods, our students' participation and the ability of processes to ensure validity and reliability cannot be decided in isolation. *Therefore, the upcoming review of the QSA OP and Tertiary Entrance processes provide the most effective and comprehensive context for the findings related to the Inquiry's terms of reference.*

In this way, issues related to assessment methods in Mathematics, Physics, and Chemistry will be appropriately considered within the context of assessment methods and associated practices of all authority subjects. Further the QSA review will appropriately consider these issues from a school education perspective that takes into account the views of the tertiary sector. The context of the Parliamentary Inquiry highlights a tertiary perspective on schooling practices in a small selection of Mathematics and Science subjects. It is important that this perspective does not inappropriately influence the practices of all senior courses and processes.

The BCE response to the Inquiry is based on principles that align with our educational mission and Learning and Teaching Framework:

1. In the best interests of our students.

The findings of this Inquiry and indeed the decisions that arise from the upcoming review processes should be focused on the question, "What assessment methods provide the most effective opportunity for all our students to demonstrate the full extent of what they know, understand and can do in relation to their learning in Mathematics, Physics and Chemistry (and other subjects)?" A focus on achieving both equity and excellence are prime considerations in this response.

2. The professionalism of our teachers.

The current Queensland system of externally moderated school based assessment emphasises the professionalism of our teachers, their knowledge of their students and their capacity to align learning, teaching, assessment and the making of valid and reliable judgements against recognised

standards. Teachers across all systems work hard in the best interests of their students. It is important that the effort invested achieves the desired outcomes. Careful consideration needs to be applied to decisions that will decrease the professional status of our teachers within a broader community context where increased professionalism is sought.

3. The need for rigour, quality and consistency in senior processes.

BCE recognises that all senior processes including those that involve assessment methods in Mathematics, Physics and Chemistry need to be rigorous, quality assured and consistent. It is our assertion that a full review of how these currently apply is best considered as part of the broader QSA OP and Tertiary Entrance review.

RESPONSE TO INQUIRY TERMS OF REFERENCE

1. That the Education and Innovation Committee inquire into and report on the assessment methods used in Senior Mathematics, Chemistry and Physics in Queensland schools.

As a general finding, BCE believes that the issues before the Inquiry relate primarily to the matter of *evolved rather than intended practices*. That is, the issues being raised do not represent the intention of syllabuses and their associated processes but practices that have evolved across some parts of the state and, in cases, unduly influenced practices at the school level. Any assessment system (public and school based) raises issues of equity and effectiveness and will, over time, become the subject of review. As such, these issues related to rigour, quality assurance and consistency are best addressed within the upcoming review of OP and Tertiary Entrance where all subjects that our students study will be the focus of review and decision-making.

2. That, in undertaking this inquiry, the committee should consider the following issues:
 - Ensuring assessment processes are supported by teachers
 - Student participation levels
 - The ability of assessment processes to support valid and reliable judgments of student outcomes.

2.1 Ensuring assessment processes are supported by teachers.

Among Mathematics and Science Coordinators there was:

- a. Strong support for the six underlying principles of exit assessment in Queensland - continuous assessment, balance, mandatory aspects of the syllabus, significant aspects of the course of study, selective updating and fullest and latest information.

- b. Strong support for the development of a school assessment program and its reasonableness and workability. Support was based on our teachers' understanding that the *intent* of the syllabus design processes are both reasonable and manageable and that issues related to evolved practices that are misaligned with their original intention can be addressed and rectified.

In Mathematics, schools value the flexibility to design their own assessment plan as a requirement of an approved work program and typically include two exams and one extended modelling and problem solving (EMPS) task each semester. It was noted that some tightening of QSA guidelines around the number of assessment items included in an exit portfolio could be reviewed and scaled down to reflect typical practice rather than the maximum number of ten items.

In Physics and Chemistry, the development of the school based assessment programs are considered to be demanding but essential in providing a valid and relevant course of study for their students and for teachers' own understanding of the knowledge, understanding and skills students are required to demonstrate. The mandatory inclusion of Extended Experimental Investigations (EEI's) and the growing inclusion of Extended Research Tasks (ERT's; not mandatory in Physics/Chemistry) are recognised as influencing and impacting on teacher and student practice and workload. However, it is asserted that if the intention of these assessment items were realised in practice (in terms of length of submission and time taken for completion) they provide students with a valuable and effective way in which to demonstrate their knowledge, understanding and skills in a way that more closely reflects contemporary scientific practice and cannot be authentically assessed in a public examination.

- c. Agreement that Moderating Processes: Monitoring, Verification and post-verification processes are manageable if quality assurance processes establish consistency in practices across Queensland. This agreement is based on an assertion that all subject panellists are well trained and follow the same standard to justify or verify all submissions. If submissions, for example EEI's, are restricted to the recommended length (maximum 1500 words) then the time available to panellists to verify submissions is sufficient to complete the task effectively. The upcoming review of OP and Tertiary Entrance will investigate the practices of panels across all subject areas and will necessarily address issues of inconsistency related to training and quality assurance related to the panel processes and BCE recognises that this is the best place for this further investigation to take place.

d. Inconsistent levels of agreement about the establishment of assessment processes that incorporate a combination of school-based and externally generated exams. A significant number of Mathematics Coordinators were interested in investigating this option further but less than half the Science respondents indicated their desire to explore the option further. It is BCEs recommendation that any further investigation of this option takes place within the upcoming reviews of OP and Tertiary Entrance and consider the implications of such a move within the overall suites of subjects and processes that students are involved in and that influence their post school pathways.

2.2 Student Participation Levels

In BCE, an analysis of the number of students (as a percentage of cohort) electing to study the subjects under review has remained constant from 2000 – 2012 despite the introduction of new syllabus documents (and alternative assessment methods) during this period and a significant push to cater for the broader range of students seeking alternative pathways into post school employment and training. The data (included in Appendix 1) is provided to the Inquiry and displays a consistency in the number of OP eligible students in Science and Mathematics subjects across 2000-2012 and mirrors the trend of participation rates across Queensland schools for the same period.

While it is acknowledged that nationally and internationally participation rates in Mathematics and Science have declined over the last thirty years at senior school and tertiary levels, the addressing of these issues is beyond the scope of this inquiry.

In short, there is no evidence that the introduction of new syllabuses and alternative assessment methods from around 2005 can be identified as a cause for lower student participation rates in Mathematics and Science at either senior schooling or tertiary levels and should be discounted by the Inquiry.

2.3 The ability of assessment processes to support valid and reliable judgments of student outcomes.

There is some agreement among Mathematics and Science Coordinators about the capacity of processes for assessment implementation to support valid and reliable judgments of student outcomes. A review and tightening of guidelines associated with assessment development and implementation that addressed issues of inconsistency of practice would establish greater confidence and therefore higher levels of agreement among participants. This review is best placed within the upcoming QSA review of OP and Tertiary Entrance processes.

There were varied levels of agreement about the capacity of assessment criteria to enable teachers to make valid and reliable judgments. In Mathematics, it is perceived that the lack of clarity around the *Standards associated with exit criteria* has led to instances of inconsistent expectations and variability in judgments. Mathematics Coordinators generally recommended that standards written to reflect outcomes that more specifically relate to the Mathematics discipline would enhance this capacity. The inclusion of the ACARA Australian achievement standards into Queensland syllabi will provide an opportunity for this to occur. It was noted that the use of marks or percentages remains a current and valid practice in schools where the evidence is then mapped to the criteria as summative judgments are made.

Science Coordinators agreed that with sufficient teacher and panel training that the development and use of assessment criteria is a necessary and desirable element of teachers' practice and can result in both valid and reliable judgements about student achievement. Some inconsistencies in evolved practice were noted and the influence of these will be reported in the upcoming QSA review of OP and Tertiary Entrance.

There was general agreement across both groups that it is possible to effectively authenticate student work. Furthermore, schools were able to validate a wide range of effective strategies that are currently employed in our schools to ensure proper authentication of student work.

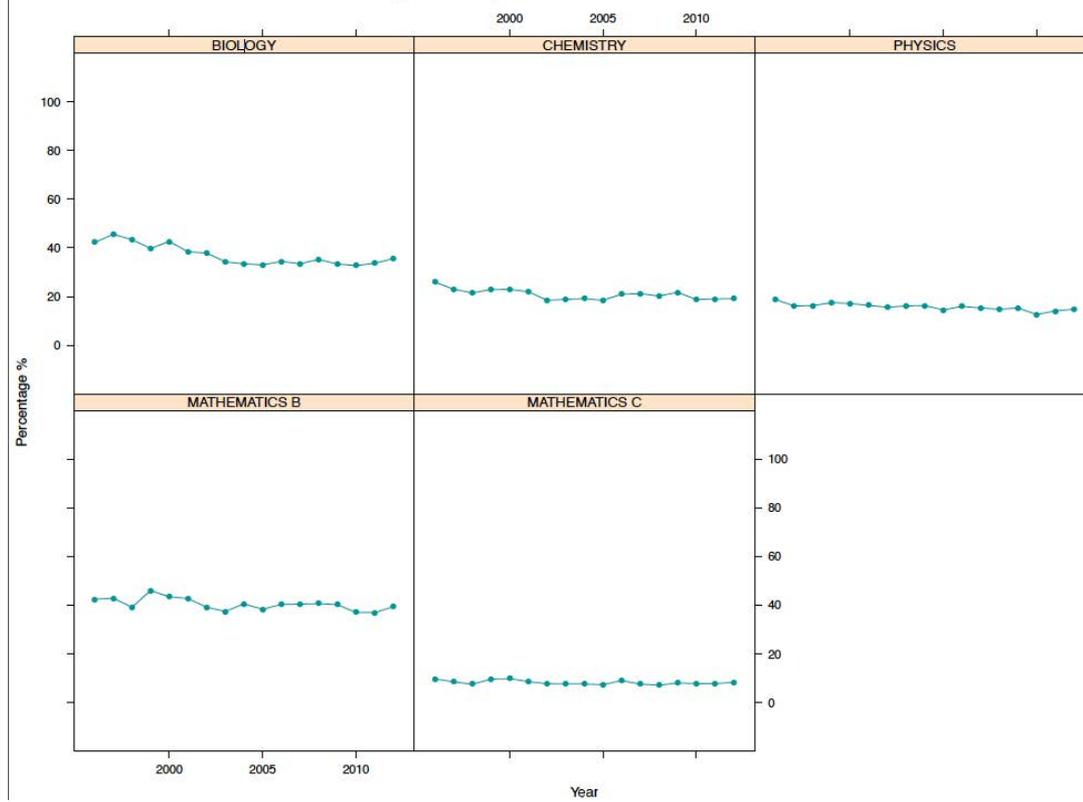
RECOMMENDATIONS

Brisbane Catholic Education makes the following recommendations to the Parliamentary Inquiry into assessment methods in Mathematics, Physics and Chemistry:

- That any considerations in terms of changes to current practices are best explored and considered within the broader, more inclusive QSA review of OP and Tertiary entrance processes;
- That the existing six principles of assessment for QSA assessment processes continue to underpin senior assessment and that all further considerations are based on the best interests of all students in all schools pursuing all pathways to post schooling employment and training; and
- That the professional judgement of teachers continues to be integral in senior assessment processes and that the professionalism of teachers is valued, supported and appropriately resourced in order to provide both equity and excellence in all classrooms for all students.

Appendix 1 – Percentage of OP Eligible cohort in BCE – Source QSA

Percentage of OP eligible cohort – Brisbane Catholic Education



This mirrors the trend in Queensland schools across the state.

