

**Submission to the Parliamentary Inquiry into Assessment Methods for Senior Maths,  
Chemistry and Physics**

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**My Background**

I have been teaching Mathematics since 1972 - in New South Wales, Victoria, Papua New Guinea and Queensland. During that time I also worked for 18 months as a Mathematics Education Consultant for AUSSIE in New York City. I held the position of Head of Mathematics and Informatics at Glenmore State High School for 20 years and am currently teaching at The Rockhampton Grammar School. Over the years I have been a panellist and then District Panel Chair for Mathematics A, and more recently a panellist on the Information Processing and Technology district panel. In 2012 I was awarded a life membership of the Queensland Association of Mathematics Teachers.

*Note: The views expressed in this document are my own and do not represent a school stance.*

**My Submission**

While there are many assessment issues to be debated, I will focus my remarks on one aspect of the current assessment system for Senior Mathematics, Physics and Chemistry - the reliability of school-based assessment.

The results that students achieve in senior assessment are very important - to the students especially, but also to their parents, their teachers and their school. Student will get access to the tertiary course of their choice (or not) based on their school results. This may impact on their lives for years, if not decades, after secondary school. The parents and teachers of the students have a vested interest in the students' success both personally and, in the case of the teachers, professionally. The academic reputation of a secondary school rests largely on the academic results of their senior students.

So it is vitally important that the results that students achieve in their Senior subjects are valid, consistent and fair.

Judged on these criteria, assignments are a particularly poor form of assessment. The quality of a student's assignment, and hence its rating, is often largely based on how much assistance the student receives when doing the assignment. Therefore those who can afford a tutor, or have a relative who is knowledgeable in these areas, or have a teacher who gives them considerable help outside of class, can benefit greatly from this assistance. Those who don't have access to such help will be correspondingly disadvantaged. How much of the work that a student submits is entirely their work? How much out-of-class assistance did a student receive? No one - except the student - knows.

The other issue with assignments is ownership. How much of the assignment is the student's own work? Unless a student is actually caught plagiarising, no one knows. Many schools use the same or very similar assignments from year to year because writing a quality assignment that is fair to the students and that will pass muster at the District Panel is very difficult. It is very hard to prove that a student used another student's assignment written two years ago as the basis of theirs. And if the assignment is largely done by a third party (eg a tutor or parent), it is unlikely that anyone will find out.

So what about exams?

Judged on the criteria listed above, school-based exams are also a poor form of assessment. Let's say that I am a panellist looking at a Maths exam from school A and at student B's work on the exam. A pertinent question is - what help did the student receive prior to doing the exam? Maybe in the lessons just before the exam, he completed a revision sheet that was a carbon-copy of the exam but with the numbers changed. Or maybe the students were told precisely which questions in the textbook to do for their revision. Or maybe the teacher went over the entire exam with the class the day before (as one respondent to the Inquiry said happened at a school at which he was teaching). Or maybe the teacher ran out of time and didn't teach all of the content in Chapter 7, so only taught and assessed a small part of the content in that chapter. But no one knows, except the student, the teacher, and maybe other Maths teachers at the school. Certainly the panellist doesn't know. So the panellist has to assume that all is above board and judge the student responses based on that possibly incorrect assumption.

The bottom line is - an assessment system in which **all** assessment is school-based is fundamentally flawed, for the reasons given above. The most logical alternative, commonly adopted by education systems world-wide, is for all non-formative assessment to be externally set. With external exams, teachers can't teach the exam because they don't know what is on the exam, so they teach what's in the syllabus, and they teach the entire syllabus. Which, not surprisingly, is what they are supposed to do. Ironically, there is far more "teaching to the test" in the QSA senior courses than in courses assessed with an external exam.

Now, how widespread are these issues? Again, no one knows for sure. But if you talk to teachers who have been teaching these senior subjects for some years, and have been on QSA panels, the conclusion I believe that you will come to is that these practices are common.

If the Committee wishes to explore the option of external assessment, an example of externally-assessed courses which are worth investigating are the AP Calculus courses in the US, which are assessed with marks-based exams in May. The courses assess knowledge, modelling and problem-solving, and communication, and do it very well.

Note that these AP courses highlight a big, big bonus that results from external assessment - the teaching in the lower grades improves as well. As the successful AP Calculus teachers oft say, you have to get the teaching right in the lower grades to prepare properly the students for their AP year. So teaching across all of the secondary year levels is examined critically and improvements are made as needed.

### **Summary**

This issue may be of lesser importance if the assessment were low stakes, ie if it didn't affect a student's life choices. But senior assessment is high stakes, so it does matter. A lot. Changing from criteria to marks, or actually requiring students to adhere to a 1500 word limit on assignments - or even scrapping assignments completely - won't change the fact that school-based assessment in a high-stakes environment is fundamentally flawed. Finally, external assessment in Year 12 comes with a bonus - it rewards secondary schools whose teachers from Year 7 to Year 12 prepare their students well for their study in the subsequent years.

I am happy to discuss further with the Committee the points raised in this submission if requested.

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