Submission to the parliamentary inquiry into Assessment Methods for Senior Maths, Chemistry and Physics

Scope

My submission is limited to the subject areas of Mathematics A, B and C. I do not teach Science at any level and so cannot comment on those aspects of the inquiry relating to Chemistry and Physics. My submission is based on my experience as a teacher and district review panellist.

Submission

Summary: I support the current system of criteria based assessment used in Queensland schools. I believe the *standards associated with exit criteria* as laid out in the three Authority Mathematics subjects provide a clear and objective method of making judgements about student achievement at a school, district and state level. Furthermore, I propose that participation levels, if an issue at all, are not the result of changes in the 2008 syllabi.

I did not set out to frame my submission as a rebuttal to Professor Peter Ridd's briefing and I certainly have not addressed all the statements made by him. However, the terms of reference for this inquiry were undoubtedly set in response to the issues raised by the lobby group led by Professor Ridd and I will therefore address a few statements that I feel are particularly important.

In relation to the written aspects of the senior courses that seem to be an issue for some members of the committee, Professor Ridd's statement that 'in Maths, we should not worry about assignments at all' disappoints me. Professor Ridd states that he is in favour of experimental investigations in Science (but not the extended sort) and I would assume this is due to the fact that by its very nature Science not only requires investigations but is also enriched by them. Why then would he deny this in Mathematics? Assessments other than exams provide opportunities for students to explore, discover, wonder about, and be amazed by Mathematics. They allow students to investigate mathematical concepts in much more depth than exams allow. I don't know a lot of professional Mathematicians but I am certain they don't spend their time sitting around taking exams. An exam only approach also flies in the face of current thinking regarding problem- and inquiry-based learning. Furthermore, I know from my experience in the SET planning process that a number of students are attracted to subjects that use primarily assignment work for assessment. I am not suggesting that Mathematics subjects should assess in this way but I believe making Mathematics exams only would turn more students off Mathematics B and C.

While QSA data shows enrolments at reasonably steady levels across the State, some schools have experienced a decline in the number of students selecting higher-level Mathematics courses. There are a number of issues that cause fluctuations in enrolments at individual schools, some of which are raised by other submissions, and none of them point to the various syllabi as the cause. Professor Ridd acknowledges the collective Universities role in students not choosing higher-level Mathematics by not requiring them as prerequisites. I have come to dread a student saying "I don't need it for my course" when I know full well that the first Mathematics course they will come across at University will require a good background in algebra and calculus. This aside, I propose that the perceived problem with participation in higher-level Mathematics subjects is a result of the fact that the Year 11 and 12 population is a much different group of students now compared to 20 years ago. As such, with a larger number of trade and traineeship oriented students completing Year 12, the percentage of Mathematics B and C students would be lower. However, if the committee wish to investigate this further I wonder if the supposed drop in enrolments would correlate with Universities removing Mathematics courses from their prerequisites?

At the heart of the inquiry is the question of whether the current system allows teachers to make valid judgements about student work. Along with [redacted] I was offended by the comment that arriving at a judgement is effectively a guess. As a person whose job regularly entails applying the criteria to make a judgement on a folio of student work I can tell the committee that guessing is far from the

reality. The assessment standards clearly articulate the aspects of a student's work required to achieve at a particular level. When students ask me what is required for them to improve, the criteria in the 2008 syllabi allow me to give specific feedback that certainly doesn't involve saying something to the effect of "well you just need to get a few more things correct".

Much has been said about how criteria based assessment in Mathematics is far more subjective but I believe the opposite to be true. At the beginning of my teaching career, for the *Knowledge and Procedures* criterion, despite what the various syllabi said I fell in with what everyone else was doing and set papers where getting 85% or more was worth an A, 70% or more a B and so on. I gave little thought to the criteria and simply filled exam papers with a few easy, a few moderate and a few hard questions. I made it so that the hard questions made up about 20% of the mark so that those students who correctly answered them would receive an A. The questions I set for *Modelling and Problem Solving* were different though; my school insisted that student responses to these problems were each given an A through E grade and that this grade was based on the criteria. The overall result for this criterion was then an on balance judgement based on the criteria. As far as I am aware, this is the approach that almost all schools took for the 2001 syllabi. I point this out for the following reasons:

- The 1994 and 2001 syllabi always had criteria but the advice around the 2008 syllabi made it much clearer that standards awarded had to be based on criteria.
- Mathematics teachers were already accustomed to marking *Modelling and Problem Solving* papers using criteria.

A core argument of the group that prompted this inquiry is that papers are much harder to mark now. Why is this the case? Why is marking *Knowledge and Procedures* using criteria so much harder than marking *Modelling and Problem Solving* using criteria?

I had prepared another argument around the differences (or lack thereof) between the 2001 and 2008 syllabi but I do not wish this submission to go on too much and so, in the interest of brevity, I would ask that committee members look at the *assessment standards* sections of the documents mentioned above. You will note the striking similarities and the complete lack of advice around the use of marks. I have never been directed by any QSA representative not to use marks. In fact the only advice I was given on this issue was that I could use marks but that my final judgement had to be based on the criteria present in the assessment standards.

Matthew Hughes