Education and Innovation Committee Email: eic@parliament.qld.gov.au

Dear Sir/Madam

## Re: Inquiry into assessment methods for senior maths, chemistry and physics

On behalf of the mathematics, physics and chemistry heads of department here at I would like to submit the following for the inquiry into assessment methods in the above subject areas.

Please see below the brief outline of our points of interest.

## Mathematics

The QSA expects students to be graded from A to E in each of the three objectives which are essentially doing, applying and communicating mathematics.

- At exit it is possible to have over twenty students with the maximum performance grades of AAA and an overall achievement of VHA (very high achievement).
- There is very little difference between an A and a B level in knowledge and procedures. To deal with this very difficult situation we designed assessment instruments with three levels of performance in each of the three objectives of knowledge and procedures (KP), modelling and problem solving (MP) and communication and justification (CJ). On the assessment instruments items are shown as level one or one star items\*, level two or two star items\*\* and level three or three star items \*\*\*, in KP and MP. The design allows a student who is successful at all level one and level two items to score a B grade at best since there has been no success with higher order tasks.
- An assignment provides an opportunity to investigate majesty of mathematics, outside the world of pure mathematics. Perhaps they are best kept out of senior mathematics courses as unfortunately, when part of an assessment system, the intention of assignments are not appreciated by students.
- In many cases students who cannot pass exams can pass assignments and scrape through courses from the help they receive from their tutors/parents. Students get a false impression of their suitability for the mathematics B course in particular. The standard is also very diverse with some students convinced that quantity assures quality.
- The quality assurance that is meant to be produced by panels does not exist. External appraisal does not account for schools or individual teachers that overtly prepare students for assessment or teach the test. The converse is also true. Some items that are genuinely unknown to students are familiar to panellists and they may not make that connection, falsely believing that teaching for the test took place.

## **Chemistry and Physics**

- It would appear that EEIs are contributing to a decline in enrolments into both chemistry and physics courses due to the workload that is needed in EEI's.
- EEI's take 4-6 weeks to complete, reducing the variety and breadth of learning experiences, students are exposed to 1 or 2 experimental techniques in depth rather than many techniques.
- The time commitment for research is anywhere between 40-70 hours. If a student takes 2 or 3 sciences that have EEI's in their assessment this is clearly too much work.
- EEI's length of task to complete all tasks to A+ standard students can easily write 2500-5000 words (few undergraduate assignments are this length)
- EEI's disliked by other departments as students tend to neglect revision and homework of other subjects.
- EEI work intensification of teachers, adequate feedback takes around 90 min per student in Chemistry and about 120 min per student in Physics. (average recorded between 2009 – 2012)
- The EEI requirement to 'show evidence of student modification or design' bears no relation to tasks students in undergraduate university degrees are required to do. Nor do they reflect the practices of scientists in the work force in areas such as mining labs and medical testing labs.
- EEI is the single largest assessment within physics which disproportionately counts to students overall result, this is usually their lowest result.
- The exit statements do not give sufficient detail to adequately discriminate between the different levels of achievement. Criteria-based marking has been found to be **more** arbitrary, than the marks based system it replaced. Although internal school moderation takes place, it is still not as accurate or definitive as using a mark scheme.
- In physics the new syllabus restricts the number of assessments of the same type to two. This has most impact on traditional examinations which assess whether students have learned basic topic content
- The use of ERT's, another written task, is also of concern. At panel their use has often been for a student to do "research" to replace a teacher actually teaching a unit of work. This is not their intended use, these are "cut-and-paste" exercise where plagiarism is common. I have heard many teachers express a desire to move away from ERT's but syllabus restrictions that allow only two assessments of the same type limit their choices.

Along with all of the above points I also have significant concerns for the workload of our students. I feel that the criteria based assessment and the inability for us to be able to assign marks insists that student folios are lengthy and wordy. This is not just Maths and the Sciences, Graphics and Technology Studies are other examples that expect large folios from students. I support the students doing folio work; however, sometimes marking something incorrect or correct without having to fit it into a criteria is necessary.

I feel that the current District Review Panel process has no real strength. There is such a significant difference between work samples across the district and yet we are constantly told to find evidence to support the school's judgement. Over the years it does feel like the power has been taken away from these professional bodies.

I thank you for the opportunity to submit our uncertainties to the assessment methods in maths, physics and chemistry.

Regards