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Submission to Education and Innovation Committee

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Inquiry into *Assessment Methods for Senior Maths, Chemistry & Physics*

13th of May 2013

I would like to make it clear that this submission contains my personal views and not those of Education Queensland. I would like my name and personal details to be withheld. This is because when student work is sent away for moderation the names of the school and teacher are known to the reviewing panel. I would not wish my students to be unfairly judged because of my personal criticisms of the Queensland Studies Authority or the assessment practices in Queensland.

I have been a teacher since 2003, and I teach the subjects of Biology and Chemistry. In my career I have taught in Queensland, and overseas. For 5 years I worked overseas, teaching the International Baccalaureate program. I currently work for the Department of Education as a Head of Department and Chemistry teacher. In addition, I am also a Chemistry examiner for the International Baccalaureate Organisation (IBO). I am familiar with, and have extensive experience using, the systems of assessment used by the Queensland Studies Authority (QSA) and those of the IBO.

Comments relating to the Terms of Reference

1. Ensuring assessment processes are supported by teachers

As a teacher, I do not support the assessment processes used by the QSA in senior science. My reasons for this are discussed below. The best way to determine levels of support across the state would be a survey, and I strongly encourage the committee to consider using one.

2. Student participation levels

It is my opinion that participation levels of boys in senior Biology and Chemistry are falling. In my school, girls outnumber boys by a clear majority in Chemistry and by a vast majority in Biology. Boys seem to find it harder to engage with and succeed at the current assessment strategies because they emphasise project work, long written texts, and interpretive methods for determining achievement.

It is not only students that don't want to participate, but also experienced teachers. I have several colleagues, at my present school and others, who choose not to teach senior Maths and Science because of the stress and workload.

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

I do not believe the assessment processes used by the QSA in senior science support valid and reliable judgements of student outcomes. The reasons for this are:

- The criteria or "standards" are confusing and subjective
- Using marks is not allowed therefore student achievement is aggregated in an inaccurate and subjective way
- External assessment is not used

The standards are confusing and subjective

Much is made of the fact the QSA system of assessment is based around standards, and that standards are the best way to judge student work. During the second QSA presentation to this inquiry, the maths C panel chair made it appear as though comparing student work to standards was a simple and straightforward process. It isn't. The reason it isn't is because the wording of the standards is confusing and subjective.

The standards use subjective terms like "significant", "effective", and "challenging". Subjective standards produce subjective judgements.

> EXAMPLE 1
> Consider the standard for Knowledge and Understanding (strand 1):
>
> The A standard reads ***"reproduction and interpretation of complex and challenging concepts, theories and principles ".***
> The B standard reads ***"reproduction and interpretation of complex or challenging concepts, theories and principles"***.
>
> The difference between the two is open to interpretation. When judging a student's Extended Experimental Investigation (EEI), which may be thousands of words long, it can be a matter of personal interpretation when deciding between these descriptors. What is a challenging concept? Something might be challenging to one person and simple to another. When I rang the QSA on the 28th of February this year, I was told by a senior quality assurance officer, the level of challenge could be determined by how many students get the question correct. **She told me that if too many of my students got the question correct, it wasn't challenging enough.** What if I have a smart class? Or a small class? Or a weak class? This is a serious flaw in the QSA system.
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> EXAMPLE 2
> Consider another example- the Investigative Processes standard (strand 1):
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> The A standard reads ***"formulation of justified significant questions/hypotheses which inform effective and efficient design, refinement and management of investigations".***
> The B standard reads ***"formulation of justified questions/hypotheses which inform design and management of investigations".***
>
> What is the difference? What makes a hypothesis significant? Some teachers I talk to suggest the significance relates to the importance or triviality of the hypothesis. Others suggest it refers to statistical significance- which can't really be determined until after the experiment is completed. Unhelpfully the QSA glossary does not give a definition for what they mean by significant.

An alternative to using subjective standard descriptors is the system used by the International Baccalaureate (IB). IB examinations are external and are graded using a mark scheme. For example if a student gets a question completely correct they may get 2 marks for the question. If their answer is partially correct it would get 1 mark, or if the response is incorrect it would get no marks. Marks are tallied and compared to grade boundaries to determine final results. Marking science reports is done the same way. If the hypothesis is testable and references the correct variables it gets 2 points and so on. The IB system does not use standards or criteria that have subjective language, and I believe it allows student work to be graded more accurately and fairly.

Using marks is not allowed therefore student achievement is aggregated in an inaccurate and subjective way

Despite what the QSA claims publicly, marks are not allowed.

On the one hand on their web site, and during their submission to this inquiry, the QSA claim marks are not banned. On the other hand, we are consistently told by QSA staff they are not allowed. I was told by a review panel chair, in a phone conversation on the 15th of February, that **I could not use marks on my Chemistry test.**

Marks and percentages are a reliable way to give an overview of achievement. They were used before 2007 in Chemistry. They allow work to be weighted differently and are easily understood by students and parents. Everybody else in the world uses marks, and Queensland teachers should be able to use marks to give a total on a test or student profile. It is common sense.

In the absence of using marks, teachers have to make "holistic judgements" to determine overall achievement on tests and profiles. In practice, these judgements amount to being guesstimations of an average. It is ridiculous.

External assessment is not used

In Queensland, all assessment is internally set and graded. Teachers vary in their test setting experience and expertise, and when combined with a lack of support from the QSA, there is a range of quality and consistency in the assessment.

In the IB, high standards are maintained because the exams are externally set by experts. The exam is rigorous and it covers a diversity of topics. Some claim external assessment means that teachers teach to the test. In fact, the opposite is true. Internal assessment, where the teacher knows the test questions in advance, makes it much easier to fall into teaching to the test.

External assessment also allows teachers to focus on what they do best, which is planning and delivering quality lessons. In Queensland, rather than do this, teachers are spending large amounts of time and energy developing, marking, and moderating assessment.