To The Education and Innovation Committee eic@parliament.qld.gov.au

SMC&PA Submission 239
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From: Graham Nielson

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Dear Committee Members,

I have been teaching physics for 28 years. During that time I have been a Head or Acting Head of Science in three schools in both the public and private sector. I have been a member of the Physics Panel for 16 years in the Brisbane West and Central Districts involving both the 1995 and 2007 Syllabuses. I am no longer a member of the panel. I am writing to express grave concerns over a number of aspects of the current Physics Syllabus and the general approach taken by the QSA to syllabuses and assessment.

Many submissions to the Committee have discussed the need to move to an external based assessment system as seen in other states. I would like to make comments regarding that later. In the first instance however, I would like to concentrate on how, in my opinion, the previous Physics Syllabus, while imperfect, delivered some degree of consistency, comparability and transparency. In these respects the current Syllabus has proved inadequate.

Marks

Much has been said of the use of criteria as opposed to marks in the current Syllabus. It is appropriate to recall that the previous Syllabus had statements of criteria and standards but allowed teachers the flexibility of using numerical cut offs that reflected the standards expressed in the Syllabus. This approach is one taken in many jurisdictions around Australia and the world. As a panelist during the entire duration of the 1995 Syllabus, my job was to determine that the assessment carried out by schools was of an appropriate standard, and that the numerical grades assigned were thus comparable across schools. *Though difficult at times, this was an achievable exercise and lead to a numerical grade that could be aggregated to produce a level of achievement. From this point on all assessment review processes were thoroughly objective.* Panelists were generally content that an acceptable level of comparability had been achieved. (We were always conscious of the fact that getting the *rank* within a school correct was paramount, as the QCS test then scaled different cohorts to produce student OP's. I'll speak to this point later.) A central issue with the new Syllabus is that the ability to aggregate scores has been taken away.

It is disingenuous of some to say that marks are still allowed in current assessment as the prime attribute of marks, their ability to be manipulated arithmetically, is denied to teachers. *Not so the QSA!* It is a cruel irony that the aggregation of scores and the manipulation of numbers is exactly what the QSA do, both in their processing of the QSC results and in the calculation of Overall Positions from the SAI's submitted by schools. It is hard to believe that they could argue that the aggregation of scores is invalid at the syllabus level, but perfectly legitimate at the OP level.

As a consequence of being unable to aggregate marks teachers are presented with the task of determining, often from a wide spray of letter grades for individual questions on an exam, an overall grade for a piece of assessment. My strongest criticism of the QSA is that the current Syllabus gives no direction whatsoever as to how an overall grade is to be arrived at in these circumstances. Similarly there are no specific instructions for arriving at a global level of achievement of a folio from a set of letter grades other than by exercising our professional judgment. My professional judgment would have me use numerical grades. There are various schools of thought on the subject but the QSA and their representatives refuse to clarify what method should be used. As a consequence, grading is inconsistent (despite teachers' best effort to moderate), unnecessarily subjective and lacking in transparency. This, in my opinion, has a negative effect on both student and parental perceptions of fairness. It also increases the workload of teachers unnecessarily.

Weighting

Another consequence of the inability to use marks is that the pieces of assessment that make up a folio of student work can no longer be weighted. Thus every piece of assessment is a major piece of assessment. (This is not the case for our southern counterparts where assessment items can and are weighted.) This, ironically, has led to a reduction in the number of assessment pieces in my course but an increase in the workload for students. (This has no doubt contributed to declining numbers in the subject in my school as there is a definite perception that the workload is onerous.) Due to Syllabus constraints students in Year 12 must have completed at least four pieces of assessment by September, which means at least one term will involve two major pieces of assessment.

Assessment Instruments, Standards and Criteria

The assessment instruments available to teachers outside the use of examinations are Extended Experimental Investigations and Extended Response Tasks. A strict interpretation of the Syllabus allows one not to use an Extended Response Task as an assessment instrument and I have chosen that path for many of the reasons cited in other submissions to the Committee. The reasons are; uncertainty over authorship, unsuitability for assessing breadth of knowledge and most importantly, the difficulty in matching the prescribed task to the statement of Standards and Criteria by which we are required to

grade an item. (The Standards are poorly written; vague and often describing the standard of a question rather than the standard of a response. Some criteria, particularly in the Evaluating and Concluding dimension, remain a mystery to most teachers. This dimension was never part of the draft syllabus submitted for review in 2006 and its inclusion remains controversial.) We are, nevertheless, required to use EEI's.

I acknowledge there are some positives to EEI's and I will leave it to others to expound on their virtues. There are many negatives however. It is a reality that EEI's displace other experimental work from my course. I simply don't have the time to do it all. As a consequence, students are experiencing a smaller variety of experiments, using a smaller range of equipment than previously (much equipment is gathering dust at the back of the room), and not experiencing the same degree of experimental support for the scientific theory covered in the course. Unfortunately, EEI's do not always engender a sense of confidence in the scientific endeavour. There is also the contextual analysis that would normally go with some experiments that is now missing from the course. EEI's are stressful, but needn't be if there were a way of diminishing their *weighting* which is what is effectively done in New South Wales and Victoria. Were numerical weighting of tasks an option, more realistic and reasonable demands could be placed on students and teachers. It would afford schools more flexibility in their programs.

Content

The framework of the current Syllabus is questionable and a departure from any I have seen in any jurisdiction here or overseas. It is entertaining to describe a course thematically, but it does lead to a diversity of content that compounds the problem of comparability in Queensland. In the previous Syllabus the content was quite specifically outlined (as is done in other states). While this did create the problem of a content heavy Syllabus, at least everyone was on an equal footing. From a panelist's perspective we could see whether schools were covering similar amounts of material and consequently whether or not the complex concepts were being addressed. The present situation is one in which schools can cover very different amounts of material. If ERT's or EEI's are used to assess an entire term's work (as is often the case), it is frequently difficult to see whether content prescribed in the school's work program is being covered at all! I am conscious that assessment involves sampling, however the samples are becoming less and less reliable.

External Assessment

We have an external exam in Queensland; it is the QCS test and is central in the awarding of OP's. For the vast majority of students, the OP is all that counts as it determines your eligibility for further studies. Prerequisites have diminished significantly for many University courses with Levels of Achievement gained in subjects being almost irrelevant and field positions being totally irrelevant. *The important*

question to ask is, is it better to have school based assessment scaled according to a CCE Scaling Test or scaled according to an External Examination in the subject in question? Southern states take the latter approach. They have an element of school based assessment that provides some flexibility and variety in the teaching of the subject. On the basis of all the statistics I have seen on student performance and indeed student retention in senior sciences the results are superior.

The QSC test has turned into a monster! In most schools it is almost a subject unto itself, with nearly as much time spent practicing for it as is spent in academic subjects. An industry has built up around the preparation of students for this test and one cannot help but think that it represents a perversion of the education process. It continues to eat into the valuable time we have to teach the subjects that we feel passionate about. I feel passionate about teaching physics. It is difficult to spruik the QSC as anything other than a bitter pill that we all must swallow.

Various reviews of the QSC test have generally concluded that the test is useful for the purpose of scaling. They have recommended reviews of the CCE's however (McLeod, 2012). There has not, to my knowledge, been a comparative review of CCE testing versus the use of External exams for scaling. We need one.

Student Achievement Indicators

Just as the QCS is somewhat vague about how its syllabuses are to be interpreted, they are equally vague about how SAI's are to be determined. These numbers, crucial to the ultimate determination of OP's, have been and remain controversial. It is perceived by some that schools *adjust* their SAI's to advantage some students over others, and indeed gain some advantage for their school as a whole. There needs to be clear direction from the QSA on how these numbers are to be determined (as opposed to saying how they are not to be determined). This, and other vagaries in the OP calculation process, undermine trust in the system and lend support to the argument for moving to external exams in subject areas resulting in greater transparency.

Conclusion

I believe superior academic outcomes would flow from a move to a system like Victoria's where a balance of school based assessment and external assessment is employed, the latter being used to scale the former to achieve comparability.

In the absence of this, a return to a version of the previous syllabus would be desirable with the right to use marks returned to the teacher.

Yours Sincerely,

Graham Nielson