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QUEENSLAND PARLIAMENT: EDUCATION AND INNOVATION COMMITTEE

Assessment of senior maths, chemistry and physics in Queensland schools inquiry

Submission from:

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Please keep my address and telephone number confidential

Dear enquiry members,

My background is: a degree in applied physics; a post-graduate certificate in education; a post-graduate Certificate of Gifted Educations (University of New South Wales); over ten years teaching physics in the UK at A-level standard and nearly twenty years teaching senior physics, and maths B for five years, in Queensland, with five years as a physics panel member.

In summary, I argue against criteria based assessment as it stands in Queensland, that criteria in and of themselves are not bad but need to be imbedded in well constructed, externally written assessment instruments, written and marked by professional examiners. This will remove in one stroke the confusion and frustration that reigns over the assessment process with many teachers and will free up teachers to be able to spend more time actually usefully teaching in this day-and-age when the catch cry is to 'improve teaching standards'.

It seems that there are two main issues under discussion here: one is the success, or otherwise, of criteria based assessment; the other is that of internal verses external assessments.

Criteria have always been used when marking assessments, albeit on a simple scale: is this right or wrong, has this student demonstrated an understanding of the concepts being tested or not etc., those are criteria. In the previous physics curriculum, for

example, criteria were assessed such as: were students able to cope with complex processes; were they able to cope with scientific processes. It is the complexity and confusing nature of the current criteria and the manner in which they are being assessed that is the issue here. As they stand at the moment many teachers find them vague, confusing, at times contradictory, and incredibly time consuming to assess.

No one can argue about the concept of using some of the criteria, of the validity of requiring students to say, *justify the reasonableness of results* (maths B, communication and justification) or *investigating the validity of mathematical arguments including the analysis of results in the context of problems; the strengths and limitations of models, both given and developed*. (rather cumbersome and wordy, maths B, Modelling and problem solving). But what in the world does ***innovative*** *use of range of formats* (physics, evaluating and concluding) mean or have to do with being a good physicist? And why make the *'use of problem-solving strategies to interpret, clarify and analyse problems to develop responses from routine simple tasks through to non-routine complex tasks in life-related and abstract situations*' (maths B, modelling and problem solving) an assessable criteria. If the student has managed to successfully solve a suitably complex mathematical problem then they must have, by default, demonstrated that they can fulfill that criteria otherwise one assumes they would not have been able to solve the problem. This is the case for many of the criteria that have to be assessed, particularly in maths. There is more emphasis on meeting the requirement of wordy, vague criteria than on actually successfully and accurately solving problems – the good old-fashioned *– did they get it right?* In fact, if one looks closely at the criteria quoted above, there is actually no requirement for the student to have *successfully* solved the problem! It could be said that that requirement is implied – but in fact it is not stated. This is one of the biggest weaknesses of the current criteria – the requirement to accurately and completely solve problems is not generally there if one strictly applies the criteria – one presumes that you are supposed to strictly apply the criteria! If this one rigorous requirement was put in place, that of requiring students to actually demonstrate their ability to accurately and completely solve problems, many of the current criteria would be redundant and life would be so much clearer and simpler and so much stress and time-wasting would be spared. Incidentally this argument equally applies to physics and chemistry too – there is little or no requirement for students to actually get things right! There is a crying need for the criteria themselves to be reviewed.

But there is also a need for the assessment methodology to be overhauled. Using criteria descriptors and alphabetic standards to grade students may work in the humanities but for the sciences it just leads to confusion. How does one determine what grade to award a student if they have successfully completed some of the B and A grade questions in an assessment instrument but not all of the C grade questions – and what grade are they awarded if they fail to complete some question in any meaningful manner, or even do not attempt some at all? And just how does one properly place a student on a ten step scale for an A grade, as we are required to do for grading at the end of year twelve, when they are being measured against criteria? Surely, if we are using criteria properly, they have either met the criteria or they haven't, so they either deserve an A or they don't. To then place a student somewhere on a ten step scale for grade A is largely subjective, whereas using the old percentage scale was clear-cut and fair.

This whole process is obviously clearly understood by those at QSA who have implemented it in the first place, but the ordinary teacher, such as myself vainly struggles to understand and overcome its complexity and make it work successfully and fairly for our students. How much better would it be if the assessment instruments were set and marked by those that truly understood the process?

That brings us to the second issue, that of internal or external assessment. I come from a UK background. As a student I worked my way through the GCE and A level system and then eventually taught in the same system for ten years – all of which was totally externally examined and worked well. When I encountered the Queensland system for the first time it was quite a shock to find completely the opposite, assessment being totally internal. When asking about the thinking behind this I was generally met with the answer that it prevented teachers 'teaching to the exam'. I have to say that this appears to be one of the most blatant arguments of the 'black is white and white is black' type. If my students are going to be faced with an assessment that I have not seen let alone written, how in the world am I going to be able to teach to that assessment!? On the other hand, if I have written an assessment item then, with the best will in the world, if, for example, I am running short of time in the term, what am I going to do – teach to the exam, of course. It is my experience, and I would argue, that external assessment forces teachers to teach the content more thoroughly and prepare their students more rigorously – this has to be a good thing. Ah, but then one is constrained by the curriculum, I hear. Well, so one should be, and if it is a good curriculum, what damage has been done? Even then, a good teacher will be able to bring in those interesting 'extras' along the way.

Internal assessment also requires the cumbersome and somewhat random process of moderation through district and state panels. It is interesting to note that in the previous submissions to this enquiry, those in favour of criteria based assessment and see moderation as a successful process are, in fact all chair persons of panels, there is not one ordinary teacher advocating the use of criteria assessment or the moderation process. Every year teachers send away their submissions to be moderated and wait with baited breath to see what the lottery of moderation throws back at them. Teachers have assessment instruments lauded one year by one set of panel members and exactly the same set of instruments criticised the next year by another set of panel members – there is no consistency despite what some previous contributers may say. Students have their grades reduced, sometimes drastically, only to have them reinstated after time consuming 'negotiations' between panel chairs and subject teachers. What kind of consistent system is this? It is supposed to be 'cutting edge'! It is random and inconsistent. It wears on the nerves of teachers and consumes valuable time. Part of the problem is that, in my experience, effective training for panel members is virtually non-existent , the time allowed for reviewing student scripts at monitoring and verification is woefully inadequate and the remuneration for panel members insulting for professionals. No wonder QSA is having difficulties filling panel positions. The whole system is inadequate in its conception and implementation and can only truly effectively be solved by external assessment .

Another issue with internal assessment is the whole question of assignments. It is interesting to note that in the UK, after a period of using external assignments, the education system there is moving back towards internal assessments because of the problem of authenticating students' work. How can the QSA reasonably ask teachers to authenticate the work of their students' assignments? It seems to be fairly well accepted now amongst teachers, that the process is being systematically rorted by some students using tutors to 'assist' them with their assignments and there is really very little a teacher can do about that.

In a single stroke external assessment can enable desired criteria to be properly assessed, it can remove the rorting that goes on with assignments in some quarters, it will do away with the current pressures and uncertainty that plagues the profession in Queensland by saving teachers the enormous amount of time and stress involved in the assessment process as it currently stands. It will free up teachers to do what they do best – teach.