Submission to the Queensland Parliament's Education and Innovation Committee's Inquiry into Assessment Methods for Senior Maths, Chemistry and Physics

Sun 12th May,2013

SMC&PA Submission 155
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To whomever it may concern,

I make this submission for your consideration in the Inquiry into the Assessment Methods for Senior Maths, Chemistry and Physics in Queensland.

I request that my personal details be withheld from publication.

I have taught Physics, Maths A, B, and C and Chemistry in Queensland throughout my 30+ year teaching career. On reflection, I can understand the improvements that changes to earlier syllabi in Physics, Maths, and Chemistry intended to bring about. However, the current syllabus has very radical changes that force teachers to teach less subject matter in a shorter time frame, and engage students in highly weighted, questionable forms of assessment.

I have read all of the submissions relating to the Queensland Parliament's Education and Innovation Committee's Inquiry into Assessment Methods for Senior Maths, Chemistry and Physics that have been published on your website as at Sun 13th May, 2013. Apart from the very few that support QSA's current system of assessment, the remaining submissions have adequately expressed my concerns. In particular, please see submissions 20, 30, 35, 37, 39, 49, 51, 68.

Currently I am teaching Chemistry and Physics. Here, I add just a few extra points.

Ensuring assessment processes are supported by teachers.

I believe that current assessment processes are not supported by a significant number of teachers for the following reasons:

- Less teaching time is inevitable to allow students about 5 weeks of a 10 week term to complete each EEI and ERT. Teachers have to teach less subject related content and its application, and teach it quicker in order for students to have a sufficient knowledge base and time to attempt EEI's and ERT's.
- Consequently, not only is less knowledge acquired but fewer standard and varied experiments are done limiting the student's skills and narrowing their understanding of methodology when attempting EEI's and ERT's.
- Teachers spend much time teaching students how to write sentences and paragraphs, how to use correct grammar, how to spell and punctuate, how to avoid plagiarism, how to in-text reference and write bibliographies, how to write critically and persuasively, not to mention how to format Extended Experimental Investigation Reports. While all teachers are responsible for promoting the use of English, sometimes one wonder what students learn in English classes. It doesn't seem to transfer into science.
- While there is value in Experimental Investigations, they should not be "Extended" and should be worth no more than 10% of a semester's assessment. Research Tasks could be the Background Research for the Experimental Investigations.
- Teaching seems to be assessment driven. You teach for 5 weeks then students are assessed for 5 weeks. This is not in line with the spirit of comments made by ACER. (See Submission 58, paragraph 2, "in modern classrooms".)
- Excessive, unwarranted time is required to run the system. Two examples: Subjective marking of EEI's and ERT's is not only time consuming, but that time is doubled if commenting on student drafts are included. With an exam, at the bottom of each page, each question's grade is recorded. These grades are transferred onto a matrix on the front cover of the exam from which Levels of Achievement (LOA) for that test are

determined. These cannot be used to determine a student's LOA at the end of the year so all these grades are again transferred onto a second matrix which is used to determine the end of year LOA's. Then the final LOA's are transferred to the Student's Profile. Unfortunately, teachers don't work from 9 to 5. If they did, this system would never survive without crippling payment of overtime.

- There is a lack of materials and resources for trial schools, and sometimes the rest of the schools once a new syllabus is adopted across the state. QSA seems to be in a hurry to implement changes and then wait for teachers to come up with suitable resources and solutions to inherent problems. Publishers hold back waiting for the last changes to the syllabus to be made so that their books are not out-dated.

Student participation levels.

- In order to attempt EEI's and ERT's successfully, students require detailed instruction on how to write sentences and paragraphs, how to use correct grammar, how to spell and punctuate, how to avoid plagiarism, how to in-text reference and write bibliographies, how to write critically and persuasively. This encroaches on the already limited learning time for subject specific content and application.
- More A level questions are required in Supervised Assessments (Exams) and fewer C level questions since each difficult question is awarded just one letter of the alphabet. If only 2 or 3 A level questions are offered (as in the past), student are considered not to have been given the opportunity to show an A level standard of achievement. This requires lengthier exams than work programs are instructed to specify.
- Overseas students with non-English speaking backgrounds find lengthy written tasks unfairly challenging, become stressed and are forced to help each other or seek the assistance of tutors. Thus often, their work is not authentic.

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

I believe in certain cases, the ability of assessment to support valid and reliable judgments of student outcomes is doubtful for the following reasons:

- ERT's in particular are an open temptation for plagiarism either from books, the internet, parents, other students, or tutors, and students under pressure resort to this practice. **If** this is discovered, there does not appear to be a standard penalty.
- EEI's and ERT's do not indicate to what extent students have mastered the knowledge base in the unit studied, nor to what extent they are able to apply it in standard and novel situations. EEI's and ERT's are often the sole means of assessing the unit. Students realise this and concentrate their efforts in the limited areas associated with their research.
- There is no specific indication in the syllabus of how many of the A level questions/criteria a student must get in order to be awarded an A or how different grades awarded to other questions/criteria would affect this. This is also true for the awarding of B's, C's etc. It is left to the subjective judgment of the teacher. This problem presents itself in Supervised Assessments (Exams) and in the determination of final Levels of Achievements.
- Students performing at a C Level of Achievement, often cannot start an A level question and therefore do not attain a C level in that question. Should that count against them? There are no guidelines.
- To establish a level of achievement, the following advice is given in the syllabus: "the standard awarded should be informed by how the qualities of the work match the descriptors overall." (Chemistry Syllabus, page 26) (Physics Syllabus, page 28) That is all the detail given about how to read and interpret the final matrix which would have criteria at A, B, and C level of difficulty graded from A to E all over it. Not much help in judging final standards from the final matrix particularly in cases where students are not showing a consistent trend.

- When I wrote our Work-programs, there were certain things permitted and others not permitted. Since then, I have noted that not all schools follow all the recommendations I was instructed to follow. It seems that work-programs written earlier were approved using a somewhat difference set of rules.
- QSA has recently (I think) specified that the Contextual approach needs only be adopted in one unit in Year 11 and one unit in Year 12. Why is this? Why do some schools use the Contextual approach consistently through the two year course when others don't?
- Under the previous syllabus, questions in test instruments were divided into three categories. Knowledge (consisting of easy to standard knowledge questions), Scientific Process (consisting of easy to standard questions relating to working scientifically e.g. interpreting data, graphs), and Complex Reasoning (consisting of a range of more difficult to very difficult questions of the former two categories). Marks were used. Students and teachers could easily see where students performed well and where more effort was required. Cut-offs for each Level of Achievement were stipulated.

  Under the present system, easy sub-criteria are mixed with the more difficult (e.g. in Knowledge and Conceptual understanding: "reproduction and interpretation of complex and challenging concepts…", something that can easily be done at home in an EEI or ERT, and "linking and application of algorithms … in complex and challenging situations", something that lends itself more to calculations under exam conditions. In Investigative Processes: "formulation of justified … hypothesis" easily done by most students, and "systematic analysis of … data … " a more demanding expectation. In Evaluating and Concluding: "… presentation of … data" not too hard to do, and "analysis and evaluation of complex … interrelationships" a difficult task.) Marks are not used. No specific cut-offs are stipulated.

  Are easier sub-criteria being used to inflate the Levels of Achievement of the more difficult in a given Criteria?

  Under the present system, if a student gets e.g. a C+ in any of the Criterion, let's say in Evaluating and Concluding, that student needs to look more closely at how that grade was awarded. Was it because of poor presentation (easily fixed) or was it because of poor analysis and evaluation (a more difficult ask). Could the teacher have awarded a B minus (or just a C)? How should the student interpret the sub-criteria paragraphs to figure out how they could improve when teachers debate their meanings? There are not that many students who are assertive enough to find out.

Hope the above indicates a serious review is warranted.

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