SMC&PA Submission 192
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SUBMISSION TO EDUCATION AND INNOVATION COMMITTEE

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Author's Background:

- State High School teacher since 1977
- Subject Master (Mathematics) 1985 to 1988
- Head of Department (Mathematics) 1988 to current
- Our Mathematics program has awarded:
  - National Numeracy Award - 2003
  - State Excellence in Teaching Award - 2008
  - National Excellence in Teaching Award – 2009
- Following requests, I and other staff have conducted numerous professional development sessions for other secondary schools, state-wide and nationally.
- Member of a number of Mathematics syllabus writing sub-committees
- Fully and successfully implemented Education Queensland's Curriculum, Assessment and Reporting Framework (QCAR), the forerunner to the National Curriculum
- Participated in the trial of the National Mathematics Curriculum
- Participated in numerous reference groups for the development of the proposed National Senior Mathematics Subjects
- I have been involved in Queensland's Externally Moderated School Based Assessment process since 1982 as teacher, as Subject Master, As Head of Department and as a Standards and Assessment Officer with QSA in 2005 where I had the opportunity to continue but missed teaching kids too much so returned to my school in 2006.
- State Panel Chair for Mathematics A since 2006.

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Purpose of Submission: To comment on:

- Assessment Methods in Senior Mathematics
- Ensuring assessment processes are supported by teachers
- Student participation levels
- The ability of assessment processes to support valid and reliable judgments of student outcomes.

I begin by making a submission on current statements being made about *the use of marks in mathematics* and *the requirement of long essays in mathematics*.

Firstly, that *"Queensland doesn't allow the use of marks in order to get the final grade"*

My understanding of 'final grade' could be the broad Level of Achievement or it could mean each student's rung position from VLA1 to VHA10

There are two issues related to this suggestion.

1. The requirements of the Syllabus and its implementation via a school work program.
    - The syllabus is developed by a sub-committee of teachers operating within QSA guidelines of world's current best practise.
    - The syllabus aligns learning objectives, the content to develop these objectives, suggested assessment strategies that reflect the objectives and the process for awarding an Exit Level of Achievement.
    - Schools, state wide, write a work program for their individual school setting which reflects the intent of the syllabus
    - Members of District Panels check there is state wide alignment with the syllabus.
    - At this stage schools generally use the syllabus criteria but are able to use marks provided they can show how these marks reflect the stated objectives and assessment criteria.
2. Verifying schools decisions.
    - At Year 12 Verification, members of District Panels search for evidence to support the school's decisions on Exit Levels of Achievement and on proposed rung positions on the Form R6.
    - Panel members only concern is whether or not the material within each sample folio matches Exit Standards.
    - Panel members are not concerned with how the school has made its decision(s) just that the work matches the syllabus requirements for each level of Achievement.
    - The school is solely responsible and has free choice in determining the method(s) by which they award students their final grades. If they wish to use marks it is their decision. If they wish to use criteria it is the school's decision.

Secondly, that *"The very, very long assignments, the wordy assignments that they're requiring in maths which are traditionally about quantitative calculations rather than writing an essay on things".*

- This is not a requirement of the syllabus or an expectation of panel members.
- The syllabus requires one piece of assessment other than written tests each semester. It may be an 'Extended modelling and problem solving task' or a 'Report', the details of which can be seen in any of the current senior mathematics syllabi. My understanding is that this was incorporated into the syllabi at the request of University personnel.
- Both require significant use of the 'traditional quantitative calculations" to possibly, substantiate an argument, detail the results of research into a particular topic, submit a proposal on a certain topic, et al with some words used to hold the flow of the writer's position. This was required at the request of Universities.

- If schools are requiring students to complete *very, very long assignments, the wordy assignments,* it is a school decision not a syllabus, panel or QSA requirement and is a matter for their school community. Panels have no authority to intervene.

I have to wonder at the reasons why these comments continue to be made again and again even though they have been refuted on many an occasion. I wonder at the motives or agendas being covertly pursued.

Our system is run by teachers with decisions made by teachers under guidance but not direction from the Queensland Studies Authority. State Panels Chairs (teachers) direct and control the process. Teachers on the panels make the decisions and recommendations. The problem arise when some schools don't like being told the work is not of a high enough standard but these statements need to be made to ensure comparability across the state.

Assessment Methods in Senior Mathematics and Student Participation

A search of the literature on what skills Australian employers want from their employees can be summarised as follows:

Skills
• Communication • Team Work • Problem-solving • Initiative and Enterprise • Planning and Organising • Self Management • Learning • Technology skills

Reasons given for Australian enterprises valuing these attributes and skills include:

- Ongoing economic globalisation causing constant and rapidly increasing change.
- The importance of knowledge work and knowledge workers to Australia's economic success.
- The need for the Australian community to understand the broad issues underpinning globalisation and the knowledge economy and the need to create a community equipped to understand and participate in ongoing change.
- Enterprises are increasingly seeking a more highly skilled workforce where these generic and transferable skills are broadly distributed throughout the organisation.
- That all young people need a set of personal attributes and skills that will prepare them for both employment and further learning.
- That ongoing employability of individuals depends on them having a set of relevant skills as well as a capacity to learn how to learn.

Education authorities, including schools, need to respond to these expectations but how do you create the best innovated and relevant learning environment for developing abilities and what is the best method of assessing achievement of these abilities?

I submit that the current practice is the best method for addressing the development of these attributes and skills, the needs of employers, the needs of teachers and the needs of students. It is a partnership between stakeholders and provides the best means of accountability.

In my 35+ years of teaching I have worked

- in a "marks based system" with cut-offs,
- the norm referencing of results where an arbitrary line was drawn under the clustering of students
- With standards based assessment, where learning objectives, not the marks, are standardised.

In my experience, the use of standards and associated criteria is the better and fairer approach.

Under the system of standards and criteria,

- With the explicit statements of learning objectives, standards to be reached to achieve a result and the criteria need to be fulfilled to achieve the standard, everyone knows what is to be taught, what is to be assessed and how it is to be assessed.
- These statements provided a clear statement of the literacies needed to be covered.
- Student achievement is determined by the success in meeting the specific and clearly specified objectives.
- Students and parents know (and have a right to know) the criteria and standards for the learning they must master.
- There are no hidden agendas or nasty surprises at the end of the assessment period.
- Students receive continual feedback explicitly stating what it is they need to do to improve their result not just being told 'you need to get another 5 marks'.
- Parents receive feedback specific to the needs of their child and in explicit terms
- Students are given tools to accurately self-assess their own work checking their what they have done against known criteria and thus move towards taking responsibility for their own learning
- Assessment becomes an integral part of the teaching and learning process.
- Provides students with greater opportunities to interact with assessment tasks with the intention of developing student processes in critical thinking, metacognition, and reflection.
- Requires greater teacher involvement and clarity in the planning, creation and execution of meaningful learning experiences and in the construction of relevant and meaningful assessment tasks both guided by clear objectives. Teachers can then clearly articulate to students *what they are to learn today*, *what they are to*

provide to demonstrate success in the day's learning and in explaining *why and how this learning is relevant*. With assessment it requires teachers to consider the purpose for asking a question, the content of the question, the wording of the question and what students will be expected to demonstrate and allow for the creativity of the student mind.

- Requires greater accountability on the part of teachers in the professional service they provide. The use of marks is certainly easier for teachers but is not our focus our students and their learning?

Ensuring assessment processes are supported by teachers

Input into the development of syllabi comes from a wide range of sources - from teachers and from representatives from the University, TAFE and Industry sectors. But we rely on QSA Personnel to do the research on current best practice. Teachers simply do not have the time to do the detailed research required. The role of the QSA personnel is vital here. It is vital that the contents of syllabi reflect the needs of all stakeholders. QSA is best placed to carry out this function.

Teachers exercise their professional expertise and work together to make judgments that are comparable statewide.

The teachers in my school fully support the use of standards and criteria in both teaching and assessment practices. I can only related what we have done at our school.

In compiling our work programs we have had and still enjoy the freedom to determine how we assess our students so long as what we do is in line with the demands of the relevant syllabi objectives. This, together with the points made previously, are the reasons we as a staff made a commitment to implement standard and criteria across Years 8 to 12 some years ago. We believe and still believe it is the best practices to produce literate, numerate, critical and creative thinkers who have some experience of using a range of technologies to explore problems. It allows students to see the relevance of the mathematics being studied in analytical contexts.

With any new syllabus QSA offers to all schools Professional Development which details every aspect of the new syllabus. Schools are invited to send teachers to attend such sessions where QSA representatives clearly and effectively explain how to develop a standards based curriculum. They demonstrated strategies to articulate learning objectives and strategies to actively engage teachers and students in the assessment process. Further QSA PD provided more strategies to clarify aspects of syllabus documents, strategies to achieve differentiation amongst student groups and provided examples for discussion. Teachers were taken through a process to help teachers devise strategies for involving students in the assessment process, contextualizing reflection and developing and working with task exemplars. Additionally, training and guidance was provided in the development and implementation of formative assessment practices that are aligned with summative learning goals. These sessions are not compulsory so I

believe that schools that attend the Professional Development in the main support the current assessment processes.

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

The strength of a standards based curriculum is that it clearly states to all teachers across Queensland what is to be taught, what is to be assessed, how it is to be assessed and upon what basis teacher judgements are to be made. In following the syllabus there is state wide consistency. We know students need to show ability across a range of problems from simple ones practised in class to unfamiliar complex problems which they may encounter. The focus is on the content in developing generic problem solving skills which, as mentioned earlier, future citizens will need in our globalised world. Consistent standards are reviewed every year through a comparability process and a random sampling process.

Often it is said that using marks gives a more consistent result. I have worked in three mark-based systems:

- Teachers stopped marking as soon as the student made an error.
- Teachers started with the total allocated to a question and deducted half a mark for each error carrying through errors to check students thinking.
- Teachers automatically halved the total allocated to a question as soon as an error was made and kept halving for each subsequent error.
- Different teachers award part marks in different ways; if a mark is allocated to the statement of a formula and if the student does not shoe the formal they lose that mark where as other teachers give no penalty if the question is worked through with out the demonstration of the formula.

When our students progress to tertiary studies we often hear criticism that they cannot do the work. In many cases this is true because tertiary institutions have lowered the pre-requisite levels to get the so called 'bums on seats' to secure funding. After that no really cares but it becomes a convenient tool to complain about falling standards. I think back to my senior mathematics studies in the early 1970's and compare this to current expectations. We expect a far higher standard now than ever before and our students are living up to these standards in a 21st century environment. It is a pity tertiary institutions don't move their thinking into the 21st century.

Another criticism often made is that students 'fail' their entrance test. As far as I am aware students sit this test after about 4 months 'off' formal education. There is no time given to allow students to prepare for this test. This reinforces my view that many tertiary institutions operate as they did in the 1970's.

I remember a Chinese university professor commenting at a conference that we (China) have prepared good test takers but we will never under the present education system produce a Bill Gates or any other entrepreneur for that matter.

Do we want to produce good test takers or do we wish to produce creative thinkers willing to take risks?

Submitted for your consideration.

ANDREW FOSTER
13 May, 2013