

Attachment E

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Wadderloader! Maths and science teaching in Australia

By John Ridd
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Those of us with eyes to see and ears to hear have been enduring the smug mantra, "Today's youth is the best educated ever" for years now. Wadderloader rubbish.

The latest blow to any remnant belief in the excellence of education in Australia lies in the recently released *Trends in International Maths and Science Study* (TIMSS). It shows that Australian students in Years 4 and 8 are mathematically weakening relative to other countries. Not only are we not in the first division with countries such as Hong Kong or Singapore, we are now sliding down the second division and have been overtaken by Hungary and England. What little data there is for physics indicates that Australian students in Year 8 are below the international average.

The mess we - or to be precise our youth - are in has not happened overnight, it takes time and a perverse sort of skill. So who has shown that skill? It is facile but unjust to blame the classroom teachers. Responsibility rests with the institutional power groups that lie behind and determine what happens in the classroom. Fundamental problems lie in:

- The various Boards of Study that are responsible for all syllabi and assessment systems;
- poor teacher training within university education faculties;
- trendy state education departments; and
- teacher unions who oppose verifiable assessments of student outcomes.

Collectively those groups are the four horsemen of the educational apocalypse or as I call them, "The Education Establishment".

University and upper secondary student enrolments in rigorous maths and physics have declined in all state jurisdictions. There is strong evidence from Australia and elsewhere that the declines are not entirely due to lack of job opportunities, hence there must be problems on the supply side. For example there is a shortage of engineers especially power engineers, but engineering faculties struggle to maintain reasonable enrolments without an unacceptable drop in standards.

Most of the declines in upper secondary enrolments in rigorous maths and physics have been due to a decline in male participation. It is known that participation, especially male participation, in those subjects is heavily dependent on previous experience, i.e. lower secondary schooling. Another illustration of the importance of lower secondary schooling is the fact that the biggest influences on students' final ENTER (TE Score or OP or whatever) are literacy and numeracy in Year 9, numeracy having slightly more influence than literacy.

Maths standards up to the end of Year 10 are known to be highly variable and frequently weak. Algebra, "the language of higher mathematics" and "a gatekeeper to educational opportunity" is particularly poor - a consequence of the fact that the subject is held in near derision by "The Education Establishment". Syllabi for both maths and science up to Year 10 are long on fashionable educational theory, short on content and are pitched at a low academic level. Numerical science in Years 8,9 and 10 is almost non-existent.

The feeble condition of maths and physical science in lower secondary schooling is often covered up by staggeringly complex, unreliable and virtually meaningless assessment systems up to and including Year 10. It is certainly true that (in Queensland at least) lower secondary school education costs many hundreds of millions of dollars annually. For that investment the taxpayers, the parents and the students receive, in toto, an unknown amount of variable educational experiences with unknown and unreliable outcomes, which are of unknown value as a preparation or a predictor for success at later studies. There is a total data vacuum about student performance in all schools up to Year 10.

Queensland the “Smart State”? Wadderloader.

Much more accurate would be: “Vacuum State”. Now that really would be an eye catching number plate!

All those syllabus and assessment problems to Year 10 can be sheeted home to the various State Boards of Study - which is why I put them as the first and worst horseman. Their syllabi and assessment systems are ill defined and student outcomes are unreliable and lack validity.

Moreover, for upper secondary school many syllabi in maths, physics and chemistry are vague and provide little idea of what content material and concepts are required learning. It is quite possible for students from neighbouring schools to be following two completely different courses. The implications for tertiary faculties are serious. Assessment systems are essentially non-numerate, depend heavily on items that may or may not be the students' own work and over emphasise English. A recent Parliamentary inquiry into the education of boys recommended that:

Assessment procedures for maths and sciences must, as a first requirement, provide information about students' knowledge, skills and achievement on the subject, and not be a de facto examination of students' English comprehension.

The fact that such an obvious statement was deemed necessary demonstrates the “wadderloader” condition of many “assessment” systems.

Boys from lower socio-economic backgrounds are frequently weaker in literacy than girls of similar background and are much weaker in English than mathematics. Hence making maths and the physical sciences a “de facto test of English comprehension” is socially and sexually discriminatory.

Any improvement in participation and performance in the enabling sciences is dependent on dramatic improvements in the standards of maths and numerical science in lower secondary schooling and the construction of syllabi that ensure that outcomes are reliable, validated and defined. Those improvements will not emanate from within “The Education Establishment”. Only parliaments can produce the improvements that are urgently needed. As a start they should take a club to the various Boards of Study (under whatever name). It is impossible to overstate how influential those institutions are - for good or evil. Certainly they are much more significant than either teacher unions or the public versus private debate because they determine everything in all subjects in all years and in all schools without exception.

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