

A bubble about to burst: why we don't need more maths and science graduates

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The Chief Scientist, Professor Ian Chubb, [last month](#) unfavourably compared our share of graduates in science and technology with those of various Asian countries. It was the latest in a long series of speeches and pronouncements talking up the need for more graduates in these fields.

Unfortunately, Professor Chubb gives far less attention to a more relevant set of numbers: the employment prospects of Australians with science degrees. These potentially reframe the problem from one of under-supply to one of over-supply.

The annual [Graduate Destination Survey](#) (GDS) of people with recently completed bachelor degrees consistently finds that people with science qualifications have above-average difficulty finding work. The only exception is for people with degrees in the geological sciences.

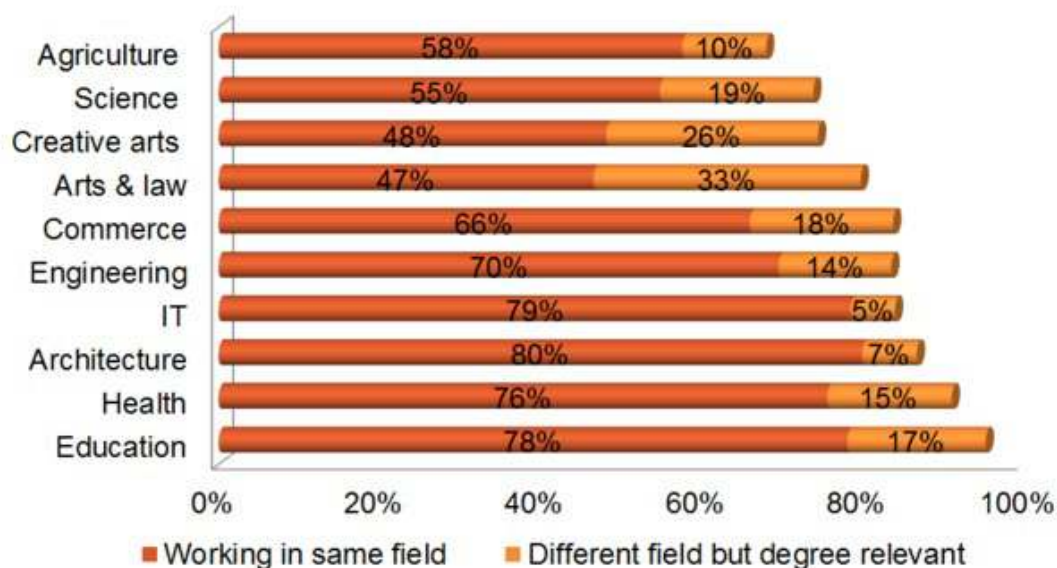
Three years on from the GDS, the [Beyond Graduation Survey](#) shows that the job outlook of science graduates improves with time. After a slow start their employment rate is only slightly below average.

But this is not evidence of strong demand for specific scientific knowledge. Only 57% of science graduates say their qualification is important or a formal requirement for their job. It is the second lowest match between qualification and discipline.

The Australian Bureau of Statistics asks similar questions of the general population in its [Learning and Work survey](#). It asks respondents whether they work in the same field of study as their qualification, and if not whether they consider their degree "relevant" nonetheless.

I have combined the two to give an overall relevance ranking in the figure below.

Bachelor degree graduates, qualification relevance to current job, 2010-11



Source: ABS, Learning & Work, 2010-11

Note: Only includes people with bachelor degree as highest qualification

Science again is the second-worst performer. It beats creative arts on matching jobs and qualifications, but falls behind because science graduates in unmatched jobs are less likely to see their degree as relevant to their work. Only agriculture is behind science (in his latest speech Professor Chubb complains about falling student numbers in some agriculture sub-fields; these numbers might explain why).

The **2011 Census** contains rich detail about graduate employment at narrow field of study level. According to the ABS, professional and managerial jobs typically use the skills of graduates. With the exception of earth sciences, bachelor-level science graduates under-perform generally.

Science and maths skills are most likely to be relevant to employers when connected to specific vocations. Graduates with bachelor degrees in IT, engineering and health have higher rates of professional and managerial employment than graduates in the more general sciences, consistent with the self-reported matching and relevance found by the Learning and Work survey.



(Note: excludes those enrolled in education or not working.)

Employers do find use for science graduates with postgraduate qualifications. PhD-level professional and managerial employment rates typically exceed 90%. Using the Learning and Work relevance data, science improves from a degree with low job relevance to a middle-ranking discipline.

It is good that employers find use for these higher-level skills. But for young people considering a career, postgraduate study is a costly and time-consuming route into a good job. There are good positions available for people with their general interests and aptitudes from bachelor degrees in IT, engineering or health.

I do not want to discourage people with genuine passions for the pure sciences. But I have been concerned for several years that government promotion of science and science careers is sending a misleading signal to the student market.

Despite Professor Chubb's talent for finding a negative angle on science enrolments, over recent years [demand for science has boomed](#). Applications are up 40% since 2009, and offers by universities are up by nearly a third.

[Detailed enrolment data](#) lags well behind applications data. But from 2008 to 2011, less than 4% of science enrolment growth was in the earth sciences, the one narrow field with good employment prospects. More than 40% is in the biological sciences, the worst field for long-term employment.

Graduates from the first year of the science boom, 2009, are only in one of the outcomes surveys I have reported, the 2012 Graduate Destination Survey. They are there in much smaller numbers than will be graduating in future years, and already the signs are bad. Graduates in life sciences, maths, and chemistry had considerably more difficulty finding full-time jobs in 2012 than they had in 2011.

Nobody doubts that science and maths skills are important to Australia's future. In some specialised areas, employers might struggle to find suitable graduates. But no enrolment or employment data suggests that we are headed for general shortages of science and maths graduates.

The science applications boom may turn out to be a higher education bubble waiting to burst. If it does, thousands of intelligent and capable young people may be left with qualifications that hamper their ability to find meaningful and rewarding work.

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