

## Science Uptake in Fijian High Schools

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### Abstract

This paper examines the uptake of science subjects in Fiji's secondary schools. There are 16 examinable subjects at the 7th form level in Fiji; these are English, Mathematics, Economics, Chemistry, Accounting, Biology, Geography, Physics, Computer Studies, History, Agricultural Science, Home Economics, Introduction to Technology, Hindi, Fijian, and Urdu. Statistics show that while there has generally been a growth in enrolments in all subjects (except Urdu) over the period 1983-2012, there has been a decline in relative science (defined here as the aggregate of chemistry, biology and physics) enrolments from about 40% in the early 1980s to around 20% in the early 2010's.

### Introduction

The importance of Science in development is undisputed. No country can progress without adequate investment in science and technology. Investments in science and technology, however, can only be sustainable if there is a commensurate base of scientists. In small economies a major problem concerns the lack of opportunities for science graduates. Industries which are founded on exploiting science and technology, are often missing. Employment prospects for scientists, thus, gets confined to a limited number of areas, of which teaching is a predominant one. A major impact of this is that interest of parents and students in science education would be limited. This paper examines the enrolment trends in sciences in Fiji over the past 30 years, specifically from 1983 to 2012.

### Examinable Subjects

There are five broad clusters of subjects; these are Commerce, Sciences, Social Sciences, Languages, and Technology. In 2012, there were 16 examinable subjects available for students in Form 7. In terms of broad programme clusters, these were:

- *Compulsory Subjects*: English, and Mathematics
- *Commerce*: Accounting, and Economics
- *Science*: Chemistry, Biology, and Physics
- *Social Science*: Geography and History
- *Technology*: Computer Studies, Agricultural Science, Introduction to Technology, and Home Economics
- *Language*: Hindi, iTaukei, and Urdu.

Over the period under consideration, 6 subjects were dropped off; these are Technical Drawing/Design, Food Technology, Apparel & Design, Applied Mathematics, and Literature/English. Some of the subject content of each have been merged with others. Literature, for example, is part of English. Technical Drawing/Design has been transformed into Introduction to Technology, and Food Technology and Apparel & Design have been merged to form Home Economics.

### Science Stream

The typical science stream includes the two compulsory subjects along with Biology, Chemistry and Physics. In many schools during the 1980's and early 1990's, all science subjects were not offered. Thus, students would enrol in the compulsory subjects, one or two science subjects, and one or two of the other subjects. While the problem of lack of offer of the three science subjects in schools have almost disappeared, a notable number of students still continue to mix subjects. This is attributable to lack of or improper careers counseling at schools.

For the current purpose, enrolments in all science subjects are considered.

Science, like maths or economics, has a particular logical, theoretical, methodological and quantitative approach and reasoning. Even a subject like Biology, which in Fiji often was paired with

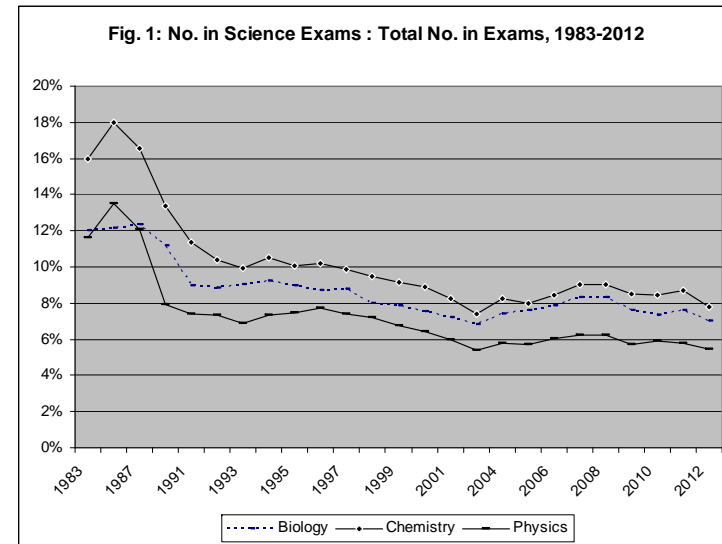
Geography, has the same attribute. This need not be the case for other subjects, particularly at the secondary school level.

Table 1 shows the percentage of students sitting for Form 7 exams in the 3 science subjects out of the total number of exams conducted each year, for the past 30 years.

	Biology	Chemistry	Physics	Total
1983	12%	16%	12%	40%
1984	12%	18%	14%	44%
1987	12%	17%	12%	41%
1990	11%	13%	8%	32%
1991	9%	11%	7%	28%
1992	9%	10%	7%	27%
1993	9%	10%	7%	26%
1994	9%	11%	7%	27%
1995	9%	10%	7%	27%
1996	9%	10%	8%	27%
1997	9%	10%	7%	26%
1998	8%	9%	7%	25%
1999	8%	9%	7%	24%
2000	8%	9%	6%	23%
2001	7%	8%	6%	21%
2002	7%	7%	5%	20%
2004	7%	8%	6%	21%
2005	8%	8%	6%	21%
2006	8%	8%	6%	22%
2007	8%	9%	6%	24%
2008	8%	9%	6%	24%
2009	8%	9%	6%	22%
2010	7%	8%	6%	22%
2011	8%	9%	6%	22%
2012	7%	8%	5%	20%

\* Source: Ministry of Education, Annual Reports. The annual reports for the years not shown could not be located. 2005 raw figures had a small unexplained spike; that has not been adjusted here.

Figure one shows the declining trend in the number of students appearing for each of the 3 science examinations as a ratio of total exam units over the past 30 years.



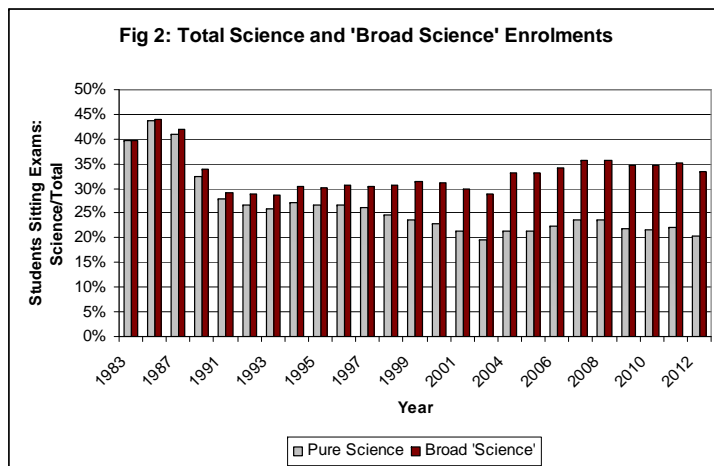
One may note the slight upward trend in the percentage of students sitting science exams around 2004-5. The trend, however, is reversed after 2010.

In 1992, the Ministry introduced *Agricultural Science* at the Form 7 level; its uptake increased steadily initially, and jumped by 20% in 2002. Likewise, the Ministry introduced *Introduction to Technology, Food Technology, and Apparel & Design* at the Form 7 level in 1995, merging the last two into *Home Economics* in 2010. It followed this by introducing *Computer Studies* in 1998.

It is likely that some pure science students would have been attracted to these subjects. Many of these subjects could be clustered with 'science'. *Biology, Food Technology, Apparel & Design*, for example, may have attracted some students who would have been aiming for teacher training careers. Likewise, *Physics, Computer*

*Science*, and *Introduction to Technology* may have attracted students aiming for technical areas in their tertiary studies; these students may have dropped *Chemistry* and/or *Biology*.

Enrolments in *Agricultural Science*, *Introduction to Technology*, *Technical Drawing/Design*, *Food Technology*, *Apparel & Design*, *Home Economics*, and *Computer Studies*, may have drawn some students from pure science. Labelling these subjects and pure sciences together as 'broad sciences' - assuming that these subjects require some science background - we can compare broad science uptake against pure sciences; this is done in Figure 2.



While adding science related subjects to pure science show a slight recovery in the enrolment trend from 2004, overall, the trend again reverses from 2008 after which even the ratio of students sitting for broad sciences over total exam units began declining.

### Implications and Concluding Remarks

Science is an important subject for a number of post-secondary school programmes, and professions/careers. These are required for medicine and allied careers, nursing, science teacher training, engi-

neering, technology, technical education, agriculture, forestry, and fisheries. All these areas - except as of now teacher training - are in high demand in Fiji; many of these areas fall in the highest priority areas for Fiji's developmental needs.

A decline in science uptake has an immediate impact on the number of students who would qualify for the programmes which are on Government's priority listing. In the medium term, this would mean fewer graduates in technical areas than what Fiji would need. In the longer term, the relatively declining interest in science would have drastic impact on Fiji's ability to move with technology in a rapidly globalising world.

### References

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