Case Study: La Trobe University (Melbourne, Australia)

La Trobe University is a multi-campus university based in the state of Victoria, Australia with approximately 30,000 students enrolled across a range of undergraduate and postgraduate programs. Established in 1967, La Trobe is a member of the Innovative Research Universities, a consortium of seven universities across Australia.

Science at La Trobe: The Faculty of Science, Technology and Engineering offers a Bachelor of Science (BSc) program with 20 majors. The program has an average annual in-take of 250 students. The entry requirement for the BSc at the Melbourne campus is an ATAR of 65 (admissions ranking from 0-100, with 100 the highest rank). The Faculty of Science, Technology and Engineering also offers a Bachelor of Biological Sciences (BBiolSc) program with 11 majors. The program has an average annual in-take of 600 students. The entry requirement for the BBiolSc at the Melbourne campus is an ATAR of 51. The Faculty offers an extensive range of named degrees in science, technology and engineering, however these do not form part of this case study.

Mathematics requirements for entry into Science: The BSc requires Mathematical Methods (Calculus-based high school subject).The BBiolSc has no mathematics prerequisite from secondary school.

The La Trobe case study focuses on majors in the Biological Sciences (in either the BSc or the BBiolSc), and is framed around a model of educational change based on the work of Michael Fullan.

Initiation of Change

"Who prompted need for QS in science and why?"

At the institutional level the Design for Learning project spawned university wide review of curriculum.

This provided the opportunity for a review of both the BSc and BBiolSc degrees, which prompted discussion by academics in the biological sciences regarding the skills expected of graduates and documentation of the often weak quantitative skills (QS) with which students entered third year units in these disciplines. Similarly there was a perception amongst staff that the standard of QS in the first year cohort was dropping.

Vision for Change

"What do QS in Science look like?"

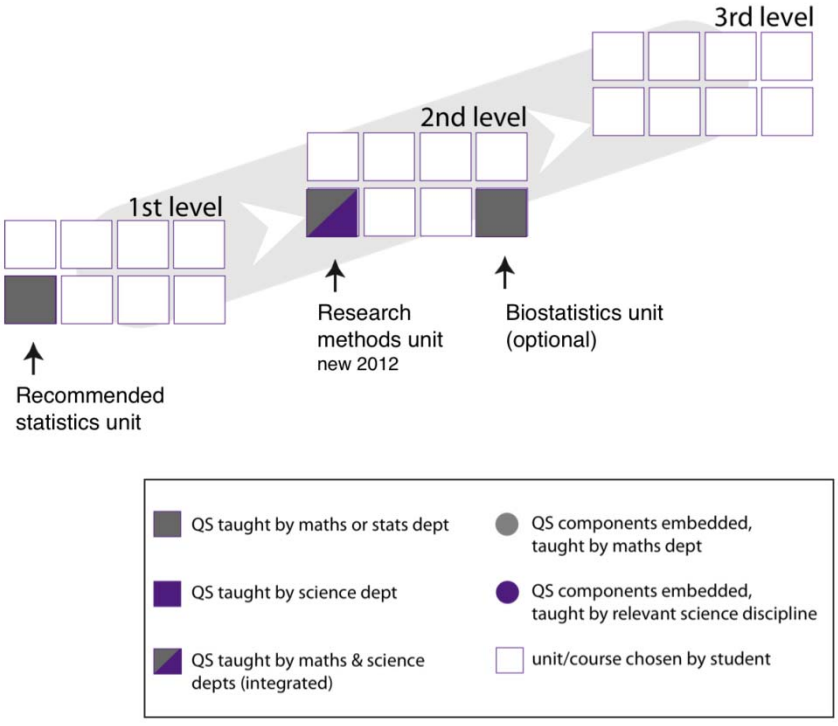
La Trobe University has institution-wide graduate capabilities.

The Faculty of Science, Engineering and Technology has developed its own set of graduate capabilities for programs in science with quantitative literacy listed as one of four such capabilities. Within the Biological Sciences departments, QS requirements of graduates are being mapped.

Implementing for Change

"How is need for QS in Science translated into practice?"

The Biological Science majors can build on the statistical knowledge provided in level one units. However, the flexible nature of the degree program, especially in the second and third years enables students to mix and match, making it difficult to identify the "QS pathways" within the majors.



Curriculum Structure for building QS: The above diagram shows the 'critical QS pathway', highlighting the requisite units for the major.

1st level features a choice of recommended statistics units.STA1DCT, Data-based Critical Thinking, is an option for students without high school mathematics. The second unit is the revised STA1LS, Statistics for Life Sciences, and is an option for students regardless of mathematics background.

2nd level features (from 2012) a new unit, BIO2POS: Practice of Science, that will be co-taught by a statistician and ecologist and focused on research methods. It is compulsory for zoology, genetics and botany students. The unit STA2ABS, Applied Biostatistics, is also an option for students in the biological sciences.

3rd level features QS components are embedded in a range of units such as ZOO3EPA, ZOO3EPB, BOT3FEB and BOT3ESE.

Extra Curricular QS: A current Faculty pilot project features a Curriculum Fellow from Mathematics who is collaborating with colleagues across first year Biology, Chemistry and Physics to develop a diagnostic mathematics test and subsequent program to support students with weak mathematical knowledge. The pilot project aims to contextualise the mathematical knowledge within the science disciplinary context to draw explicit links between the mathematics and its applications in the science units.

Interdisciplinary QS: The current curricular reviews across Science have sparked cross discipline conversations. However, there are no formal structures or mechanisms that facilitate or promote cross-departmental planning around building QS.

Evaluating the Change

"How effective has the change to build QS in Science been?"

Institutional standardized procedures are in place at La Trobe University, including general unit surveys.

Evidence of QS learning outcomes: To date there has been no formal evaluation on the effectiveness of the changes in the curriculum to build QS.

Thanks to the following people at La Trobe University for collaborating with us to document this Case Study.

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If you have any questions, comments or thoughts on the La Trobe University Case Study, you are welcome to contact them directly.

This case study is up to date as of September 2011. The interviews to gather this data were conducted in May 2011.