QS Quantitative Skills in Science
Curriculum models for the future

Project Team

The University Of Queensland
AUSTRALIA

PURDUE UNIVERSITY

uclan

University of Western Sydney

UNIVERSITY OF MARYLAND

JAMES COOK UNIVERSITY
AUSTRALIA

AUSTRALIAN LEARNING & TEACHING COUNCIL

QS Quantitative Skills in Science *Curriculum models for the future*

Why are quantitative skills (QS) in Science important?

Concerns

- Secondary students lacking skills and confidence in quantitative skills
- How to embed QS in science curricula to develop these in students?
- Technology - driven society demanding quantitative literate graduates
- World-wide problem

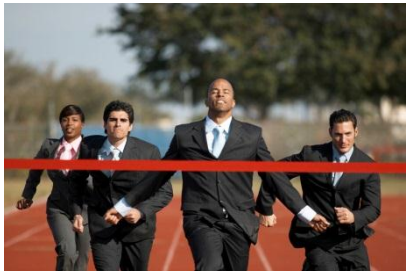
Definition: QS are defined as the ability to apply mathematical and statistical thinking and reasoning within a given external context, in this case, Science

In the beginning ……..

and throughout the project we held

meetings 

to plan 

on track 

(project manager)

QS Quantitative Skills in Science *Curriculum models for the future*

What we were hoping to do ….

Outcome 1: Curriculum Structures	International benchmarking of undergraduate science curriculum structures that effectively integrate QS.
Outcome 2: Model for Curricula Change in Higher Education	A model for Institutional curriculum change processes based on four phases: need, vision, implementation and evaluation.
Outcome 3: Framework for Academic Change information	A framework for cross-disciplinary academic collaboration, supporting adaption, adoption and evaluation of educational approaches/resources.
Outcome 4: High Profile Dissemination Activities	A symposium in 2012, a special issue with a high rated journal, and the development of an interdisciplinary Australian 'QS in Science' network.

QS Quantitative Skills in Science *Curriculum models for the future*

How did we do this ….

Outcomes 1 and 2

- a case study approach was used – 13 case studies from 11 universities in Australia and 2 from overseas.

Outcome 3

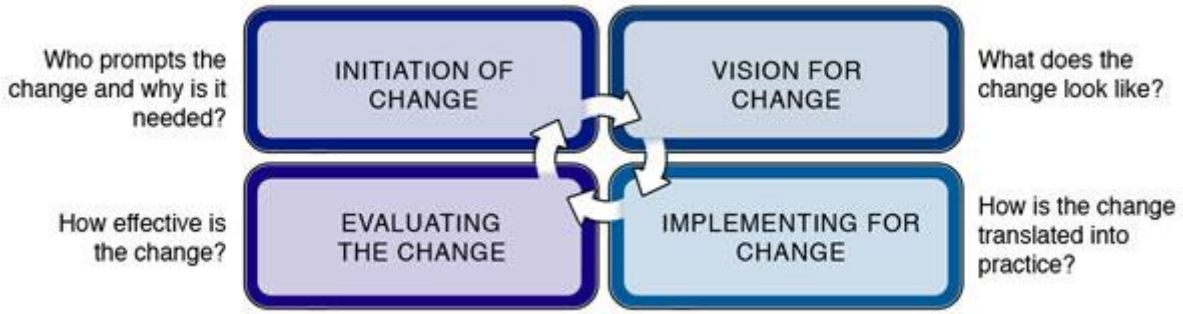
- two institutions (UWS and UQ) have started on projects - both are yet to be finalised

Outcome 4

- CUBEnet-VIBEnet-*QS in Science* symposium *Game on!: Preparing our biology and biomedical graduates for the future,* December 19th 2012
- *Quantitative skills in science: integrating mathematics and statistics in undergraduate science curricula* a Special Issue in the *International Journal of Mathematics Education in Science and* Technology (*iJMEST).* Publication date is September 2013

Model for Curricular Change

Fullan's work (1983, 2007)



QS Quantitative Skills in Science
Curriculum models for the future

What we found…

- Lack of shared meaning for QS
- Lack of communication about QS across the disciplines
- Lack of curricula leadership for QS
- Lack of evaluation and evidencing of QS curricular learning outcomes
- Lack of QS reform efforts when organisational restructuring is occurring
- Lack of connection between attributes, outcomes and standards
- Lack of knowledge and adaption of QS educational resources

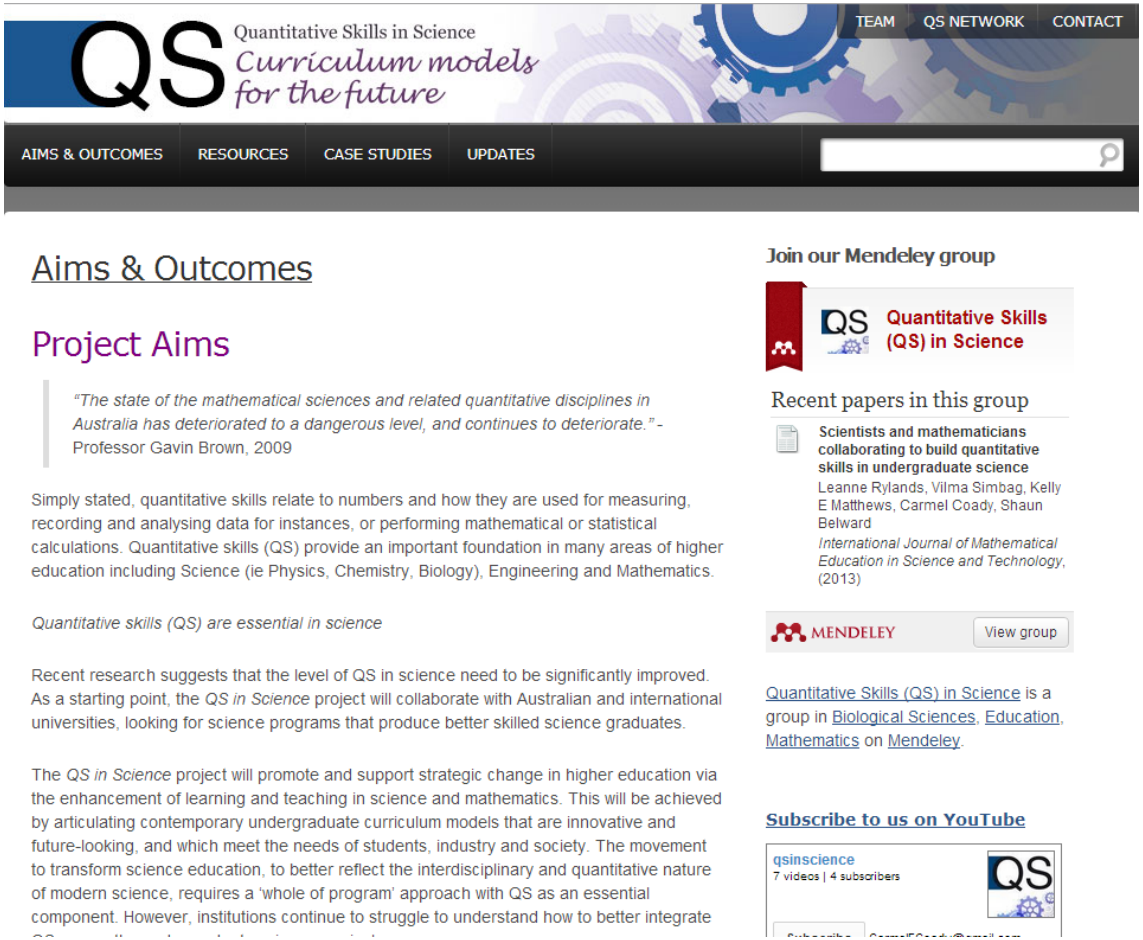
QS Quantitative Skills in Science *Curriculum models for the future*

Our recommendations …

1. Formulate a shared meaning for QS in science
2. Development and maintenance of effective communication channels across and within disciplines
3. Fostering of curricular leadership in QS
4. Development of an evaluation framework for QS

QS Quantitative Skills in Science *Curriculum models for the future*

Resources developed ….

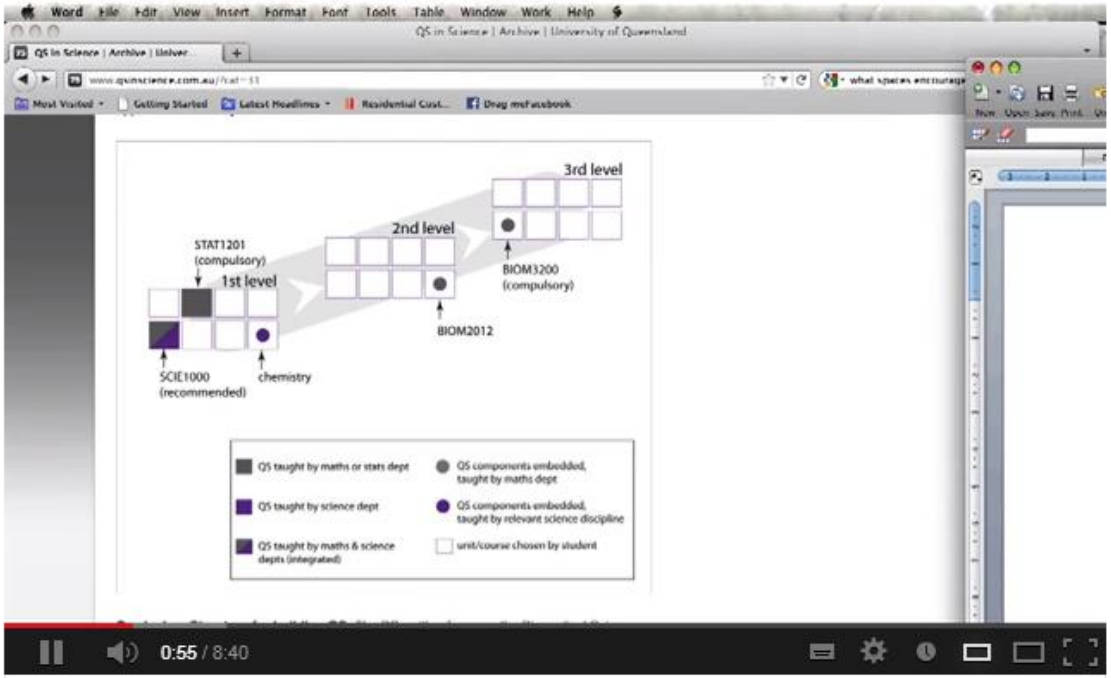


QS Quantitative Skills in Science
Curriculum models for the future

YouTube AU

Upload

GUIDE



QS Curriculum Mapping Tool

MENDELEY

Sign up & Download | Sign in

Get Mendeley | What is Mendeley? | Papers | Groups

Groups | Search...

Quantitative Skills (QS) in Science

In this group: **47** papers · **24** members

Join this group | Share

Mendeley | Biological Sciences | Groups

Overview
Papers
Members

Group activity

Vilma Amante Simbag added a document to this group
Scientists and mathematicians collaborating to build quantitative skills in undergraduate science
17th April

Vilma Amante Simbag added documents to this group
Impact of interdisciplinary undergraduate research in mathematics and biology on the development of a new course integrating five STEM disciplines
Comprehensive curriculum reform in higher education:collaborative engagement of faculty and administrators
Science and Mathematics: A relationship in need of counselling?
A new professionalism for higher education? (
Margaret L.
16th April

Vilma Amante Simbag added a document to this group

About this group

Owned by Kelly Matthews
Lecturer
Education

sharing references on the integration of mathematics and statistics in undergraduate science education. in association with the QS in Science project.

www.qsinscience.com.au

28 members

Biological Sciences | Education | Mathematics

QS Quantitative Skills in Science
Curriculum models for the future

QS Quantitative Skills in Science
Curriculum models for the future

QS Phase 2 Project
… advancing the QS agenda

[QS in Science Report]