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Enhancing undergraduate engagement through research and inquiry

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ALTC National Teaching Fellow
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Outline

- ❁ Why engage undergraduates in research and inquiry?
- ❁ My ALTC National Teaching Fellowship
- ❁ Practical implications
- ❁ How to move this undergraduate research agenda forward

Some like it cold

Surviving change
in the Arctic



Human
Rights
a time
terror



Fear

The
sugar
trap



Drowning in
plastic

Living in a toxic world



Violence



WESTERN
UNDER S
THOMAS FRIEDMAN
JOURNAL
RAILWAY
END OF THE



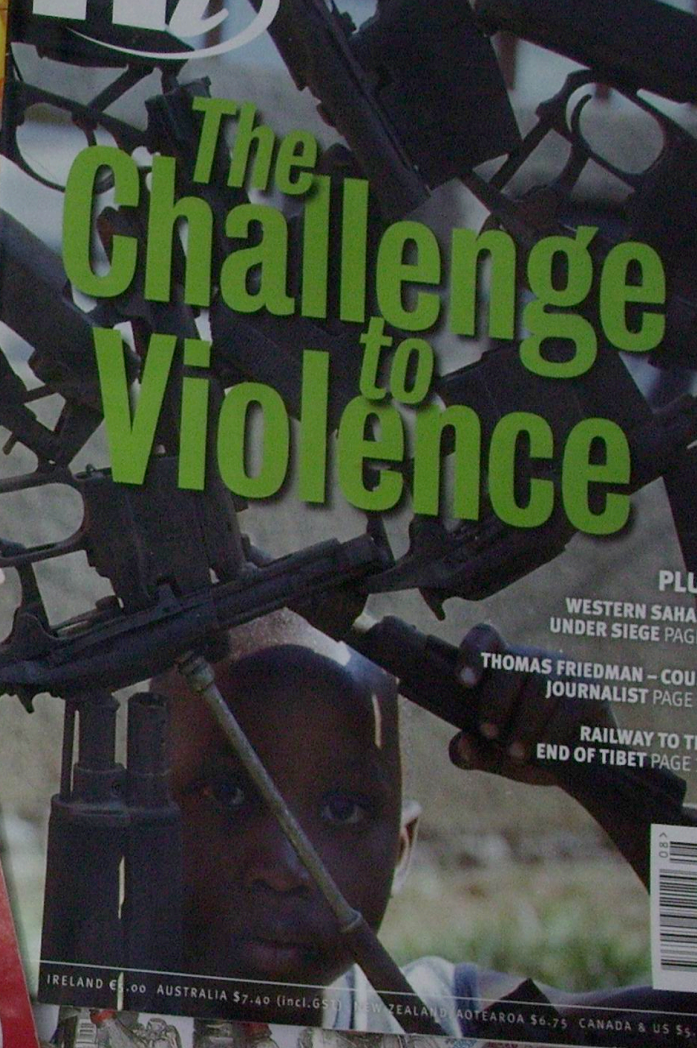


Ben Gulak: Uno cycle



Rafael Smith: The Über Shelter

1.  PLACE SHELTER IN DESIRED LOCATION
2.  OPEN FROM ENCLOSED POSITION TO BASIC STRUCTURE
3.  SET FLOOR, ATTACH JACK STANDS AND LEVEL THE STRUCTURE
4.  SECURE I-BEAM AND SHELTER FLOOR INTO LOCKED POSITION
5.  ATTACH FABRIC SUPPORT RODS AND MODULAR REINFORCEMENT
6.  ATTACH INNER FABRIC LINING. THIS INCLUDES AN ALREADY INTERWOVEN MOSQUITO NET
7.  ATTACH OUTER FLY LAYER OF FABRIC. THIS LAYER HELPS SHIELD FROM THE SUN AND PROTECT FROM THE ELEMENTS
8.  SECURE TOP FLOORING TO BOTTOM STRUCTURE AND REPEAT THE PROCESS





National documents

- ✿ "Public funding should be directed only to those institutions that: encourage both students and staff to engage in critical enquiry...." (Bradley Review Report page 7)
- ✿ "Self-fulfilment, personal development and the pursuit of knowledge as an end in itself; the provision of skills of critical analysis and independent thought to support full participation in a civil society; the preparation of leaders for diverse, global environments; and support for a highly productive and professional labour force should be key features of Australian higher education." (Transforming Australia's Higher Education System)

Integrating research and teaching to enhance student engagement

- ✿ Positive impact on retention and satisfaction
- ✿ Students learn what research is and how to do it
- ✿ They develop a sense of professional identity
- ✿ Increases in self confidence
- ✿ Develops of advanced technical skills, problem solving, creative thinking and communication skills e. g. giving presentations
- ✿ Develops independent work habits
- ✿ Enhances teamwork and collaboration
- ✿ Ability to deal with ambiguity and obstacles
- ✿ Clarifies career goals

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Aim of my Fellowship

To enhance student engagement in learning through supporting the development in Australia of undergraduate research and inquiry

Identifying national needs

✿ Study tours

✿ National documents

✿ Undergraduate research

✿ Key personnel

Intended outcomes

- ✿ Identify national needs
- ✿ Enhance debates concerning engagement of undergraduate students in research and inquiry
- ✿ Establish a set of readily available resources and protocols to bridge gaps between current and future practice
- ✿ Disseminate these through a [website](#) and discussions
- ✿ Provide the foundation for the establishment of a national centre for the integration of research, teaching and learning

Definition of undergraduate research and inquiry

An inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline.

(Beckman & Hensel, 2007)

Definition of undergraduate research and inquiry

[An] inquiry or investigation or a research-based activity conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline and/or to understanding.
(following Beckman & Hensel, 2007)

Tensions in implementing undergraduate research and inquiry

Student, process
centered



Outcome, product
centered

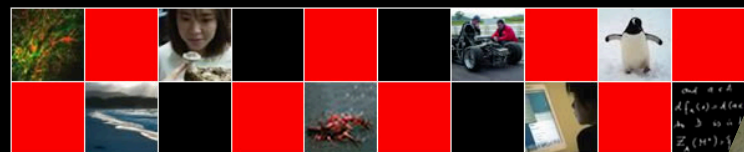
Reinvention

a Journal of Undergraduate Research

Reinvention: a Journal of Undergraduate Research

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Reinvention: a Journal of Undergraduate Research has now reached its first birthday. In our first year we have published our launch issue and our first volume. We have grown from accepting papers from the Reinvention Centre's two host institutions, to accepting papers from around the world and the response we have had from undergraduate students and academic staff alike has been better than we could have predicted. Our website has received over 40,000 hits in this first year alone with 6,500 individual visitors to the site and we hope to build on this success in our second year.

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neXus journal of undergraduate science engineering and technology

[Home](#)[Contact us](#)[Volume 1 2004](#)[Volume 2 2005](#)[Volume 3 2006](#)[Submission details](#)

Nexus: journal of undergraduate science, engineering and technology of integrating and promoting the teaching/research nexus within the University of Tasmania.

The journal highlights linkages between high-level learning and research publication. It also provides a showcase for the research undertaken by students from the disciplines of science, engineering, and technology.

It is published annually.

Volume 3 is currently being laid out for printing and will be published in the preparation of Volume 4 of Nexus: journal of undergraduate science, engineering and technology.

Currently

We are calling for academic staff, able to nominate and mentor students willing to provide a mentoring role. The work needs to be:

- of a high quality;
- written in semester 2 2006, semester 2 2007 or semester 2 2008;
- able to be **formatted** as either a research paper or a review article.

Mentors are usually Unit Coordinator, but can be any academic staff member. The mentor is to provide guidance to the student throughout the submission process. It is not envisioned that the student will be required to submit a paper to the journal.

Initially, we need Unit Coordinators to simply nominate students.

Timetable

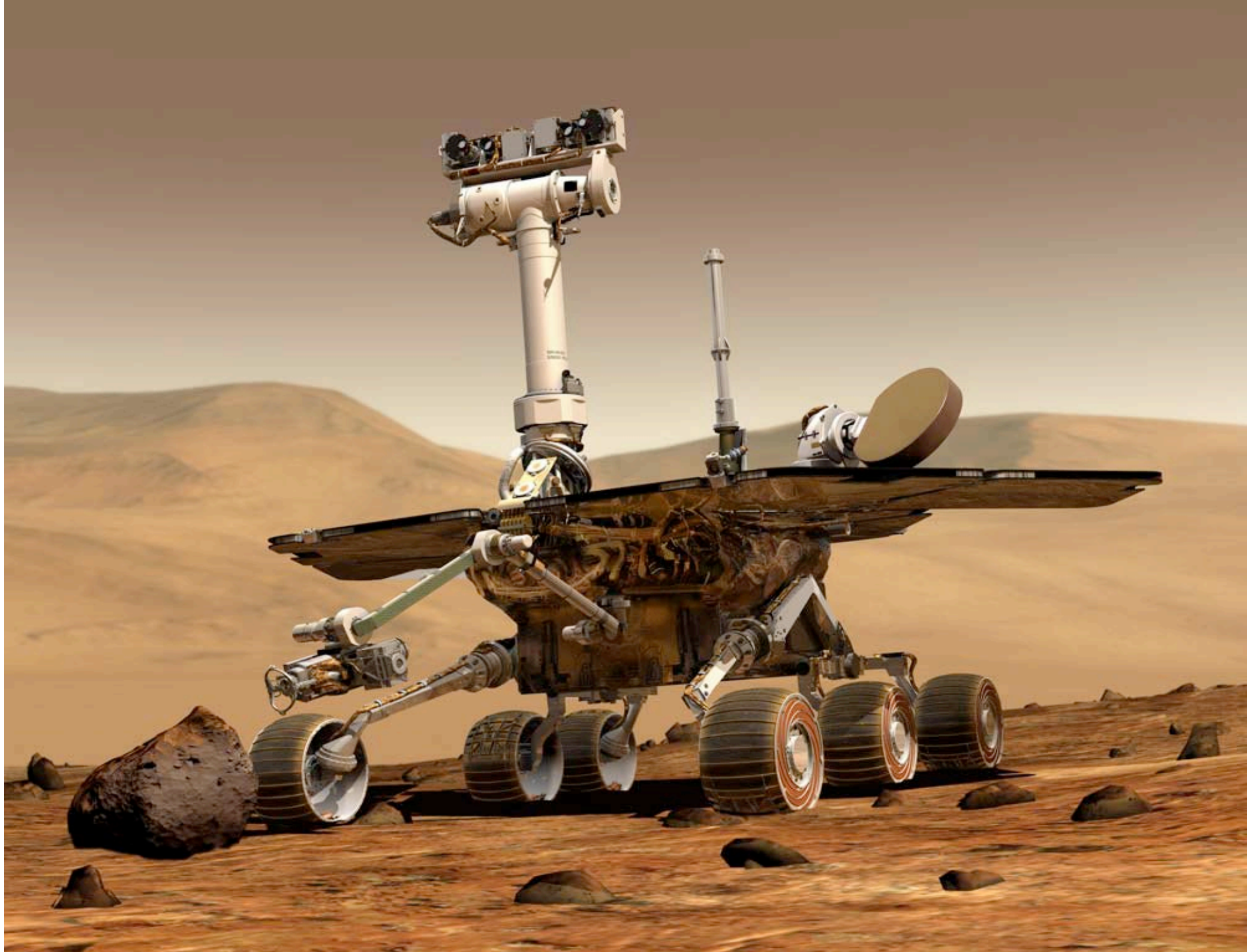
The following dates punctuate the timeline for Volume 4's release:

- June 8th (or earlier) — unit coordinators to advise the Editorial Committee

ERGO
WEBER STATE UNIVERSITY
UNDERGRADUATE RESEARCH JOURNAL
VOLUME 3 • SPRING 2009

WEBER
STATE
UNIVERSITY
ERGO
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RESEARCH
JOURNAL

VOLUME 2 • SPRING 2008



Tensions in implementing undergraduate research and inquiry

Student, process
centered

Student initiated

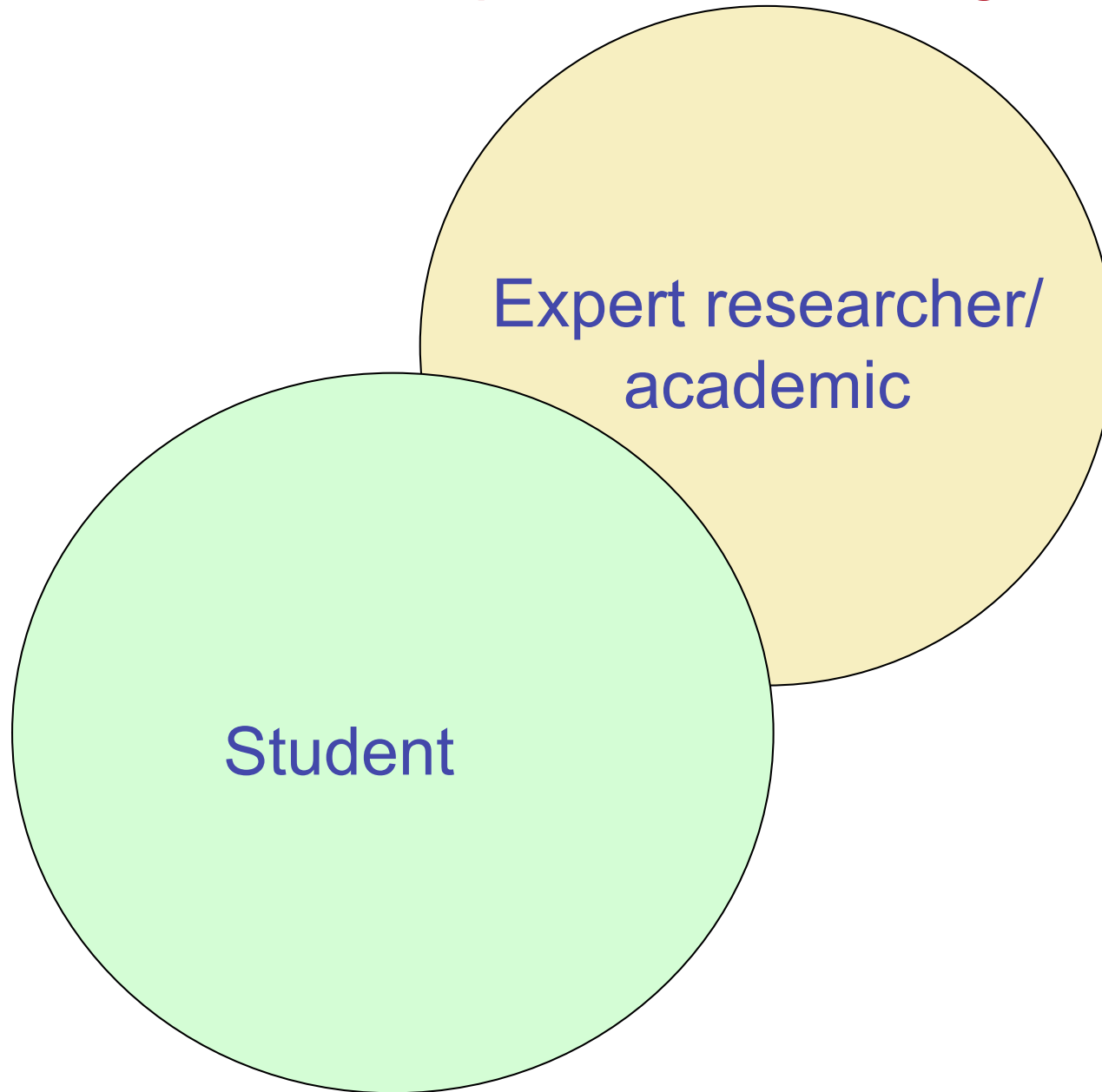


Outcome, product
centered

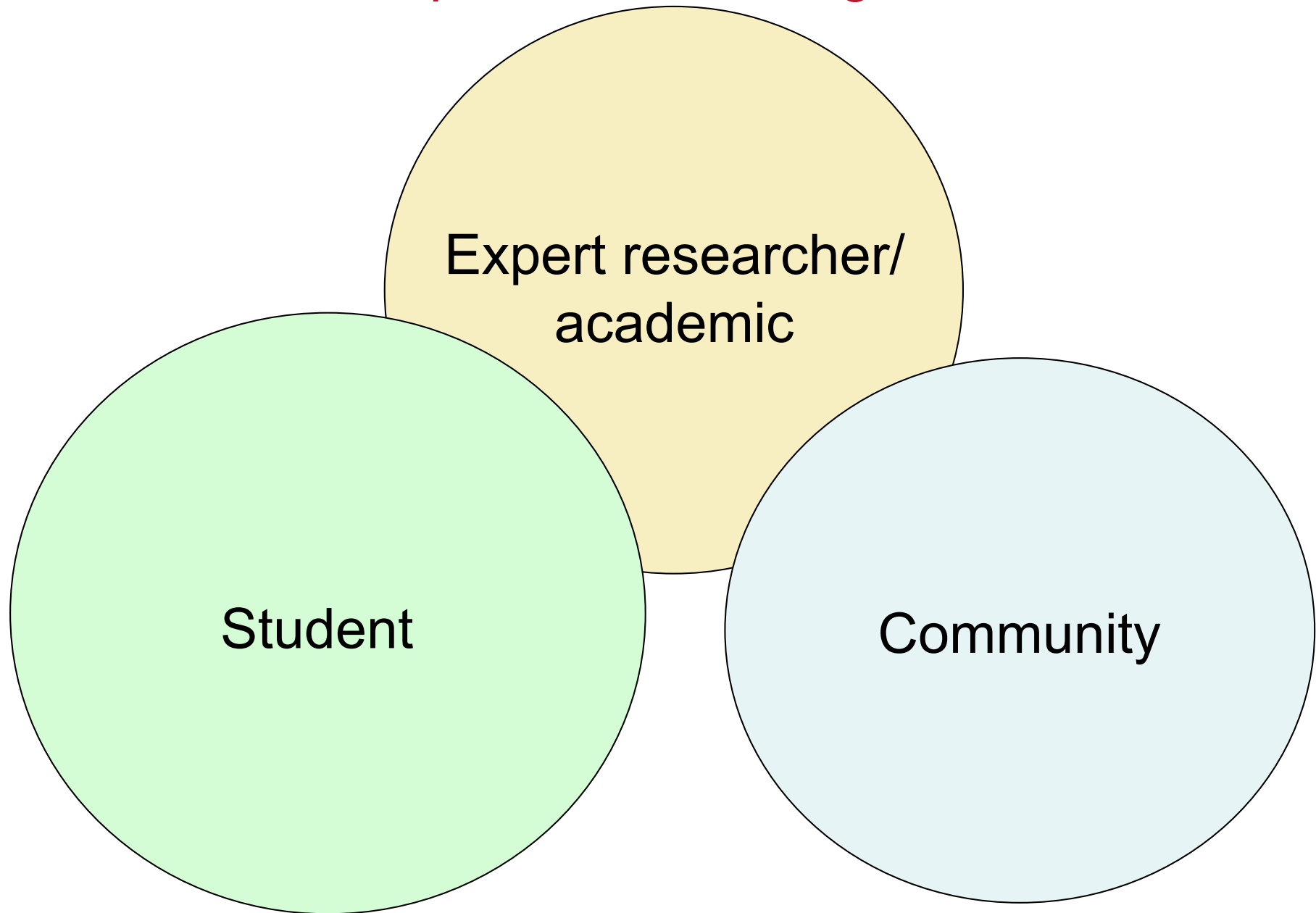


Faculty initiated

Who defines the question in undergraduate research?



Who defines the question in undergraduate research?



Tensions in implementing undergraduate research and inquiry

Student, process
centered

Student initiated

Honors students



Outcome, product
centered



Faculty initiated



All students

[Link](#)

Tensions in implementing undergraduate research and inquiry

Student, process
centered



Outcome, product
centered

Student initiated



Faculty initiated

Honors students



All students

Curriculum based



Co-curricular







Research in the curriculum can be carried out

1. Assignments and tutorials within specific subjects
2. Whole courses or programs, for example across year levels
3. At whole of degree level e.g. PBL, IBL









What needs to change?

- ❁ Course organisation structures: from individuals to course teams
- ❁ Module flexibility
- ❁ Vertical integration
- ❁ Ideas about research and who is capable of doing it
- ❁ Teaching spaces

Tensions in implementing undergraduate research and inquiry

Student, process centered		Outcome, product centered
Student initiated		Faculty initiated
Honors students		All students
Curriculum based		Co-curricular
Collaborative		Individual
Original to student		Original to discipline

Tensions in implementing undergraduate research and inquiry

Student, process centered		Outcome, product centered
Student initiated		Faculty initiated
Honors students		All students
Curriculum based		Co-curricular
Collaborative		Individual
Original to student		Original to discipline
Interdisciplinary		Discipline based
Campus/community audience		Professional audience

SOUR08
SOUTHERN CALIFORNIA CONFERENCE ON UNDERGRADUATE RESEARCH
November 22, 2008
California State Polytechnic University
Pomona

22ND ANNUAL
CALIFORNIA STATE UNIVERSITY
STUDENT RESEARCH COMPETITION
CALIFORNIA STATE UNIVERSITY, EAST BAY
MAY 2 - 3, 2008
SRS
STUDENT RESEARCH SYMPOSIUM
2009 STUDENT
RESEARCH
SYMPOSIUM
Celebrating the achievements
of SDSU student research,
scholarship, and creative activity

Weber State University
Sixth Annual Undergraduate Research
Symposium & Celebration

California State University
Student Research Competition
UNIVERSITY OF CALIFORNIA, SANTA BARBARA
23rd ANNUAL
UCSB 2009 Undergraduate Research Colloquium
fifth annual undergraduate research
symposium & celebration
abstracts
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Celebrating the achievements of
San Diego State University students
in research, scholarship & creative activity
February 29 & March 1, 2008

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Concluding key issues

- ❁ Importance of undergraduate research as a beginning preparation for research careers
- ❁ “The path I am setting out...raises the expectations we have of our young people and their parents and of our great institutions. It asks them to be bolder and more ambitious in what can and should be achieved” (Hon Julia Gillard MP 4th March 2009)



References used in this presentation

- ✿ Picture taken by Angela Brew of various covers of the magazine “New internationalist.”
<http://www.newint.org/>
- ✿ Picture of Uno cycle by Ben Gulak
<http://www.nytimes.com/2009/01/04/education/edlife/ideas-Uno-t.html?ref=edlife> New York Times article: An Easy Ride Around the Crowd of Old Polluters
- ✿ Uber shelter by Raphael Smith:
<http://www.nytimes.com/2009/01/04/education/edlife/ideas-ubershelter-t.html?ref=edlife>
- ✿ Question mark picture: unknown internet source
- ✿ Hunter, A-B., Laursen, S.L., Melton, E., Seymour, E., & Thiry, H. (forthcoming 2010). *Undergraduate Research in the Sciences: Engaging students in real science*. New York Jossey-Bass.
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- ✿ Undergraduate research journals including: Reinvention: the journal of undergraduate research, University of Warwick, UK, (<http://www2.warwick.ac.uk/fac/soc/sociology/rsw/undergrad/cetl/ejournal/>) Nexus: journal of undergraduate science, engineering and technology (<http://www.utas.edu.au/scieng/nexus/>) and Ergo, Weber State University, USA.
- ✿ Picture of Mars Rover: From Jet Propulsion Laboratory, California Institute of Technology: mars.jpl.nasa.gov/.../20031104a.html
- ✿ Picture of booklets from various undergraduate conferences and colloquia taken by Angela Brew
- ✿ Gillard, J. (2009). Quotation from Speech 4th March.