



Undergraduate Student Research Skill Development: 12 Disciplines, 5 Universities, 1 Framework

A Seminar for USQ
Dr John Willison,
University of Adelaide

Disciplines Involved in Trialling RSD

<http://www.adelaide.edu.au/clpd/rsd/framework/>

- Business (Melbourne and Monash)
- Dentistry/ Oral Health, Electronic Engineering, Introduction to Academic Learning for International Students, Medical Science, Nursing, Petroleum Engineering, Academic Development (Uni of Adelaide)
- Psychology (Macquarie)
- Introduction to Tertiary Learning (University of South Australia)
- *Impending*: Chemical Engineering and Computing Science
- *In train*: VU (Engineering), USQ (Multiple)

Why Research Skill Development (RSD)?

- Undergraduate research experiences are claimed to increase student motivation, satisfaction, understanding of content, progression to, and completion of HDR, and to reduce attrition and plagiarism ... but ...
- 'Without modeling the practice of [.....] at a higher level of thinking, students continue to practice investigative [.....] at the introductory level, even though their exposure to [.....] content is considerably richer with each [.....] course they take.'
(Chaplin, 2003 p.238)

Facets associated with research processes

In researching, students:

- embark on an inquiry and so determine a need for knowledge/understanding
- find/generate needed information/data using appropriate methodology
- critically evaluate information/data and the process to find/generate
- organise information collected/generated
- synthesise and analyse and apply new knowledge
- communicate knowledge and the processes used to generate it, with an awareness of ethical, social and cultural issues.

(Willison & O'Regan, 2007; based on Bundy, 2004).

Levels of Student Autonomy

Facets of research inquiry 1. The student embarks on inquiry and so determines a need for knowledge/understanding 2. The student finds/generates needed information 3. The student critically evaluates information/data and the process to find/generate 4. The student organises information collected/generated 5. The student synthesises and analyses and apply new knowledge 6. The student communicates knowledge and understanding and the process used to generate them.	Level I Student researches at the level of a closed inquiry and requires a high degree of structure/guidance.
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Level I

Students research at the level of a closed inquiry and require a high degree of structure/guidance

<http://www.adelaide.edu.au/clpd/rsd/>

Levels of Student Autonomy

Facets of research inquiry 1. The student embarks on inquiry and so determines a need for knowledge/understanding 2. The student finds/generates needed information 3. The student critically evaluates information/data and the process to find/generate 4. The student organises information collected/generated 5. The student synthesises and analyses new knowledge 6. The student communicates knowledge and understanding and the process used to generate them.	Level I Student researches at the level of a closed inquiry and requires a high degree of structure/guidance.	Level II Student researches at the level of a closed inquiry and requires some structure/guidance.
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Level II

Students research at the level of a closed inquiry and requires some structure/guidance

<http://www.adelaide.edu.au/clpd/rsd/cells/a/a2.html>

Levels of Student Autonomy

<p>Facets of research inquiry</p> <ol style="list-style-type: none"> 1. The student embarks on inquiry and so determines a need for knowledge/understanding 2. The student finds/generates needed information 3. The student critically evaluates information/data and the process to find/generate 4. The student organises information collected/generated 5. The student synthesises and analyses new knowledge 6. The student communicates knowledge and understanding and the process used to generate them. 	<p>Level I</p> <p>Student researches at the level of a closed inquiry and requires a high degree of structure/guidance</p>	<p>Level II</p> <p>Student researches at the level of a closed inquiry and requires some structure/guidance</p>	<p>Level III</p> <p>Student researches independently at the level of a closed inquiry</p>
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Level III

Students research independently at the level of a closed inquiry

<http://www.adelaide.edu.au/clpd/rsd/cells/a/a3.html>

Levels of Student Autonomy

<p>Facets of research inquiry</p> <ol style="list-style-type: none"> 1. The student embarks on inquiry and so determines a need for knowledge/understanding 2. The student finds/generates needed information 3. The student critically evaluates information/data and the process to find/generate 4. The student organises information collected/generated 5. The student synthesises and analyses new knowledge 6. The student communicates knowledge and understanding and the process used to generate them. 	<p>Level I</p> <p>Student researches at the level of a closed inquiry and requires a high degree of structure/guidance</p>	<p>Level II</p> <p>Student researches at the level of a closed inquiry and requires some structure/guidance</p>	<p>Level III</p> <p>Student researches independently at the level of a closed inquiry</p>	<p>Level IV</p> <p>Student researches at the level of an open inquiry within structured guidelines</p>
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Level IV

Students research at the level of an open enquiry within structured guidelines

<http://www.adelaide.edu.au/clpd/rsd/cells/a/a4.html>

Levels of Student Autonomy

<p>Facets of research inquiry</p> <ol style="list-style-type: none"> 1. The student embarks on inquiry and so determines a need for knowledge/understanding 2. The student finds/generates needed information 3. The student critically evaluates information/data and the process to find/generate 4. The student organises information collected/generated 5. The student synthesises and analyses new knowledge 6. The student communicates knowledge and understanding and the process used to generate them. 	<p>Level I</p> <p>Student researches at the level of a closed inquiry and requires a high degree of structure/guidance</p>	<p>Level II</p> <p>Student researches at the level of a closed inquiry and requires some structure/guidance</p>	<p>Level III</p> <p>Student researches independently at the level of a closed inquiry</p>	<p>Level IV</p> <p>Student researches at the level of an open inquiry within structured guidelines</p>	<p>Level V</p> <p>Student researches at the level of an open inquiry within self-determined guidelines</p>
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Level V

Students research at the level of an open inquiry within self-determined guidelines

RSD Framework

- Discuss the RSD in small groups: write down a comment or question to throw out to the whole group
- Is 'obvious'
- May provide the Big Picture and/or help colour in the details for coordinators, lecturers, tutors, and especially students
- Informs assessment-first curriculum redesign
- Same 'facets' for multiple assessments, various levels
- Explicit & Transparent assessment criteria
- Coherent & Incremental skill development
- Revisited & (potentially) Cyclic Conceptual Framework

Research Skill Development in Curriculum Design and Assessment

- In 12 Disciplines so far, changes that lectures have made are small
- Lecturers take existing assessment, and rework the marking criteria according to the RSD
- Use analogous criteria eg Oral Health used Business
- Some missing facets e.g. 'evaluate', are incorporated
- Diagnostic Assessments have been changed or added
- Otherwise, the nature of assessments is unchanged
- The focus of the course is either renewed or clarified
- *Explicit* nature of RSD changes curriculum

Application of RSD Framework for Learning and Teaching

Applications of RSD Framework: Semester 1 RSD Tasks

<p>Literature-Based</p> <ol style="list-style-type: none"> 1. RSD Diagnostic <ul style="list-style-type: none"> - O-week: synthesis & integration of information, structured note taking 2. Lit RSD Task 1 <ul style="list-style-type: none"> - Early Sem 1: above (advanced) 3. Lit RSD Task 2 <ul style="list-style-type: none"> - Mid Sem 1: critical appraisal of scientific writing 4. Lit RSD Task 3 <ul style="list-style-type: none"> - Late Sem 1: source selection, information retrieval and referencing 	<p>Laboratory-Based</p> <ol style="list-style-type: none"> 1. Lab RSD Task 1 <ul style="list-style-type: none"> - Early Sem 1: microscope-based 2. Lab RSD Task 2 <ul style="list-style-type: none"> - Mid Sem 1: above (advanced) 3. Lab RSD Task 3 <ul style="list-style-type: none"> - Late Sem 1: correlate micro- and macro-structural features
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As RSD Tasks progress, students gradually build on skills introduced in earlier tasks & are given increased autonomy over task directions & outcomes

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Application of RSD Framework for Learning and Teaching

Applications of RSD Framework: Semester 2 RSD Tasks

Literature and Laboratory Based

- Lit/Lab RSD Task 1 (Population Analysis Report)**
 - **Early Sem 2:** all semester 1 skills, BUT students:
 - Construct their own aim/hypothesis
 - Collect their own data
 - Analyse/synthesise data
 - Identify limitations/biases of study design
- Lit/Lab RSD Task 2 (Mini-Symposium)**
 - **Mid Sem 2:** all above skills within group context

RSD Task Progression ↓

As RSD Tasks progress, students gradually build on skills introduced in earlier tasks & are given increased autonomy over task directions & outcomes

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Application of RSD Framework for Learning and Teaching

Results/Benefits

For Students

- **Caters for all students regardless of their initial or current ability**
 - Addresses and remediates gaps in skill base
 - Extends more capable students
 - Fosters progression, i.e. everyone can improve
- **Clearly articulates expectations and standards**
- **Enables self-assessment against explicit criteria**
- **Enables better quality and more timely feedback**
- **Provides consistency of approach**
- **Provides an approach that can be adapted to other courses/disciplines where less guidance is provided**

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Application of RSD Framework for Learning and Teaching

Results/Benefits

For Staff

- **Facilitates clear linkage/mapping of teaching practices, assessment tasks and outcomes with course objectives and graduate attributes**
- **Less time required in the assessment process**
 - Explicit task guidelines and expectations fewer student → queries
 - Better and more timely feedback
- **Allows assessment of process as well as content**
- **Increased student engagement with course materials**
- **Reduced incidence of poor practice**
 - Drop in plagiarism
 - Evidence of more critical analysis of sources for scientific validity and credibility

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References

- Bloom, B., Engelhardt, M.D., Furst, E.J., Hill, W.H., & Krathwohl, D.R (1956). *Taxonomy of Educational Objectives*, NewYork: David McKay Company.
- Bundy, A. (Editor) (2004): *Australian and New Zealand Information Literacy Framework: Principles, standards and practice (2nd Edition)*. Retrieved from <http://www.caul.edu.au/info-literacy/InfoLiteracyFramework.pdf> on 15/4/08.
- Chaplin, S.B. (2003). Guided development of independent inquiry in an anatomy/physiology laboratory. *Advanced Physiology Education* 27: 230-240, 2003
- Willison, J.W. & O'Regan, K. (2007). Commonly known, commonly not known, totally unknown: A framework for students becoming researchers. *Higher Education Research and Development* 26 (4).

Web Site

www.adelaide.edu.au/cipd/rsd

Lots of downloadable RSD examples are available here.

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For more Information...

... or to discuss ideas further, contact John

john.willison@adelaide.edu.au
08 8303 3219

