

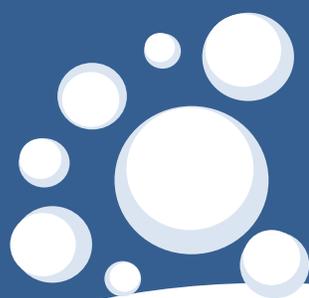


RSD @ USP

200-Level Courses

Handbook for workshops

December 2013



Embedding the skills associated
with *researching and problem
solving* in the curriculum

RSD Handbook for the December 2013 Workshops



Introduction

Bula USP colleagues

I am very pleased to be able to work with you on reframing curricula so that individual courses together explicitly and coherently develop students' research skills, research literacies and problem solving skills throughout the years of undergraduate and postgraduate study. This endeavour started in UU courses in 2012 and continued with Level 100 courses in all faculties in 2013. This handbook is a resource to help pursue this initiative across 200 Level courses in 2014, and so enable a degree-program approach culminating with 300 Level courses in 2015.

As you are aware, this initiative is part of a larger agenda to renew the university, including the STAR Project. The vision is that USP's research makes a deep and broad contribution to address the environmental, political, economic, cultural and social challenges of the region. The mission to achieve this vision is explicit and coherent research skill development across whole degree programs.

I wish you all the best with making the University of the South Pacific an institution where research and teaching have clear and immediate connections that mutually reinforce, and so make a powerful contribution to the region and its citizens.

John Willison, 28 November, 2013

University of Adelaide

STAR Project – the Strategic Total Academic Review.

STAR is a comprehensive, far-reaching, transformational review of USP's academic portfolio, policies, procedures and services to ensure the development of graduates who can take advantage of opportunities, secure meaningful and well-paid employment, appreciate multiple perspectives and live harmoniously with others; dealing effectively with the challenges of a globalised economy. Various working groups were commissioned, and Working Group 5 took on the responsibility of determining the best way to incorporate research skills and research literacies in USP curricula.

Working Group 5 (WG5)

WG5 found that in general the RSD framework was a workable tool that could guide academics in developing and assessing students' research skills in content-rich courses from First Year undergraduate to PhD level in diverse fields of specialisation. Moreover, it found that the bottom-up approach adopted by University of Adelaide and the dual approach by Monash University (top-down and bottom-up) provided an implementation model that USP could adopt.

WG5 thus concluded that the RSD framework was a suitable model for USP and recommended a 3-year phased adaptation and implementation that would culminate in a university-wide usage in 2015.

Websites for RSD resources

www.rsd.eu.au

<http://research.usp.ac.fj/rsd>

<http://monash.edu/library/skills/rsd/>

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Rationale for the Research Skill Development Framework

This rationale is based on an article published in Willison, J. & O'Regan, K. (2007). Commonly known, commonly not know, totally unknown: A framework for students becoming researchers. *Higher Education Research and Development* vol. 26, no. 4, pp. 393-409. The article is available at <http://www.tandfonline.com/doi/abs/10.1080/07294360701658609>

I am neither especially clever nor especially gifted. I am only very, very curious.
--Albert Einstein

Undergraduate education and university research

Undergraduate education has historically been seen in conflict with academics' research agenda (Lane, 1996; Sample, 1972). Boyer's revolutionary reconceptualisation of scholarship, motivated by a concern to 'break out of the tired old teaching versus research debate' (Boyer 1990, p. xii) has suggested possibilities other than that seemingly entrenched 'truth' of research and teaching as necessarily competing endeavours. In this view, teaching and research are not perceived as being in opposition, but rather, as inextricably linked with one other (Brew, 2006).

Within this paradigm, students are perceived as researchers who 'observe and participate in the process of both discovery and communication of knowledge' (The Boyer Commission on Educating Undergraduates in a Research University, 1998, p.18). Universities are 'scholarly communities' (Huber, 2003) and the purpose of undergraduate education is to induct students into that community. Lave and Wenger (1991) speak of learning as being 'configured through the process of [the learner] becoming a full participant in a socio-cultural practice' (p. 29), with learning corresponding to 'increasing participation in communities of practice' (p. 47). The 'beginner' develops 'an increasing understanding of how, when and what about old-timers collaborate, collude and collide' (p. 95); they learn to become members of a research community (Coppola, 2001; Brew, 2003a). So research skill development can be seen as an underlying principle of all education, not as something restricted to 'researchers' engaging in activities which compete with their teaching demands.

A framework for research skill development

The emerging question is, why is the research work done as part of undergraduate study not explicitly identified as such more often? Undergraduate research is possible, and is presently being conducted in some disciplines; yet many problems remain as barriers to its wider implementation. One of these problems, at least, is potentially addressable: the conceptual difficulties faced in facilitating student research skills. This could be addressed by a framework that helps academics conceptualise how they could explicitly facilitate student research skill development.

Research is motivated by curiosity or a need to know about how things are, and what they do or may do. Einstein claimed that his redeeming feature, in terms of research, was not cleverness or giftedness, but that 'I am only very, very curious', and while we may question his self-assessment in relation to cleverness and giftedness, what he says does underscore the pre-eminent characteristic of research: namely, to wonder why. To research, we embark on a voyage of discovery launched by curiosity or need. Children have this capacity to wonder early in life. However, to be maintained, this desire to embark on inquiry needs to be nurtured. Education should lead students to ask research questions of increasing sophistication, specificity, depth and breadth that set them on a journey towards making the unknown known.

Conceptualising and facilitating this journey is a task for all educators, and especially lecturers of undergraduates. At most levels of education, students research knowledge that is unknown to themselves, but which is commonly known to others. This research typically takes the form of assignments which are prescribed by others. As a student's education progresses, their research moves into a discipline discourse with concepts, language and conventions unknown to those outside that discipline. Research at this level is into the commonly not known. As students become well-acquainted with the canon of a discipline and its research techniques, they may be ready—probably at postgraduate level—to research gaps into or even extend the field, into areas previously unknown to humankind.

Whether researching into the commonly known, the commonly unknown or the totally unknown, the process may equally be labelled researching or learning: 'research is learning' (Brew, 1988 cited in Brew & Boud, 1995, p.267). Assignment tasks frequently require students to be involved in a process of research, though this is seldom made explicit. All associated activities which could be broadly identified as 'research' can be located on the research continuum, placing a first-year library or internet research assignment on the same continuum as PhD research: the associated set of skills are often the same, but what varies from first year to PhD is the degree of rigor, the level of specialisation and complexity of the discourse, the scope, depth and methodological framework applied to the inquiry process, and the extent of 'unknownness' of the topic under research. The fundamental facets of inquiry are identical, with common processes being acted out across all research endeavours.

This notion of the commonality of research processes underpins the two models we drew upon to identify facets of research, namely the ANZILL (2004) Standards and Bloom's Taxonomy (Bloom, *et al.* 1956). The ANZILL Standards comprehensively describe 'the skills or competencies that together make for effective and appropriate use of information' (CILIP 2005), this use being an essential and major part of the research process. Bloom's Taxonomy was developed initially to 'help one gain a perspective on the emphasis given to certain behaviours by a particular set of educational plans... so that it becomes easier to plan learning experiences and prepare evaluation devices' (Bloom *et. al.*, 1956, p.2). Although the Taxonomy was first published fifty years ago, it has been consistently applied to teaching and learning contexts since that time (see, for example, Ormell, 1974; Furst, 1981; Anderson, Sosniak & Bloom, 1994; Krathwohl, 2002) and so provided another widely-applicable framework we considered relevant to research-as-learning. Drawing together elements from these two models led us to specify six facets of the research process: namely, that students embark on 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 them, organise information they have collected/generated, synthesise and analyse new knowledge, and communicate knowledge and understanding and the processes used to generate them.

As well as these facets, there are variables which span across the whole research process. One of these is the degree of 'knownness'; another is the degree of student autonomy in the research activity. Autonomy is widely acknowledged as an important aim in education (Boud, 1988; Bruce, 1995; Butler, 1999; Fazey & Fazey, 2001). Autonomy in the research context ranges from student engagement with closed inquiries directed towards a pre-determined outcome, involving a high level of structure and guidance and using prescribed methods and processes, through to open inquiries involving high levels of autonomy and self-determination in terms of what is investigated and how the investigation is done. Inquiries can be classified as 'closed' (lecturer-specified) or 'open' (student-specified) in relation to: the question, hypothesis or aim of the task; the procedure followed or equipment used; and the answer, resolution or need for further inquiry which is arrived at (Hackling & Fairbrother, 1996).

Drawing together the facets of research with the degree of student autonomy, we devised a conceptual framework based on an earlier formulation (Willison & O'Regan, 2005), from which to hang conceptions of student research skill and its development. This is the Research Skill

Development framework, the rows of which correspond to the six major student research facets, with the double-ended vertical arrow indicating that the movement through these facets is not linear, but recursive. Students researching may find, for example, whilst synthesising (Facet E) information and data, that they need to reframe their research question (Facet A). Nevertheless, there is a general progression from Facet A, leading ultimately to Facet F. The five columns in the table represent the degree of student autonomy, with Level I corresponding to a low degree of autonomy and describing students working at a level of a closed inquiry, requiring structure and guidance, and Level V corresponding to a high degree of autonomy and describing students functioning at the level of open inquiry.

The labelling of the facets and levels with successive letters and numbers is not meant to imply that a student progresses through them in a linear, pre-determined way. Nor will a student necessarily, at any one time, be functioning at the same level for all the specified facets. The progression for each student is recursive as well as context-, task- and discipline-specific. An individual student may engage in research behaviour which corresponds to their own individual pathway through the table, moving to higher or lower levels in each facet depending on the variables of context, task and discipline: a student may, at one time and in one context, be functioning for Facet A at Level II, for Facet C at Level V and for Facet D at Level III, while at another (or the same) time, in another context, their position may be represented by a different cluster of cells.

Students may go through many Level I to Level V cycles when researching the commonly known in undergraduate studies (or earlier). As they progress towards researching the commonly unknown, they may move through those same cycles several more times, finally arriving at the cutting edge of research into the totally unknown. Yet here again they may need guidance, starting at level I or II, until the autonomy of Level V is realisable, and at which point the student is applying the 'standards' of rigour and impact (Glassick *et al.*, 1997) required to generate knowledge new to humankind.

The RSD framework is designed primarily as a conceptual tool for diagnosis and planning, promoting understanding and interpretation of both potential and realised student research skill development.

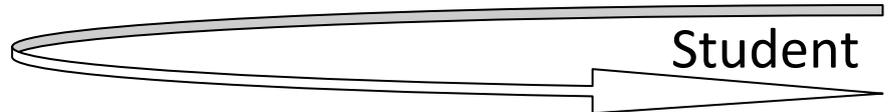
RSD Terminology

Definitions of key terms that are specific to the RSD approach are given below.

- Facet of inquiry:** A facet of inquiry is an element of the research process. In the RSD the six facets are based on and build on from the stages of Bloom's Taxonomy, but are not considered hierarchical or linear; students may undertake all or some of the facets at different points during an assessment task or engagement with a text.
- Level:** A level of the RSD represents the extent of autonomy in research that a student can achieve or has achieved. Although these levels are arranged in a progression, they are not necessarily a hierarchical construct and do not imply a linear progression from Level 1 to Level 5; a student's location within the levels is context-dependent and individualised.
- Comprehensive rubric:** A comprehensive rubric gives detailed marking criteria for each facet and level. This allows criteria to be extremely explicit and objectives to be completely clear, and feedback to be extremely detailed. It also allows students to have a clear idea from the outset about what they must do to achieve a target grade.



Research Skill



What characterises the difference between 'search' and 'research'? More searching and more data generation is just a "big search"! Research is when students...

		Level 1 (Prescribed Research)	Level 2 (Bounded Research)
Facet of Research	a. Embark & Clarify Respond to or initiate research and clarify or determine what knowledge is required, heeding ethical/cultural and social/team considerations.	Curious Respond to questions/tasks arising explicitly from a closed inquiry. Use a provided structured approach to clarify questions, terms, requirements and expectations.	Respond to questions/tasks required by and implicit in a closed inquiry. Choose from several provided structures to clarify questions, terms, requirements and expectations.
	b. Find & Generate Find and generate needed information/data using appropriate methodology.	Determined Collect and record required information or data using a prescribed methodology from a prescribed source in which the information/data is clearly evident.	Collect and record required information/data using a prescribed methodology from prescribed source/s in which the information/data is not clearly evident.
	c. Evaluate & Reflect Determine and critique the degree of credibility of selected sources, information and of data generated and reflect on the research processes used.	Discerning Evaluate information/data and reflects on inquiry process using simple prescribed criteria.	Evaluate information/data and reflect on the inquiry process using given criteria.
	d. Organise & Manage Organise information and data to reveal patterns and themes, and manage teams and research processes.	Harm onising Organise information/data using prescribed structure. Manage linear process provided.	Organise information/data using a choice of given structures. Manage a process which has alternative pathways.
	e. Analyse & Synthesise Analyse information/data critically and synthesise new knowledge to produce coherent individual/team understandings.	Creative Analyse and synthesise information/data to reproduce existing knowledge in prescribed formats. <i>*Ask emergent questions of clarification/curiosity*</i> .	Analyse and synthesise information/data to reorganize existing knowledge in standard formats. <i>*Ask relevant, researchable questions emerging from the research*</i> .
	f. Communicate & Apply ethically Write, present and perform the processes, understandings and applications of the research, and respond to feedback, accounting for ethical, social and cultural (ESC) issues.	Constructive Use mainly lay language and prescribed genre to demonstrate understanding for lecturer/ teacher as audience. Apply to a similar context the knowledge developed. Follow prompts on ESC issues.	Use some discipline-specific language and prescribed genre to demonstrate understanding from a stated perspective and for a specified audience. Apply to different contexts the knowledge developed. Specify ESC issues.

Development Framework

Autonomy

Level 3 (Scaffolded Research) Scaffolds placed by educator shape student independent research	Level 4 (Student-initiated Research) Students initiate the research and this is guided by the educator	Level 5 (Open Research) Students research within self-determined guidelines that are in accord with discipline or context.
Respond to questions/tasks generated from a closed inquiry. Choose from a range of provided structures or approaches to clarify questions, terms, requirements and expectations.	<i>*Generate questions/aims/hypotheses framed within structured guidelines*.</i>	<i>*Generate questions/aims/hypotheses based on experience, expertise and literature*.</i>
Collect and record required information/data from self-selected sources using one of several prescribed methodologies.	Collect and record self-determined information/ data from self-selected sources, choosing an appropriate methodology based on structured guidelines.	Collect and record self-determined information/data from self-selected sources, choosing or devising an appropriate methodology with self-structured guidelines.
Evaluate information/data and inquiry process using criteria related to the aims of the inquiry. Reflect insightfully to improve own processes used.	Evaluate information/data and the inquiry process comprehensively using self-determined criteria developed within structured guidelines. Reflect insightfully to refine others' processes.	Evaluate information/data and inquiry process rigorously using self-generated criteria based on experience, expertise and the literature. Reflect insightfully to renew others' processes.
Organise information/data using recommended structures. Manage self-determined processes with multiple possible pathways.	Organise information/data using student-determined structures, and manage the processes, within the parameters set by the guidelines.	Organise information/data using student-determined structures and management of processes.
Analyse and synthesise information/data to construct emergent knowledge. <i>*Ask rigorous, researchable questions based on new understandings*.</i>	Analyse and create information/data to fill knowledge gaps stated by others.	Analyse and create information/data to fill student-identified gaps or extend knowledge.
Use discipline-specific language and genres to demonstrate scholarly understanding for a specified audience. Apply the knowledge developed to diverse contexts. Specify ESC issues in initiating, conducting and communicating.	Use discipline-specific language and genres to address gaps of a self-selected audience. Apply innovatively the knowledge developed to a different context. Probe and specify ESC issues in each relevant context.	Use appropriate language and genre to extend the knowledge of a range of audiences. Apply innovatively the knowledge developed to multiple contexts. Probe and specify ESC issues that emerge broadly.

Using the RSD to develop assessments and curriculum

There are many ways to use the RSD framework. So far, academics on our project team have developed five or six common methods. The first and most commonly-used approach is to *build an ongoing profile of student research skills*. The second is to *develop student research and technical skills in a uniform progression*, for use introducing new skills to a cohort that requires a clear level of technical skill to practise. The third is to *assign grades*, using the levels as bands of achievement matching High Distinction, Distinction, Credit etc. The fourth is *SOLO-influenced*, and the fifth is to use the RSD framework as a jumping-off point, to create a non-standard framework that *reflects the demands of a particular topic or discipline*.

Below is a description of how to use the RSD to redesign assessment tasks and curriculum in order to build a profile of student research skills.

Curriculum redesign

The RSD is frequently used as a conceptual tool for 'assessment-first' curriculum design.

The process of redesigning curriculum using RSD involves, first, developing marking rubrics, or designing new ones, that are informed by the RSD structure for existing assignments. Doing this first allows changes to the course structure to flow from the changes to the marking rubrics.

One prominent change that occurs as a result of redesigning marking rubrics in this way is that lecturers represent the purpose of assessment tasks to students differently: they give more emphasis to the development of students' research skills in their discipline, which can have positive effects on student engagement. Some lecturers have reported that relatively small changes to assessments have led to substantial differences in the way they talk in class about a journal article or laboratory task, and that this can ultimately alter the whole purpose and feel of a course.

The first step in this method of using the RSD is to develop a diagnostic assessment. This is typically a task requiring students to synthesise information from two or more literature sources, and is marked up to Level 2 of an RSD rubric, but diagnostics can also be designed to assess laboratory, fieldwork or performance research skills, and skills specific to many other disciplines.

The second step is to reframe the marking of an existing assessment—usually one that falls late in the semester, and ideally the final assessment task in the course—so that it too uses on the RSD format of assessing the 6 research facets, each marked up to Level 3 or Level 4 of the framework.

The third step, using these two modified tasks as bookends, is to modify and revise the emphasis of other existing resources and assessment tasks so that they form a coherent sequence.

Developing RSD marking rubrics for individual assessments

In developing an RSD marking rubric for an existing, individual assessment, there are several stages:

- *map* the existing assessment task against the RSD framework to locate it at a **level of student autonomy**.

- *consider* whether the task should remain at that level of inquiry, or to focus on a higher or lower level.
- *assess* the task against the six RSD **facets**, to identify which facets are present in the existing assessment, which are absent, which need to be strengthened and which need to receive less emphasis.
- *modify* the assessment task to incorporate all facets, and to include all the required levels.
- using the assessment task as a guide, *develop* a marking rubric based on the RSD shell rubric. This will articulate the assessment's requirements accurately to students, and enable effective and quick marking.

Developing a diagnostic assessment

Diagnostic assessments using RSD are usually, but not necessarily, literature research tasks in which students compare and analyse two short pieces of writing on a key topic. The topic should be one that is clearly defined and can be effectively explored in this format and in a limited time frame, as a diagnostic assessment should ideally be completed during a single class period.

The first element in developing a workable diagnostic assessment for research skills is to decide what research skills it needs to cover and what level of autonomy it should encompass. Identify a pair of short texts that contain different perspectives on a relevant topic, devise a task that requires students to identify key ideas and/or locate points of difference and similarity between the articles (you may ask them to present these in note form, to develop a research skill), and to compare and contrast or offer an analysis of the sources. Students should be asked to support their judgements of source validity with evidence (another research skill).

You can then use the RSD shell rubric to articulate your set of assessment criteria, modifying the assessment task and rubric as necessary during the process to ensure that all of the six RSD facets are included and that the task allows students to work to your chosen levels.

Examples of diagnostic assessments and marking rubrics in Human Biology and Electronics Engineering are available in this handbook.

How to redesign a curriculum using the RSD

To redevelop or redesign a full course curriculum using the RSD, develop an initial (diagnostic) task for the course, using the RSD framework and marking rubric, and then revise a later assessment task (ideally, the final task for the course) and create an RSD marking rubric for it. These will form the two end points of your RSD continuum.

Working from these two end points, determine which 'midway' points and research skills you want to develop and assess in your students. Revise existing tasks, or create new ones, to assess these points.

It is important to remember that the first run of an RSD course will reveal problems and issues that could not necessarily be predicted, so you will need to revise or edit your course over two or three iterations to make it as effective as possible.

You can find a detailed description of Eleanor Peirce and Mario Ricci's experience of designing an RSD course for Human Biology at <http://www.adelaide.edu.au/rsd/explain/humanbio/>

Workshop Program



TIME	PROGRAMME
8.30 – 8.50am	Registration
8.50 – 9.00am	Welcome by PVC Prof John Bythell
9.00 -10.15am	<p>Session 1: Introducing the RSD to Students Unpacking the RSD Framework: how to help students relate to the six facets of research Brainstorming discipline-appropriate stimulus and structure for introducing students to the facets. Report back.</p>
10.15 – 10.35am	MORNING TEA
10.35am – 1.00pm	<p>Session 2: Designing rubrics for 200-level FBE and FALE courses. Identifying key features of rubrics from 100-level FBE and FALE courses. Draft design of rubrics for your 200 level FBE and FALE course. Staff to look at how an existing assignment can be assessed by using the facets of the RSD. Consider changes to the assignment description to ensure it fits with the rubric.</p>
1.00 – 1.45pm	LUNCH
2.00 – 3.15pm	<p>Session 3: Coherence of Learning & Teaching Activities, Assignments and Marking Rubrics for Integration of RSD in 200-level courses Work on revision of existing learning & teaching activities to ensure consistency with the assignment and its RSD marking rubric for 200-level courses (e.g FALE: PS course FBE: MG201)</p> <p>Is the L&T activity e.g tutorial, etc. appropriate for developing these facets? Ensure that the L&T activity, assignment and rubric are appropriately aligned to each other.</p>
3.15 – 3.30pm	AFTERNOON TEA;
3.30 – 4.45pm	<p>Session 4: Reporting to the group on RSD Learning & Teaching Activities, Assignments and Marking Rubrics Staff report on the assignment and rubrics for 200-level course assignments (report on at least one course from each Faculty, the rest to be submitted as word documents to Heena). Peer feedback provided to each group.</p>
4.50 –5.30pm	<p>Comments and Feedback from the audience Conclusions from the workshop</p>

Session 1: Reinforcing the RSD with Students in 200-Level Courses

Deriving the facets of the RSD

Unpacking the RSD Framework: re-animating the six facets of research in your context.

Linking the facets of the RSD to use in UU100, UU114 and other courses in your program.

Task 1: Devise a way to reintroduce the RSD facets to your 200 Level students, given that they have been exposed to them in at least in two 100 level courses.

Option A: Use the 5Ss below, and the stimulus examples pages 14-17, to develop a discipline-specific activity for students to revisit the facets of the RSD. The structure on page 18 will guide you.

Option B: Use UU100 and UU114 RSD-based marking criteria to revisit the skills being developed and assessed in your 200 Level course.

Option C: Make students the masters of marking criteria by having them mark previous students work in teams (see an example on Page 21-24: ask John about this if you are interested)

Some Underlying pedagogical principles of Activities for Students to Derive the facets of the RSD

5Ss

Stimulating: Socially interactive and cognitively engaging activity.

Same: Small groups all working on identical tasks

Single-view: Not wading through lots of materials, but can be represented in one slide or one side of A4 paper.

Short timeframe:

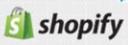
Self-aware: Students are required to be metacognitive: they make their own thinking visible



- ✓ Zero Setup Fee
- ✓ Zero Bandwidth Fees
- ✓ 0% Transaction Fees*
- ✓ Unlimited SKU's

CHAPTER 8: Introduction to the Hydrosphere

(o). Introduction to the Oceans



- ✓ Zero Setup Fee
- ✓ Zero Bandwidth Fees
- ✓ 0% Transaction Fees*
- ✓ Unlimited SKU's
- ✓ Unlimited Storage
- ✓ \$100 Adwords Credit
- ✓ Discount Codes
- ✓ Carrier Shipping

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Table 8o-1: Surface area of our planet covered by oceans and continents.

Surface	Percent of Earth's Total Surface Area	Area Square Kilometers
Earth's Surface Area Covered by Land	29.2%	148,940,000
Earth's Surface Area Covered by Water	70.8%	361,132,000
Pacific Ocean	30.5%	155,557,000
Atlantic Ocean	20.8%	76,762,000
Indian Ocean	14.4%	68,556,000
Southern Ocean	4.0%	20,327,000
Arctic Ocean	2.8%	14,056,000

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Evaluation September 2008

From Wikipedia, the free encyclopedia

 This article may require **cleanup** to meet Wikipedia's **quality standards**. Please [improve this article](#) if you can. *(September 2008)*

This article is about characterizing and appraising something of interest. For other uses, see [Evaluation \(disambiguation\)](#).

Evaluation is systematic determination of merit, worth, and significance of something or someone using criteria against a set of standards. Evaluation often

http://wikimediafoundation.org/wiki/Donate/Now/en?utm_source=enwiki_01&utm_medium=anon_donation_banner&utm_campaign=spontaneous

start RMIT 7 Microsoft Office ... 4 Internet Explorer 22:37

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Evaluation November 2013

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This article is about characterizing and appraising something of interest. For other uses, see [Evaluation \(disambiguation\)](#).

 This article has **multiple issues**. Please help [improve it](#) or discuss these issues on the [talk page](#).

- This article may require **cleanup** to meet Wikipedia's **quality standards**. *(September 2008)*
- This article is written like a **personal reflection or opinion essay** rather than an **encyclopedic description of the subject**. *(May 2011)*

Evaluation is a **systematic** determination of a subject's merit, worth and significance, using criteria governed by a set of **standards**. It can assist an organization, program, project or any other intervention or initiative to assess any aim, realisable concept/proposal, or any alternative, to help in decision-making; or to ascertain the degree of achievement or value in regard to the aim and **objectives** and results of any such action that has been completed.^[1] The primary purpose of evaluation, in addition to gaining **insight** into prior or existing **initiatives**, is to enable **reflection** and assist in the identification of future change.^[2]

Evaluation is often used to characterize and appraise subjects of interest in a wide range of human enterprises, including the **arts**, criminal justice, foundations, **non-profit organizations**, **government**, **health care**, and other human services.

Contents [\[hide\]](#)

- 1 Definition
 - 1.1 Purpose
 - 1.2 Discussion

INBOX: Australian Taxation Office - Refund Notificati

Delete | Reply | Reply to All | Forward | Blacklist | Message Source | Save as | Print
Date: Tue, 30 Jun 2009 15:39:11 -0700
From: "refund@ato.gov.au" <refund@ato.gov.au>
To: Undisclosed recipients@,
Subject: Australian Taxation Office - Refund Notification - Message ID: LUG092HGFE
1 unnamed text/html 0.94 KB



Australian Government
Australian Taxation Office

You have get a Tax Refund on your Visa or MasterCard.
Complete the formular, and get your Tax Refund.

(Your Refund Amount Is \$210.75 AUD)

[Complete Formular](#)

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Delete | Reply | Reply to All | Forward | Blacklist | Message Source | Save as | Print

From: support@ato.gov.au <support@ato.com>;
To:
Subject: Australian Taxation Office
Sent: Mon, Dec 12, 2011 3:32:25 AM



Australian Government
Australian Taxation Office

Progress of income tax return.

After calculations of your fiscal activity we have determined that you are eligible to receive a tax refund.

Find out about the progress of income tax returns [click here](#) .

Regards,

Administrative Department Team
Australian Taxation Office

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Skills that Employers Seek in Advertisements

GLENSIDE FULL OR PART TIME New Position



**ADELAIDE – EASTERN SUBURBS
GLENSIDE VETERINARY CLINIC**

Dare to be Different?

Are you an experienced veterinary surgeon with a penchant for surgery and looking for a new challenge?

This could be the career opportunity for you.

You will need to be enthusiastic, innovative and have an inquiring mind as your caseload will be 75% dogs and cats plus 25% birds and other exotic pets.

The position is at Glenside Veterinary Clinic, a long established practice at the gateway to the beautiful eastern suburbs of Adelaide. Here, everything is at your fingertips; schools and colleges, diverse shopping, beautiful parks and historic walking trails.

Please [click here to see photos!](#)

Manager - Veterinary Disease Surveillance

Primary Industries and Regions SA (PIRSA) offers innovative employment options, including flexible, diverse, and family friendly working environments. Awarded at State and national levels for our commitment to the health and wellbeing of our staff, we are seeking persons who are prepared to strive to exceed customer expectations and collaborate with industry to get things done.

The Manager - Veterinary Disease Surveillance is responsible for the leadership and management of the surveillance group including the supervision of other veterinarians and animal science graduates. The role also includes the development and management of disease monitoring programs and associated data to meet the needs of exporters, food safety programs and national disease reporting programs. It involves being a resource for strategic animal disease decision making using epidemiological and risk management principles. The incumbent will need to collaborate closely with livestock industry leaders in SA to procure funding and to continually monitor and develop the animal surveillance system in SA. It is also necessary to identify and relate to the needs of rural communities and possess a capacity to work collaboratively with veterinary practitioners, livestock producers, stock agents, industry groups, SA Health and other relevant stakeholders. A high level of independent work, initiative, strategic development and motivation is required to ensure results are achieved.

Essential Minimum Qualifications:

A degree in Veterinary Science is essential. Post-graduate qualifications in epidemiology or equivalent are desirable.

Skills in both adds in bold

RSD Facets (affect in red)	Analysis of Skills in Job Adds
A. Embark & clarify Curious, inspired	INNOVATION, MOTIVATION, strong int in surgery, special interests in patient welfare, willingness
B Find & Generate Determined	Monitor & Develop animal disease surveillance system
C Evaluate & Reflect Discerning	follow up your cases & pursue your special interests
D Organise & Manage Harmonising	TEAM PLAYER, Leadership
E Analyse & Synthesise Creative	Lateral thinker , Decision making,
F Communicate & Apply ethically Constructive	GOOD COMMUNICATION
A. Embark & clarify Curious, inspired	VET DEGREE, EXPERIENCE, EXCELLENT CUSTOMER SERVICE, sense of humour,, epidemiology. Current drivers licence & willingness to drive, understanding of modern technology

A discipline-specific learning activity for students to understand the facets of the RSD

Audience: (Year level/s, compulsory/optional, degree of interest in course, number of students, etc). _____

Course name: _____

Purpose: introduce all facets of the RSD

Organisation of Activity: Students create 2 written lists: eg

Stimulus	List 1	List 2
Tax Office	Reasons to believe	Reasons to distrust
Lightning Strike (Electrical Engineering)	Why adage 'lightning never strikes twice in the same place' may be correct'	Why adage 'lightning never strikes twice in the same place' may be incorrect'
Lightning Strike (Nursing)	List reasons why Dom should have gone to emergency	List reasons why Dom did not need to go to emergency
Death of European explorers in Australia	Similarities of Aboriginal living-on-the-land skills and research skills	Differences between Aboriginal living-on-the-land skills and research skills

Step 1: Choose a discipline appropriate stimulus for a 200 level course that will use the RSD eg any on pages 14-18 or preferably one that relates to content early in the course

Step 2: Consider '5 Ss' on page 13

Step 3: What are the two lists that students will create in 2 minutes?

List 1

Description: _____

List 2

Description: _____

Step 4: How will you capture their ideas for each list? (eg edit mode of powerpoint?). This is best done as a 'brainstorm' ie no right or wrong. Students can challenge items after both lists complete.

Step 5: 'What skills did you use to do that?' Will you use John's 'hidden facets' in a powerpoint table, or some other strategy? (see table 1, next page)

Table 1: RSD facets and the kinds of things students may call out about the skills they used

Facets (hidden until students completed the second column)	What skills did you use to do that activity?
Embark and Clarify	
Find and Generate	
Evaluate and Reflect	
Organise and Manage	
Analyse and Synthesise	
Communicate and Apply Ethically	

'Biggest Stingray Ever Caught

It took 13 men to heave this giant out of the water. This giant stingray weighed 55,000 kg.



Source: <http://hubpages.com/hub/Biggest-Animals-in-the-World?>

Research Skills in the Health Sciences

Practicing with RSD Marking Criteria

Background/Rationale

The University environment is one in which you will be exposed to many new and different experiences and challenges. You will meet people from different backgrounds; encounter different methods of course delivery and course materials of a more challenging nature, and need to cope with varying expectations of what, and how much, you will successfully achieve. Initially, courses may appear to be presented in a foreign language, as lecturers routinely use unfamiliar, discipline-specific terminology in classes. As part of your studies you will be required to read and interpret various course materials, critically evaluate and synthesize them into a coherent story, and effectively communicate ideas and findings using the appropriate format and language for the discipline area. All of these requirements assume at least a basic level of skill in accessing and critically analysing discipline-appropriate literature.

The short task that you are asked to undertake is aimed at identifying your current level of ability in recognising, extracting and logically organising key points from literature available on a topic. The outcomes of this task will enable us to provide you with appropriate support (e.g. tutorials, workshops, online guides) to enable you to develop and refine the research skills necessary to succeed in your studies in Health Sciences.

Task Instructions:

Read the two short articles about obesity printed on the reverse side of this handout and complete tasks 1 and 2.

1. *Integrate the information presented in the two articles to write your own dot-point notes on the worksheet attached.* To do this:
 - Identify 3-4 key ideas from the articles
 - Use these key ideas to formulate headings
 - Make bullet-point notes and list them under these headings.
 - After each point, indicate its source, i.e. whether the idea came from article 1, article 2, or both
 - Provide a title that embodies the content of your notes.
2. Which of the two articles do you consider to be the better source? On what characteristics/features of the article have you based your choice? / How have you arrived at your choice?

Childhood obesity: modernity's scourge

Overweight and obesity affect about 23% of Australian children and adolescents, with 6% being obese.¹ These are conservative estimates, as there has been no systematic monitoring of the prevalence of overweight and obesity in Australian children and adolescents since 1995. However, over the previous decade, the prevalence of overweight children has almost doubled, and the prevalence of obese children more than tripled.^{1,2}

Health inequalities related to overweight and obesity are evident. There is a higher incidence of overweight and obesity in children of parents of particular backgrounds,³ and maternal education is the strongest social determinant of overweight and obesity in childhood.⁴ Although there are limited national data, and combined New South Wales, Victorian and National Nutrition datasets¹ failed to find a rural/urban difference, Victorian epidemiological data show a statistically significant, higher proportion of overweight and obese boys in metropolitan areas, but this difference was not found for girls.

The health consequences of overweight and obesity are substantial.⁵ Issues of social acceptance, athletic competence and physical appearance are well known to obese children and affect their sense of social and psychological wellbeing. Obese children with decreasing self-esteem are more likely to smoke and drink alcohol compared with those whose self-esteem increases or remains the same.⁷ Obese children and adolescents may also have a range of medical conditions including hypertension, dyslipidaemia, and even type 2 diabetes. Other problems, such as musculoskeletal discomfort, obstructive sleep apnoea, heat intolerance, asthma and shortness of breath, greatly affect their lifestyle.⁸

Addressing the determinants of health and wellbeing for children and adolescents will improve population health and wellbeing overall. The overarching cause of the obesity epidemic is energy imbalance — a relative increase in energy intake (food intake) together with a decrease in energy expenditure (decreased physical activity and increased sedentary behaviour). Identifying the most important predictive determinants of each of these behaviours, as well as the most effective and sustainable remedial strategies, is complex and involves parental education and employment; housing environments; play, recreation and physical activity; food and nutrition; accessible active transport; and child-friendly physical and social environments.⁹

From: Waters EB and Baur LA 2003 Childhood obesity: modernity's scourge. Medical Journal of Australia 178(9), 422-423.

http://www.mja.com.au/public/issues/178_09_050503/wat10857_fm.pdf

Halting the Obesity Epidemic: A Public Health Policy Approach (2000)

Traditional ways of preventing and treating overweight and obesity have almost invariably focused on changing the behavior of individuals, an approach that has proven woefully inadequate, as indicated by the rising rates of both conditions. Considering the many aspects of American culture that promote obesity, from the proliferation of fast-food outlets to almost universal reliance on automobiles, reversing current trends will require a multifaceted public health policy approach as well as considerable funding.

National leadership is needed to ensure the participation of health officials and researchers, educators and legislators, transportation experts and urban planners, and businesses and non-profit groups in formulating a public health campaign with a better chance of success. The authors outline a broad range of policy recommendations and suggest that an obesity prevention campaign might be funded, in part, with revenues from small taxes on selected products that provide "empty" calories—such as soft drinks—or that reduce physical activity—such as automobiles.

They conclude by saying 'we do not pretend that these suggestions alone will eliminate obesity from American society, but they will be valuable if they help to produce even small reductions in the rate of obesity, as even modest weight loss confers substantial health and economic benefits. Without such a national commitment and effective new approaches to making the environment more favorable to maintaining healthy weight, we doubt that the current trends can be reversed'.

From: Nestle M and Jacobson MF 2000 Halting the Obesity Epidemic: A Public Health Policy Approach. Public Health Reports 115, 12-24.

Web reference:

<http://www.cspinet.org/reports/obesity.pdf>

Study and Research Skills in the Health Sciences: O-Week Assessment

Student Name:

Program: (tick appropriate)

Entry Category: (tick appropriate)

Title: Obesity in AUS and solution to it

Overweight and obesity ^{over-view} in AUS

- 23% of Aussie children and adolescents are affected (1)
- 6% of above are obese. (1)
- The rate is still rising (1,2)
- ~~Systematic prevalence is delayed~~

Problems related to overweight and obesity

- Hardly to be social acceptable (1)
- Lose self-esteem, ~~un~~ unbehaviour (1)

In my opinion, article 2 is a better source. Since it is a government report. The data ~~report~~ used are more reliable, ~~in contrast~~ while article 1 just ~~use~~ ^{used} general ideas and the data used is not authorised.

Moreover, article 2 aims at a certain point as in-depth treatment while article 1 just talks about general ideas.



Marking Criteria for 'O-Week' Research Skills Evaluation

Student Name: _____ Student ID: _____

Marker: _____

Indicators	Level 1	Level 2
<i>The student with research skill ...</i>	Student engages with a closed enquiry and requires a high degree of structure and guidance	Student engages with a closed enquiry and requires some structure and guidance
<i>1. embarks on inquiry and so determines a need for knowledge/understanding</i>	<input type="checkbox"/> Identifies some <i>peripheral</i> or <i>duplicated</i> ideas as key	<input type="checkbox"/> Identifies KEY ideas
<i>2. finds/generates needed information/data</i>	<input type="checkbox"/> Points/notes generated partially relate to the headings under which they are listed <input type="checkbox"/> Notes produced are sourced predominantly from 1 text only	<input type="checkbox"/> Points/notes generated elaborate on the key ideas to which they are linked <input type="checkbox"/> Notes produced draw on ideas from both texts
<i>3. critically evaluates information/data and the process to find/generate</i>	<input type="checkbox"/> Identifies indicators of source credibility and reliability but does not fully apply them in evaluating data or process	<input type="checkbox"/> Identifies several relevant indicators of source credibility and reliability and provides appropriate rationale for usage/inclusion of information
<i>4. organises information collected or generated</i>	<input type="checkbox"/> Has attempted a note-taking framework, but information is organised predominantly as a list of undifferentiated bullet points	<input type="checkbox"/> Uses a hierarchical note-taking framework that organises related information under the appropriate key headings.
<i>5. analyses and synthesises new knowledge</i>	<input type="checkbox"/> Produces point form notes (information not directly copied or sentence format) but notes separated according to source	<input type="checkbox"/> Combines and integrates ideas/data from different sources to generate notes
<i>6. applies and communicates knowledge with understanding and acknowledges cultural, ethical, economic, legal and social issues</i>	<input type="checkbox"/> Title is present <input type="checkbox"/> Partial and/or incorrect acknowledgement of sources of information	<input type="checkbox"/> Title relates clearly to the key ideas presented in the notes <input type="checkbox"/> Full and correct acknowledgement of sources of all noted information.

HY101 Pacific Islands Prehistory Essay Marking rubric – RSD (20 marks)


Facet of Research	Element of Essay	A Highly Satisfactory Pass (71-100%)	A Satisfactory Pass (50-70%)	Unsatisfactory (<50%)	No Evidence (0)	Mark
Embark and Clarify (2)	Introduction of purpose and structure of essay (1)	<input type="checkbox"/> Precise and clear	<input type="checkbox"/> Satisfactory, but lacks	<input type="checkbox"/> Does not represent the rest of the contents	<input type="checkbox"/>	
	Answer to question (1)	<input type="checkbox"/> Directly addressed.	<input type="checkbox"/> Peripheral answer	<input type="checkbox"/> Unclear or off track		
Find and Generate (4)	Sufficient number of appropriate info sources (2)	<input type="checkbox"/> A substantial number of highly appropriate sources	<input type="checkbox"/> Sufficient sources, generally appropriate	<input type="checkbox"/> Insufficient or inappropriate sources	<input type="checkbox"/>	
	Identification of ideas/themes to address the question (2)	<input type="checkbox"/> All or most of the relevant ideas are identified	<input type="checkbox"/> Some ideas/ themes are relevant	<input type="checkbox"/> Less than half of the themes/ ideas are relevant	<input type="checkbox"/>	
Evaluate and Reflect (2)	Credibility of information (1)	<input type="checkbox"/> All cited work is from credible sources	<input type="checkbox"/> Cited work is generally from credible sources	<input type="checkbox"/> Cited work includes a number of sources lacking credibility.	<input type="checkbox"/>	
	Statement of the limitations of information used (1)	<input type="checkbox"/> Explains thoroughly the limitations	<input type="checkbox"/> States some limitations	<input type="checkbox"/> Little consideration is given to the possible limitations of information	<input type="checkbox"/>	
Organise and Manage (4)	Categorisation of ideas -sentences (1)	<input type="checkbox"/> Sentences have one main idea each.	<input type="checkbox"/> Some sentences lack focus.	<input type="checkbox"/> Many sentences lack focus.	<input type="checkbox"/>	
	-paragraphs (1)	<input type="checkbox"/> Paragraphs have clear leading theme	<input type="checkbox"/> Some paragraphs lack focus.	<input type="checkbox"/> Many paragraphs lack focus.	<input type="checkbox"/>	
	Sequence of information (2)	<input type="checkbox"/> Logical sequence of information.	<input type="checkbox"/> Information sequence lacks	<input type="checkbox"/> Disconnected/ unstructured information	<input type="checkbox"/>	
Analyse and Synthesise (4)	Findings (2)	<input type="checkbox"/> Clear analysis of information provides insightful findings	<input type="checkbox"/> Useful analysis of information yet some findings lack clarity.	<input type="checkbox"/> Findings stated yet lack clarity due to weak analysis	<input type="checkbox"/>	
	Explanation of ideas- clarity and completeness (1)	<input type="checkbox"/> Clear, complete and relevant synthesis of ideas	<input type="checkbox"/> Sufficient synthesis of ideas yet lacks	<input type="checkbox"/> Attempted synthesis of ideas, yet disjointed.	<input type="checkbox"/>	
	Conclusion – precision and fit for contents (1)	<input type="checkbox"/> Precise and fitting conclusion.	<input type="checkbox"/> Conclusion does not fit the contents <i>or</i> is not precise.	<input type="checkbox"/> Conclusion is not fitting <i>and</i> is not precise.	<input type="checkbox"/>	
Communicate and Apply ethically (4)	Grammar; Syntax and style; word limit. (2)	<input type="checkbox"/> Correct grammar, good syntax and style; within word limit;	<input type="checkbox"/> Some grammatical errors; lack proper syntax and style over word limit but <10%	<input type="checkbox"/> Numerous grammatical and spelling errors; poor syntax and style; under or over word limit > 10%	<input type="checkbox"/>	
	Title fitting and succinct (1)	<input type="checkbox"/> Succinct title, fits contents	<input type="checkbox"/> Appropriate title	<input type="checkbox"/> Inappropriate title	<input type="checkbox"/>	
	In-text citing, reference list (1)	<input type="checkbox"/> Correct and complete citing and reference list	<input type="checkbox"/> Partly correct citing or partly complete references	<input type="checkbox"/> Incomplete and incorrect citing or reference list	<input type="checkbox"/>	

MG101 (face to face mode) Research Report Marking Criteria

(DRAFT)

Students' Names & ID Numbers: _____

Marker: Naolah Pitia (MG101 Coordinator)

Total Marks: 30%

	Elements of the report	High Credit (HC) = 71-100%	Satisfactory (S) = 50-70%	Not satisfactory (NS) = <50%	None = 0	Mark
1. Embark and Clarify Clarify purpose, state definitions & significance (3 marks)	Context and focus are in the introduction	<input type="checkbox"/> Clear context and precise focus provides direction	<input type="checkbox"/> Adequate context and provides some direction	<input type="checkbox"/> Unclear context or focus or not in introduction		
	Definition of workplace diversity	<input type="checkbox"/> Clear and succinct	<input type="checkbox"/> Adequate definition	<input type="checkbox"/> Lacking clarity		
	Significance of the study based on the literature	<input type="checkbox"/> Broad significance from multiple sources	<input type="checkbox"/> Outlined using some literature	<input type="checkbox"/> Significance not based on literature or is unclear		
2. Find & Generate Quality and relevance of information, research methods (5 marks)	Source- Variety - Currency - Relevancy	<input type="checkbox"/> Wide Variety of sources <input type="checkbox"/> less than 5 years old <input type="checkbox"/> Strongly support key ideas and themes	<input type="checkbox"/> Acceptable range <input type="checkbox"/> Some not current <input type="checkbox"/> Appropriately support key ideas and themes	<input type="checkbox"/> Heavy reliance on few <input type="checkbox"/> Many are not current <input type="checkbox"/> Questionable relevance of some information		
	Use of examples	<input type="checkbox"/> Clear & appropriate examples where needed	<input type="checkbox"/> Examples are effective yet not all ideas supported	<input type="checkbox"/> Examples lack relevancy or sufficient detail		
	Research rationale and methods used	<input type="checkbox"/> Methods well explained and rationale clear	<input type="checkbox"/> Methods or rationale unclear in places	<input type="checkbox"/> Methods and rationale are unclear		
3. Evaluate and Reflect Accuracy and trustworthiness (5 marks)	Level of information accuracy and reliability	<input type="checkbox"/> Primarily highly reliable information	<input type="checkbox"/> Moderately reliable information	<input type="checkbox"/> Much information is doubtful quality		
	Challenges/limitation & implications of these	<input type="checkbox"/> Challenges/limitations & implications articulated	<input type="checkbox"/> States challenges but no implications noted	<input type="checkbox"/> Challenges are only partially considered.		
4. Organize and Manage Structure of paragraphs and whole report (5 marks)	Organisation -sentences -paragraphs	<input type="checkbox"/> one main idea each <input type="checkbox"/> have clear leading theme	<input type="checkbox"/> Some lack one main idea <input type="checkbox"/> Some lack leading theme	<input type="checkbox"/> Many lack one main idea <input type="checkbox"/> Many lack leading theme		
	Sequence of information	<input type="checkbox"/> Logical and coherent sequence of information.	<input type="checkbox"/> Information sequence is logical but lacks coherence	<input type="checkbox"/> Unstructured information lacking harmony		
	Raw data documentation	<input type="checkbox"/> Complete and no errors	<input type="checkbox"/> Sufficient but lacks proper documentation & reliability	<input type="checkbox"/> Poorly documented data		
5. Analyze and Synthesize (8marks)	Discussion based on analysis of information	<input type="checkbox"/> Clear analysis provides an insightful discussion	<input type="checkbox"/> Useful analysis, yet part of discussion lack clarity.	<input type="checkbox"/> Discussion lacks clarity due to weak analysis.		
	Finding and Conclusion – precision and fit for contents	<input type="checkbox"/> Findings precise, accurate & fits conclusion. <input type="checkbox"/> Conclusion realistic, well-thought out, based on key findings <input type="checkbox"/> Insightful lessons for the workplace	<input type="checkbox"/> Appropriate to key findings, but sometime lacks reliability and accuracy <input type="checkbox"/> Conclusion does not fit the contents or is not precise. <input type="checkbox"/> Satisfactory statements of lessons for the workplace	<input type="checkbox"/> Do not fit the key findings or inappropriate <input type="checkbox"/> Conclusion does not fit the contents or is not precise. <input type="checkbox"/> Unclear or non-applicable lessons for the workplace		
6. Communicate and Apply (4marks)	Expression	<input type="checkbox"/> Clear for an academic audience.	<input type="checkbox"/> Clear for a layman's audience	<input type="checkbox"/> Expression lacks clarity		
	Spelling and grammar	<input type="checkbox"/> Correct grammar, syntax and style	<input type="checkbox"/> Few errors - not well thought out	<input type="checkbox"/> Multiple errors		
	In-text citing, reference list	<input type="checkbox"/> Correct and complete citing and reference list – strong evidence of ethical compliance & professionalism	<input type="checkbox"/> Partly correct citing or partly complete references – some evidence of ethical compliance & professionalism	<input type="checkbox"/> Incomplete and incorrect citing or reference list <input type="checkbox"/> Lacks evidence of ethical sensitivity & professionalism		

Copyright © MG101 Course Coordinator Ms Naolah Pitia and RSD Consultant Dr John Willison, The University of the South Pacific, 2013. Available under Creative Commons Attribution NonCommercial-ShareAlike 3.0 Unported License. Reference: Willison, J. and O'Regan, K., 2006 and 2013. *The RSD Framework*.

Session 2: Designing Rubrics for 200-Level Courses.

Consider how an existing assignment can be assessed by crafting assessment criteria that are framed by the facets of the RSD. Consider changes to the assignment description to ensure it fits with the rubric.

RSD-framed rubrics are different in their orientation to students' work:

Find the evidence for the process in the product.

This means that the same underlying research processes can be assessed, using the same RSD structure, by many and varied product types, from essays to lab reports to oral presentations.

Task 2: Create a RSD-based marking rubric for an existing assignment

Step 1: Identify 'elements' of your existing assignment that you currently mark. List these here:

Step 2: Use the blank marking rubric (page 31) to best line up these elements with RSD skills. You may like to start the process in the 'skeleton' RSD (pages 28-29).

Step 3: Are there RSD skills that are currently not assessed, but you think that should be assessed? Identify the 'elements' of students' products that may provide evidence for these here:

Step 4: Consider the evidence that you will gather from each student's final product (submitted assignment, oral presentation, etc) to determine how effectively students used their skills. What criteria will you apply for each piece of evidence for:

Below benchmark (ie what is unsatisfactory criteria)

Benchmark (What is satisfactory for this course)

Above Benchmark (What makes this work highly satisfactory)

It's a good idea to look at a number of other marking rubrics for ideas.

Also see the descriptions in ‘Example of questions and skill statements related to each “Facet of Inquiry”’.

Table 2: Marking rubric for an existing assessment, reframed by the RSD facets

Assessment Task Name _____

Degree of Student Autonomy (how much scope, from Level 1 to 5): State here: _____

<p>What characterises the difference between ‘search and ‘research’? More searching and more data generation is just a ‘big search’! Research is when students...</p>			
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Facet of Research</p>	<p>a. Embark & Clarify Respond to or initiate research and clarify or determine what knowledge is required, heeding ethical/cultural and social/team considerations.</p>	Curious	
	<p>b. Find & Generate Find and generate needed information/data using appropriate methodology.</p>	Determined	
	<p>c. Evaluate & Reflect Determine and critique the degree of credibility of selected sources, information and of data generated and reflect on the research processes used.</p>	Discerning	
	<p>d. Organise & Manage Organise information and data to reveal patterns and themes, and manage teams and research processes.</p>	Harmonising	
	<p>e. Analyse & Synthesise Analyse information/data critically and synthesise new knowledge to produce coherent individual/team understandings.</p>	Creative	
	<p>f. Communicate & Apply ethically Write, present and perform the processes, understandings and applications of the research, and respond to feedback, accounting for ethical, social and cultural (ESC) issues.</p>	Constructive	

CH101 - Marking Rubric for *Determination of Available Chlorine in Bleach by Iodometry* Experiment

Facet of Research	Element of Report	No Evidence	Below Benchmark Not present, incomplete or inaccurate	Benchmark Complete but not fully accurate, comprehensive or insightful	Above Benchmark Complete, accurate, and insightful/ innovative
Embark and clarify (6 marks)	Pre-Lab	<input type="checkbox"/> __	<input type="checkbox"/> Incomplete or major errors	<input type="checkbox"/> Pre-lab complete but not fully accurate	<input type="checkbox"/> Complete and accurate
	Title	<input type="checkbox"/> __	<input type="checkbox"/> Off track	<input type="checkbox"/> Reproduces given title	<input type="checkbox"/> Rephrased title
	Aim	<input type="checkbox"/> __	<input type="checkbox"/> Misses the purpose <input type="checkbox"/> Introduction misses the point	<input type="checkbox"/> Aim stated but does not accurately reflect experiment <input type="checkbox"/> Reproduces the given introduction	<input type="checkbox"/> Rephrased, clear, succinct <input type="checkbox"/> Finetuned, clear, succinct
<i>Find and Generate</i> (3 marks)	Procedure	<input type="checkbox"/> __	<input type="checkbox"/> Stated but incorrect <input type="checkbox"/> Attempted but commonly incorrect	<input type="checkbox"/> Correct yet reproduces supplied procedure <input type="checkbox"/> Significant figures and decimal places are mostly correct, except _____	<input type="checkbox"/> Finetuned, clear, succinct. <input type="checkbox"/> Without error
	Significant figures and decimal places	<input type="checkbox"/> __	<input type="checkbox"/> outside the limit of expected outliers	<input type="checkbox"/> data are within the limit of expected outliers, however are spread (lack precision)	<input type="checkbox"/> Accurate and precise, (suggesting quality bench skills)
	Data accuracy	<input type="checkbox"/> __			
<i>Evaluate and Reflect</i> (4 marks)	Verification of data accuracy and precision	<input type="checkbox"/> __	<input type="checkbox"/> Data verification is done poorly	<input type="checkbox"/> data is verified to assure quality, but lacking ... (repeated measurements, outlying data removal or _____)	<input type="checkbox"/> Data verification is thorough
	Methods adjustment	<input type="checkbox"/> __	<input type="checkbox"/> Adjustments to methods unspecified	<input type="checkbox"/> Adjustments to methods are specified	<input type="checkbox"/> Specified and justified
<i>Organize and Manage</i> (3 marks)	Structure of report	<input type="checkbox"/> __	<input type="checkbox"/> Required structure not used	<input type="checkbox"/> Title, aims, method, results and discussion are evident.	<input type="checkbox"/> Structure correct, highly coherent.
	Data representation	<input type="checkbox"/> __	<input type="checkbox"/> Not tabulated appropriately as _____	<input type="checkbox"/> Data appropriately tabulated with units, but could be improve by _____	<input type="checkbox"/> Appropriately tabulated with units
	Management	<input type="checkbox"/> __	<input type="checkbox"/> Late < 5 days	<input type="checkbox"/> Submitted on time	<input type="checkbox"/> On time and signed
<i>Analyze and Synthesize</i> (4 marks)	Data inclusions and exclusions	<input type="checkbox"/> __	<input type="checkbox"/> statement about data quality lacks relevance to data	<input type="checkbox"/> Any poor data or outlying data is treated accordingly and discarded or included data is justified	<input type="checkbox"/> Full and accurate justification of all data
	Statistical representation	<input type="checkbox"/> __	<input type="checkbox"/> Inappropriate statistics or	<input type="checkbox"/> Statistics are shown but not... (explained, justified...)	<input type="checkbox"/> Statistics explained and justified
	Replication	<input type="checkbox"/> __	<input type="checkbox"/> Repeat experiment stated but data lacking	<input type="checkbox"/> The experiment was repeated	<input type="checkbox"/> Additional results were more precise
	Data comparison	<input type="checkbox"/> __	<input type="checkbox"/> Comparison of data lacks information	<input type="checkbox"/> There is comparison of data obtained but not with specific local/international brands	<input type="checkbox"/> Includes other brands locally and internationally
<i>Communicate and Apply Ethically</i> (3 marks)	Citations	<input type="checkbox"/> __	<input type="checkbox"/> Not all sources cited (manual, texts, other students)	<input type="checkbox"/> The procedure and references are all cited but some format errors	<input type="checkbox"/> All references cited with no errors
	Text reproduction	<input type="checkbox"/> __	<input type="checkbox"/> Font, spacing or labelling problematic	<input type="checkbox"/> Font, spacing and labelling make report easy to read	<input type="checkbox"/> Labelling and titles highly polished
	Report clarity and argument	<input type="checkbox"/> __	<input type="checkbox"/> Arguments are not easily traceable/ clear	<input type="checkbox"/> The report's arguments are traceable but not always clear to follow	<input type="checkbox"/> Chrystal clear
	Grammar and	<input type="checkbox"/> __	<input type="checkbox"/> Typo-graphical and grammatical errors impair interpretation	<input type="checkbox"/> Some incidence of typo-graphical and grammatical errors, but do not impair interpretation	<input type="checkbox"/> No errors

Title of Assessment:					
Facet of Research	Element of _____	No Evidence	Below Benchmark Not present, incomplete or inaccurate	Benchmark Complete but not fully accurate, comprehensive or insightful	Above Benchmark Complete, accurate, comprehensive, and insightful/ innovative
Embark and clarify (6 marks)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Find and Generate</i> (3 marks)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Evaluate and Reflect</i> (4 marks)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Organize and Manage</i> (3 marks)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Analyze and Synthesize</i> (4 marks)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Communicate and Apply Ethically</i> (3 marks)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Example of questions and skill statements related to each “Facet of Inquiry”				
		FACETS OF INQUIRY	QUESTIONS (Clarifying what students need to do?)	SKILLS STATEMENTS (What students are <u>able</u> to do)
A.	Embark and Clarify	Students embark on inquiry and determine a need for information	<p>How do I start? What do I need to do? What am I expected to produce? What do I need to find out? What are the main themes/topics of the task? What are the key words? Why do I need to find this out? What do I already know about the topic? Is there anything I don’t understand about what I have to do? Who can help me to clarify the task? What are the task guidelines? What are my research questions? Who is my audience? Who am I communicating too? Are there any ethical considerations?</p>	<p>Analyse the task requirements Draw on prior knowledge (brainstorm, cluster ideas, concept maps, mind maps) Identify and interpret key words in the task Formulate an argument Formulate research questions Set the scope of the task Devise a time management strategy Create a supportive environment for team members</p>
B.	Find and Generate	Students find/generate needed information/ data using appropriate methodology	<p>What are the key concepts of the task? Where do I look for information/data? What resources do I use? How do I select resources? How diverse should the resources be? Where do I find resource details? How/where do I record sources’ bibliographic details?</p>	<p>Access and locate resources/information/data needed Understand how resources/information data are organised Apply a range of appropriate search strategies Select resources/information/data based on relevance Select resources/ information/data at the</p>

			<p>What do I know already about finding information/data?</p> <p>What do I still need to ask / learn about finding the right kind of information/data?</p> <p>Do I know how to use information tools? Search engines, databases, online resources, the library?</p> <p>Do I know how locate the information/data I need within the resources?</p> <p>Have I found information/data from a variety of resources?</p>	<p>appropriate level</p> <p>Select from a variety of resources/information/data</p> <p>Recognise when enough information/data has been collected</p>
C.	Evaluate and Reflect	Students critically evaluate information/ data and the process to find/ generate this information/ data	<p>Have I looked in the most relevant sources of information/ data?</p> <p>What are the sources of the information/data?</p> <p>Is this information/data relevant?</p> <p>Is the information/data accurate?</p> <p>Is the information/data authoritative?</p> <p>Is the information/data current?</p> <p>Is the information/data objective?</p> <p>Have I and selected the appropriate resources for the task?</p> <p>Have I examined a variety of resources?</p> <p>Do the resources answer my research questions?</p> <p>Am I able to extract, understand and interpret the information/data?</p> <p>What information/data do I keep? What do I leave out?</p> <p>Have I evaluated the information/data for currency, authority, accuracy, relevance?</p>	<p>Evaluate source of information/ data for currency and relevance</p> <p>Interpret, compare and select information/data</p> <p>Formulate appropriate questions to interrogate information/data</p> <p>Evaluate information/data for accuracy, reliability, bias, omission</p> <p>Evaluate information/data for currency, authority, scope, relevance</p> <p>Evaluate argument for logic</p> <p>Examine reasons for value judgements</p> <p>Consider ethical implications</p> <p>Examine reasons for contradictions in evidence</p> <p>Recognise when resources/information/data is inadequate</p> <p>Recognise the significance of cross referencing information/data</p> <p>Analyse the effectiveness of problem solving</p>

				<p>strategies</p> <p>Identify and evaluate validity of methodology</p> <p>Interprets and respect the opinions of others</p>
D.	Organise and Manage	Students organise information collected/ generated and manage the research process	<p>How many sources of information/ data do I want to use?</p> <p>What is relevant?</p> <p>What information/ data do I need to record?</p> <p>Am I able to take meaningful notes?</p> <p>How will I record the information/data effectively and accurately?</p> <p>How will I outline/categorise the information/data?</p> <p>How will I manage/categorise the information/data that I have collected/generated?</p> <p>How will I manage the information/data from different resources/</p> <p>How will I bring all the information/data together meaningfully?</p> <p>Do I need more information/ data?</p> <p>Do I need less information/ data?</p> <p>Do I need different information/ data?</p> <p>How will I record where the information/data came from?</p>	<p>Review the aims of the task</p> <p>Evaluate relevance and/or applicability of data/information</p> <p>Record the relevant data/ information and sources effectively</p> <p>Record relevant data/ information and sources accurately</p> <p>Group data/ information into larger units of information</p> <p>Extract any relevant specific details from the larger units of information.</p> <p>Distinguish between broad ideas and specific details of information</p> <p>Takes appropriate notes – oral, written, graphic, electronic</p> <p>Categorise information, ideas (graphic organisers, templates, software)</p> <p>Comply with copyright requirements</p> <p>Record bibliographic details</p> <p>Generate tables, maps, charts, spreadsheets, data sets</p> <p>Store information/data appropriately and responsibly</p>

E.	Analyse and Synthesise	Students synthesise, analyse and apply new knowledge	<p>How will I combine/integrate information? How do I apply the new knowledge? How do I develop new knowledge, concepts? What further questions do I need to ask? Have I understood the main/fundamental concepts presented in the information/data? Have I identified the consistencies and relationships between the information/data? Am I able to link ideas, themes, concepts, draw conclusions from the information/data I found? What are my new understandings/ideas? What answers/conclusions can I draw from the knowledge?</p>	<p>Analyse information/data Combine ideas and information Formulate hypotheses/questions based on available facts Make inferences, deductions, critiques Draw on prior knowledge Recognise knowledge gaps Analyse response to problem in terms of resources, constraints and objectives Apply problem solving strategies Evaluate different perspectives Create an original response to a problem or task Verify results Draw valid conclusions</p>
F.	Communicate and Apply	Students communicate knowledge and the processes used to generate it, with an awareness of ethical, social and cultural issues	<p>What will I do with this knowledge? With whom will I share this knowledge? Have I included everything that I needed to and followed the task guidelines? Have I prepared my response/ideas to suit my audience? Have I used the appropriate language and terminology? How will I communicate my ideas clearly? How will I share this information and persuade effectively? Have I met the assessment requirements?</p>	<p>Present and communicates knowledge appropriate to the task Write in a clear and coherent manner Apply academic conventions appropriate to the discipline Acknowledge others ideas through citing and referencing Consider audience Analyse audience response Negotiate solutions to problems/conflict Use subject specific specialised language Accept and respond to feedback from peers</p>

			<p>What referencing conventions do I need to apply?</p> <p>Have I followed University/Faculty guidelines in regard to plagiarism?</p> <p>Have I acknowledged through citing and referencing?</p> <p>Have I used information/data ethically and responsibly?</p> <p>Have I complied with copyright requirements?</p> <p>Can/How can I improve any of these steps in the process?</p> <p>How will I make use of constructive feedback?</p> <p>How will others interact with and apply the information/data I have created/contributed?</p>	<p>Acknowledges group and personal achievements</p> <p>Identifies skills that require practice</p> <p>Use feedback to improve learning outcomes</p> <p>Reflect on new knowledge</p> <p>Explain how new knowledge will be used</p> <p>Present results in appropriate formats</p>
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Learning activity developed by Monash University Library for the *Research Skill Development Framework*. Willison, J., and O'Regan, K. (2006). Accessed from <http://www.adelaide.edu.au/clpd/rsd/framework>. Questions and skill sets informed by ILPETS: Information Literacy Planning Extra Teaching Support. Ryan, J., and Capra, S. (1999).



Research Skill Development Framework

www.adelaide.edu.au/clpd/rtd - john.willison@adelaide.edu.au

Facet of Research	Level 1 <i>Students research at the level of a closed inquiry* and require a high degree of structure/guidance</i>	Level 2 <i>Students research at the level of a closed inquiry* and require some structure/guidance</i>	Level 3 <i>Students research independently at the level of a closed inquiry*</i>	Level 4 <i>Students research at the level of an open inquiry* within structured guidelines</i>	Level 5 <i>Students research at the level of an open inquiry* within self-determined guidelines in accordance with the discipline</i>
A. <i>Students embark on inquiry and so determine a need for knowledge/ understanding</i>					
B. <i>Students find/generate needed information/data using appropriate methodology</i>					
C. <i>Students critically evaluate information/data and reflect on the process to find/generate that information/data</i>					
D. <i>Students organise information collected/generated and manage the research process</i>					
E. <i>Students analyse and synthesise new knowledge</i>					
F. <i>Students communicate and apply knowledge, understanding and the process used to generate it, with an awareness of ethical, social and cultural issues</i>					

* closed = lecturer specified. open = student initiated. Lecturers and teachers determine scope of inquiry and standard required; student achievement determines the Level their research actually attains. For example, the provision of an open inquiry within structured guidelines (Level 4) in the First Year University context will see some students providing evidence of Level 1 attainment for a specific facet, with others demonstrating Level 2, Level 3 or Level 4, depending on their degree of rigour.



Session 4: Reporting to the group on RSD Learning & Teaching Activities, Assignments and Marking Rubrics

Task 4: Report to the whole group on the following

- a) The marking criteria you are using for 'embark and clarify'
- b) Any aspects of the assignment that were previously not marked but that you will now directly mark.
- c) Any changes to the assignment description
- d) How you will introduce students to the RSD-based rubric.
- e) Overall coherence of the different components

Take the opportunity to record others' feedback

Feedback from others	Your plans in response to feedback

Research Skill Development and Assessment in the Curriculum: Examples from Several Disciplines

Human Biology

Eleanor Peirce and Mario Ricci

Assessment tasks and marking rubrics:

- Diagnostic exercise
- Literature Research Task 1
- Laboratory Research Task 3
- Population Analysis Report

Between 2004 and 2009, Eleanor Peirce and Mario Ricci revised the whole of their Human Biology course to use RSD principles and marking rubrics. In it, they take the first and most common approach to using the RSD: to assess the research skills profile for each student at regular points throughout the course.

Human Biology is a two-semester-long First Year course. The course aims to develop fundamental reading, writing and research skills in a large cohort of students, so that they will move into their second-year studies with key skills in place. It focuses on communicating teacher expectations clearly to students, and giving concise and effective feedback that helps students to consistently develop their research skills and improve their work standard over the course of a full year.

For this reason, the Human Biology course includes:

- an initial diagnostic exercise
- several intermediary assessment tasks in the literature and laboratory research strands
- a final semester assessment
- a second-semester field research task that combines elements of literature and laboratory research work

in this approach to using the RSD, assessment tasks are structured to build on each other, with each literature or laboratory assignment developing aspects of an earlier one. You can see examples of this in the similarities between the diagnostic exercise and Literature Research Task 1 in the following pages.

Assessments are also designed to expand and integrate students' concepts of what research is. The two strands of the semester 1 course are therefore designed to introduce students to two distinct cultures of research—the culture of scientific literature research, and the culture of laboratory practice—while the final task, the Population Analysis field report in Semester Two, requires students to combine elements of both, while further developing new skills.



Literature-based Research Skill Development Task 1: Note Taking, Synthesis and Integration of Scientific Literature

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Background:

Part of being a sound scientist involves being “information literate”, i.e. having the research skills that enable you not just to locate or collect information related to a topic, but to also critically evaluate, process, integrate and apply that information (which may be collected from a range of different sources), to a specific situation or within a specified context. The Lit-RSD tasks that form part of the assessment for Human biology IA are aimed at assisting you to develop and/or refine these essential research skills while studying the structure and function of the human body.

Lit-RSD Task 1 expands upon and extends the RSD diagnostic task introduced in O-week, and focuses on the identification and appropriate acknowledgement of key scientific information about a specified topic and its effective use in constructing a coherent written summary of the topic.

Aims:

Through the completion of Lit-RSD Task 1 each student will have the opportunity to develop and refine the following research skills: -

- Effective note taking, using a framework that identifies key terms, ideas and/or concepts, and organises relevant points and information in relation to these terms in a hierarchical manner.
- Synthesis and integration of key terms and information derived from different sources to form a single set of structured notes that accurately and efficiently conveys the scientific message without duplication of ideas or data.
- Production, from the notes taken, of a logically presented, coherent, piece of writing that conveys the key scientific concepts or findings related to the topic.
- Accurate tracking and documentation, both within the notes and piece of writing, of the origins and/or “ownership” of all key terms, information and ideas derived from the literature provided about the topic (i.e. referencing).

Resources and Requirements for Task:

In order to complete Lit-RSD Task 1, you will need to access the following file, which is available from the Human Biology IA Assignments folder on MyUni: -

- “Bone” Information File – this file contains copies of articles and links to websites from which the notes for the task are to be taken.

You might find the following resources useful in completing the task: -

- Anderson J and Poole M 2001 *Assignment and Thesis Writing 4th Ed.* Wiley Brisbane. Chapter 2 Planning the Assignment, pages 9-17. – The chapter provides general guidelines on taking reliable notes, organising information and planning a piece of writing.
- Marking Criteria for Lit-RSD Task 1 (available in the Human Biology IA Assignments folder) – This document provides an indication of the characteristics that will be assessed.
- Guidelines explaining the Harvard System of reference citation – The Barr Smith Library website links to several useful documents on referencing. We will provide specific guidelines on application of Harvard referencing with Lit-RSD Task 3 later in the semester.

A Research Skills Support Session, run in conjunction with staff from CLPD (Centre for Learning and Professional Development) will be held in the Laboratory Session times scheduled in week 2 of semester (i.e. Wednesday 7th Mar 2-4pm and Thursday 8th Mar 9-11am). The venue is Lab S210a, Medical School South on both days. At the session we will:

1. Provide feedback about the O-week Diagnostic Task.
2. Discuss how to approach the RSD tasks.
3. Explain the marking criteria used for RSD tasks.
4. Introduce some of the tools available for finding scientific information.

Summary of Task:

Students will access the “Bone” Information File, which contains articles and links to information about bone structure and remodeling. From these sources, students will take structured, dot point notes, based around 3 or 4 key scientific concepts or ideas presented in the articles. The notes will then be used to prepare a short, written summary or abstract (not more than 1-1½ A4-sized pages, single spaced) that integrates each of the key concepts and ideas and accurately reports information from the original sources. Throughout the task, the sources of all information will be appropriately tracked, and the final written summary will use the Harvard system of reference citation to acknowledge the origins of data and ideas.

Specific Instructions:

Follow the steps indicated to ensure that each aspect of the competency exercise is undertaken.

STEP ONE

Access the “Bone” Information File.

The file is available in the Assignments Folder of the Human Biology IA MyUni website and contains various information sources about bone structure and remodeling. Read each of the articles or web pages indicated.

STEP TWO

Construct notes from the sources provided.

1. Identify a theme or context around which you will base your notes. Use this to formulate a title for your notes and subsequent summary or abstract (see Step Three).
2. From the sources provided, identify 3 or 4 key terms, ideas and/or concepts and use these as sectional headings for your notes.
3. Under each of your headings, organise the relevant information and data in dot point format, using symbols and abbreviations where appropriate.
4. Indicate the origins of all information, i.e. use a tracking system that links the information with the article or web page from which it was taken. [The designated system of reference citation for Health Sciences courses (with the exception of Psychology) is the Harvard system. Find out information about this system and have a go at using it. The finer details of how to apply Harvard referencing will be presented in the tutorial session in week 5.]

STEP THREE

Write a short summary or abstract that presents the key findings as identified in your notes.

The summary or abstract should incorporate the following features: -

1. A readily identifiable organizational framework or structure that is consistent with the overall context and title of the summary (e.g. introductory sentence, body of discussion of key areas, iterative or concluding sentence).
2. Integration of materials from the various sources in relation to each of the key concepts/ideas documented.
3. Logical linkage of key concepts and their synthesis into a coherent whole.
4. Evidence of understanding (e.g. provision of definitions and explanations) of all scientific data and the context in which they are presented.
5. Documentation of sources, both within the written text, and through the provision of a reference list.

STEP FOUR

Edit/review your work and check that you have addressed all aspects of the task before submitting it for assessment.

1. Check what you have written against both the specific task instructions given in this document, and the Research Skills Assessment Criteria.
2. Check your assignment using an editing checklist. The Centre for Learning and Professional Development Language and Learning Service provides an editing checklist via its website http://www.adelaide.edu.au/clpd/lis/stud_resources/
3. Attach a completed assignment coversheet (available via MyUni) to the front of your Lit-RSD Task 1 and lodge it before the deadline in the locked assignment box in the corridor outside of the School.



Literature Task 1: Marking Criteria

Student Name: _____ Student ID: _____

Marker: _____

 Facet of Inquiry	Student Autonomy Level 1 <i>Students research at the level of a closed inquiry and require a high degree of structure/guidance</i>	Students Autonomy Level 2 <i>Students research at the level of a closed enquiry and require some structure and guidance</i>	Student Autonomy Level 3 <i>Students research independently at the level of a closed enquiry</i>
A. <i>Students embark on inquiry and so determine a need for knowledge/understanding</i>	<input type="checkbox"/> Identifies some peripheral or duplicated ideas as key	<input type="checkbox"/> Identifies key ideas based on several sources	<input type="checkbox"/> Identifies key ideas utilising all sources
B. <i>Students find/generate needed information/data using appropriate methodology</i>	<input type="checkbox"/> Points/notes generated partially relate to the headings under which they are listed (some points not relevant to heading) <input type="checkbox"/> Notes produced are sourced predominantly from 1 text only	<input type="checkbox"/> Points/notes generated elaborate on the key ideas to which they are linked, but relevant data from some sources omitted, e.g. _____ _____ <input type="checkbox"/> Notes produced draw on ideas from several texts	<input type="checkbox"/> Points/notes generated fully and completely elaborate on the key ideas to which they are linked <input type="checkbox"/> Notes produced draw on ideas from all texts
C. <i>Students critically evaluate information/data and the process to find/generate this information/data</i>	<input type="checkbox"/> Identifies indicators of source credibility and reliability but does not fully apply them in evaluating data or process	<input type="checkbox"/> Identifies several relevant indicators of source credibility and reliability and provides appropriate rationale for usage/inclusion of information	<input type="checkbox"/> Identifies a wide range of indicators of source credibility and reliability and fully applies these in selection of data for inclusion
D. <i>Students organise information collected or generated</i>	<input type="checkbox"/> Has attempted a note-taking framework, but information is organised predominantly as a list of undifferentiated bullet points <input type="checkbox"/> Report structure follows general layout of notes, and has a beginning, middle and end	<input type="checkbox"/> Uses a hierarchical note-taking framework that organises related information under the appropriate key headings <input type="checkbox"/> Report based on notes; Ideas/data linked within sections/paragraphs, but no clear linkage between sections Poor linkage of: _____ _____	<input type="checkbox"/> Uses a hierarchical note-taking framework that appropriately organises related information according to sub-headings under key headings <input type="checkbox"/> All sections of report linked with coherent flow both within and between sections
E. <i>Students synthesise, analyse and apply new knowledge</i>	<input type="checkbox"/> Produces point form notes (information not directly copied or in sentence format) but notes are separated according to source <input type="checkbox"/> Report largely restates original data with minimal integration across sources	<input type="checkbox"/> Combines and integrates ideas/data from different sources to generate notes, but some inaccuracies or misinterpretations evident <input type="checkbox"/> Report presents integrated ideas/data but overall theme closely resembles that of original sources	<input type="checkbox"/> Combines and integrates ideas/data from different sources to generate notes that accurately reflect sentiment/ideas portrayed in the original sources <input type="checkbox"/> Report incorporates paraphrasing of data/ideas and presents "new" interpretations/context from that of original source(s)
F. <i>Students communicate knowledge and the process used to generate it with an awareness of ethical, social and cultural issues</i>	<input type="checkbox"/> Title is present <input type="checkbox"/> Partial and/or incorrect acknowledgement of sources within notes and/or report <input type="checkbox"/> Partial/incorrect reference list provided	<input type="checkbox"/> Title relates to the key ideas within the report, but requires some refinement <input type="checkbox"/> Full acknowledgement of all sources within notes and report <input type="checkbox"/> Reference list contains all sources cited	<input type="checkbox"/> Title clearly and succinctly reflects contents of the report <input type="checkbox"/> Full and correct acknowledgement of all sources within notes and report, with differentiation between quotation and paraphrase <input type="checkbox"/> Reference list contains all sources cited and follows referencing conventions



Activity 3.2: Light Microscopic Observation of Cells

In this activity, you will prepare a sample of the cells that line the inside of your cheeks (i.e. a buccal smear) and then examine it under a light microscope.

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METHOD FOR THE PREPARATION AND STAINING OF A BUCCAL SMEAR

Prepare specimens as follows:

1. Using a pipette, place a small drop of distilled (purified, clean) water in the centre of a clean microscope slide.
2. GENTLY and lightly scrape the inner lining of your cheek with the broad end of a flat toothpick.
3. Stir the toothpick vigorously in the drop of water on your slide, and then dispose of the toothpick in the container for hazardous waste.
4. Cover the drop with a clean cover slip lowered onto the slide at an angle to minimise the formation of air bubbles between the specimen and the cover slip. If there is too much liquid on the slide, blot the excess from the edges of the cover slip using absorbent paper towel.
5. Repeat steps 1 to 4 for a second specimen, but this time add a drop of 10% methylene blue stain to the water-cheek cell suspension on the slide, prior to adding the cover slip.

METHOD FOR LIGHT MICROSCOPIC EXAMINATION OF A CELL SMEAR

6. Examine your prepared specimens by following the protocol for the appropriate use of a light microscope as presented on pages 1-2 of the Laboratory Notes. Examine the appearance of the cells on the slide using first the low power, 4x objective lens, before moving to the higher power 10x and 40x objective lenses.
7. In Table 3.1, draw the typical appearance of a cheek cell, as observed at high magnification for both the unstained and the stained smear.

Table 3.1

Appearance of Unstained Cheek Cells	Appearance of Stained Cheek Cells

8. On each of your drawings, accurately label the cell's nucleus, cytoplasm and plasma membrane. Can you identify any additional components or features of the cells in your smear preparations? If so, label these on your drawings.
9. What effect, if any, did the methylene blue have on the cells in your preparation? List the advantages of staining cells (and tissues) before viewing them under the light microscope.

10. Most tissue preparations are stained with not one, but two different dyes. The most widely used combination of dyes used for staining in light microscopy is haematoxylin and eosin (H&E). What colour is haematoxylin?

What colour is eosin?

11. Now briefly examine slide 56 – Lip (H&E) from your slide box. Locate the region of tissue shown on the laboratory monitors. This region is the inner surface of the lip and is composed of the same cell type as that in your smear. How do these cells appear different from those in your smears?

12. Explain the reason(s) for the differences in cellular appearance between the two preparations.

13. On the basis of their appearance and arrangement, suggest a possible function(s) of buccal cells. Where possible, link individual features with their contributions to the overall function of these cells.

14. Review what you have achieved by completing Activity 3.2 and list up to 3 learning objectives addressed by the activity.


Laboratory 3, Activity 3.2: LM Observation of Cells: Marking Criteria

Student Name: _____

Student ID: _____

Marker: _____

 Facet of Inquiry	Student Autonomy Level 1 Students research at the level of a closed inquiry and require a high degree of structure/guidance	Students Autonomy Level 2 Students research at the level of a closed inquiry and require some structure and guidance	Level 3 Students research independently at the level of a closed inquiry
A. Students embark on inquiry and so determine a need for knowledge/ understanding	<input type="checkbox"/> Identifies an appropriate purpose/reason for undertaking Activity 3.2 (LM Observation of Cells)	<input type="checkbox"/> Clearly & concisely identifies several principle purposes/ reasons for undertaking Activity 3.2 (LM Observation of Cells)	
B. Students find/generate needed information/data using appropriate methodology	Generally follows methods/ protocols, yet some aspects omitted or incomplete, for: <ul style="list-style-type: none"> <input type="checkbox"/> preparation of a cell smear <input type="checkbox"/> staining <input type="checkbox"/> operation of microscope <input type="checkbox"/> Q9 or Q10 correct 	Rigorously adheres to methods/ protocols for: <ul style="list-style-type: none"> <input type="checkbox"/> preparation of a cell smear <input type="checkbox"/> staining <input type="checkbox"/> operation of microscope <input type="checkbox"/> Q9 & Q10 correct 	
C. Students critically evaluate information/data and the process to find/generate this information/data	<input type="checkbox"/> Presents data generated after consideration & evaluation of only part of the overall activity <ul style="list-style-type: none"> <input type="checkbox"/> Accurate contrast, missing some details, in Q11 	<input type="checkbox"/> Presents data based on consideration & evaluation of most or all parts of the activity <ul style="list-style-type: none"> <input type="checkbox"/> Accurate, detailed contrast in Q11 	
D. Students organise information collected/ generated	<input type="checkbox"/> Produces drawings that are partially labelled & depict some structural features of the cells <ul style="list-style-type: none"> <input type="checkbox"/> Ideas/ data not always presented in a logical sequence within answers 	<input type="checkbox"/> Produces drawings that are appropriately labelled & accurately depict most or all observable structural features of the cells <ul style="list-style-type: none"> <input type="checkbox"/> Ideas/data presented in logical sequence within answers 	
E. Students synthesise and analyse and apply new knowledge	<input type="checkbox"/> Understanding of cell structure & function is based on cell smear activity only <ul style="list-style-type: none"> <input type="checkbox"/> Some valid inference in Q12 or Q13 <input type="checkbox"/> Linkage between cellular features & functions partially explained or incorrect for Q 13 	<input type="checkbox"/> Understanding of cell structure & function utilises data obtained from the cell smear activity as well as other sources (e.g. interpretations of tissue section) <ul style="list-style-type: none"> <input type="checkbox"/> Explanation based on evidence and valid inference in Qs 12 & 13 <input type="checkbox"/> Linkage between cellular features and functions fully explained & accurate for Q 13 	
F. Students communicate knowledge and the process used to generate it, with an awareness of ethical, social and cultural issues	<input type="checkbox"/> Aspects of the student's conduct within the laboratory indicate some awareness of safe practice protocols	<input type="checkbox"/> Student's conduct within the laboratory indicates a thorough awareness and understanding of safe practice protocols	



ASSESSMENT TASK 2: Population Analysis – Laboratory Report

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Timeline:

The deadline for submission of the laboratory report is **Monday 13th October 2008, 4.00pm** (week 10 of semester).

Please note that you will be required to collect the data on which to base your report in your own time as class time has not been allocated to this activity. The course coordinators will be available to provide assistance with data analysis (i.e. construction of life tables and graphs) in weeks 7 and 8 of semester and at designated times during the first week of the mid-semester break – September 22nd-26th 2008. Please consult the Human Biology IB Notice board in MyUni in week 8 of semester for the times when assistance will be available.

Late submission of the report will attract marking penalties at the rate of a 5% deduction from the total mark allocated to the task per day of lateness. Reports submitted more than 5 days late will not be awarded a mark.

Rationale for Task:

Throughout the Human Biology courses there has been an emphasis on the development of research and communication skills within a discipline specific context. To date students have been introduced to, and given the opportunity to apply through a variety of assessment tasks, skills in the location, interpretation, critical evaluation and integration of scientific information. While previous assessment tasks have been based around scientific research conducted by other individuals and reported in the literature, this assessment task requires that students collect and interpret their own scientific data set. These data are then to be discussed in a short, written report supported by evidence (which is appropriately acknowledged) from similar studies in the research literature.

Aims:

The broad focus for this assessment task is to undertake an analysis of the characteristics of a human population in order to gain an understanding of:

- basic concepts of population demography
- how populations change over time
- factors that influence population change, and
- what past and/or current environmental, social and political circumstances might predict about the composition of future populations.

A suggested way of collecting relevant data for analysis, e.g. information about the age composition and sex ratio with a population, is to visit a cemetery and record details of ages at death for males and females who died during a particular time period. Instructions on how to do this are provided later in this document. **[Note:** You may choose to obtain your data in some other way. This is acceptable, but you must fully document how and from where you obtained data in the Materials and Methods section of your report.]

Through the successful completion of this assessment task each student has the opportunity to: -

1. Apply scientific method in the investigation of human population dynamics.
2. Learn about methods of data collection and their limitations, e.g. biases arising from sampling techniques and difficulties/limitations in data interpretation arising from collection methods.

3. Develop skills in the manipulation of data sets via the construction of life tables, and survivorship and mortality curves (graphs).
4. Investigate/research factors that shape the composition and dynamics of human populations.
5. Further develop skills in the communication of scientific information through the preparation of a short written report about the characteristics of the chosen population.
6. Consolidate skills in library research (use of search engines, indexes and databases), integration and referencing of scientific information.
7. Develop skills in critical analysis through self-evaluation of the report against a set of criteria around which the report will be assessed.

General Task Instructions:

The assessment task involves writing a short scientific report based on the collection and analysis of demographic data for a specific population of humans. Details of how to go about collecting and interpreting population data are provided in the following notes. Information about the general format of a scientific paper or report was provided in the notes for **Lab 1: Principles of Scientific Writing**. (Copies of these notes are available on MyUni).

Please take note of the following points before commencing your investigations.

- i. You may choose to sample a time period and location different from the ones listed later in these notes, e.g. age at time of death during a particular year, or mortality patterns for individuals who are buried in a rural as compared with an urban locality. What population you sample and the time interval you use will depend on the hypothesis or question you are posing about the composition of the population, or the aspect of population dynamics you wish to investigate. Similarly, the time interval chosen may depend on availability of a large enough sample size.
- ii. It is acceptable to collect data by methods other than visiting a cemetery. You must, however provide full details of how, and from where, you accessed your data set.
- iii. You may choose to share the collection of data with a group of other students. Each student must however analyse the data separately and write up their own report about the findings.
- iv. There is no prescribed page or word limit for the report, but it is expected that the topic can be adequately presented in 6-8 pages, excluding figures, tables, references and appendices.
- v. It is expected that the format of the written report will follow the guidelines for a short paper or report provided in the notes for Lab 1.
- vi. Hand written reports are acceptable provided that the script is legible.

To assist you in determining whether your report includes all of the attributes that will be assessed, please self-evaluate your report against the criteria identified in the **Report Checklist**. (This is provided as a separate document that you can download and print from MyUni). The checklist must be attached to your submitted assignment, along with a coversheet that includes a signed statement to the effect that the report is your own work. You should also access the Marking Criteria document for this task (on MyUni).

Background to Population Dynamics:

A population is a group of interbreeding individuals that inhabits a particular place. The study of populations is known as **demography** meaning in Greek "description of the people".

Populations vary in both space and time. In order to understand the dynamics of a population, the number or proportion of males and females and their ages must be known, along with how rapidly the population's numbers are increasing or decreasing. Fluctuations in the size of a population are related to differences in its birth and mortality rates (natural movement), and the rate of migration into or out of the population (migratory movement). These properties of a population are measured in a statistical way by calculating a number of biometric functions as defined below.

The four simplest measures of changes in the size of a population are:

1. The **crude birth rate**, calculated as the number of births during a year divided by the total population size.
2. The **crude death rate** (the number of deaths occurring during a year as a proportion of the total population size).
3. The **rate of emigration** from the population (number of persons leaving during a year as a proportion of the total population size).
4. The **rate of immigration** into the population (number of people arriving as a proportion of the total population size).

Such simple measures however do not take into account the age or sex composition of a population, hence the name "**crude rates**". Many biological phenomena vary in a more or less orderly fashion with age. For example, the probability of living from one instant to the next is a function of an organism's age, as well as the conditions encountered in its environment. Although individuals become fecund (capable of child-bearing) at puberty, they reach their full child-bearing potential only at around 20 years of age. An age-specific approach, then, is essential to understanding the dynamics of a population.

Age-specific rates are more precise measures of population dynamics as they relate births, deaths etc. not to the total population size, but to the number of individuals of a given age. For example, the age specific fertility rate of women aged 20-24 years is the number of children born to mothers aged 20-24 years divided by the total number of women aged 20-24 years within the population. The age specific mortality rate is commonly expressed as the probability of dying during a year at a given age. For example, the probability of dying at age 43 is the number of persons aged 43 who died during a year, divided by the total number of 43 year olds in a population.

If the age-specific rates of fertility, mortality, emigration and immigration for a population are known, it is possible to **predict** the characteristics of the population in the future, assuming that the rates will remain constant, i.e. that environmental conditions will not change. Of course, the characteristics of the population at the present time are the result of occurrences in the population in the past.

Life Tables

A life table is a convenient format for describing the pattern of mortality in a population in a formal, mathematical way. The first life table was calculated by the British astronomer Halley during the 17th century for the City of Wroclaw (now in Poland). Life tables were developed and are commonly used by demographers working for life insurance companies, who have a vested interest in knowing how long people can be expected to live. An example of a life table is presented as Fig. 1. Formulae for calculating age-specific biometric functions of the life table are included with these notes. The meaning of these functions will be explained during the laboratory session..

Figure 1: Life Table: Australian Population, 1960's.

age x (yrs)	d_x	l_x	q_x	L_x	T_x	e_x
0	0.0294	1.0000	0.029	9.853	68.028	68.03
10	0.0084	0.9706	0.009	9.664	58.175	59.94
20	0.0149	0.9622	0.015	9.547	48.512	50.42
30	0.0187	0.9473	0.020	9.379	38.964	41.13
40	0.0439	0.9286	0.047	9.067	29.585	31.86
50	0.1102	0.8847	0.125	8.297	20.519	23.19
60	0.2251	0.7746	0.291	6.620	12.222	15.78
70	0.3028	0.5494	0.551	3.981	5.602	10.20
80	0.2087	0.2467	0.846	1.424	1.621	6.57
90	0.0372	0.0380	0.979	0.194	0.198	5.21
100	0.0008	0.0008	1.000	0.004	0.004	5.00
110	0.0000	0.0000	1.000	0.000	0.000	0.00

Methods for Investigation of a Population:

One method of investigating the characteristics of a population is to sample a "captive" group, such as that found buried in a cemetery. Most tombstones and plaques in memorial walls provide information about the dates of birth and death of individuals and their age at the time of death; analysis of these data then provides a snapshot of the population's characteristics. Hence by collecting data from local cemeteries, information can be gleaned about the population of *Homo sapiens* that inhabited particular regions of Adelaide and South Australia over the last 150 or so years.

Each student is required to collect data on the age at death of individuals within a specific population of their choice. In order to determine whether population characteristics have changed over time, different time frames should be investigated by the class as a whole. Suggested populations that could be investigated include those from specific localities where individuals died:

- Prior to 1860.
- Between 1860 and 1879.
- Between 1880 and 1899.
- Between 1900 and 1914.
- Between 1915 and 1919.
- Between 1920 and 1939.
- Between 1940 and 1949.
- Between 1950 and 1969.
- Between 1970 and 1985.
- Between 1986 and 2000
- After 2000
- During any other time interval as designated by the investigator.

Collect data for one population group only; if you wish to undertake a comparative study of populations living in the same locality in different time frames, or living during the same time frame but in different localities, you are permitted to share data collected by other students.

From where should I collect my data?

Suitable cemeteries (in terms of their size) from which to collect data include: -

- West Terrace Cemetery
- Hindmarsh Cemetery
- Luhr's Road Cemetery, Payneham.
- Mitcham Cemetery
- Cheltenham Cemetery
- Enfield Cemetery
- Centennial Park Cemetery
- Klemzig Pioneer Cemetery
- any other cemetery from which a large enough data set can be collected. You might like to confirm with the subject coordinator that your choice is suitable before collecting your data.

PLEASE DO NOT CONTACT CEMETERY AUTHORITIES WITH REQUESTS FOR THEM TO SUPPLY YOU WITH DATA FROM THEIR RECORDS AS THEY ARE UNABLE TO DO THIS FOR NUMEROUS STUDENTS.

How should I collect my data, and how much data is required?

The success or otherwise of this activity depends in part upon an **efficient and valid system of data collection**. The aim is to **systematically collect data from EACH RELEVANT TOMBSTONE in the cemetery or section of the cemetery**. **Do not collect data just from those tombstones that are "nicer looking" or more readable, as this will bias your sample**. **Likewise, do not sample a tombstone more than once**. Each student should aim to collect data for at least 1000 individuals in their population group. In order to minimise the work involved in data collection, students collecting data for the same population group may like to organise themselves into teams of three or four, with individuals collecting data from tombstones in different sections of the cemetery and then pooling their data into one data set. In this way a larger data set can be obtained for less individual effort.

Data on the **age of individuals at the time of their death** should be collected. In most cases, an age will be displayed on the tombstone. In others you may have to calculate an age from the dates of birth and death given. **Age** at time of death **need only be estimated to the nearest year** for our purposes. Please **record data for females and males separately**. Separate data sheets for females and males have been provided with these notes.

How should I analyze my data?

Each student should:

- Express the results of their data collection in the form of a frequency distribution graph of age at time of death for each sex (if working as part of a team, collate the data collected by all team members before doing this).
- Calculate the percentage of the total population of each sex represented in the cemetery that died at a particular age.
- Calculate all biometric functions of the life table for males and for females separately. These functions are explained on the following page of these notes.
- Discuss the results obtained and their possible significance, i.e. what they might infer about the characteristics of the populations and possible factors influencing the population.

You might like to consider the following questions when analyzing your data and writing your report. Some or all of the questions might generate discussion that is applicable to your sample population. It is not appropriate however to just answer these questions in the discussion section of your report without placing your study within the wider context of other population studies reported in the literature.

Are there any differences in the pattern of mortality between men and women? If so, what are these differences and how might they be explained?

What is the average age at which death occurs in men and women?

Do all of the individuals in the cemetery represent a single cohort? In what ways will this affect interpretation of the data?

Are there any peaks in the mortality schedules? How do you interpret these?

Did you find any evidence of migration into or out of the population? What form might such evidence take?

How does natural increase influence the data?

What differences might you expect in the appearance of a frequency histogram for a population with a high infant mortality, as compared to one for an ageing population?



Marking Criteria for Population Analysis Laboratory Report

Student Name:
 Marker:

Student ID:

← Level of Student Autonomy →

↓ Facet of Inquiry	Level 1 <i>Students research at the level of a closed inquiry and require a high degree of structure/guidance</i>	Level 2 <i>Students research at the level of a closed inquiry and require some structure/guidance</i>	Level 3 <i>Students research independently at the level of a closed inquiry</i>	Level 4 <i>Students research at the level of an open inquiry, within structured guidelines</i>
A. Students embark on inquiry and so determine a need for knowledge/ understanding	<input type="checkbox"/> Aims/hypothesis not made explicit	<input type="checkbox"/> Aims/hypothesis not clearly stated or inappropriate	<input type="checkbox"/> Aims/hypothesis clear, but adheres closely to guidelines	<input type="checkbox"/> Aims/hypothesis clear, focussed and innovative
B. Students find/generate needed information/data using appropriate methodology	<input type="checkbox"/> Source of data is cited (cemetery name/location, ABS, etc)	<input type="checkbox"/> Data sampling protocols are adequate	<input type="checkbox"/> Data gathered are appropriate to aims/hypothesis	<input type="checkbox"/> Data from a variety of sources or rigorous data collection
C. Students critically evaluate information/data and the process to find/generate it	<input type="checkbox"/> Self-evaluation of project (completed the 'Report Checklist')	<input type="checkbox"/> Limitations <u>or</u> biases of the study are stated	<input type="checkbox"/> Limitations <u>and</u> biases of the study are stated	<input type="checkbox"/> Evaluation of the whole study design is rigorous
D. Students organise information collected/ generated	<input type="checkbox"/> Data gathered but not presented in a report writing structure Missing _____ _____ _____	<input type="checkbox"/> Data are incorporated into a report writing structure but there is no clear linkage between sections Poor linkage of _____ _____	<input type="checkbox"/> Report writing conventions are generally followed with coherent flow Areas for improvement: _____ _____	<input type="checkbox"/> Report writing conventions are followed completely
E. Students synthesise, analyse and apply new knowledge	<input type="checkbox"/> Limited synthesis of data with literature <input type="checkbox"/> Results restated with minor analysis _____ _____	<input type="checkbox"/> Data compared <u>or</u> contrasted with literature <input type="checkbox"/> Data analysis, but inappropriate on occasions _____ _____	<input type="checkbox"/> Data compared <u>and</u> contrasted with literature <input type="checkbox"/> Data analysis is appropriate _____ _____	<input type="checkbox"/> Synthesis of data with other studies is rigorous <input type="checkbox"/> Data analysis is comprehensive
F. Students communicate knowledge and the processes used to generate it, with an awareness of ethical, social and cultural issues	<input type="checkbox"/> Title is present <input type="checkbox"/> Sources are used, but Harvard referencing style is not applied _____ _____	<input type="checkbox"/> Title portrays a general sense of the study content <input type="checkbox"/> Sources are used and sometimes Harvard referencing style is applied _____ _____	<input type="checkbox"/> Title succinctly portrays the full dimensions of the study <input type="checkbox"/> A variety of sources is used and Harvard referencing style is usually applied	<input type="checkbox"/> Title succinctly portrays a study from an "original" perspective <input type="checkbox"/> A variety of source <u>types</u> is used and Harvard referencing style is applied consistently

Student name and identifying details removed.

Generic Research Skill

Title: Semiconductor Optical Amplifier Technology and Application

Structure and Characteristics of SOA

- Consist of amplifying medium inside a resonant cavity [1]
- Works like Fabry-Perot laser diode [1]
- Two types: Resonant SOA and Travelling-wave SOA [1]
- Amplification achieved by externally pumping the energy level of material using current [2]
- Gain is influenced by input signal and noise of SOA [2]
- Gain saturation occurs if input signal power is high [2]

Non-linearities of SOA

Cross gain modulation (XGM)

- Strong signal at one wavelength affects the gain of a weak signal at another wavelength [2]
- Caused by carrier density changes [2]

Cross phase modulation (XPM)

- Phase and gain of optical wave propagating are coupled via gain saturation [2]
- XPM can be used to create wavelength converters [2]

Four-wave mixing (FWM)

- Occur in SOA between two optical fields [2]
- Injected fields cause gain to be modulated at beat frequency, and create a new field [2]
- Useful for wavelength converters, dispersion compensators and optical demultiplexers [2]

Application of SOA

Amplifiers

- Such as booster amplifier, preamplifier and in-line amplifier [2]
- To increase high power input signal prior to transmission (booster), to increase receiver sensitivity via increasing power level (preamp), and to compensate for fibre loss (in-line) [1&2]

Optical gates

- SOA can be constructed as optical gate (or switch) with high-speed switching capability that is required by high-speed optical communication network nowadays [1&2]
- Can be integrated into gate arrays for high density switching [1&2]

Wavelength converters

- SOA can be used in optical time division demultiplexer and add/drop multiplexer in optical network [2]

Optical clock recovery

- High-speed clock recovery is best achieved by optical solution [2]
- Uses phase locked loop with SOA based interferometric switch [2]



Marking Criteria: Health Numeracy for Nursing – Level 2

TCN 2A Health Numeracy 2009	Level 2 Students research at the level of a closed enquiry and require some structure / guidance	Task description
A. Students embark on inquiry and so determine a need for knowledge / understanding	Responds to questions / tasks required by and implicit in a closed inquiry	Students will analyse the medication charts of patients and identify ten medications that require some form of calculation prior to patient administration. Do NOT identify patients in any way. 1
B. Students find / generate needed informational data using appropriate methodology	Collect and record required information/ data using a prescribed methodology from prescribed sources in which the information / data is not clearly evident	Students will use the information from the medication charts to create a table of the 10 <u>different medications (at least one each of O, S/C, IV, IM)</u> . Table headings will be: <ul style="list-style-type: none"> • Generic name • Brand name • Usual dosage • Patients dosage • Route • Indications 2
C. Students critically evaluate informational data and the process to find / generate this information / data	Evaluate information / data and the inquiry process using prescribed criteria	Students will evaluate the tabulated data to determine which numerical operation is required for administering each drug (i.e. what is the drug calculation required conversion/ multiplication etc). There may be more than one type of operation required. 3
D. Students organise information collected / generated	Organise information using a recommended structure and process	Students will organise the data from the table and identify the most common to least common types of numerical operation. 4
E. Students synthesize and analyse and apply new knowledge	Synthesize and analyse information / data to reorganise existing knowledge in standard formats. Ask relevant researchable questions.	Students will create a pie chart to illustrate the numerical operators required. As a result of the findings suggest a research topic that you might consider useful to improving nursing numeracy skills. 5
F. Students communicate knowledge and the processes used to generate it, with an awareness of ethical social and cultural issues	Use some discipline specific language and prescribed genre to demonstrate self selected knowledge and understanding from a stated perspective and for a specific audience	Students will describe the impact of drug calculation errors on the patient population in a summary of a number of pre-selected journal articles. (500 words) 6

Golbeck, A Ahlers-Schmidt, C Paschal, A Edwards Dismuke, S 2005 'A definition and operational framework for health numeracy', *American Journal of Preventive Medicine*, vol 29, no 4, pp 375-376



**Bachelor of Oral Health - Human Biology
Assessment Task - Semester 2 2008
Instructions to Students**

Developed by Sophie Karanicolas and Cathy Snelling, School of Dentistry, Faculty of Health Sciences, The University of Adelaide.

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Collaborative group work – Developing a wiki and poster presentation assignment.

I. A Wiki on How to Make a Wiki!!!

Cathy and I will begin to construct a collaborative wiki on 'How to Make a Wiki' to model the format of your next assignment for Human Biology.

For the purpose of this project you will:

1. Work in groups of 3
2. Explore and investigate an assigned topic/issue in Human Biology
3. Review your aims and objectives collaboratively
4. Assign group member tasks equitably
5. Develop a wiki of your research findings with support from your designated e-facilitator
6. Frame a research topic/question and design an academic poster to present to a simulated scientific forum, with a summary of your findings
7. Your poster presentation will be accompanied by a 10 minute oral presentation.

2. What is a wiki?

For the technologically savvy amongst us, a wiki is easy to understand, develop and nurture. We have provided a few links to for you to view some pretty amazing wikis. Not that we expect the same level of construction for the purpose of this assignment from you guys, but it may help to view some other wikis to help give you ideas. They look more complex than what they are, and trust me, if Cathy and I can get our heads around them, you Gen Y kids have already got a head start on us. They can be a simple or as complex as you like. The beauty of a wiki is that it becomes a written record of your collaborative group work. My advice for making a wiki... Just do it !!! Click the icons and see what happens. Everyone knows of wikipedia, right? Well here is a link to view a wiki on the Endocrine System as an example:
http://en.wikipedia.org/wiki/Endocrine_system

Next we have an example from the University of Columbia on Social Justice. This is a favourite of mine and Cathy's.

http://socialjustice.ccnmtl.columbia.edu/index.php/Main_Page

Step 1

Your assigned groups, topics and e-facilitator (Sophie or Cathy) are as follows:

Group 1 The Gag Reflex

Group 2 Physiology of Dental Pain

Group 3 Cementum

Group 4 Endocrine and Exocrine Glands

Group 5 Endocrine System: Negative Feedback

Group 6 Endocrine System: Growth Hormone

Group 7 Endocrine System: Adrenal Glands

Group 8 Stress

Group 9 Diabetes

Group 10 Pregnancy

Group 11 Smell and Taste - Sophie

Step 2

Aims and objectives: you may add to or modify your assigned objectives to make them more suited to your learning preferences, as well as helping to frame your research focus.

The aims and objectives of each poster will be discussed in our F2F session on the assignment on Tuesday 27/7/09

Step 3

Set group roles and assign tasks.

The role of your e-facilitator: Cathy and I will join in on your selected groups to assist you with any queries or concerns you may have. Although we will not add or contribute to the content of your wiki, we may make some suggestions as you are progressing through the different stages on the wiki discussion page or by sending you an email. An example of how the discussion page works can be accessed on <http://boh08.wikispaces.com/message/list/Group+9>

Step 4

Find your page in this space under the navigation list.

Step 5

Begin your research and start your collaborative writing. Write down your ideas and information and do not be too concerned about the format or structure of your page as it evolves. There is plenty of opportunity to cut and paste and reframe the page as it develops. That's part of the fun..... Start by clicking the 'edit this page' tab on the right hand side tool box.

Step 6

Click on the Wiki folder in MyUni under **Human Biology I OH Semester 2/Assignments/Wiki Resources** to access the **assessment rubric** that gives you

clear and explicit criteria of how you will be assessed. You will notice that the learning process eg., group work, research skills and wiki development will be assessed just as equally as your final poster presentation.

Other useful resources found in this folder:

- Links to academic poster formats
- Criteria outlining high quality poster presentations
- Exemplars: Past student posters and poster presentations
- Exemplars; Past student wiki pages eg., <http://boh08.wikispaces.com/Group+9>

Alternatively you can take the stairs to the fourth floor of the Medical School South Building - Physiology Department- and view the suggested layouts for posters in the corridor or take note of the many Posters displayed around the Dental School and outside our offices. Please be mindful not to disrupt classes whilst you are viewing the layouts.

Remember you can also access the many discipline specialists across the dental school to help you frame a research focus for your topic.

Step 7:

Once you have the final draft of your wiki, refine the content and add links to pages and external resources. You must reference your wiki content throughout using the Harvard Referencing System. (Refer to your General Studies MyUni folder for a refresher on how to reference accurately).

Whilst in the process of finalising the content and layout of your wiki, begin selecting the information that you will include in your poster.

Your poster must include the following elements:

Title and authors

Aims and objective, research focus

Introduction

Content to include diagrams or any graphs etc..

Summary and any acknowledgments etc....

The University of Adelaide Logo

Step 8:

Your e-facilitator will upload your group's poster on MyUni under Human Biology 1 in the assigned area labelled **Poster Gallery**. You will need to prepare a 10-minute oral presentation of your poster and your wiki space to the rest of the class. The date for these presentations is scheduled for the first week in October 2009, in the Wine Centre Gallery. The first year students last year really enjoyed this part of the project - not just because it was at the end - but they were really proud of what they have achieved as a group and it was a chance to showcase their work.

Step 9: Enjoy !!



Group Wiki Collaboration and Project Poster

Student Name: _____ Student ID: _____

Marker: _____

 Facet of Inquiry	Student Autonomy Level 1	Student Autonomy Level 2	Student Autonomy Level 3
<p>A. Students <i>embark on inquiry</i> and so determine a need for knowledge/ understanding</p>	<p><i>Students research at the level of a closed inquiry and require a high degree of structure/guidance</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Identifies peripheral/duplicated core components of topic <input type="checkbox"/> Minimal articulation of core components to oral health practice. 	<p>Students research at the level of a closed inquiry and require some structure and guidance</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identifies core components of topic. <input type="checkbox"/> Clear articulation of core components to oral health practice. 	<p>Students research independently at the level of a closed inquiry</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identification includes and goes beyond core components of topic. <input type="checkbox"/> Comprehensive articulation of core components to oral health practice.
<p>B. Students <i>find/generate</i> needed information/data using appropriate methodology</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Search strategy is limited to a single source (eg internet only) for finding information. <input type="checkbox"/> Content generated is partially relevant to the topic and/or primarily drawn from one or two sources. <input type="checkbox"/> Allocation of group roles to manage workflow is minimally identified on the wiki page. <input type="checkbox"/> Inequitable distribution of group work contribution with minimal evidence of shared leadership roles. 	<ul style="list-style-type: none"> <input type="checkbox"/> Search strategy uses several different sources (eg catalogues and databases) for finding information. <input type="checkbox"/> Content generated is relevant to the topic, and primarily based on several sources. <input type="checkbox"/> Allocation of group roles to manage workflow is identified on the wiki page. <input type="checkbox"/> Equitable distribution of group work contribution with evidence of shared leadership roles. 	<ul style="list-style-type: none"> <input type="checkbox"/> Search strategy includes multiple source types for finding quality information (eg scientific catalogues, library databases, search engines) <input type="checkbox"/> Content generated is relevant and draws on a wide range of sources. <input type="checkbox"/> Allocation of group roles to manage workflow is clearly detailed and identified on the wiki page. <input type="checkbox"/> Equitable distribution of high degree group work contribution and strong evidence of shared leadership roles.
<p>C. Students <i>critically evaluate</i> information/data and the process to find/generate this information/data</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Identifies indicators of sources credibility and reliability but does not fully apply them in evaluating data or process <input type="checkbox"/> Supporting evidence in search strategy only partially supplied and/or inappropriate <p>Missing: _____</p> <ul style="list-style-type: none"> <input type="checkbox"/> Minimal evidence of a team approach to reviewing, revising and editing group content contributions. 	<ul style="list-style-type: none"> <input type="checkbox"/> Identifies several relevant indicators of source credibility and reliability and provides appropriate rationale for use/inclusion of information. <input type="checkbox"/> Supporting evidence in search strategy supplied but some details inaccurate. <p>Problems with _____</p> <ul style="list-style-type: none"> <input type="checkbox"/> Evidence of a team approach to reviewing, revising and editing group content contributions. 	<ul style="list-style-type: none"> <input type="checkbox"/> Identifies a wide range of indicators of source credibility and reliability and fully applies these in selection of data for inclusion. <input type="checkbox"/> Supporting evidence in search strategy is extensive and appropriate. <input type="checkbox"/> Strong evidence of a team approach to reviewing, evaluating, revising and editing group content contributions.
<p>D. Students <i>organise</i> information collected or generated</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The group use basic strategies to organise the wiki (eg headings, dot points etc.) but with little flow or connection. Problems with: _____ <input type="checkbox"/> The group use basic strategies to organise the poster (eg layout, sections, choice of visuals etc.) with some explanations and basic conclusions. Problems with: _____ 	<ul style="list-style-type: none"> <input type="checkbox"/> The group use several sound strategies to organise the wiki, with linkage between and within most sections. Problems with _____ <input type="checkbox"/> The group use several sound strategies to organise the poster with accurate explanations and sound conclusions. Problems with _____ 	<ul style="list-style-type: none"> <input type="checkbox"/> The group use a wide variety of strategies to organise the Wiki with coherent linkage between and within all sections <input type="checkbox"/> The group use a wide variety of strategies to organise the poster with accurate and complete explanations and draw distinct conclusions.
<p>E. Students <i>synthesise, analyse and apply</i> new knowledge</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Content largely restates information from original sources used, with minimal integration. <input type="checkbox"/> Poster has a broadly based and superficial coverage, which does not specifically address the chosen learning outcomes 	<ul style="list-style-type: none"> <input type="checkbox"/> Information from original sources is integrated data but overall theme closely resembles that of the original sources <input type="checkbox"/> Poster has broadly based coverage, with detailed information provided for at least one of the chosen learning outcomes. 	<ul style="list-style-type: none"> <input type="checkbox"/> Content incorporates paraphrasing of information and presents 'new' interpretations/context from that of original sources. <input type="checkbox"/> Poster has a focussed and in-depth coverage of all chosen learning outcomes.
<p>F. Students <i>communicate</i> knowledge and the process used to generate it with an awareness of ethical, social and cultural issues</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Minimal coverage of poster appearance criteria. <input type="checkbox"/> Partially conforms to spelling, grammar conventions except for: _____ <input type="checkbox"/> Partial/incomplete referencing <p>Missing: _____</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Moderate coverage of poster appearance criteria. <input type="checkbox"/> Generally conforms to spelling, grammar conventions; minor errors with _____ <input type="checkbox"/> Generally well referenced; <p>Problems with _____</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Complete and total coverage of poster appearance criteria. <input type="checkbox"/> Accurately conforms to spelling/grammar conventions. <input type="checkbox"/> Full and correct acknowledgement of all sources used in poster.

Analysis of public health issue using Chapter 1

Assignment 1 Marking Criteria				
Facets of Inquiry ↓	Highly satisfactory <i>If you were ticked here, this facet of research is a good starting point</i>	Satisfactory <i>If you were ticked here, this facet of research was OK but needs to go up a notch: use this feedback to improve assessment 2</i>	Unsatisfactory <i>If you were ticked here, this facet of research needs work</i>	Weighting
A. Embark on inquiry & clarify the knowledge that is needed	<input type="checkbox"/> Does the introduction of the analysis clearly explain the relevance of the issue to public health (PH)?	<input type="checkbox"/> Does the introduction of the analysis give some indication of relevance of the issue to PH?	<input type="checkbox"/> Is the introduction of the analysis about the relevance of the issue to PH unclear or not done?	25%
B. Find needed information & generate needed data	<input type="checkbox"/> Do the bullet-form notes from newspaper define and elaborate on the relevant PH issue? <input type="checkbox"/> Are the bullet-form notes from text book highly appropriate to the newspaper issue?	<input type="checkbox"/> Do the bullet-form notes from newspaper define and partially elaborate on the relevant PH issue? <input type="checkbox"/> Are the bullet-form notes from text book appropriate to the newspaper issue?	<input type="checkbox"/> Do the bullet-form notes from newspaper partially define the relevant PH issue with no elaboration? <input type="checkbox"/> Are the bullet-form notes from text book inappropriate to the newspaper issue?	15%
C. Evaluate information/data & reflect on the process	<input type="checkbox"/> Is there a thorough identification and evaluation of vested interests?	<input type="checkbox"/> Is there identification and realistic evaluation of some vested interests?	<input type="checkbox"/> Is there some attempt at evaluation of vested interests?	15%
D. Organise information & manage processes	<input type="checkbox"/> Is the analysis coherent within and between paragraphs?	<input type="checkbox"/> Is the analysis coherent within or between paragraphs?	<input type="checkbox"/> Does the analysis lack coherence between and within paragraphs?	10%
E. Analyse & synthesise new knowledge	<input type="checkbox"/> Does a PH idea from Chapter 1 inform a thorough analysis of the newspaper issue?	<input type="checkbox"/> Does a PH idea from Chapter 1 inform a simple analysis of the newspaper issue?	<input type="checkbox"/> Is there a limited analysis of the PH newspaper issue?	25%
F. Communicate & apply knowledge, understanding and the process used to generate it, heeding the ethical, social and cultural issues	<input type="checkbox"/> Does the title clearly and succinctly reflect the contents of your analysis? <input type="checkbox"/> Are both sources referenced and cited correctly (Vancouver)?	<input type="checkbox"/> Does the title give an indication of the contents of your analysis? <input type="checkbox"/> Are both sources referenced and cited, but with some mistakes?	<input type="checkbox"/> Is there a title? <input type="checkbox"/> Is one source cited or referenced?	10%
Marker:	Total Mark: /10			Total: 100%

Student Name:

Student ID:

Final Year Project Assessment Matrix

A1 Proposal Seminar

Student Name _____ Assessor _____ Date _____

Supervisor Co-supervisor

Research Process	Facet	F	P	C	D	HD
		<i>Fails to satisfy the minimum requirements</i>	<i>Satisfies the minimum requirements</i>	<i>Demonstrates a high level of understanding and presentation and a degree of originality and insight</i>	<i>A very high standard of work which demonstrates originality and insight</i>	<i>Outstanding or exceptional work in terms of understanding, interpretation and presentation</i>
A. Students embark on inquiry* and so determine a need for knowledge / understanding (10%)	Objectives stated	Unclear or inappropriate	Clear but lacks focus	Clear and focussed	Clear, focussed and innovative	Clear, focussed, innovative, open inquiry
	Context of project	Not described	Minimally described	Satisfactorily described	Informative, well-researched	Comprehensive, extensively researched
B. Students find/generate needed information / data / ideas using appropriate approach / method (15%)	Technical challenges	Vaguely specified	Clearly identified	Clearly identified and explained	Clearly identified, explained in context	Clearly identified, explained in context and justified
	References and citations	Minimal use of or inappropriate sources	Few appropriate sources	Several appropriate sources	Numerous appropriate sources	Numerous appropriate and wide range of sources
C. Students critically evaluate information / data / ideas, their approach and results, and react appropriately (25%)	Valid technical reasoning	None presented	Some presented	Strong evidence	Comprehensive	Comprehensive and insightful
	Feasibility of proposed approach	Flawed or infeasible	Feasible, with major changes	Feasible, with some changes	Feasible, with minor changes	Fully feasible
	Project significance	Not discussed	Minimal discussion or evidence of understanding	Some evidence of understanding; reasonably considered	Strong evidence of understanding; mostly considered	Exceptionally strong evidence of understanding; fully considered
	Strengths and weaknesses of proposed approach	Not discussed	Minimally discussed	Moderately explored and analysed	Well explored and analysed	Comprehensively explored and critically analysed
D. Students perform necessary processes to meet stated project objectives (10%)	Broader (social and/or cultural) implications of project	Not addressed	Minimally addressed	Adequately addressed	Well addressed and justified	Comprehensively addressed and justified
	Proposed project plan	Presented but is superficial	Presented but lacks sufficient details	Presented in moderate detail	Presented in detail	Presented in detail and explained
E. Students organize themselves effectively and adequately manage human input to project (10%)	Project risks	Not discussed	Some degree of risk identification but with limited mitigation strategies	Moderate degree of risk identification; some mitigation strategies	Thorough risk analysis; some mitigation strategies	Thorough risk analysis; effective and innovative mitigation strategies
	Group roles and team organisation	Not specified	Roles specified but no reason provided	Roles specified with reasons provided	Roles specified with reasons provided; team organisation structured	Roles specified with reasons provided; team organisation is highly structured
F. Students communicate project objectives, achievements and the process (30%)	Team management strategy	Not discussed	Discussed but strategy is superficial	Discussed; strategy is potentially effective	Discussed in detail, strategy is likely to be effective	Discussed in detail, strategy is likely to be effective and innovative
	Seminar presentation	Unengaging, laboured, disjointed	Mildly engaging, need improvements for the future	Generally engaging, minor improvements for the future	Strongly engaging, well presented	Exceptionally engaging, brilliantly presented, highly professional
	Visual and spoken elements	Inappropriate or ineffective	Appropriate but not well-integrated, or ineffective	Well-integrated and effective	Cohesive, effective and polished	Imaginative, effective; professional level
	Seminar time management	Poor; grossly over-/under-time	Adequate; moderate degree of over-/under-time	Satisfactory; ran to schedule, some hurry or delay	Well-paced presentation, suited to the schedule	Ideal pace with careful attention to time management

Evaluation Framework

Consider evaluation that grows over time:

1. Increasing number of perspectives:

- Students'
 - Class engagement
 - Solicited feedback forms, quantitative and qualitative
 - Analysis of student assessments and class contributions
- Colleagues'
 - Feedback on teaching and assessment resources
 - Feedback on teaching
- Self-reflection
 - Reflective journal
 - Metacognition (looking at your learning over time)

2. Increasing timeframe

- Time for one task
- Whole lecture/tutorial/laboratory
- Whole semester
- Several cohorts or years of data

3. Increasing scale of use

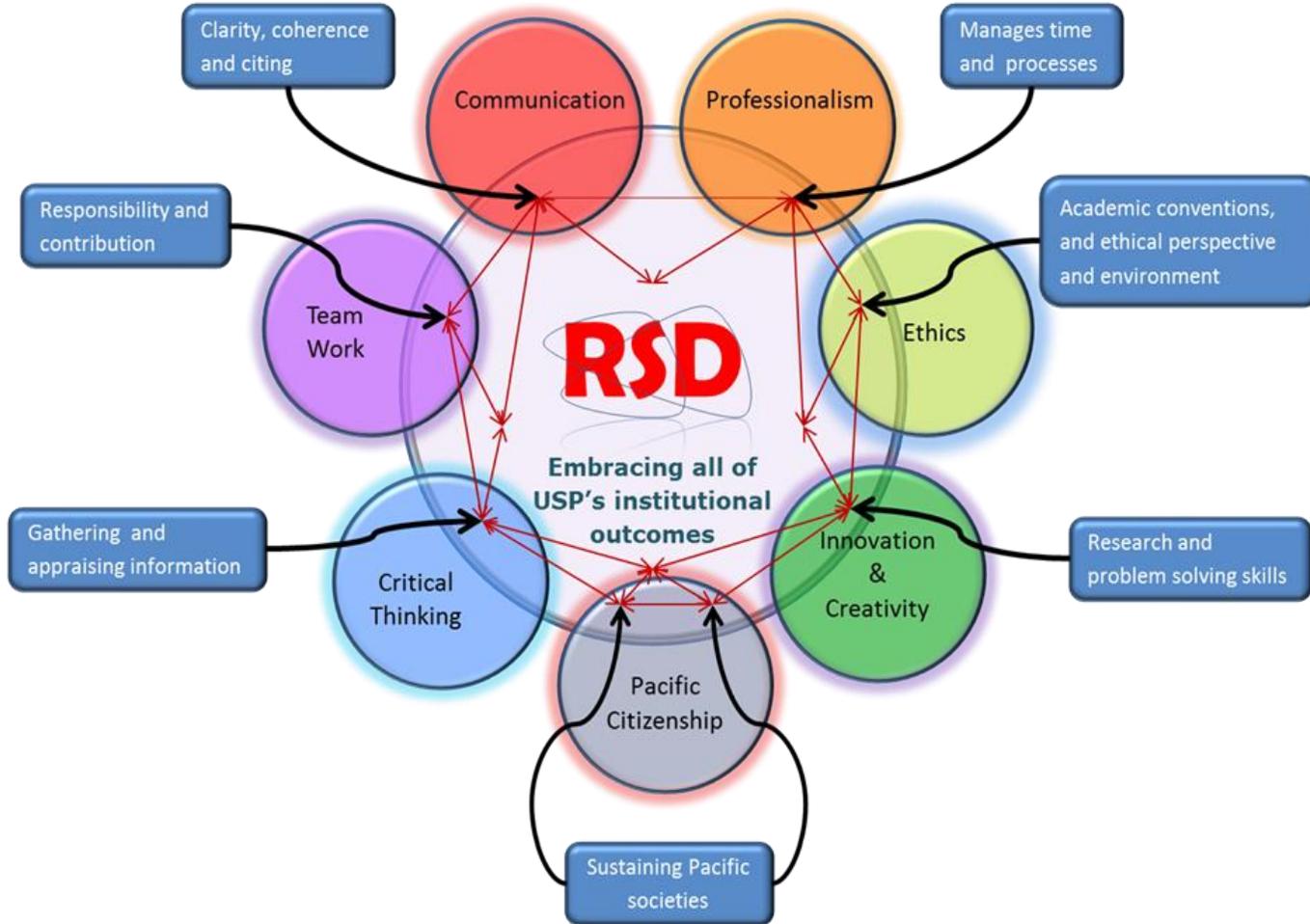
- From one tutorial to all tutorials
- From one course/unit to whole program
- From one discipline to many
- From one campus to many

4. Increasing rigour

- Expanding use of the literature
- Search for 'disconfirming' evidence
- Action research spirals

Appendix 1: Relationship between USP Student Outcomes and the RSD

(Source: STAR Working Group 5 Final Report)



Appendix 2: Work Skill Development (WSD) framework, which mirrors the RSD. See www.adelaide.edu.au/rsd/framework/frameworks/



Work Skill Development Framework



LEVEL OF STUDENT AUTONOMY →

FACET OF WORK 	Level 1 Student requires a high degree of structure & guidance	Level 2 Student works with less structure / guidance /supervision	Level 3 Student works independently and within provided guidelines	Level 4 Student works innovatively with limited guidelines	Level 5 Student works within self-determined guidelines appropriate to the context.
A. INITIATIVE Student establishes role and adapts	Student requires a high degree of guidance to identify and to adapt to position	Student identifies role requirements with some guidance and adapts to position	Student establishes role independently and adapts readily to this context	Student adapts the role appropriately and through consultation and fulfills original and new requirements	Student identifies future goals and projects while fulfilling original requirements
B. TECHNOLOGY Student applies technology to find and generate information / data	Student uses basic technology with high degree of guidance to find and generate information /data	Student uses technology with some degree of guidance to find generate information /data	Student uses technology independently to find and generate a range of information / data	Student shows a complete understanding and appropriate mastery in choice of technology to generate information /data	Student shows a high degree of sensitivity in the application of technology to generate information /data
C. LEARNING Student critically evaluates their role and objectives to establish life long learning skills	Student evaluates information at a minimum level to understand their role.	Student evaluates with some degree of guidance, the methodology / technology in use, to generate knowledge	Student critically evaluates the match between theoretical and practical applications to generate knowledge	Student critically evaluates the processes in seeking or filling gaps to generate knowledge	Student critically evaluates and uses knowledge to generate lifelong learning skills
D. SELF MANAGEMENT Student reflects and self manages time and information	Student uses reflective practice to organise information and establish role, using a simple format	Student uses reflective practice to master methods and practices using existing structures	Student uses reflective practice to evaluate and monitor own performance with confidence	Student uses reflective practice to deliver clear projects and goals	Student uses reflective practice to articulate visions, goals and innovative strategies
E. PROBLEM SOLVING Student synthesises and analyses to create solutions	Student applies a simple structure to understand existing knowledge	Student applies a structured format to synthesise and analyse existing data and knowledge	Student works independently to synthesises and analyse a range of resources to generate new knowledge	Student applies critical thinking and works collaboratively to synthesise, analyse and produce innovative and creative solutions	Student applies sophisticated critical thinking and analysis to initiate change and extrapolate outcomes
F. COMMUNICATION Student understands self and others through interpersonal communication & teamwork	Student requires highly structured guidelines to communicate information	Student requires some degree of guidance to understand individual role and communicate within the team	Student demonstrates confidence and assertiveness in communicating information	Student communicates independently and competently showing high degree of understanding of workplace culture and professional ethics	Student negotiates and asserts their own values while respecting the contribution of others in communicating information

