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Outcomes and uptake of explicit research skill development across degree programs

Final Report 2014

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James Cook University

La Trobe University

Monash University

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We acknowledge the contributions of the participants on the Steering RSD 2014–2020 Group who helped to clarify the direction of the Research Skill Development project into the future.

List of acronyms used

ALTC	Australian Learning and Teaching Council Ltd
AQF	Australian Qualifications Framework
ALL	Academic Language and Learning
CUR	Council on Undergraduate Research, USA
DVC	Deputy Vice-Chancellor
HDR	Higher degree by research
HERD	<i>Higher Education Research and Development</i> journal
HERDSA	Higher Education Research and Development Society of Australasia
OLT	Australian Government Office for Learning and Teaching
RSD	Research Skill Development
RSD7	Researcher Skill Development

Executive summary

'It's got a practical application in my world, in what I do.'

The title for this project was originally drawn from a quotation made by a student in 2008. The student was commenting about the relevance to his work of the research skills he had developed in one semester-long course that used the Research Skill Development (RSD) framework. Graduates who had completed three or four years of undergraduate degrees that explicitly developed their research skills also agreed with the relevance of the title of this project.

The RSD is a conceptual framework used by academics and professional staff to inform curriculum and assessment design so that student research skills are explicitly developed in individual courses in the undergraduate curriculum.

By the time this project began in 2011, experienced users of the RSD framework had embedded it into multiple courses in undergraduate degree programs and were broadening its reach and deepening its use. The undergraduate degree programs included Bachelor of Media, Bachelor of Oral Health, Bachelor of Engineering (Electrical and Electronic), Bachelor of Science (Animal Science) and Bachelor of Business (Tourism). The purpose of this project was to determine the effectiveness of the implementation of the RSD by academics across these degree programs.

The primary evaluation strategy of the success of these implementations was to interview graduates (27) of these programs or Honours students (23) in these programs. (See Chapter 2 for the results). In one whole-of-School context (Medical Science), in addition to Honours students, academics (9) and PhD students (8) were interviewed to develop a rich case study of the benefits and disadvantages of explicit, extended, research skill development. (See Appendix A.)

The majority of comments by graduates and Honours students alike asserted that RSD should be embedded across the degree program from first or second years. There was a powerful sense of usefulness and empowerment provided by the research skills developed across three years of an undergraduate degree, or four years in the case of engineering (page 11). Another striking and common feature was that the skills students nominated as research skills could just as easily have been labelled as graduate attributes. Depending on the disciplinary and employment context, graduates may align the skills associated with research with those associated with problem-solving or critical thinking. From the point of view of academics, use of the RSD framework provided a way to conceptualise curriculum design and to implement and assess graduate attributes across degree programs.

After analysis of the data gathered in this project, the following recommendations are provided for the university sector:

Recommendation 1

That individuals, teams and institutions consider the Research Skill Development framework

as a viable conceptual model to scaffold the development of skills associated with researching, problem-solving and critical thinking in individual courses and in multiple courses across degree programs (page 25).

Recommendation 2

That universities considering using the RSD framework as a conceptual model to inform learning and assessment environments provide timeframes that enable a thorough adaptation of RSD-framed resources to individual course contexts, evaluation of early implementations, and thinking space for argument and debate on implementation at the degree program level (page 25).

Recommendation 3

That course coordinators, librarians, academic language and learning staff and learning designers explore together the implications of the Research Skill Development framework as a language in-common to maximise their effectiveness as learning and teaching teams who design and implement curricula (page 26).

Recommendation 4

That use of the RSD framework and the extended version, the RSD7, be evaluated in numerous disciplinary and interdisciplinary contexts at Masters and PhD levels (page 26).

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Chapter 1: Project outcomes and impacts

Introduction

'It's got a practical application in my world, in what I do.' This phrase was integrated into this project's title for a number of reasons; it was a surprising but typical outcome of the first Research Skill Development (RSD) project funded by the ALTC (2007–2009); it was the project team's expectation for the current project; and it was a driver for the involvement of most of the team.

The team's anticipation was worth the wait. Interviews with graduates of three degree programs and with Honours students in two others demonstrated that explicit research skill development in multiple courses makes a substantial and positive contribution to long-term graduate attributes.

The aims of the project were to evaluate the long-term effectiveness of the implementation of the RSD framework, as it was implemented in multiple courses across five degree programs, and to disseminate existing RSD understanding as well as project findings when they became apparent.

The RSD framework delineates the skills associated with research into six facets: embark on research and clarify understandings needed; find information and generate data; evaluate information and data, and reflect on processes used; organise information and manage processes; analyse trends and synthesise new understandings; and communicate and apply understandings and processes ethically. These six facets are elaborated into five levels of student autonomy, with Level 1 being Prescribed Research and Level 5 being Open Research (Willison & O'Regan, 2007). Academics involved in this project used the RSD framework to inform the design of curriculum for and assessment of multiple courses in the degree program.

Approach and methodology

The conceptual framework for the project was the Research Skill Development (RSD) framework (Willison & O'Regan, 2007). The ALTC project from 2007–2009 (mentioned above) demonstrated that explicit use of the RSD framework had the long-term advantages of applicability to subsequent study and, especially, to subsequent employment for those interviewed in the study (Willison, 2012). One of the main features of the RSD framework is that it makes explicit the skills students frequently use at university; academics commonly reframe the marking of their assessment tasks according to the six different facets of research the framework describes. This use was particularly important because the external reviewer of the 2007–2009 RSD project found that, when the RSD framework was used to reframe assessment tasks, it typically had a profound influence on the whole curriculum (Nightingale, 2009). The framework also describes the extent of autonomy, or the level of scope provided to students, from the highly structured and guided (Level 1) to the fully open-ended (Level 5). In one Honours context, the extended version of the RSD framework, the Researcher Skill Development framework (RSD7), was used to describe an additional

level of autonomy (Willison & O'Regan, 2008). Delineating the extent of autonomy raises pedagogical teaching questions that probe educators' thinking about their curricula (Willison & O'Regan, 2007).

Nevertheless, the effectiveness of the use of the RSD in multiple courses in a degree program, if this use would have a beneficial multiplying effect, and if revisitation in more than one course would be of benefit or even detrimental, were not known. Therefore, this project relied on a team of RSD implementers who had already embedded explicit research skill development in multiple courses in a degree program, and who provided support for the evaluation of this embedding. The evaluation focused on the long-term outcomes for graduates of their programs. The project was, therefore, primarily evaluative, and also had a strong dissemination component. Semi-structured interviews were conducted with:

- graduates, one year after graduation
- Honours students midway through their Honours year
- PhD students
- a large proportion of academics in one whole-School context.

Interviews were arranged with students in each degree program until data saturation was achieved for four programs, where the number of students interviewed varied from program to program (see below). However, data saturation was not achieved for three programs where difficulties in interviewing graduates were experienced.

Dissemination commenced early in the project and used mechanisms such as a national symposium, presentations and workshops for individual universities, faculties and schools, with a total of 60 dissemination activities. Fourteen dissemination activities involving six of the project team in seven different universities occurred in the last month of the project as outcomes emerged.

Extent of achievement of the stated outcomes

The outcomes of the project are:

1. Degree program-level evaluation of explicit research skill development in one program in each faculty grouping of Business, Engineering, Health Sciences, Humanities and Sciences incorporating:
 - a. graduate perspectives of the benefits and detriments of explicit research skill development across their degree programs one year post-graduation
 - b. academic and other teaching staff perspectives of the benefits and detriments of explicit research skill development across their degree program.

Graduates interviewed included:

- Bachelor of Oral Health (9) one year after degree program completion
- Bachelor of Media (10) one year after degree program completion
- Bachelor of Engineering (Electrical and Electronic) (5) nine months after degree program

completion

- Bachelor of Business (Tourism) (2) one year after degree program completion
- Bachelor of Nursing (1) one year after degree program completion.

Students who had completed three years of an undergraduate degree and proceeded to research-intensive study were also interviewed:

- School of Medical Science: Honours students (14) and PhD students (8)
- Bachelor of Science (Animal Science): Honours students (9).

Interviewees totalled 27 graduates and 23 Honours students: a total of 50 people who had experienced explicit research skill development over multiple contexts in the first three or four years of undergraduate study. Hence, all interviewees had encountered multiple discipline-specific materials and assessment tasks, all with the same framing of the six RSD facets described earlier; the potential for positive reinforcement was high, but so too the potential for reinforcement of negative aspects.

The team also interviewed nine academics and eight PhD students from the School of Medical Science to determine a whole-School attitude to RSD implementation. These data, along with the interviews of fourteen Honours students and eight PhD students (three were tutors), provided a rich case study of explicit, long-term implementation of RSD framework in a whole-of-school context. Details of results from this case study are in Appendix A. Chapter 2 contains the results, analysis and recommendations emerging from the interviews.

2. Approximately 60 school-level seminars and workshops conducted primarily by discipline academics on RSD approaches and evaluation.

Sixty dissemination activities were conducted by a total of 10 team members and the project leader, hosted in twelve different universities and attended by 1606 educators representing thirty-five Australian universities. A major dissemination feature of this project was the empowerment of individuals and pairs of experienced RSD users to conduct workshops in universities other than their own. Four pairs and two individuals ran such workshops without the direct assistance of the project leader. This autonomy has significant consequences for ongoing RSD dissemination, as the team continues to be both willing and able to run RSD sessions that are discipline- or context-specific. The Steering RSD 2014–2020 group recommended at the end of the project:

Program-level embedding, 'grass-roots' approaches will tend to remain too patchy, while university-level approaches will tend to generate a compliance approach amongst staff and, as a result, the RSD will, in practice, have little impact. Based on our own experiences with trying to embed literacies development across programs, I would say that working at School level is really worthwhile, ideally through workshops held with all staff in the School. This creates a broad awareness and understanding at a local level, and it means that all staff who meet in the corridors are using the same language and have an understanding about RSD.

The experiences of the team show that the members have the capacity to conduct School-level workshops when the RSD suits any university's policy or practice agendas, or there are other drivers to bring in a pedagogy that is RSD-orientated.

3. Case studies of effective degree-program level RSD on the RSD website.

Case studies, such as the whole-School approach detailed in Appendix A, have not yet been finalised for the RSD site. Two are in preparation and will be finalised by the end of 2013.

4. Web 2.0 capacity of the RSD website realised and expanded, capturing and sharing the experiences of RSD website return visitors.

The RSD site was completely overhauled in terms of its user interface, with changes including:

- 'user-savvy' layout of the homepage, making existing resources easier to find
- interfacing the existing RSD blog with the website. The automatic refresh of the widget bar whenever new blogs are released means that the RSD site has current dates on an ongoing basis: the site always looks alive.
- blogs written weekly and to reflect current trends, such as concerns about AQF Levels 9 for masters degrees by coursework
- videos on the site that capture the actual use of RSD with students and academics, not staged for the camera
- emerging resources for 'how to' use RSD at entry-level and across degree programs (in train). For example, a Learning Activity Management System module provides a three-hour introduction to the RSD, plus the opportunity for the participant to submit their own RSD product for peer review.

Together, these enhancements contributed to a tripling of page-loads of the RSD site and a sharp increase in the number of unique visitors from 2011 to 2013. This increase is based on web statistics that show the RSD site page-loads was steady from 2008–2011 at around 13,000 each year. This number rose to 18,000 in 2012 and was at 30,000 for 2013 (as at 7 October). The average number of visitors has slowly risen year on year; however, the visitor numbers more than tripled from 2011 to 2013. More importantly, there has been more than a doubling of the downloads of RSD resources, with the RSD framework being downloaded 1700 times from May to October 2013. All other resources framed by the RSD are being downloaded at a comparable rate.

The pre-print version of the first major article on the RSD (Willison & O'Regan, 2007), the conceptual framework for this project, was downloaded from the RSD site over 240 times from May to October 2013, which is eight times the rate of download of this article from the *Higher Education Research and Development* (HERD) website. This rate of download has contributed to the article being a well-cited HERD article.

Nevertheless, the above strategies did not provide the level of interaction sufficient to make the site genuinely Web 2.0, with inputs to the site made by visitors. For example, while the blogs seemed to be helpful in promoting more visits to the RSD site, very few people posted

comments on the blogs. Therefore, a further strategy was trialled employing a six-week webinar series running in May and June 2013. This was advertised on the Higher Education Research and Development Society of Australasia (HERDSA) mailing list and the RSD website and pre-empted in the RSD blog, which summarised the theme of the webinar. This advertisement resulted in an average of ten participants in May webinars, tailing off to four in the two June webinars. Numbers of visits to the RSD website spiked in May 2013, with over 2000 unique visitors to the site in that month; this included almost 400 returning visitors. Posted comments on the blog did rise, but the frequency of these was generally disappointing, with three or four comments per blog. The strategies employed did not in themselves enable the website to be a functioning Web 2.0 site.

An unanticipated web-based emergence, however, is the development of RSD portals by Monash University (stories and interviews with users of the RSD) and the University of the South Pacific (examples of documents framed by the RSD). While the websites of these universities are not Web 2.0 for their visitors, they are examples of a community of practice creating its own RSD resources at an institutional level. These two universities are diverting their own resources to create RSD-framed teaching and learning documents, which provide accounts of their own users' contexts and cultural understandings.

Emerging online strategies to assist users of the RSD in practical ways include the beginnings of trials of using rubric tools within the Blackboard environment and within Turnitin with the Faculty of Health Science at The University of Adelaide. In this approach, existing RSD-based rubrics for different types of assessment will be available in a bank, ready for course coordinators to adapt to their context. Moreover, Monash University has piloted an RSD mapping tool across degree programs and is working towards making an open access web version that would be promoted strongly on the RSD site.

5. Conference papers and journal articles on RSD approaches and outcomes, at the level of discipline and meta-discipline.

Three articles on RSD outcomes and approaches have been published:

Wu, C., Chanda, E. & Willison, J. (2013). Implementation and outcomes of online self and peer assessment on group based Honours research projects. *Assessment & Evaluation in Higher Education*, <[dx.doi.org/10.1080/02602938.2013.779634](https://doi.org/10.1080/02602938.2013.779634)>

Willison, J. (2012). When Academics integrate research skill development in the curriculum. *Higher Education Research and Development*, 31: 905–919.

Willison, J. (2013). Inquiring ape? *Higher Education Research and Development*, 32: 861–865.

In addition, one discipline-specific article is under review and another three are in preparation. One peer-reviewed conference paper was also presented:

Bandaranaike, S., Snelling, C., Karanicolas, S. & Willison, J. (2012). Opening minds and mouths wider: Developing a model for student reflective practice within clinical

placements. *Proceedings of the 9th International Conference on Cooperative and Work-Integrated Education, Bahçeşehir University, Istanbul, Turkey*, pp.1–16. 20–22 June 2012.

The overview of the outcomes of the project described here is a simple representation of the data. A much more sophisticated analysis is being conducted program by program, with an eventual meta-analysis of the program analyses. This approach is being used, as in the first RSD project funded by the ALTC (2007–2009), the analysis clustered the data of ten courses; the resulting journal article was strong in quantitative data but did not represent students' voices with rich quotes. As this project has interviewed many graduates after their completion of an undergraduate degree program, it is vital to represent their voices clearly. An example of the results in a specific context, the School of Medical Science of the University of Adelaide, is at Appendix A. After all discipline-specific articles are completed, an article presenting the meta-analysis of these articles will be written.

Unanticipated outcomes

The RSD embedded into university Teaching and Learning Plans

An unanticipated outcome of the project was the embedding of the RSD into university-level or faculty-level operational plans. Monash University incorporated the RSD into its Teaching and Learning Plan 2011–2016. This has helped to drive a surprisingly different model of RSD implementation, and one that is unusual in teaching and learning at university level. The model has been, to a large extent, driven by the Monash Library, with librarians and student support staff leading collaborations with course coordinators and other academics to refresh the curriculum and assessment with the RSD framework.

Monash University commenced use of the RSD in 2007 in the context of Business; this grassroots use slowly spread including to library staff. The ensuing Library-Business collaboration proved fruitful, and led to a slow increase in uptake in other contexts. This uptake was escalated by the incorporation of an RSD module in Monash University's Graduate Certificate in Higher Education in 2010, and then by the policy driver mentioned above from 2011, the Teaching and Learning Plan 2011–2016. As a consequence, many Monash courses and quite a few degree programs have been embedding RSD into curriculum and assessment regimes. Yet to be seen is the overall efficacy of this approach, though early signs have been very positive. For example, academics and professional staff involved in the Pharmacy undergraduate degree mapped the facets and degree of autonomy of the RSD framework across the program. This resulted in the Pharmacy accrediting body commending the program for its transparent program structure.

The University of the South Pacific also incorporated the RSD into its Teaching and Learning Plan, as well as its research plan, as part of a Systematic Total Academic Renewal process. The RSD was incorporated into two compulsory, large (2000 students per semester) first year undergraduate degree courses in 2012; these showed a number of advantages over the previous structure of the courses. Consequently, a large number of first year courses trialled the use of the RSD in 2013 and multiple second year courses planned to use the RSD in 2014.

The University of Adelaide has taken a different route, with the RSD framework embedded into the Faculty of Health Sciences Teaching and Learning Plan from 2012 and the Faculty of the Professions Business Model 2013. These two faculties will probably prove to be highly informative to the sector: Health Sciences has seen the largest uptake of the RSD framework at the grassroots level and has many academics, courses and programs already incorporating the RSD; the Professions has very few users of the RSD framework and its recent incorporation in the business plan is partly in response to the University's strategic plan 2013–2024. The strategic plan requires all programs to provide a discovery experience for all first year students from 2014 that is to be organised with a minimum of two sessions with experienced academics. The Faculty of the Professions is looking to the RSD framework, at least in principle, to scaffold appropriate research skill development in advance of, between and after these sessions.

Trevecca University, Tennessee, USA also embedded the RSD framework into its plans for undergraduate coursework and mentored research in 2013. This followed the attendance of the Dean of the Faculty of Arts and Science, Trevecca University, at a Council on Undergraduate Research (CUR) conference presentation on the RSD and a subsequent videoconference presentation by the project leader to 80 faculty members of the university.

A renewed version of the Research Skill Development framework

A second deliverable was not planned for in the research proposal, but has already proven to be important for the sector. Since the time of the only face-to-face RSD team meeting, in December 2011, there have been ongoing enhancements to the wording of the RSD framework. This finessing has improved the framework's capacity as a communication tool.

Advancement of existing knowledge

The project has also realised achievements with reference to the following OLT Innovation and Development program priorities:

- Promote and support strategic change in higher education institutions for the enhancement of learning and teaching, and the benefit of the student experience.

The unanticipated outcome noted above, i.e. institutions integrating the RSD framework into the Teaching and Learning Plans at institution- or faculty-level, demonstrates the potential of this project for systematic change. More powerful, however, is the evidence from graduates of the effectiveness of explicit research skill development over time. In the long term, those involved in teaching and learning will be persuaded more by tangible evidence than argument-based rationales.

- Raise the profile and encourage recognition of the fundamental importance of teaching in higher education institutions and in the general community.
- Develop effective mechanisms for the identification, development, dissemination and embedding of good individual and institutional practice in learning and teaching in Australian higher education.

The RSD project, funded by the ALTC from 2007–2009, employed pre-and post-completion questionnaires within courses using the RSD framework to determine statistically significant changes in students' self-assessment of their discipline-specific research skills. This strategy was useful for semester-long, context-specific questionnaires; however, this strategy was not effective for longer-term outcomes of a degree program which is significantly more complex.

The evaluation strategy in this project of interviewing graduates one year after degree program completion provided data that are both authentic to life after university and rich in descriptive detail. This strategy also relied on highly targeted research questions and project purpose; without specificity, it was much harder for students to attribute influence to specific elements. Therefore, the strategies employed in this project exemplify effective mechanisms for identifying, developing and disseminating good practice in the embedding of RSD.

- Develop and support reciprocal national and international arrangements for the purpose of sharing and benchmarking learning and teaching processes.

Monash University team members in the Bachelor of Pharmacy degree program, in collaboration with the Monash Library staff, developed a highly effective curriculum mapping tool based on the RSD framework; this tool seems to be of greater interest to academics than standard mapping tools. Monash University is now working towards making a broadly available web-based version. This could have a profound influence on sharing and benchmarking learning and teaching processes both within Australia, especially with the three other local universities that have partnered with them on this project, and internationally, as the University of the South Pacific is also a partner on the project.

- Develop and enhance a deep understanding and knowledge of the learning process appropriate to the disciplines being taught.

RSD is a conceptual tool that, in all cases of which the team is aware, is modified to fit the disciplinary context. Numerous discipline-specific examples are available on the RSD website. Deep analysis of the interview data continues at the discipline-specific level, before the meta-analysis is finalised.

- Build leadership capacity in ways that promote and advance learning and teaching in Australia higher education.

As noted in the discussion of dissemination activities, the leadership capacity of many in the RSD team was greatly enhanced during the project, with ten team members conducting workshops without the assistance of the project leader. Two to four years of use of the RSD have been necessary for team members to achieve sufficient capacity to conduct RSD facilitation workshops.

Analysis of success factors and impeding factors

The following factors proved to be critical to the success of the approaches used in this

project:

1. Consistency

The team had a language in common, the RSD framework, which helped with the identification and management of expectations, project management and establishment of what could be achieved realistically.

2. Confidence

The team began the project knowing that the RSD framework could successfully inform the learning and assessment in course-level context in a variety of disciplines. There were good indications that the benefits of using the RSD framework would be multiplied across multiple courses in a degree or program. This meant that there was a basis for the confidence to persuade others to be involved.

3. Team spirit

Team members, both academic and professional staff, rather than being involved in competitive behaviour, took responsibility for their roles. Monash University exemplified this egalitarian approach, particularly with professional staff from the Library leading academics in curriculum renewal.

4. RSD-aware external reviewer

The External Reviewer deeply understood the project due to their involvement in reviewing the initial RSD project (2007–2009). This knowledge was helpful as the funding limit for the follow-on projects made funding an external reviewer at a satisfactory level difficult; an experienced reviewer needed less familiarisation time.

5. Established website

Having the RSD website established since 2006 made growing the resource base and, particularly, ensuring its accessibility to visitors far more realisable. The team reorganised the website substantially during this project, and saw a dramatic increase in visitors after this, as noted in the Project Outcomes above.

6. Follow-on project

As the second nationally funded RSD project, this project built substantially on established networks in Australia and overseas.

7. Diversity of implementation models

The three most significant users of the RSD framework to inform curriculum design and assessment (The University of Adelaide, Monash University and the University of the South Pacific) have very different implementation models. This range of implementations is of major interest to the sector, and evaluation will continue long after the completion of this project.

8. Enduring

There are signs that the use of the RSD framework will continue to expand both in Australia and internationally after the project's conclusion. For example, in the period January 2010 to September 2011, the RSD team was not funded, yet the use of RSD continued to grow,

especially internationally. The website contributed immensely to this growth.

9. Steering RSD 2014-2020 group was more useful than a 'standard' reference group

In the previous RSD project funded by the ALTC, the reference group met every six months; by the end of the project very few members attended the final meeting. Moreover, it was difficult for the reference group to make valuable contributions as the allocated time was used in their understanding the progress of the project.

For this project, initially scheduling meetings of the Steering Group was difficult. Consequently, Steering Group members read more in advance of the meeting at the end of the project and made some considered and tangible suggestions as to how the RSD project should proceed in the next six years.

The following factors impeded the success of the approaches used in this project:

1. Difficulties in arranging interviews with graduates

Procuring graduates to be interviewed proved difficult. For example, it took three years to gather a critical mass of Bachelor of Oral Health graduates. Telephone interviews with graduates of Bachelor of Business (Tourism), University of Monash in South Africa were too problematic to continue. Consequently, the data from these graduates are limited.

2. The slowed interview process affected other components

As interviews with graduates tended to be conducted later than planned, analysis of data was slowed and dissemination was affected, especially in the second year. The time spent in trying to arrange and run student interviews also affected the time available to interview employers. Obtaining ethics approval for employer interviews was also problematic, and protocol changes were required. Approval came late in the project and interviews with employers are only now able to be arranged at the end of 2013 and into 2014. The need to allocate extra project resources to gaining interview access also slowed the incorporation of case studies of effective degree program level-RSD on the RSD website. These are being developed currently, and will be progressively released.

Implementation of RSD in a variety of institutions

The unanticipated outcome of four institutions embedding the use of the RSD into institutional policies, noted above, suggests that there is some scope for institution-wide RSD implementation. However, long-term outcomes need to be determined before these initiatives should be seen as effective implementation strategies.

In most other cases, the RSD is used by individual educators to reframe one or two elements of a curriculum. If this use proves to be effective over time in that specific context, then educators tend to expand their use of the RSD and, at times, convince others to use the framework. The RSD has been used by individual academics in over 25 disciplines in a variety of Australian and overseas universities, and the influence of individual usage is starting to be felt. Some examples of this include:

- University of Alberta, Canada, using the RSD to inform its Office of Undergraduate Research following the initial use of the RSD in a first year psychology course

- University of Wollongong embedding the RSD across the Bachelor of Education (Primary), following the successful bid of one academic for an internal Teaching and Learning grant to accomplish this.

As noted earlier, the Steering RSD 2014–2020 group recommended that the focus of RSD work subsequent to this project be at whole-of-school level, and this is likely to occur in a school with strong drivers to embed research skills in the undergraduate curriculum, such as concerns for AQF Level 8 for professionally-oriented Honours degrees, or for AQF 9 for coursework masters. RSD use is also more likely to be relevant to a school with several existing RSD users who would then have credible practical knowledge of RSD use.

The primarily positive graduate outcomes of explicit Research Skill Development embedded in multiple points in the undergraduate degree suggest that the RSD is worth trialling in a variety of university types and disciplines.

Chapter 2: Results, analysis and recommendations

Results

The project team interviewed 27 graduates, all of whom had completed a degree program that used the RSD framework in multiple courses or extended contexts. Typically, this entailed using the RSD to frame assessment rubrics in two or more courses of a program. Once academics reframed assessment rubrics, substantial impacts on the way the curriculum was implemented and changes in curriculum documentation tended to occur over time. The programs that used the RSD in this way and were part of this project are indicated below as are the number of graduates interviewed:

- Bachelor Media: 10
- Bachelor of Oral Health: 9
- Bachelor of Engineering (Electrical and Electronic): 5
- Bachelor of Nursing: 1
- Bachelor of Business: 2.

The project team also interviewed 23 Honours students six months to one year after they completed their required three-year undergraduate degree in:

- Medical Science: 14
- Animal Science: 9.

Medical Science as a school began using the RSD in two consecutive first year courses in 2005, and then in 2012 used the RSD to frame Honours assessment rubrics. This provided a unique context to determine the long-term, rich use of the RSD.

Table 1 (below) shows that:

- research skills developed across degree programs are perceived by a substantial majority of graduates (25/27) to be useful in their employment context
- a substantial majority of Honours students (20/23) recommended that the RSD framework be used to inform courses earlier in the degree program as well
- use of the RSD framework in multiple courses of degree programs was recommended by the majority of graduates and by Honours students interviewed.

Table 1: Frequency of students who commented in interview on different aspects of explicit research skill development across the degree program

Degree program	No. of Honours students/graduates interviewed	Benefits of current RSD use in the program	Disadvantages of current RSD use in the program	Recommend RSD to be used in Years 1 to 3 of the degree program	Current use of research skills in employment (or study)	RSD-based rubrics useful in Honours
B. Media	10 graduates 7 employed, 1 Masters 1 second u/g degree 1 work-seek	7 – yes 1 – no (1 could not remember RSD rubrics)	1 – yes 8 – no	9 – yes 7 from First Year 1 from Second Year 1 unclear when 1 – no	6/7 – yes 1/7 – no (Masters – 1/1 yes u/g – 1/1yes)	
B. Oral Health	9 graduates (9 employed)	8 – yes 1 – no	6 – yes 2 – no	9 – yes 6 from First Year 3 from Third Year	8 – yes	
B. Engineering (Electrical)	5 graduates	3 – yes	2 – yes	3 – yes 1 – no	2 – yes	3 – yes 2 – no
B. Nursing	1 graduate	1 – yes	1 – no	1 – yes	1 – yes	
B. Business	2 graduates	1 – yes	1 – no	1 yes 1 no	1 – yes	
B. (Hons) Medical Science	14 Honours students	14 – yes	8 – yes 6 – no	13 – yes 9 from First Year 2 from Second Year 2 from Third Year 1 – no		13 – yes 1 – no
B. (Hons) Animal Science	9 Honours students	9 – yes	0 – yes	7 – yes 1 – no		
Total	27 graduates 23 Honours 50 people having completed min. 3 years of u/g degree	43 – yes 2 – no 5 – no clear response	17 – yes 18 – no 15 – no clear response	43 – yes 5 – no		16 – yes 3 – no

u/g undergraduate

Analysis

RSD is a viable model to guide the development of most, if not all, graduate attributes across degree programs

A substantial majority of graduates and Honours students who were interviewed recommended that the RSD be used to inform the undergraduate curriculum from first year. Those who had encountered the RSD in first year were able to reflect on the experience and its advantages, including one student who stated:

Since the beginning [of first year], they have given us assignments based on this criterion. You might not have liked the assignments, but because they have been consistently applying this structure to all of our assignments, we have come to think that way for science... You might not know that you're following their guidelines, *but you are*.

(Medical Science Honours Student 4)

“Think that way for science” is this student’s way of saying that research skills explicitly framed by the RSD and developed in multiple content-rich contexts deeply influence one’s thinking processes. Through RSD use, students can, and should, experience the variations and nuances in research processes and products in different individual courses and yet maintain a common framing that provides purpose and structure between courses. The RSD provides the way of “consistently applying this structure” so that different learning and assessments tasks are framed in a way that students and academics recognise as the same overarching skill set from context to context, i.e. the same six facets of the RSD are revisited explicitly and so reinforced incrementally.

The level of awareness of a consistent structure indicated above can be contrasted with that of an Animal Science Honours student, who reflected on his level of awareness of the RSD framework during the previous three years:

Looking back at my undergrad, I sort of didn’t really have much to do with this framework in the large scheme of things. It was more sort of focus on whatever assignments you had at the time and *not really looking at the big picture*.

(Animal Science Honours Student 6)

This inability to see the “big picture” does provoke a pedagogical need to make skill development explicit, with recent research showing that merely providing more details to students does not provide a clear guide for learning:

... given the growth of ever more detailed marking schemes for assessments, does feedback become something which is too specific to a single episode of assessment rather than generalisable to the learning experience as a whole.

(Adcroft, 2011)

Being able to generalise to the learning experience as a whole, where students are enabled to be not just cognitive but also metacognitive, is facilitated when connections between

different aspects of learning can be understood with the same conceptualisation, such as the facts of the RSD. The skills associated with research as portrayed in the RSD seem to overlap heavily with those associated with problem-solving, critical thinking, clinical reasoning and graduate attributes in general. The use of different terms to highlight different nuances and purposes is often useful and necessary; however if academics do not show or do not recognise the similarities, students too will not see their conceptual connections and not be able to generalise to their own learning experience as a whole. With rich use of the RSD, graduates were deeply aware of many skills that they had developed; for example, one graduate, when asked about his research skills, said that he used these in his employment for:

... coming up with new ideas to solve complex problems ... I think I'm good at doing something and then critically analysing it ...
(Electrical and Electronic Engineering Graduate 5)

Research skills for this graduate meant problem-solving and critical thinking. Research skills overlap with and equate with many cognitive skill sets and the RSD use by academics in this study has typically evidenced effectiveness to develop overarching cognitive skills by enabling students to generalise to the learning experience as a whole.

The RSD as a conceptual framework for educators, however, poses as many questions as it answers. By elaborating a continuum of 'extent of autonomy', the framework places up front questions concerning the amount of structure and guidance students may need in any context. Without appropriate structure and guidance, by third year students tend to perform open-inquiry projects at 'the *same level of sophistication* as in their introductory core course' (Chaplin, 2003). Therefore, the RSD can play an effective role by providing a familiar structure in various learning contexts to enable incremental, explicit and coherent development in the undergraduate years towards employment contexts in which graduates need to be autonomous and perform at high levels. One graduate reflected that the:

The [RSD-based] rubric was basically a guide that I followed to finish the assignment. It was really good in the sense because I could go step-by-step, and not just kind of flick from one bit to another bit. In my work now, I find it is also a step-by-step process, and that [RSD] rubric from Media Research Methods and also from Global Media *kind of set the fundamentals* of what to do when you're actually in the workplace as well.
(Bachelor of Media Graduate 1)

Here, different courses together with the same framing set the fundamentals of the research process for the newly graduated student. Data in this study may well suffer from selection bias with, for example, the graduate/Honours students who came to interview more favourably disposed to RSD-framed processes than other students. Nevertheless, there is substantial evidence of increased advantage when the RSD is used to inform multiple courses when compared to its use in individual courses.

Recommendations

Recommendation 1

That individuals, teams and institutions consider the Research Skill Development framework as a viable conceptual model to scaffold the development of skills associated with researching, problem-solving and critical thinking in individual courses and in multiple courses across degree programs.

Time to implement

Many RSD users have been using the RSD for more than two years. One academic stated:

I see the framework being what I'll call *nebulous enough* for everybody to be able to accommodate it. Because it's not very prescriptive. It just sets a framework, and everybody can work within a framework ... [yet] it's *relatively comprehensive* in what it describes over all.

(Medical Science Academic 2)

The property, being “nebulous enough”, is important. If academics feel locked in, many will resist the use of a framework. Therefore, it is an important feature that the RSD is not an off-the-shelf solution, and it needs to be adapted according to each context. The RSD is a conceptual framework with many possible implementation modes in use, from reframing marking criteria to analysing existing curricula, to empowerment for Indigenous students. Moreover, the results in Appendix A suggest that the framework and rubrics framed by it guarantee very little in themselves and that, for students and for markers, these are like frozen conversations that need to be made fluid for real advantages to materialise. Optimising the use of RSD-framed rubrics takes time and practice. Most often it is likely that small-scale local adaptations may be most appropriate first, before program-level initiatives are considered; for example, the Faculty of Pharmacy at Monash University trialled RSD-framed rubrics in several courses. When these proved to be effective, they developed the mapping tool mentioned earlier, based on the six facets and degrees of autonomy of the RSD; they used the mapping tool to audit the ‘current state of play’ of skill development across the four years of the undergraduate degree. They are now in a process of analysing this mapping and deciding, on this evidence basis, how to coherently develop research skills across the degree program.

Recommendation 2

That universities considering using the RSD framework as a conceptual model to inform learning and assessment environments provide timeframes that enable a thorough adaptation of RSD-framed resources to the context, evaluation of early implementations and thinking space for argument and debate on implementation at the program level.

The Research Skill Development framework enables a common language and purpose for teaching and learning teams

Of the 60 dissemination activities in this project, more than half were upscaling activities run by Monash Library staff to more deeply embed the RSD. This was strongly supported by the

embedding of the RSD in the Monash Teaching and Learning Plan, by the Deputy Vice-Chancellor (Academic) and by the University Librarian. The process was driven by the two professional staff on the RSD team, one a librarian and the other an Academic Language and Learning (ALL) coordinator. Very successful strategies included the Bring-a-friend workshops, where one librarian and one ALL team member would invite an academic to a RSD workshop. Commencing in 2009, this collaborative approach has grown in effectiveness, where academics, librarians and ALL staff gather around the same conceptual framework to have meaningful curriculum and assessment design discussions; this level of collaboration in the redesign of courses has a profound influence on the way that the curriculum is implemented because there is a greater sense of shared ownership.

Recommendation 3

That course coordinators, librarians, Academic Language and Learning staff and learning designers explore together the implications of the Research Skill Development framework as a language in-common to maximise their effectiveness as learning and teaching teams designing and implementing curricula.

That RSD7 be explored for higher degree by research (HDR) and Honours students

The School of Medical Science, The University of Adelaide, began using the RSD in 2005 in first year courses. However, there was little additional use of the framework until a colleague presented the extended version of the RSD, the RSD7, in December 2011. The RSD7 puts on the same page the first year student with the professor, as both fall somewhere on the same continuum described by the RSD. The extended format caught the attention of the research-orientated academics, and the school moved quickly to adopt the use of the RSD7 in the Honours year. Subsequently, the RSD is being used to frame learning and assessment in second and third year courses. It may be that the RSD7 is an effective introduction for some academics to the pedagogical orientations of research skill development. The RSD7 representation is also worth exploring in its application to the Honours year, Masters courses and PhD study, in consideration of the Australian Qualifications Framework Levels 8, 9 and 10 and in consideration of increasing uptake generally. Early evaluations of the RSD7 in the context of PhD supervision of international students have suggested benefits to students and to supervisors (Velautham & Picard, 2009).

Recommendation 4

That use of the RSD framework and the extended version, the RSD7, be evaluated in numerous disciplinary and interdisciplinary contexts at masters and PhD levels.

Chapter 3: Dissemination, linkages and evaluation

Dissemination strategies for the project were set up in a way that also would enable post-project dissemination, and are detailed in Chapter 1 as part of the stated project outcomes. These strategies took the form of workshops led by team members other than the project leader, and the improvements in the RSD website. There were also information dissemination strategies such as journal articles and conference presentations.

Seminars and workshops

The project team conducted 60 seminars and workshops on RSD framework use and outcomes. This number and reach were achieved because of the dissemination strategy used. In the first and only face-to-face team meeting of the project, Monash University members of the team conducted a workshop on running RSD workshops. This prepared team members with a raft of practical strategies on how to run their own discipline-specific workshops. Nevertheless, despite this training, no other members arranged to run workshops for the project in the following ten months.

A breakthrough happened, however, as Monash members of the team organised the Research Skill Development Symposium in Melbourne on 4 November 2012. The team used this event as leverage to fly to Melbourne The University of Adelaide team members to conduct RSD workshops and to present at the symposium during the same period. Outcomes of this symposium were:

- 170 people attended the day-long symposium
- three teams of two colleagues each presented two workshops in their discipline to universities in Melbourne
- two of these teams have gone on to subsequently give RSD presentations at other universities.

Even though each of the presenters had been using the RSD framework for three to four years, they were reluctant to run workshops alone or to initially organise workshops. The multiple strategies mentioned around preparing RSD users to run workshops were necessary to enable them to run workshops confidently.

Importantly, at the end of the project four pairs and three individuals in addition to the project leader, evidenced that they are capable of conducting RSD workshops should the opportunity arise. This capability is important, especially because of a recommendation made by the Steering the RSD 2014–2020 group towards the end of the project, (mentioned earlier), that encouraged School-level dissemination as a future priority for the RSD project. The small teams of RSD presenters are well equipped to run workshops at the School-level, which augers well for future dissemination of the RSD framework. The project dissemination strategy enabled a longer-term capacity building for dissemination by RSD users.

RSD Website

The updated RSD framework, discipline examples and evaluation articles are available from <www.rsd.edu.au>.

During the project's lifetime, the number of page-loads per year tripled and visitors doubled, as noted in the Outcomes in Chapter 1. Given the current rate of downloads, 3000 copies of the RSD alone will be downloaded in 2013, as will a similar number of other resources on the site.

The site is being further upgraded with resources that provide a clearer sense of how to use the RSD for curriculum design and assessment in the period to December 2013.

Connections with other OLT projects and fellowships

Professor Angela Brew's earlier Fellowship, Enhancing undergraduate engagement through research and inquiry, has clear and close connections with this project, with Professor Brew referring readership and attendees at her presentation to the RSD as one scaffold to enable undergraduate research. Professor Brew was a member of the Steering RSD 2014–2020 group. Likewise, Dr Margaret Kiley, leader of the Coursework in Australian doctoral education: What's happening, why, and future directions? project, invited the leader of the RSD project to join the reference group for that project. Dr Lyn Robert's Fellowship, Identifying, developing and disseminating best practice in supporting Honours and coursework dissertation supervision, will be particularly interested in the outcomes of this RSD project for the Honours students involved. The University of Queensland (Lead) project, Developing and resourcing academics to help students conduct and communicate undergraduate research on a large scale, has team members well aware of the RSD, with several of the project team being users of the framework. Their evaluation of available tools will be highly salient to this project.

Other closely related fellowships or projects include: Professor Les Kirkup's National Teaching fellowship, Inquiry-oriented learning in science; Queensland University of Technology's (Lead) Leadership in Indigenous research capacity building: Implementing and embedding an Indigenous research methodologies masterclass module; and Australian National University's (Lead) Teaching research – evaluation and assessment strategies for undergraduate research experiences.

Interdisciplinary linkages

RSD interdisciplinary linkages have been emerging since 2006, when Electrical and Electronic Engineering academics began to use the RSD as informed by Medical Science colleagues. From that time, many disciplines have been informed and influenced by other discipline's use of the RSD, as is evidenced in the disciplinary examples on the RSD website. During the timeframe of this project, some interdisciplinary connections include:

- the School of Medical Science adopting and adapting the School of Electrical and Electronic Engineering's use of the RSD at honours level

- universities that have looked to the RSD to provide a consistent conceptualisation across disciplines, such as for undergraduate research at University of Alberta and Trevecca University or for embedding in the undergraduate curriculum, such as at Monash University and University of the South Pacific
- the use of the RSD to frame the marking criteria for wiki-based research in Oral Health has been adapted by numerous disciplines.

Evaluation

The project was evaluative in nature. The first outcome states: ‘Degree program level evaluation of explicit research skill development in one program in each faculty grouping of Business, Engineering, Health Sciences, Humanities, and Sciences’. Chapter One provides the evaluation strategies and Chapter Two details the degree of success. In terms of the effectiveness of the project itself, the external reviewer concluded that “OTL money has been well-spent” and her comprehensive evaluation comments are provided in Appendix B. The reviewer quotes as a concluding evaluative statement a response she received from an academic:

Through this project and through interactions with colleagues during my involvement with this project, I have learnt more about myself as an educator, more about curriculum design and alignment, more about assessment and what it is we are really looking for in our work-ready graduates and more about how useful a tool the RSD can be as a reflective surface. I feel that at this point, I have made real inroads with regards to my own course mapping, organisation and linking of student learning across both of the courses I teach in and coordinate. I feel confident now to help take my colleagues to the next level of creating a more coherent thread and greater course alignment using the RSD.

Following on from the first RSD project (2007–2009), this quote reinforces the role of the RSD in a total reconceptualising of teaching and of research and consequent high-level influence on student learning. The project itself had a major impact on people inside and outside the project team, including students, graduates and educators.

Determining the effectiveness of the implementation of the RSD involved interviewing graduates and Honours students. This is noted in Chapter 1. This proved to be far more difficult than originally planned, even though the interviewer was extremely proficient at arranging and running interviews. For example, the entire span of the project was necessary to interview nine Oral Health graduates, three in each of the years 2011, 2012 and 2013. Having arranged interviews with eight Nursing graduates, the team was able to interview only one (see page 21). This limited interviewing had some positive consequences as it led to the decision to interview Honours students of two programs, as they had completed their compulsory undergraduate degree and yet were more readily available for interview. These data are proving to be valuable for educators with a stronger focus on research degree preparation.

It must be noted that the data from interviews are likely to suffer from a bias towards those willing to come to interview, possibly because they were more favourable about the RSD

approaches. However, the interviews did, by design, unearth 'disconfirming evidence' and the case study in Appendix A displays the negative aspects clearly.

The second major project outcome concerned dissemination; 60 presentations, seminars and workshops were run by the project team in 12 different universities during the project, with 14 presentations run in the last month after the data were analysed and outcomes were available. Project dissemination sessions were attended by 1606 people and this equates to a dissemination cost per person of about \$15, suggesting that the project was indeed value for money. Along with the growing number of visitors to the RSD website and the discipline-specific and meta-analysis papers written or in preparation, opportunities exist for the higher education sector to be aware of the approaches to, and the benefits of, using the Research Skill Development framework across entire degree programs. Hopefully, the benefits of such an approach can be similar to those reflected in a comment by one of the graduates interviewed:

[D]oing research at this point in time in first year you may not understand what the relevance of this is, and I certainly didn't. But, as you go through the course [degree program], you develop the skills, and you also develop this personal sense of: I need to know. Having integrity and wanting to do the best in your degree and in your future career, it's really important to develop those skills ... It's the best thing I've ever done. I love it. *It's not only just work and looking up things and researching work things, it's my whole life.* I've changed the way I think about a lot of things – politics, science, environment things.

References

- Adcroft, A. (2011). The mythology of feedback. *Higher Education Research & Development* 30 (4), 405-419.
- Bandaranaike, S., Snelling, C., Karanicolas, S. and Willison, J. (2012). Opening Minds and Mouths Wider: Developing a model for student reflective practice within clinical placements. *Proceedings of the 9th International Conference on Cooperative & Work-Integrated Education*, Bahçeşehir University, Istanbul, Turkey, pp.1-16. 20-22 June 2012.
- Chaplin, S. (2003). Guided development of independent inquiry in an anatomy/physiology laboratory. *Advances in Physiology Education*, 27(4), 230–240.
- Nightingale, P. (2009). Final (Summative) Report. In *Making Research Skill Development Explicit in Coursework Final Report 2010*: p 56-66. Available from <http://www.adelaide.edu.au/rsd/evidence/study/RSD_in_coursework_with_appendices.pdf> . Accessed 4 October 2013.
- Velautham, L. & Picard, M.Y. (2009). Collaborating equals: Engaging faculties through teaching-led research. *Journal of Academic Language & Learning* 3 (2), A130-A141.
- Willison, J. (2012). When academics integrate research skill development in the curriculum. *Higher Education Research & Development*, 31(6), 905–919.
- Willison, J. (2013). Inquiring ape? *Higher Education Research and Development*, 32(5), 861-865.
- Willison, J.W. & O'Regan, K. (2007). Commonly known, commonly not known, totally unknown: A framework for students becoming researchers. *Higher Education Research and Development* 26 (4), 393-410.
- Willison, J. & O'Regan, K. (2008). *Researcher Skill Development framework*. Available from <<http://www.adelaide.edu.au/rsd/framework/rsd7>>. Accessed 1 September 2013.
- Wu, C., Chanda, E., Willison, J. (2013). Implementation and outcomes of online self and peer assessment on group based Honours research projects. *Assessment & Evaluation in Higher Education*, <[dx.doi.org/10.1080/02602938.2013.779634](https://doi.org/10.1080/02602938.2013.779634)>

Appendices

Appendix A: An example of context-specific results of interview data

Example results from interviews with students of the School of Medical Science

Of the fourteen Honours students interviewed, ten had experienced RSD-framed rubrics in two consecutive first year Human Biology courses while four students had not encountered the use of RSD- framed rubrics previous to the Honours year; one of these students had studied at another university and the other three were in programs that did not require first year Human Biology. All Honours students had experienced the RSD7-based marking rubrics for their assignments and projects during Honours, and one indicated seeing the RSD7 framework itself. Of the nine academics interviewed six had direct exposure to the RSD7 framework previously and three were exposed to it during the interview for the first time.

One academic summarised the ways that the RSD7 framework was implemented through multiple task-specific rubrics, framed by the six facets of research and used throughout the year.

Our Honours students have a literature review which will be coming in next week I think, so we're using it [RSD7] for that. They have a short research proposal which is set out in the format of a small grant that they're doing, and then in September we have a poster presentation day which is happening at the school level ... then we'll use it [RSD7 framing] for assessing the final research paper that they write at the end. So we are using it [RSD7] consistently for all of the assessment items.

(Academic 3)

More important than the design of individual rubrics then, was the fact that there were multiple rubrics all framed by the one conceptual model, the RSD7, yet specifically targeting the different components of the course, and revisited at different stages of the year. This meant that there was designed, sequential development across the year intended to enable incremental learning and a chance for students to see their research skills mature (20). The analysis following is structured in the following sections: Advantages and disadvantages of RSD7 rubrics in the Honours Year, and recommendations of RSD7 across the undergraduate degree program. Italics are used within quotes from the interviews for emphasis of pertinent themes.

Benefits of the RSD7 implementation in Honours year

One major type of benefit of the School's use of the RSD7-based criteria was in assisting student understanding of Medical Science research processes. All 14 of the Honours students indicated that the RSD7-informed marking criteria aided their thinking about research processes as they were:

... a good guide because you can see all the levels; you can *see where you are*. You compare yourself to the data. It takes a skill to be honest to yourself; that's the first skill. When you look at the different levels, you can see where you are fitting and then you look at the levels ahead, at what are your areas of improvement so *you can improve yourself* ...

(Student 1)

This use of “see where you are” and “look at the levels ahead” gives the idea of a conceptual map revealing where students were and where they needed to go. An important part of this planning process was gaining early insights into the expectations of those who would be assessing the complexities of the student research:

... you know exactly what's required of you, so you're aware of it in everything you do, ... I think it's better to be clear from the beginning that that's what's expected of you.

(Student 9)

For Honours, the six different rubrics used throughout the year were all framed by the six facets of the RSD7, revisiting and so reinforcing the explicated research skill set in discipline-nuanced language. For Student 9, being able to see the overall picture *from the beginning* was critical to enabling whole-year application, rather than being uncertain in the early months of Honours study. Such clear guidance was seen as a key advantage of RSD-framed rubrics, even when compared to other rubrics students had experienced. One student, whose enrolment had been mid-way through 2011, provided a comparison between rubrics which were not framed by the RSD7 and those that were organised according to the RSD7:

It would have been good to have it [RSD7 rubric] last year ... it's more specific in terms of the structures and it's *easier to see* where you need to improve your strengths or weaknesses.

(Student 3)

Clarity in advance with specific criteria made the research process explicit and visible. Another feature students identified about the RSD7-based criteria was in enabling a meta-cognitive process:

... they ask you basically have you critically analysed the depth of ... your research. So, what I did was to compare what I have written to that criterion, to fit that criterion . If it doesn't, if I see there was a gap in there that I haven't, for example, communicated the data very well, I would go back on it and do the corrections and make sure that it fits the criteria.

(Student 1)

The use of the RSD7-based rubrics consistently led the students to see beyond the products of research and their standard structures, to the processes underlying research:

Because I was exposed to research experience, hands-on research experience, in terms of being in a lab and working in a lab and understanding that, okay, it's not

just about having an abstract, an introduction and discussion; it's about *how all of that work that goes into it* and it actually comes together at the end. Sort of understanding the broader scope of things made more sense for me, personally.
(Student 10)

Students began to see past the superficial structures of a reported paper to the deeper level of how all the cognitive and psychomotor skills come together in research processes that they ultimately will write up in a standard reporting structure; understanding the “work that goes into it” i.e. the research processes, was more important than the product of “an abstract, an introduction and discussion”.

All nine academics indicated that that the RSD7 framework fits the research processes of Medical Sciences. This included that the framework gives educational direction but does not constrain unnecessarily perspectives of research. One of the three academics who had not seen the RSD7 previous to the interview provided a nuanced understanding of the guidance provided by the RSD:

I see the framework being what I'll call *nebulous enough* for everybody to be able to accommodate it. Because it's not very prescriptive. It just sets a framework, and everybody can work within a framework ... [yet] it's *relatively comprehensive* in what it describes over all.
(Academic 2)

The oxymoronic quality of “sufficiently nebulous yet relatively comprehensive” is a key quality of the RSD7 framework, where student researchers and those supervisors who are educating them should not feel overly constrained and yet do need to have a sense of guidance and a standard for comparability. The sentiment of the academic above was also explicitly stated by Honours students, including one who commented:

So I think it does help *that it's not completely structured*, but at the same time *that structure* also really, really helps.
(Student 5)

In general, there was the perception from experienced researchers and from novice researchers that the RSD7 should fit the Medical Science research context and help students to deeply understand the processes used. Another of the academics who saw and digested the RSD7 for the first time in the interview found that the value of the framework was:

... in convincing me that I was already on the right track with the way that we've organised the curriculum ... So I would think that this would just say to me, yes, what you're doing is appropriate because other people agree.
(Academic 1)

This suggests that the RSD7 resonated with this academic's practice, and that she could intuitively map her work with students onto it. From her perspective, the RSD7 was not necessary to achieve what her team had achieved, but the framework was an affirmation of good practice. A design intention of the RSD7 framework itself was to unpack the facets of

research as experienced by students and academics in a variety of contexts, and describe these succinctly, not to create a whole new approach; all nine academics expressed sentiments that the RSD framework complemented and articulated their existing notions of research. These comments not only affirm the academics, but they also reinforce the fit of the framework to research processes as used in the school:

I think a lot of people might do this sort of thing intuitively, and what this [RSD7] has done is just spelt out what probably the good teachers were trying to do in any case...
(Academic 8)

Disadvantages of RSD7 implementation

Disadvantages of the implementation of the RSD7-based rubrics especially included criteria that were not applicable to students' context and this was indicated by eight of the 14 Honours students and four out of the nine academics.

I kind of find that sometimes they [RSD7-framed rubric criteria] *don't apply* very well to the assignment.
(Student 11)

Students made clear statements about why they perceived these criteria did not always apply to their specific work. One student contrasted her work with a student in the same lab to explain the overly-prescribed nature of some criteria:

... our projects are vastly different ... I don't understand how the same marking scheme can apply when it's so specific for what it's looking for.
(Student 11)

Some criteria were not relevant for students' specific work:

... one of the ones for the lit review was use of *up-to-date relevant literature*. It's like, I don't have any...
(Student 11)

"Up-to-date literature" was a criterion not perceived to be relevant, as the pertinent literature base on the topic was from 30 years previously, according to the student. More worrisome for this student was the fact that the assessors would not appreciate the context of her project, and so would not *know* the current state of play in the relevant literature. One criterion some students perceived to be impossible for markers to make valid and informed judgments about 'for outstanding grade' is: Objectives clear, focused and innovative, extending past supervisor guidelines (Student Marking Criteria for ... Appendix 1)

One student remarked:

Some of it, you think, *how will assessors know* that we're doing that? ...
[Assessors] don't know what we and our supervisors talk about in our meetings,

so they don't know whether or not we're going beyond our supervisors. I think that's a bit stupid at times.
(Student 5)

From the perspective of the student, this was a criterion that required mind-reading on the part of examiner. As another comment about the lack of applicability of the RSD7-generated criteria, one student stated:

I've found out that *assessors are also quite subjective*. I have one assessor that says I am in level 4 and 5; I have another one that says I'm in level 2 and 3 ... So I've found that this framework is really *subjective* ... although they make markers a lot more accountable.
(Student 4)

This student is understandably troubled by the perennial problem of inter-rater reliability and there is no surprise that mere criteria do not guarantee reliable scores, as this is frequently reported in the literature. However, she could appreciate that the markers would at least be able to defend their decisions for where they allocated marks, even if they did not agree with others. It is the subjectivity and knowing how to deal with multiple subjective perspectives at once that seem to have perplexed the student. One student found the focus of the RSD7-based criteria made it less relevant to apply:

Like I said, a lot of it [RSD7 rubrics] is concentrated on getting the facts right rather than the flow of language.
(Student 5)

This student's perspective, however, is completely different from that of other students and academics. Two students noted another problem:

We get a rubric for every single assessment, and they're all completely different. They're very much for each assessment, and I hate them.
(Student 11)

Unlike the student comments in the first section where the connections between RSD-informed rubrics, even those provided years apart in different courses and contexts, were clear, these comments suggest that some students were not aware of the common framing four months into Honours, as they saw each rubric as separate 'for each assessment'.

Two academics noted an issue affecting applicability based around their use of the RSD-based rubrics, especially in oral presentations:

... what looks really clear on a piece of paper in an assessment task list becomes a lot more complex. Say you're in a seminar and someone is talking about a particular area and trying to tease out a quite complicated presentation so that you can tick off numerous little boxes can be quite difficult.
(Academic 6)

Assessing with complex criteria is clearly a barrier for some academics especially in the oral presentation setting, and even details such as a small font size could make the process untenable. Another reason for lack of applicability of the RSD7-generated criteria, identified by one academic, related to standard traditional practice as compared to some changes in thinking about underlying processes that the RSD7-based criteria required:

Another person said, 'I've looked through this; this is a seminar. I don't mark seminars like this. I want it ordered so you say something about the introduction, something about the literature, something about the methodology that they're proposing, something about how well they answered the questions.
(Academic 3)

As the criteria were structured in an unfamiliar fashion, academics found the criteria more difficult to apply to marking seminars.

Appendix B: External Evaluator's Report

Outcomes and uptake of explicit research skill development across degree programs: 'It's got a practical application in my world'.

Final (Summative) report

Peggy Nightingale – External Reviewer

September 2013

This project, funded by the Australian Government Office for Learning and Teaching, commenced in late 2011.

The project aimed 1) to evaluate the outcomes when the Research Skill Development (RSD) Framework is employed in multiple courses across degree programs, and 2) to continue dissemination of the Framework and information about how it has been used by university academics.

This report is intended to evaluate the project's success in achieving its aims. It is the result of 1) attending a symposium at Monash University in November 2012, 2) reading materials provided by the team leader, Dr John Willison, 3) reviewing materials available on-line, 4) surveying participants in the project by email, 5) interviewing participants using Skype and 6) attending a virtual meeting of the Steering RSD 2014-2020 group.

Part One: Overview

Success in achieving intended outcomes (Summary)

There is no point in this reviewer detailing quantitative information about how project funds have been spent. This data will be in Dr Willison's final report to OLT. Suffice it to say that the funding has enabled a serious attempt to collect information about the pros and cons of RSD in undergraduate study from students who experienced it. It is notoriously difficult to conduct follow-up studies with graduates, and there have been problems resulting in delays to the planned timetable in this case. However, there is now a collection of interview transcripts from a range of disciplines, and a series of articles analyzing this data is in preparation. One has been submitted for publication and, in this reviewer's opinion, is a contribution to understanding. I believe the rest will also be useful, and that the planned meta-analysis will be very valuable.

Interviewing of employers has been thwarted by a range of factors including difficulties in obtaining ethics approval.

The evidence available to date is anecdotal but nevertheless convincing that where the

RSD Framework has been used consistently in more than one subject within a program of study, students have gained valuable skills. Many recognize that those skills have been internalised and are being employed in the workplace and in their day-to-day lives.

Funding has also enabled continuing dissemination of information about the use of RSD and about its extension from individual subjects to sequences of subjects or programs of study.

There have been many workshops and campus visits to introduce RSD and/or support users as a result of this project. Numbers attending are impressive.

Materials have been added to the website, and further developments are planned.

The numbers of people visiting the website, returning to it, and downloading material suggests that RSD is much more broadly appealing and applicable than most conceptual frameworks designed to improve teaching practice.

It should be noted that work on the RSD and its dissemination has been underway since 2005. External funding has been available for only four years (2008-09 and 2012-13). Funding has not been used to enable release from teaching. Rather it has been used to conduct research to improve the framework and to disseminate the concept and assist with its use in various applications. In other words, it has enabled activities that simply could not have happened without external funding. That RSD has thrived over nearly a decade, more than half of that time without external funding, is one of many indications of both the dedication of the key players – especially Dr Willison – and of the conceptual strength of the framework.

Conclusion: OLT money has been well-spent.

Some further thoughts based on this review

The following remarks are conclusions reached as a result of information collected in the section below headed “Impressions Confirmed, Extended, and/or Modified”.

One theme that emerged during this review was that being strategic in attempts to extend RSD can increase the chances of success. For example, there may be pressure to engage in curriculum review and development as a result of a negative course review, from government requirements for quality assurance, or to gain accreditation from a professional body. On the other hand, it may be very unwise to attempt a new initiative if something like a requirement for developing graduate attributes has just been met.

It seems clear that there is no one right way to approach the extension of RSD. However, there do seem to be a few key ingredients for success: enthusiastic colleagues who will encourage and support others, well-developed resources and examples of good practice, and workshop programs or some other sort of training. This project has provided all of these.

The interaction within the community of people experienced in using the RSD framework is

very important. Many have commented how valuable it is to have the support and encouragement of sympathetic colleagues and to study the range of applications from different disciplines. OTL funding has been instrumental in building this community.

Having reviewed both the first (ALTC) funded project and this one, I wish to emphasise that such projects bear fruit long after the money has been spent. Much has happened in the period between the two projects, and much more is planned. The RSD Framework is being used outside Australia, at primary and secondary levels, in clinical and workplace programs as well as in Australian university classrooms. It is proving to be remarkably flexible and adaptable.

Part Two: Evaluation of project

Background and introduction

It should be noted that when asked to review this project, I was already very familiar with the Research Skill Development Framework (RSD) as I served as external reviewer of a previously funded project, "Making Research Skill Development Explicit". At that time I wrote:

It is to be hoped that what is now happening in separate courses (subjects) will gradually spread to sequences of courses (programs) so that the skills promoted by RSD can be developed to higher levels in all facets through coherent and cohesive efforts over several years of study. So far the spreading of these ideas and innovations appears almost random, based more on personal networks than communication within departments. It is hard to predict what will happen next.

I was delighted to hear that there was funding to support implementation of RSD across degree programs and very happy to have the opportunity to see whether such sequencing may result in even more positive outcomes for both students and their teachers.

Because of my previous work with Dr Willison and RSD, I see no need to try to identify strengths and weaknesses of the RSD Framework itself. What I heard at the November 2012 symposium and feedback from project participants since then suggested that I would reach the same conclusions as I did in 2008-9; specifically, these are that

- 1)The RSD Framework is a useful tool for teachers in a wide range of disciplines and can be effective from first year through postgraduate university teaching.
- 2)Using the RSD Framework effectively requires teachers to make a substantial investment of their time.
- 3)Like other teaching innovations or developments, the RSD Framework does not solve all problems, does not appeal to all students nor to all academics.

If anything, my opinion is even more favorable now. I would describe the Framework as inspirational for many academics who take the time to work with it. It is more flexible in terms of how it can be used than I previously thought – assisting with tasks as (relatively) simple as developing assessment criteria to the very complex, such as conducting a program

review or skills audit.

Process of Review

- 1) The invitation to act as external reviewer was accepted in early October 2012.
- 2) The reviewer was provided with a range of materials:
 - a) the project proposal,
 - b) Extracts from interviews with students and academics,
 - c) Papers, published and draft, about RSD,
 - d) Web addresses to access material for dissemination of information about RSD and this project,
 - e) Public documents from institutions attempting to implement RSD across programs of study,
 - f) Information about a Symposium to be held at Monash University in late November,
 - g) the Year 1 report to the OTL.
- 3) The reviewer attended the Symposium.
- 4) The reviewer studied materials provided.
- 5) The reviewer consulted further with Dr Willison.
- 6) This formative report was prepared.
- 7) In 2013, the reviewer
 - a) continued to study materials provided. Most of these were transcripts or summaries of interviews with graduates and Honours students,
 - b) attended Webinars (on-line meetings of people interested in the applications of the RSD Framework),
 - c) attended a virtual meeting of the Steering RSD 2014-2020 group ,
 - d) commented on draft publications,
 - e) emailed a set of questions to project participants and collated their responses,
 - f) interviewed key participants in the project by Skype.

Limitations of the Review

Judging the effectiveness of any teaching innovation/ intervention is not really possible without taking into account many other variables. This is difficult when one is looking at individual courses. Since this project involves many courses within a number of programs at different universities, taking all variables into account is well beyond the scope of this review. Indeed, two universities are now attempting an institution-wide approach which adds many more variables to the equation.

Because the budget for this review is limited and because the reviewer was not involved until late in the first year of the project, there has been little opportunity to interact with participants in the project. There was a less than 50% response rate to emails asking for information about participants' experiences with the use of RSD, and particularly about efforts to extend its use to sequences of subjects.

Impressions confirmed, extended and/or modified

When the formative evaluation was reported one year ago, a number of impressions were discussed. Most of them have been confirmed by data collected this year so they have been repeated below with some new comments and conclusions. (Earlier comments are in italics.)

1. *Two universities have exceeded the aims of this project by embedding RSD in institutional policy.*

Both Monash University and the University of the South Pacific have written RSD into institutional policy.

At Monash the policy statement is the Education Strategic Plan 2011-2015 which specifies four objectives. The third is to “Reform and renew the curriculum to attract, challenge and retain outstanding and diverse students”. A range of implementation strategies is nominated, and one is “to embed the Research Skills Development Framework across all faculties”.

At the November 2012 Symposium, Cathrine Harboe-Ree, Monash University Librarian, reported with justifiable pride that Monash University’s Course Experience Questionnaire (CEQ) ranking had risen to #1 in generic skills development and that the rise coincides with the introduction of RSD. Monash staff participated in the first ALTC-funded RSD project and have been very active in the current project.

At that same Symposium Dr Jito Vanualailai reported on initiatives at the University of the South Pacific (USP) where a Working Group of the USP Strategic Total Review (STAR) “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 by 2015”. RSD is now being introduced in two courses which are pre-requisites for all undergraduate programs at USP. A program of staff training and phased implementation is planned to continue through 2015.

It has been reported to this reviewer that there is far from universal acceptance of these policy decisions, that individuals may be resisting implementation – some to the point of refusing to attend workshops. On the other hand, at USP there are now four core courses, each of which is taken by every undergraduate student, using the RSD framework to introduce students to the research process in a structured and rigorous manner.

At Monash University extensive support is offered to Faculties and Schools by library/ learning support staff and while implementation of policy may still be less than universal, it does seem to be quite wide-spread.

Conclusion: The decision to mandate the use of RSD in a program may, indeed, result in positive changes to curriculum. However, those making the decision should consider how they will deal with almost inevitable resistance.

2. *A number of programs are working toward implementing RSD with some successes reported.*

The relatively new Occupational Therapy program in the School of Primary Health Care, Faculty of Medicine, Nursing and Health Sciences, Monash University is using RSD to give coherence and structure to courses offered in collaboration with librarians and learning skills staff. They have found

*that RSD provides a shared vocabulary for academic and support staff and their students.
(presentation at November 2012 Symposium)*

Two staff from the Oral Health program within the School of Dentistry at the University of Adelaide were very early adopters of the RSD approach. Their enthusiasm has helped extend RSD across discipline levels. They emphasise that “embedding is not just a word, it’s a concept” and that RSD is a tool, not an end in itself. This combination of enthusiasm and realism may be one of the prerequisites for successful implementation of program-wide development.

Another University of Adelaide program which is attempting to extend the use of RSD is Electrical and Electronic Engineering. There it was first employed to structure assessment of Master’s degree theses and now the School is encouraging staff to address development of desirable graduate attributes over the entire 4 year program using RSD to provide structure. There seems to be some resistance in this School. The Symposium heard that engineering staff are afraid that explicitly addressing research skill development will take time which they need to cover adequately the content of their courses.

In a collaboration between Pharmacy and the Library at Monash, RSD has informed the development of a tool for conducting a skills audit necessary for course accreditation and for the TEQSA process. For the Library information from the RSD mapping tool identifies where in the curriculum to target skills. Once again the RSD Framework has been demonstrated to be a very flexible tool.

During an online meeting of a small group discussing future directions for RSD, one participant contributed the following about approaches to extending RSD use across programs of study:

“Program-level embedding: 'grass-roots' approaches will tend to remain too patchy, while university level approaches will tend to generate a compliance approach amongst staff and as a result, the RSD will, in practice, have little impact. Based on our own experiences with trying to embed literacies development across programs, I would say that working at School level is really worthwhile, ideally through workshops held with all staff in the school. This creates a broad awareness and understanding at a local level, and it means that all staff who meet in the corridors are using the same language and have an understanding about RSD.

There is enough evidence from students to encourage programs to take a systematic approach to developing research skills, but it is likely that exactly how to go about this is going to be highly context-dependent. One interviewee commented that while RSD is at the back of his mind all the time he is making curriculum decisions, he has not tried to push it with his colleagues (even though he is in a leadership position). He is, however, intending to introduce it more strategically, as a “framing device” during preparation for an up-coming review of his discipline. In addition, he used RSD to add “gravitas and serious intent” in a submission to a program approvals committee.

In another case one Faculty heard about another’s use of RSD at Honours level and followed that lead, and then embedded RSD at policy level. An academic leader wrote:

In general my advice would be that a small core of enthusiastic supporters for the concept is needed to ensure that the method takes hold and is successful enough to get some runs on the board. Then others will follow. Be patient and persevere. It takes

time for people to understand what the method is all about but it is worth it.

Some have found dealing with assessment of graduate attributes 'slippery' but that RSD provides a way of mapping skills. A recommendation from an online meeting about the future directions of RSD projects was that "RSD could assist the conceptualisation of Masters courses to comply with AQF 9 as well as accommodate the diversity of students from domestic to commencing international [students]. RSD could address this issue by helping students and staff conceptualise where students are on entry, as well as providing structure for multiple courses in the program of study."

Conclusion: The extension of RSD to give some coherence and consistency across subjects in a program is desirable, but such a development is highly context-dependent and should be carefully considered.

3. The deep involvement of librarians at Monash University is advancing the goals of this project and the implementation of their university's policy.

Monash librarians and learning skills staff (who are based in the Library) are assigned responsibilities in specific faculties. They work directly with academic staff offering programs to help students develop discipline-specific research skills. Their understanding of the RSD framework helps spread knowledge of the material and how to use it and makes uptake across the University (in line with the University's Strategic Plan) much more likely than might otherwise be expected.

This strategy is possible because of administrative structures at Monash. The very close relationship between librarians and learning skills staff is unusual (at least in this reviewer's experience) and facilitates implementation of a policy initiative that could have been very unpopular if there were less support offered to the Faculties.

Email responses to requests for information about the project suggest that RSD was useful in opening conversations and building trust between academics and the library staff tasked with supporting them, but over time limitations to the appropriateness of the framework are discovered. For example, as one person wrote:

[The] framework works well for information research orientated tasks, such as search strategies, but can lead to oversimplification of other aspects of the process (such as masking the complexity of 'embarking on enquiry').

On the other hand, the same person noted that RSD:

makes expectations of the process explicit for students, but especially for staff (highlights how complex some 'simple' tasks actually are!).

Monash library staff commented that their participation in a substantial externally funded project added impetus and credibility to their efforts to support implementation of Monash policy. They talked about breaking through barriers with a common language which articulates the research process.

Responses from Monash staff have made it clear to this reviewer that if there is going to be

a policy-driven initiative based on the RSD framework, whether at School, Faculty, or University level, substantial support must be offered. RSD does not explain itself and deciding when and how to use it requires familiarity with a range of applications. However, once it becomes part of a teacher's repertoire, it can be "transformative" (to quote an enthusiast).

Conclusion: The extension of RSD from individual subjects to coherent programs will almost certainly require support for the academic staff involved. This may be offered in many forms but should not be neglected.

4. *The application of the RSD framework to work skill development suggests that this is a robust tool for conceptualising incrementally staged skill development.*

This application of the RSD, developed at James Cook University (<http://www.adelaide.edu.au/rsd/weblinks/>), has already been utilised in Oral Health (University of Adelaide) to inform their efforts to encourage students to enhance their clinical reflective skills. It suggests that the project goal of documenting outcomes related to employment may be achievable. It also demonstrates the helpfulness of projects like this which bring people from different disciplines and different institutions together to exchange ideas.

Interviews with Oral Health graduates indicate a very high level of appreciation for the program of study overall and that the graduates are consciously using the skills RSD sets out to instill in the workplace and indeed, in day-to-day life.

Conclusion: Strategic and coherent development of research skills throughout a degree program may have highly desirable outcomes not only for students but also for graduates. RSD is proving to be a useful tool.

5. *Interest from primary and secondary teachers is further evidence of how useful the RSD framework is in curriculum development.*

It is beyond the scope of this review to investigate this surprising new expansion.

It should also be noted that there has been international interest in RSD as well. Enquiries have come from Canada and the USA and from southeast Asia. The RSD framework may need fine-tuning to work in different cultures, but this reviewer believes it has already shown itself to be a very flexible resource.

An academic who works with Aboriginal students in the Centre for Aboriginal Studies in Music (CASM), Elder Conservatorium of Music, University of Adelaide, commented that the Framework helps to explain the process of research and the nature of scholarship to students (some of whom are educationally disadvantaged), another indication of how robust is this tool.

The recent addition of two more degrees of autonomy which reflect research at the highest levels of scholarship was an important step and increased the appeal of the framework to PhD supervisors and research-oriented academics.

Conclusion: It is really important that people who are using RSD continue to exchange ideas and materials and to disseminate information about their practice more widely. There have been developments which would have been very hard to predict and which may stimulate others to creative teaching innovations.

6. Interview material from students and from academics suggests that RSD can be a valuable tool and that it might be even more valuable if programs were to incorporate it systematically.

A student's comment – not unusual:

So yes, I think the more courses that it was in, as long as the students got exposed to it at least in the first few of their courses, it would be a good thing.

So I think this would be a good idea to bring up in the sort of practical areas of the first couple of years to get people away from just trying to memorise what they've been told and actually think about the process of research. [Analyst's emphasis]

An academic's comment – not unusual:

...it's very important to have feedback from both ways – from third years to the second years to the first years. That's critical. So that we're all on the same level in terms of the research philosophy and approach that's been started. No point in third year going in one direction, whereas the students have been learning skills and training in a research philosophy which is somewhat different to what you think it should be.

So there has to be what I'll call a program wide approach

However, these are not universal perceptions. Students' comments indicate that they do not always understand how an assessment rubric is used by markers and that they need help to understand the framework and encouragement to apply it.

Some students simply do not like the RSD framework, and some academics do not find it useful or informative. In fact, mandating such initiatives may well be counter-productive. It will be interesting to see what happens at Monash and USP over time.

The articles currently in preparation by Dr Willison with discipline-based collaborators present persuasive arguments in support of efforts to extend RSD systematically from first year through postgraduate study. It is not necessary or even appropriate to use it to frame all tasks or in all subjects, but reinforcing research skills and increasing autonomy over the course of a student's experience at University seems highly desirable and likely to benefit graduates in many ways. However, no teaching strategy works for all students in all subjects, and it is vital for teachers to monitor and modify such innovations over time.

Conclusion: Analysis and reporting of data collected during this project should result in very useful publications. This information should be widely disseminated through all possible avenues as it may well encourage others to improve teaching practice.

7. New materials have been developed which introduce RSD in more accessible ways.

The review of the first RSD project stressed that this was not an easy concept or an accessible document. A new exercise has been developed to introduce the facets of research in an experiential way (see <http://www.youtube.com/watch?v=xI7MRoHhrI0>)

This and other materials (for example, those in the handbook prepared for USP workshops) should help achieve the goals of the current project to involve more people in dissemination of information about RSD and how to incorporate it across programs. Dr Willison has mentioned that people have not been keen to lead RSD workshops on their own despite programs designed to make this possible. However, some 40 workshops have been conducted and more potential leaders seem to be coming forth.

There is also a SmOOC (Small Open Online Course) introducing the RSD linked to the RSD Homepage. This is Module 1 of a series.

As the current funded project draws to a close, a number of workshops are planned, and leaders (other than Dr Willison) will go to the Australian Catholic University and Griffith University, while another visits the University of Adelaide. Dr Willison will conduct workshops at six other institutions.

8. *The materials available on the website do not yet offer much assistance to people seeking to extend RSD from individual courses to whole programs.*

A review of the RSD website (<http://www.adelaide.edu.au/rsd/>) found many interesting items about the framework itself and some suggestions about applications. However, there is as yet very little about introducing the framework across programs. The video “Academics Discuss RSD”, (U of Adelaide Electrical Engineers) accessed via a link to YouTube from the Homepage is not very informative and the sound is not very good.

New materials are being added to the website. The University of Adelaide has purchased new software, Articulate Storyline, which will be used. Dr Willison advises that:

“With the simple example of the RSD across the whole Grad Cert in Higher Ed (first time this year) we have an effective example of a priori mapping, which can be ‘Articulated’ in a short timeframe. We will add to this more complex programs – hopefully Monash Pharmacy will share more of their whole degree mapping. Certainly for programs here (e.g. Oral Health, Media) we have the materials to consolidate into Articulate and will work on this.”

9. *The website is fairly easy to navigate but it may need editing to reduce duplication/overlap and to present only the items which will be most informative and of practical assistance.*

There may, in fact, be too many items on the website. Conversely, there is material on YouTube (RSDROCKS) which is not linked to the website though it probably should be. I found it accidentally when I viewed the Electrical Engineers’ discussion which is linked from the homepage. Some of this material is also used in the SmOOC.

10. *The blog does not seem to be attracting comments; the website is not yet achieving the goal of encouraging interactivity and exchange of ideas.*

There are amusing and interesting entries by Dr Willison but I found no comments or interaction.

Re: website development (comments 7–10 above)

Dr Willison has provided the following summary of website developments:

- The development of the LAMS RSD module, part of the SmOOC.
 - 16 people have completed the module, which takes about 3 hours. The feedback has been that this module drives people to a deeper understanding of the RSD.
 - 40 people registered for the module, so 24 non-completions suggest that it may be ‘too much’, ‘too difficult’ or ‘too hard’ to access for some.
 - We are planning further RSD LAMS modules, however the priority will be Articulate Storyline, as easier to access, will be simpler and require less input.
 - LAMS + Storyline versions will provide a useful repertoire from the website of ‘How to RSD’
- The Webinar Series
 - Advertised on the RSD blog
 - Pushed up web visits and downloads of the RSD framework by 30-40% on the month previous to the series
 - After the series finished, the number of visits returned to their previous levels, suggesting that there has to be an ongoing series of events to keep things lively and keep site visits up.
- The RSD blog
 - Automatically imports into the ‘widget zone’ of the RSD site- keeping the site current
 - Is partly responsible, along with events and webinars and the RSD site refreshed look, for the doubling the number of visitors, from around 13000 page-loads per year on average, 2008- 2011, to 18000 (2012) and 26000 (first 8 months of 2013).
 - Yearly average number of visitors progressively increased 2008-2011, but has jumped dramatically 2012-2013, as have returning visitors.

Conclusion: Although much has been achieved, further development of the RSD website is highly desirable.

The final word

The following was the conclusion of a submission from an Associate Lecturer in a School which has extended RSD across its undergraduate degree program.

“Through this project and through interactions with colleagues during my involvement with this project, I have learnt more about myself as an educator, more about curriculum design and alignment, more about assessment and what it is we are really looking for in our work ready graduates and more about how useful a tool the RSD can be as a reflective surface. I feel that at this point, I have made real inroads with regards to my own course mapping, organisation and linking of student learning across both of the courses I teach in and coordinate. I feel confident now to help take my colleagues to the next level of creating a more coherent thread and greater course alignment using the RSD.”

Congratulations to all involved in this project.