

Development Of All Students' Research Skill Becomes A Knowledge Society*

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Abstract

The political will towards developing strongly as a knowledge society will inevitably remain an aspiration in any country, and Ireland is no exception, unless there is substantial guidance emerging from within the university sector. This present paper introduces a model that was devised to conceptualise exactly the type of development that enables enrolling HDR (Higher Degree Research) students to be research-ready, and students, undergraduate or postgraduate, heading for employment to have research skills utilisable in work environments. I suggest small-scale trials of this model, thoroughly evaluated, well in advance of any policy directives, as the starting point towards evolving a set of approaches to enable the development of a knowledge society.

* Invited Article. URL: <http://ojs.aishe.org/index.php/aishe-j/article/view/12>

Based on a keynote presentation at the AISHE International Conference 2009.

1. Introduction

The political will towards developing strongly as a knowledge society will inevitably remain an aspiration in any country, and Ireland is no exception, unless there is substantial guidance emerging from within the university sector. This guidance needs to take the form of a coherent and explicit agenda to develop the skills associated with research throughout each university student's enrolment in any Irish Higher Education Institution (Irish Universities Association: *Fourth Level Ireland*¹). Contemporary thought internationally expresses similar sentiments:

Our interest in developing students as researchers originated through our explorations over the last few years into ways to enhance the linkage between teaching and discipline-based research... Our perspective here is that one of the most effective ways to do this is to engage our students in research and inquiry. With regard to our previous work on linking teaching and research, our goal here is to move more curricula in the direction of developing students as participants in research and inquiry, so that they are producers, not just consumers of knowledge. (Healey & Jenkins 2009, p.6)

This present paper, therefore, focuses on ways to conceptualise curriculum design which enables all students, not just high achievers, to be participants in research. First, it introduces a model, the Research Skill Development² (RSD: Willison & O'Regan 2006) framework, that was devised to conceptualise the type of curriculum design that enables undergraduate or postgraduate students heading for employment to have research skills utilisable in work environments, and enrolling HDR (Higher Degree Research) students to be research-ready. The paper then presents the key characteristics of the RSD as enabling explicit, incremental, cyclic and coherent research skill development. Next, evaluations of approaches inspired by the model are reviewed, finishing with current limitations.

Diverse applications of this model may be worth trialling in Irish contexts, because indications of its success in Australian Higher Education institutions have been followed by its adaptation and modest uptake in other countries, such as Canada, South Africa, USA & Holland. I suggest small-scale trials of well-adapted approaches inspired by the RSD, thoroughly evaluated, well in advance of any policy directives, as the starting point towards evolving a set of strategies that enable the development of a knowledge society.

1 <http://www.iaa.ie/iaa-activities/4th-level-ireland/index.html>

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

2. Research Skill Development and Knowledge Societies

With the imperative to become knowledge societies, the Republic of Ireland and Northern Island are moving towards more structured PhD programs (Fourth Level Ireland³), while considering what preparation in the Honours year and earlier is also required. How can educators at all levels in different types of institutions and different disciplines meet demands to prepare students to contribute to a “knowledge society”? And how can this be facilitated systematically, and yet allow for the diversity both in these contexts and especially in the creative research output that should be entailed in a PhD?

I propose that some answers to this question pertain to the ‘research skill development’ and ‘autonomy’ of students from first year university onwards. The RSD mentioned above was designed to incrementally develop the skills needed to conduct and report on independent research, and has been used⁴ and evaluated in 20 disciplines across five Australian universities by academics teaching in the sciences, engineering, health sciences, professions, humanities and social sciences. They have used the RSD to develop and assess student literature, laboratory and field research skills (Willison 2009). The RSD framework may have application in Irish Higher Education, because it has shown substantial adaptability: it has been utilised in the countries named above and its Australian uses include undergraduate, Honours, Masters by coursework and PhD programs in research intensive universities, technology universities and rural universities. In some cases, the RSD has served as a conceptual model for curriculum redesign. Moreover, in every instance, the distinguishing characteristics of the disciplines, contexts and individuals using the framework have been maintained and fostered while research and reporting skills have been, overall, enhanced, with measurable increases in independent learning. This has had the consequence of enabling very diverse approaches to developing students’ research skills while utilising the same conceptual framework.

3. RSD Characteristics

The main characteristics of the model that enable its flexibility and breadth of scope is that it makes explicit about research skills what is otherwise frequently implicit, it provides coherence of approach, it suggests incremental development of research skills, and also suggests a cyclic approach to developing these skills. These characteristics are described below, and illustrated by examples from two consecutive First Year Human Biology courses, which have utilised RSD approaches since 2005.

3 <http://www.iaa.ie/iaa-activities/4th-level-ireland/index.html>

4 Examples of RSD assessments from 15 disciplines are available at:
<http://www.adelaide.edu.au/clpd/rsd>

3.1 Explicit development of research skills

The RSD model makes explicit six facets of research, initially identified from the literature (ANZIL 2004; Bloom et al. 1956), fine-tuned by use by academics, and that have provided a surprising degree of agreement across 20 disciplines, as diverse as Business and Computing Science, Oral Health and English. The six facets of research (Willison & O'Regan 2006) are that students:

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

To make the process of developing research skills explicit, Human Biology lecturers reframed the assessment criteria of existing tasks in accordance with the RSD, renamed the tasks as 'Literature Research' and 'Laboratory Research' and demonstrated to students at the beginning of the year how all the tasks fitted together over the whole year.

3.2 Incremental development of research skills

The RSD framework is constructed on a premise that these facets of inquiry should be modelled by lecturers, and scaffolded structures be provided to enable students to mirror these skills; likewise students should also be encouraged to independently apply these skills in areas novel to the students. So the RSD elaborates the facets into a continuum described by degree of student autonomy, where Level 1 is the highly prescribed end, and Level 5 the highly autonomous end.

The first three levels of the RSD all describe 'closed inquiry', where the academic determines the starting point such as aim, purpose or question, the processes to follow, such as methods and procedures, and the end point such as the answer, resolution, intended audience, and style of presentation. A student who is considered to be working at Level 1 requires a high degree of structure and guidance, whereas a student working at Level 3 does so independently within all parameters set. Levels 4 & 5 describe open inquiry, where the starting point, processes and end points are determined by the students; at Level 4 this is scaffolded, so that, for example, students would still be limited in their scope and be given objectives to meet & marking criteria in advance; at Level 5 the open inquiry is determined by the student with reference to the discipline. For all of these levels, the degree of academic rigour required to fulfil them will vary according to year level, disciplinary expectations, and so on (Willison & O'Regan 2007, p.397).

Whilst the RSD does not specify that any end of the spectrum is better than the other, it does suggest movement, from the highly prescribed and modelled end, to the student-determined end. The movement is not one of big jumps, but of incremental increases in autonomy, in order to maximise student immersion in disciplinary contexts and standards, as well as increasing possible student success.

To enable incremental development, rather than requiring a big jump in skills, the Human Biology lecturers provide initial Literature Research tasks with structure and guidance (Level 2), next provide tasks which required independence within the parameters set by the lecturers (Level 3), and finally provide an open-ended field research task at Level 4. The degree of autonomy required over the year increases stepwise, with realisable jumps.

3.3 Cyclic development of research skills

The incremental movement implied by the RSD is not necessarily unidirectional. It also suggests a movement back again to the highly prescribed, when context demands this, for example with conceptually more demanding content, or higher degree of rigour required, say, in a subsequent year of study. So, when first year Human Biology students progress to second year, with its increasing cognitive demands and requirements of rigor, structured and guided research tasks, equivalent to Level 2 are more appropriate for most students, rather than Level 4 or 5 tasks. In this way, the skill development may cycle through the years, with students learning appropriate ways of communicating and researching in a discipline, before applying these understandings in more self-directed research of Level 4 or 5 nature.

3.4 Coherent development of research skills

The RSD enables academics to conceptualise students' research skill development in systematic and flexible ways, characteristics that coupled together enable a coherent approach, both within a course, and across the years of university education. It is systematic, as it frames academics' thought processes in terms of facets and levels of autonomy. However, it is flexible, as it is a general description pertaining to research skills that was not designed to be used directly with students, but rather in most cases needs to be adapted completely to fit a context. Its use across the various year levels, disciplines and universities mentioned earlier suggests that it is highly adaptable. Ultimately, the RSD is a *conceptual* framework rather than a theoretical model, meaning that it aids, rather than prescribes thinking. Flexibility is almost an obligation of any RSD user. It would be somewhat ironic for academics to be obliged to use the RSD, let alone a prescribed approach to its use, given that the framework itself describes Levels of autonomy.

The RSD, if utilised as a conceptual framework in-common across years of study, may enable a traceable thread of research skill to run through all university education as a major theme for students and ultimately be critical in the formation of a knowledge society.

4. Evaluation of RSD approaches

Some disciplines have been evaluating RSD approaches to the development and assessment of discipline-specific research skills for three or four years, and many more are into their second year. A summary of findings so far, based on a study funded by the Australian Learning and Teaching Council, includes that:

- Students perceive that their research skills improve substantially during a semester when these skills are explicitly developed (Willison, Schapper et al. 2009).
- Academics across eight disciplines have noted substantial improvements in research skills from diagnostic assessments to final assessments (Willison 2009).
- The development of literature research skills in closed inquiry is correlated with the development of field research skills in open-ended research (Willison, Peirce et al. 2009).
- Students claim that research skills explicitly developed in first year were very useful in subsequent study and, notably, in employment (Peirce et al. 2009).
- Use of RSD-based assessment tends to persist, and academics tend to increase their use over time (Willison 2009).
- Six quite different approaches to utilising RSD have been identified, including the utilisation of online environments (Snelling & Karanicolas 2008).
- An external review of the RSD project found that approaches work best that were most thoroughly adapted to the context of use (Nightingale 2008).

5. RSD Limitations

RSD-based approaches, as implemented do not suit all students, or at least do not help the development of all students' research skills. Uptake is patchy from course to course in a program of study, with some lecturers readily adapting and adopting the RSD to suit their discipline & students, and their neighbours in the next office disinterested, or unconvinced of benefits. A focus on research skill development tends to require some content is 'removed' from courses, an outcome that many academics would resist without being persuaded that advantages substantially outweigh disadvantages.

Moreover, the generally positive evaluations, noted in the section above, are for the course level use of RSD. As yet, there is no program-level evaluation of RSD approaches, and it cannot be assumed that it will transfer from the smaller to the larger unproblematically, or from the Australian to the Irish context. Some Irish academics may choose to trial and evaluate RSD approaches at the course level, with an eye towards the potential for a coherent thread of research skill development through all university study.

6. Conclusion

For a society to become a knowledge society, universities must take a lead in framing across all university education the development of the skills for knowledge production through research. To this end consideration may be given to utilising the Research Skill Development framework, or some other way of conceptualising an explicit, incremental and coherent development of students' skills from the first year of university study. These skills will hold students in good stead, whether they are going out immediately into the workforce, or progressing onto Higher Degrees by Research. A population with research skill becomes a knowledge society, just as a knowledge society becomes a home for the development of all students' research skills.

7. References

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