

Researching, problem solving, critical thinking ... same ship, different bay. (0193)

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Background

Six facets of research in common across disciplines were characterised in early versions of the Research Skill Development framework (RSD: Willison & O'Regan, 2005; 2006) and fine-tuned as: embarking and clarifying; finding and generating; evaluating and reflecting; organising and managing; analysing and synthesising; communicating and applying (Willison & O'Regan, 2006/2013). Federal funding in 2007-2009 (Willison, Le Lievre & Lee, 2010; Willison, 2012) and in 2011-2013 (Willison, 2014), allowed implementations and evaluations of the RSD in nine different Australian Universities and more than 20 disciplines. After feedback from over 100 workshops (Willison, Le Lievre & Lee, 2010; Willison, 2014), and a variety of critiques in peer-reviewed articles (Cumming, 2010; Hughes, Tucker & Knaggs, 2011; Brew 2013; Spronken Smith, et al. 2013; Allin, 2014) there has been broad recognition that research in many disciplines '... align with the six facets of Willison & O'Regan's (2007) Research Skill Development framework' (Walkington et al., 2011). This is the case in disciplines ranging from Accounting (Wilkin, 2014), Agriculture (Lovey's, et al., 2014), Biochemistry (Bugarcic, et al., 2012), Dentistry (Winning, et al. 2008), Education (Bahr & Lloyd, 2011), English (Kelly, Russell & Wallace), Engineering (Al Sarawi et al., 2013), Environmental Education (Beavis & Beckmann, 2012), Geography (Tweed & Boast, 2011), Medicine (Murdoch-Eaton, 2010), Management (Blasco, 2012), Teacher Education (Klebansky & Fraser, 2013, through to Zoology (Hazel,nd).

With the RSD seeming to be suitable as a language in common about quite diverse types of research across very different disciplines, this also raised the question about whether the RSD could provide useful language in other contexts. In one study 'data suggested that research activity was central to knowledge-making and the *primary scaffold* for a student's ... critical thinking'. (Wass et al P322'italics added.), where research not only develops student critical thinking, but was the main way of actually achieving this. Dwyer et al. (2014, p.44) found that 'the relationship between the concepts of CT [critical thinking] that are taught and those that are assessed is often unclear; and a large majority of studies in this area include no theory to help elucidate these relationships.' With difficulties of articulating and assessing critical thinking, and research processes seen to develop it, it may be that this skill set and others like it could be beneficially described using the RSD in many disciplines.

Research Approach

Five diverse undergraduate degree programs used the RSD to frame teaching, learning and assessment tasks over multiple semesters. This study determined student and graduate long-term perspective on the nature of the research skills they developed. From students' and new graduates perspectives', what is the distinction between researching as portrayed in the RSD and other active cognitive engagement in their university or work context, whether critical thinking, problem solving, clinical reasoning or evidenced-based practice? This is an important question because if there are substantial differences, these need to be elucidated; if similar, this needs to be articulated more clearly to the Higher Education community and potentially reinforced more coherently.

Twenty six graduates were interviewed one year after completing an undergraduate degree, and 23 students were interviewed during the fourth year- an honours year- of their degree, that used the RSD to frame teaching, learning and assessment tasks in multiple semesters. The semi-structured interviews were analysed according to ways that graduates or students described their current experiences of use of the skills associated with research.

Findings

Results showed that working context and field of undergraduate study flavoured the language that interviewees used to describe their processes involved in work or study. For example, an engineering graduate was asked in an interview: 'In general, in terms of *research skills* - what do you think you are pretty good at?' The engineer replied:

I think I'm good at *solving complex problems* and coming up with new ideas to solve complex problems. That's my main strength... I think I'm good at doing something and then *critically analysing* it.' (EEE Graduate 3, italics added)

For him, this overlap between terms like 'research', 'solving problems' and 'critically analyse' was substantial. Such context-specific and discipline-specific take on the same overarching skill set was prevalent in the interviews when cued on their current understanding of research: Media graduates would be more likely to talk about critical thinking, Oral Health graduates and, Medical Science and Animal Science students used the term research and Engineering graduates use problem solving.

Implications

This sense of overlap is prevalent in the literature, where critical thinking comprises the same skills that a researcher uses to determine the accuracy and worth of a knowledge claim (Wass et al., 2011).

The differences in foci of active cognitive engagement strategies such as researching, problem solving, critical thinking and clinical reasoning are useful and should be maintained. Moreover, the substantial disciplinary differences within these terms also need to be recognised and emphasised as these skills are not generic- as this implies transferable from one context to another. Transfer of skills from one similar context to another is notoriously hard.

The problem is that students, as well as many educators from casual tutors to lecturers do not see the overlapping features, and so they are presented as unconnected. This disconnect wastes the potential to reinforce the elements in common, so that university education is more coherent, and students see the connections from one subject to another, which differ in content, but the skills curriculum is evident to them and building. '... 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 p. 417). When researching is seen as distinct from problem solving, critical thinking and evidence based decision making, the separation leads to separate episodes of learning that may not mutually reinforce. If students see they are riding the same ship of cognitive skills through university, they may experience a much more coherent higher education as they enjoy visiting many diverse and wonderful bays of learning experiences and terminologies.

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