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The Effectiveness of 'Bolted on' Research Training

Evaluating the alignment between the RSD framework, and the effectiveness of 'bolted on' research skills training.

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Research outcome

Using the example of “bolted-on” research skills training, fully aligned with the RSD framework, I highlight the lack of a relationship between academic performance and the reflective thinking amongst postgraduate students.

I suggest reasons for this lack, and urge to address it.

Main topics and presentation structure

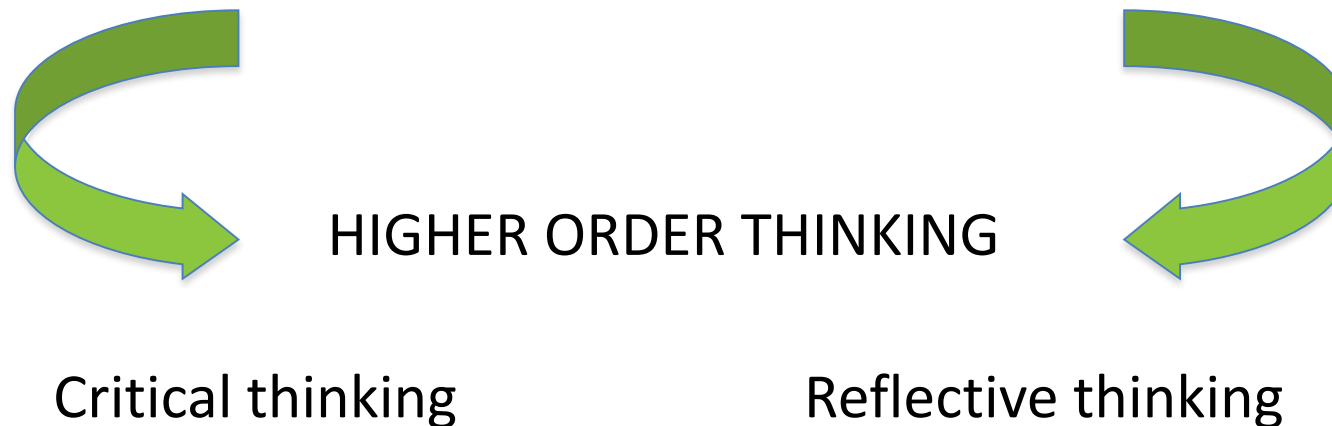
- 1) Describe SC5055 and examine how it aligns with the RSD matrix. I do that to validate our training approach
- 2) I then identify which students benefited most from skills training – objectively assessed
- 3) examine the impact of SC5055 on students' achievement and their ability to self-evaluate the development of their skills and understandings – an important feature of academic success and lifelong learning
- 4) Discuss findings
- 5) Finally suggest ways in which the RSD framework can be improved in response to my findings

Research training in HE

“Normal” UG or PG subjects that include a research related/relevant assessment task (i.e. Lit. review)

Original research project, individually supervised (i.e. MSc, PhD)

Dedicated research methods subjects prior to or in parallel with an MSc or PhD research project.



The academic setting: SC5055

Available to PG coursework students

Limited attendance, blended learning design

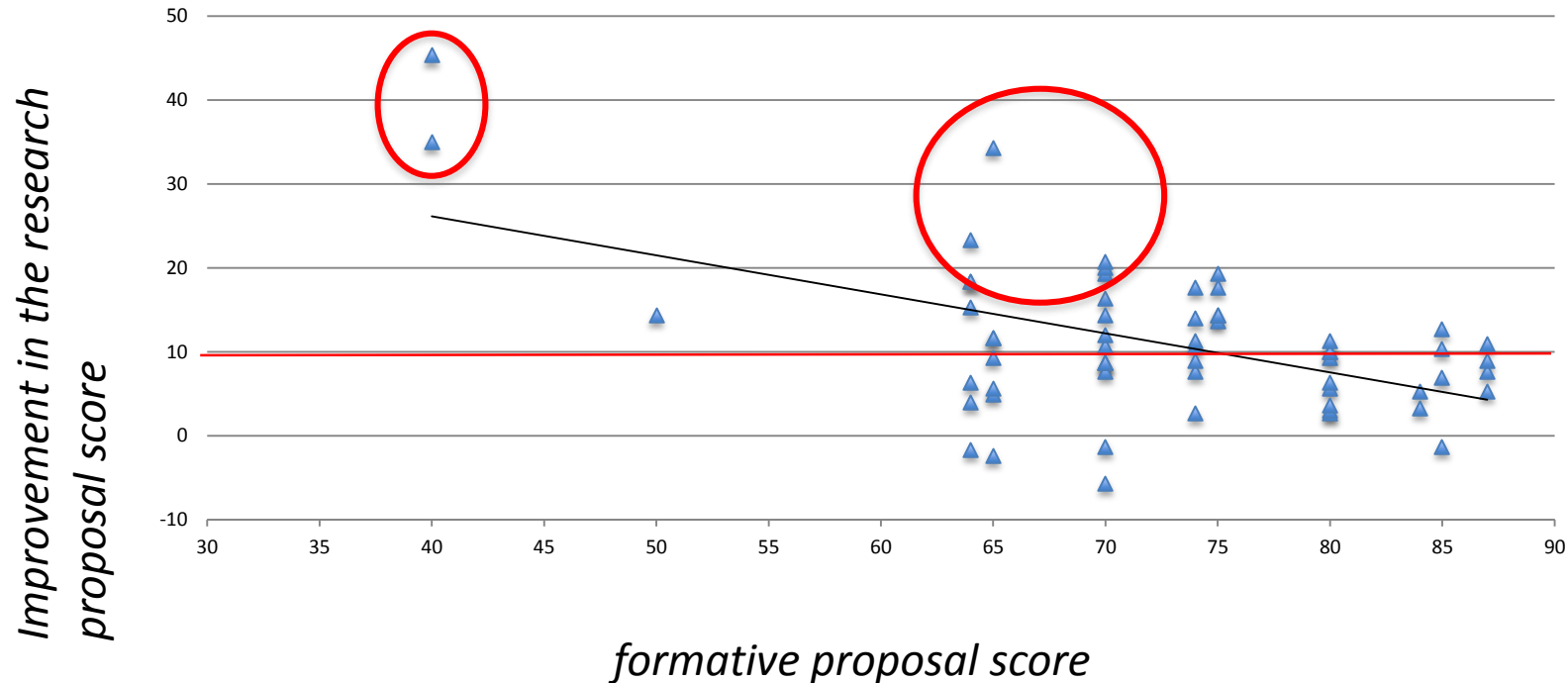
Assessment:

- Original research proposal (10+30%);
- e-Oral presentation (30%);
- Learning portfolio (30%).

Facets of RSD framework	Level 4 indicators	Alignment to indicators (made evident by assessment criteria below)
1 Embark & Clarify	Students generate questions /aims/ hypotheses framed within structured guidelines. Anticipate & prepare for ECST issues	<ul style="list-style-type: none"> • The research question is clearly original and fits clearly within Australian and New Zealand Standard Research Classification Codes and research type. (1) • Ethics and safety issues are considered and are appropriate and comprehensive for the research (1,6) • The methodology is appropriate to address the research question. (2) • The proposal has a clear project description that includes why the work warrants funding based on the identification of a knowledge gap or contradiction, innovative research and very clearly defined outcomes and outputs. (2, 3, 4, 5) • The budget is fit for the purpose of the proposed research and is tightly aligned with proposed research methods. (4) • Track record and leadership, relative to opportunity, are clearly articulated. (5) • Alignment to university strategic intent made clear. (5) • The project has a clear objective and the summary is well articulated for the layperson. (6) • Quality of writing, observance of guidelines and presentation. (6)
2 Find & Generate	Students collect & record self-determined information/data choosing an appropriate methodology based on parameters set.	
3 Evaluate & Reflect	Students evaluate information/data & the inquiry process using self-determined criteria developed within parameters given. Reflects to refine others' processes	
4 Organise & Manage	Students organise information/data using self-determined structures, & manage the processes (including team function) within the parameters set.	
5 Analyse & Synthesise	Students analyse information/data & synthesize to fully integrate components, consistent with parameters set. Fill knowledge gaps that are stated by others	
6 Communicate & Apply	Students use discipline-specific language & genres to demonstrate scholarly understanding for a specified audience. They apply the knowledge developed to diverse contexts and specify ECST issues in initiating, conducting & communicating.	

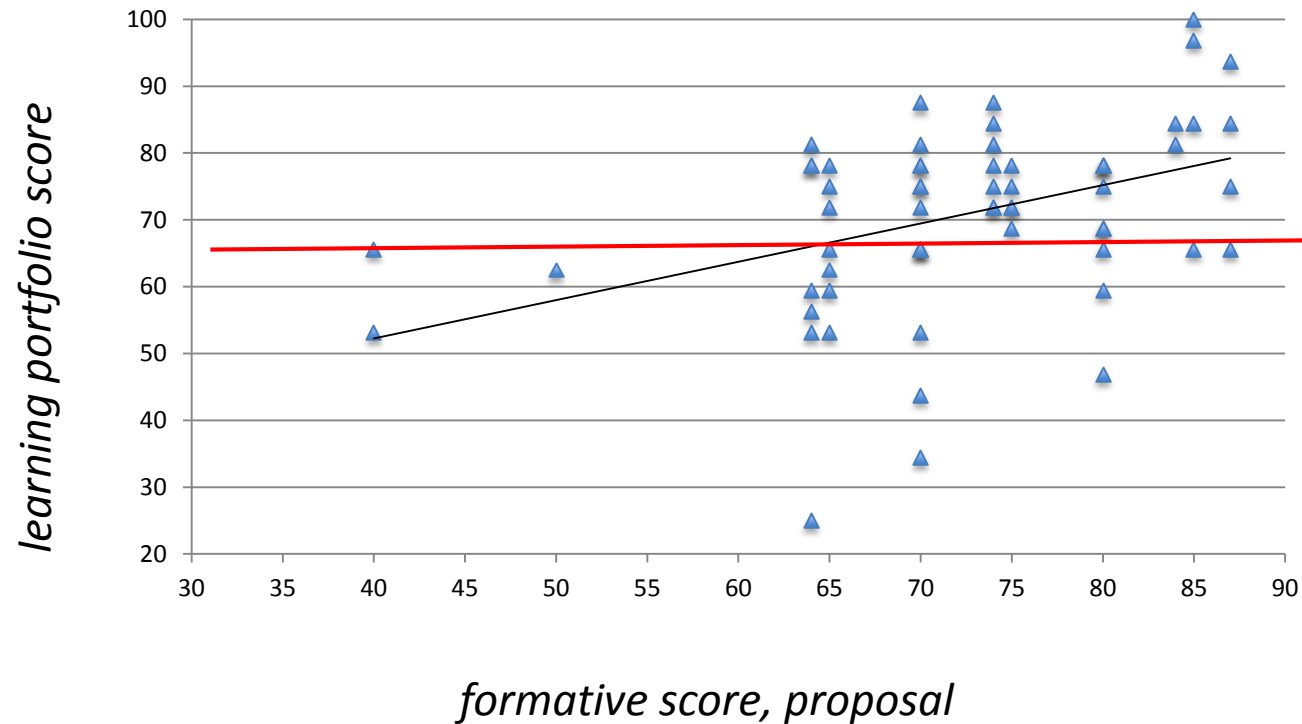
Evaluation criteria	Very well developed			Needs a lot more work
Elements of reflection in portfolio	<p>Reflection clearly and systematically describes, analyses and synthesises student's development and current level of proficiency; future actions clearly appropriate to personal goals; clearly cites strong and appropriate evidence found in the artefacts for all observations and to support all evaluative judgements; clear linkages between suggestions for growth and improvement and present skills and knowledge. Citing works of others as appropriate.</p>			<p>Reflection vaguely or inconsistently describes, student's development or current level of proficiency or plans to improve; reader has some difficulty verifying the presence of appropriate evidence that illustrates observations and to support evaluative judgements; if present, suggestions for growth and improvement are platitudinous and not well linked to present skills and knowledge. Missing or haphazardly citing the works of others.</p>
Elements of communication in portfolio	<p>Text is succinct, grammar, spelling and punctuation all correct. Document is very well planned with all information efficiently accessible; white space, formatting, fonts, bullets and numbering are all used to maximum effect.</p>			<p>Text lacks succinctness; several errors in grammar, spelling and/or punctuation. Frustrating to locate information; white space, formatting, fonts, bullets and numbering are not well used or considered.</p>

Performance of the 2015 student cohort: The main beneficiaries



Take home message 1:
Weaker students benefitted the most (Pearson's $r=0.52$, $P<0.001$).

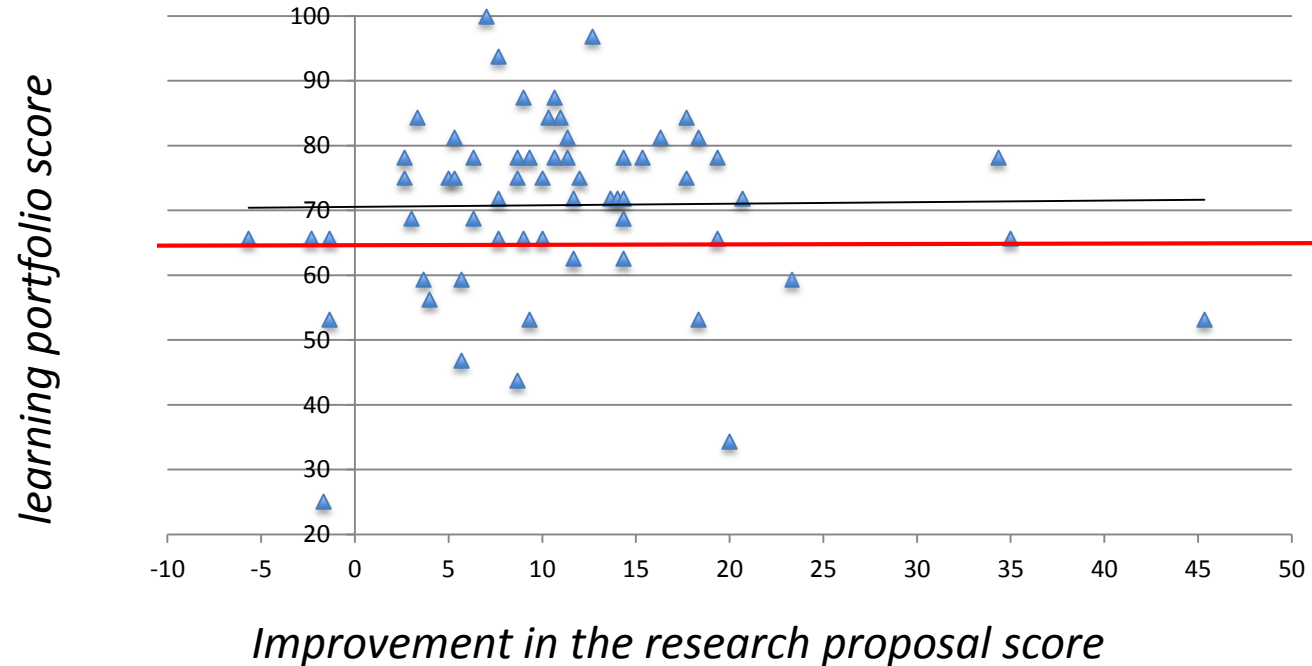
Performance of the 2015 student cohort: Awareness of learning 1



Take home message 2:

A weak +ve correlation between awareness of learning and formative proposal score (Pearson's $r=0.41$, $P<0.001$)

Performance of the 2015 student cohort: Awareness of learning 2



Take home message 3:
No relationship between improvement in proposal score and awareness of learning (Pearson's $r=0.003$, $P=0.98$)

How to explain these observations?

- 1) Why students scoring low in the first submission showed the most improvement for the second submission?
- 2) Why students who improved most seem unaware of how such improvement was achieved?
- 3) Why students with distinctions or high distinctions for the first submission show such widely spread scores for the portfolio?

How to explain these observations?

1) Why do students scoring **lower** in the first submission **improve more** for the second submission?

- ❑ “Pulled up the sock”
- ❑ Over-relied on assistance
- ❑ Higher scoring students happy with formative grade, did little to improve
- ❑ Higher scoring students have less “room” for improvement

How to explain these observations?

2) Why students who **improved most** seem **unaware** of how such improvement was achieved?

The Performance Heuristic* and the Performance Bias**



Over-reliance on assistance most likely

*Critcher CR, Rosenzweig EL. The performance heuristic: A misguided reliance on past success when predicting prospects for improvement. *Journal of Experimental Psychology: General*. 2014; 143:480-485.

**Kornell N, Hausman H. Performance bias: Why judgements of learning are not affected by learning. *Memory and Cognition*. 2017; 45:1270-1280

How to explain these observations?

3) Why students with **Ds or HDs** for the first submission show such **widely spread** scores for the portfolio?

- ❑ Critical thinking vs reflective judgment*
- ❑ Lack of relationship btwn academic performance & reflective thinking **
- ❑ The Performance Heuristic and the Performance Bias
- ❑ Writing the portfolio to the assessment criteria

*Brabeck, MM. Critical thinking skills and reflective judgment development: Redefining the aims of higher education. Journal of Applied Developmental Psychology. 1983;4:23-34.

**Phan HP. Predicting change in epistemological beliefs, reflecting thinking and learning styles: A longitudinal study. British Journal of Educational Psychology. 2008; 78:75-93.

Implications for the RSD

- ❑ Higher order thinking skills are critical for research.
- ❑ Currently, the RSD focuses on performance, operationalizing critical thinking.
- ❑ **Reflective thinking, critical (self) reflection**, aka metacognitive skills, also need to be emphasized to facilitate continuous learning & improvement (e.g.. following Gibbs' reflective cycle)
- ❑ Identify appropriate developmental stages