

Internet Appendix A44: Research Student Creativity

A44.1 Illustrative Pitch Template Example Training Creativity Skills

Pitcher's Name	Jennifer Gippel ¹	FoR	PhD Creativity	Date Completed	11/08/15
(A) Working Title	Training creative problem solving skills in higher degree research students				
(B) Basic Research Question	(1) How do HDR students understand <i>creativity</i> in the research process? (2) Do supervisors and HDR students have similar perceptions of <i>creativity</i> in scientific research?				
(C) Key paper(s)	<ul style="list-style-type: none"> • Cravens, A. E., Ulibarri, N., Cornelius, M., Royalty, A., & Nabergoj, A. S. (2014). Reflecting, iterating, and tolerating ambiguity: Highlighting the creative process of scientific and scholarly research for doctoral education. <i>International Journal of Doctoral Studies</i>, 9, 229-247. • Byrge, C., & Tang, C. (2015). Embodied creativity training: Effects on creative self-efficacy and creative production. <i>Thinking Skills and Creativity</i>, 16, 51-61. • Firestien, R. L. (1996). <i>Leading on the Creative Edge: Gaining Competitive Advantage Through the Power of Creative Problem Solving</i>: Piñon Press. • Walsh, E., Anders, K., Hancock, S., & Elvidge, L. (2013). Reclaiming creativity in the era of impact: exploring ideas about creative research in science and engineering. <i>Studies in Higher Education</i>, 38(9), 1259-1273. • Whitelock, D., Faulkner, D., & Miell, D. (2008). Promoting creativity in PhD supervision: Tensions and dilemmas. <i>Thinking Skills and Creativity</i>, 3(2), 143-153. 				
(D) Motivation/Puzzle	<p>To graduate with a PhD requires four essential skills: (i) knowledge of the field; (ii) technical knowhow; (iii) effective communication; and (iv) creative problem solving ability to generate novel and useful ideas as well as to navigate the complex, ambiguous and often messy business of research. In developing research skills, students tend to readily acquire the disciplinary knowledge and the technical expertise necessary to put together a research proposal and conduct the research. In fact, most institutions provide an array of courses and training opportunities to address these skills e.g., “how to” workshops covering oral and written communication, good research design, developing research proposals, ethical issues in research, and how to publish well—all to ensure the student is research prepared.</p> <p>Far less attention is paid to the 4th skill of acquiring the mindset and expertise to be truly creative—to generate novel and thought provoking research questions, to persevere in the face of ambiguity and complexity, to negotiate collaborative relationships as well as to successfully balance the demands of family, work and research, even though creativity is considered by many to be at the heart of all aspects of scientific research (Cravens, Ulibarri, Cornelius, Royalty, & Nabergoj, 2014; Epstein, 2000; Loehle, 1990; Lovitts, 2008). In fact, some argue, creative research may coincide with a neglect of technical expertise (M Rhodes, 1961) and come from the mind unshackled by the mental constructs built up and often taken for granted in the process of becoming an ‘expert’. As Loehle (1990) claims: ‘the expert is in danger of developing the small cage habit’ (p.126). Furthermore, there is ample evidence that training in the techniques of creative problem solving enhances creative intelligence (Byrge & Tang, 2015; Root-Bernstein & Root-Bernstein, 2001; Scott, Leritz, & Mumford, 2004; Torrance, 1972).</p>				

¹ **About the author:** Jennifer holds a PhD in Finance from the Australian National University and is currently working toward a Master of Science in Creative Thinking and Change Leadership from the International Center for Creative Studies, Buffalo, New York. Dr Gippel teaches post graduate finance and has published in leading finance journals. Currently, Jennifer is adapting and expanding her research interests to include areas related to creative problem solving. Connecting research development to research provides Jennifer a way to blend her research skills with facilitating workshops to PhDs in creative problem solving and scholarly writing.

THREE	Three core aspects of any empirical research project i.e. the “ IDioTs ” guide
(E) Idea?	By including the skills and techniques of creative problem solving in research development programs we can enhance HDR student creativity and provide them with an essential 21 st century competency i.e., creative intelligence.
(F) Data?	Survey of supervisors across disciplines and countries; Survey of PhDs including quantitative and qualitative responses. The sample will include students: at different stages of candidature; across disciplines; and across countries.
(G) Tools?	Tools used in conjunction with quantitative survey data and software to analyse qualitative data.
TWO	Two key questions
(H) What's New?	The novelty is in the idea. A few studies have explored supervisors’ interpretations of the role of creativity in research; however, no study has compared or explored the perceptions of HDR students to creativity and its role in their research process, product, and environment.
(I) So What?	The form and purpose of a PhD is evolving. PhD students more than ever require creative problem solving skills and not only because research involves high level cognitive skills to formulate and find solutions to ill-defined problems. PhDs need skills transferrable to workplaces outside of academia where many now must seek employment. Further, creativity is a key driver for change and as our future problem solvers, young researchers need the skills to address the so called “wicked” problems of modern society i.e., global and national social, economic and environmental challenges (The Group of Eight, 2013). Such problems are often ill-defined (meaning there is no one solution); they are novel (meaning past experience is insufficient in resolving the emerging situation); and they are ambiguous (there is often incomplete, missing and extraneous information), and any intervention is likely to have multiple affects, some unintended, unwanted and even unpredictable. In short we need creative intelligence.
ONE	One bottom line
(J) Contribution?	Uncover the mindset HDR students bring to their research with regard to the creative aspects of scientific endeavours and as a result to better support students’ creative thinking abilities and their creative scientific contributions.
(K) Other Considerations	Help with survey design and dissemination. Ethical clearance required Target Journal: <i>Creativity Research Journal</i> or <i>Studies in Higher Education</i>