**Creative Ecologies:**

**Fostering Creativity in Secondary Schools**

Final Report



**To cite:**

Harris, A. (2017). *Creative Ecologies: Fostering Creativity in Secondary Schools*. Available at: <http://creativeresearchhub.com>

**Table of contents**

Acknowledgements…………………………………………….…………….…….3

List of Figures…………………………………………………….………………..4

Executive Summary…………………………………………………….……….…5

Introduction…………………………………………………………….……….….6

Research Design…………………………………………………………..………14

Creativity measurement tools exemplars……………………………….….…..…19

Data/Findings overview……………………………………………...……….…..21

1. *Summary of Themes - Australia)…*…………………………….………22

2. *Summary of Themes - International)*………………………..…..…..…23

3. *Summary of Student Surveys*………………………………………..…28

4. *Quantitative Findings (Comparative)*………………………...…….…29

5. *Qualitative Findings (Comparative)*………………………...…….......34

Outcomes……………………………………………………………...……...….40

Creative Ecologies: A new Conceptual Framework………………………...…...42

Methodological Toolkit…………………………………………………………..45

Recommendations………………………………………………………........…..48

*For Schools…*…………………………………………………………….48

*For creative workforce*…………………………………………..….……48

*For Government…*……………………………………………….…...…..49

Conclusion…………………………………………………………………….….50

Appendix A: Creativity Assessment Tools………………………………….……51

Appendix B: Whole School Creativity Audit…………………...…………..……61

Bibliography……………………………………………………….……..………65

#### Acknowledgements

Thanks firstly to the Australian Research Council who funded this study and by doing so recognised the value of creativities education in schools, and in Australian and global culture more generally. I would like to thank the Australian, Singaporean, American and Canadian schools, students, teachers, principals and professional staff who invited me into their educational practices and environments, and who entered into honest and open dialogue with me on the topic of creativity in secondary school contexts. While the schools and individuals remain anonymous in this report, I want to express the deep gratitude and respect I have for the openness of those who shared their sometimes-frustrated, sometimes-joyful sometimes-aspirational professional and personal experiences and who are grappling with the complex issue of how to foster more robust creativities education in compulsory schooling, even as the approaches and needs of these creative educations continues to evolve.

I would like to acknowledge Monash University Faculty of Education and my colleagues there who have supported this study, in practical terms but also in conceptual, pedagogical and interpersonal ways, over the three years of its life. I thank Alice Tinning who was an extraordinary Project Manager and friend who assisted me not only logistically and strategically, but also conceptually throughout the life of this project, and I would also like to acknowledge Stephanie Scherr whose research assistance in the 2013 pilot stage of this study was invaluable. Lastly, I would like to thank my family, and in particular Stacy Holman Jones, for her support and love throughout this challenging project and many others.

#### List of Figures

Figure 1: Constitution of the expert panel Advisory Group for this study…………………...12

Figure 2: Cho et. al (2011) Education for Creative Talents………..…………………………...13

Figure 3: Participant demographics, this study………………………….…………………...16

Figure 4: KEYS protocol measures **………….**………………………………………………...18

Figure 5: KEYS protocol analysis overview….………………………………………………19

Figure 6: Summary of themes, Australia **…**……….………………………….………………22

Figure 7: Summary of themes, International………………………………….……………...23

Figure 8: Summary of Student Surveys – Australia only…………..………………………...28

Figure 9: Survey demographics………………………………………………………………29

Figure 10: Question 7: *In general*………………………………………………………….…30

Figure 11: Questions 7.1: Findings graph………………………………………………….…30

Figure 12: Findings graph: *How much do you agree?*……………………………………….31

Figure 13: Findings graph: *Creative achievements recognised*………………..……………..33

Figure 14: Findings diagram: *Alone or with others?* …………….…………………………..35

Figure 15: Thematic comparison table (Australia/international)………..……………………35

Figure 16: Top 10 List Creative Skills and Capacities…………………..……………..........41

Figure 17: Harris Creativity Index …………….……………………………………………. 45

Figure 18: Creativity Assessment Tools………………………………..…….………………51

Figure 19: Whole School Creativity Audit………………………………..………………….61

#### Executive Summary

The primary focus of this study was to investigate and describe how the General Capability of Critical and Creative Thinking (ACARA 2012) can be fostered through an environmental approach in Australian secondary schools. To achieve this aim, four **OBJECTIVES** were identified:

1. develop a workable and measurable **DEFINITION OF CREATIVITY** for Australian secondary schools, adapting Lucas et al’s “5 Creative Dispositions” to the Australian context;
2. develop a new **THEORETICAL FRAMEWORK** for cultivating creativity in schools that is internationally comparative (adapted from Cho);
3. **MEASURE CREATIVITY** in a **representative sample of Australian secondary schools** (from at least 5 of the 7 States and Territories, and from a range of geographical, socio-economic and demographic sites); and
4. make **ACTIONABLE RECOMMENDATIONS** to Australian education policy-makers.

In meeting the objectives, the project has produced the following **OUTCOMES**:

1. Articulate a **new discourse of creative and innovative skills** and dispositions which can be embedded in Australian secondary education policy, contextualised against an **international literature review** of research in this area;
2. To analyse and **disseminate the results** of an online survey of students, teachers, administrators and staff across Australia, about their current practices and attitudes toward creativity (e.g., “What do educators across Australia describe as the key elements of creativity education?” and “where is it most clearly evident?” etc.);
3. Propose a **new theoretical framework** for comparative and consistent integration with international standards in creativity and innovation discourses and practices in education**.**

These aims, objectives and outcomes were accomplished through a 3-year international mixed-method study and generated the recommendations, an international advisory group, and a series of events and publications, which are collectively summarised in this report.

#### Introduction

***Background***

Creativity and its importance to economic development has never been more a “subject of debate and research, both by academic and political institutions” (Correia & Costa 2014, p. 8). The United Nations (UNESCO 2013) has noted its importance to economic development, reporting that trade of creative goods and services more than doubled from 2002 to 2011. Locally and globally, research is increasingly required into what a productive, implementable and sustainable creativity across the education lifespan might mean beyond a collection of rubrics, curricular skills, or general capabilities. At the same time, creative economies, creative cognition and creative and cultural industries research continues to talk mostly about ‘lifelong learning’ and workplace innovations rather than mandatory schooling and how it is increasingly disconnected from global workplace needs. There has been no regionally-focused research on Australasian creativity education (in the compulsory years) crossing national boundaries in the Asian region.Only through increased and sustainable research that bridges education and creative industries can we account for the new creative and educational practices that have emerged from the region in the last two decades.

Educationally, creativity has moved to the forefront of Australian education through inclusion in the Australian Curriculum’s General Capability of *Critical and Creative Thinking* (ACARA 2012)*,* yet school leaders and educators still seek a clear and consistent approach to its implementation, a challenge reflected globally. Most recently, the Welsh Government’s strategic objectives for creative learning (2015 to 2020) include the “aim to build a successful education system which would directly contribute to greater innovation and creativity, to the cultural capital of the nation” which will “contribute to our plans to build an excellent professional workforce” (Wales 2015). This kind of progressive and integrated approach between workforce, governing bodies, arts and cultural organisations and education consortia, is currently lacking in Australia and across the Australasian region. Consequently, educators and students may not be sufficiently equipped to adequately thrive and compete in a complex global environment.

Economically, a range of countries, organisations, and transnational teams are developing various Creativity Indices, including the *Global Creativity Index* (GCI), which ranks 139 nations worldwide on the “advanced economic growth and sustainable prosperity based on the performance of its creative class.” The 2015 GCI ranks Australia as number one overall, with the USA second, New Zealand third, and Canada fourth. Ranking ninth, Singapore is the only Asian nation in the top 10. Southeast Asia as a region is rapidly moving from an industrial economy to a creative one, and in comparing against the 2015 ranking, lists Singapore alone among the top ten performers, with Hong Kong (21st), and China (62nd), ranked much lower.

Australia can do better as a global and regional leader to operationalise educational and economic policy and practice toward better creative industries education in compulsory years’ schooling. State authority *Creative Victoria* has noted, “As a nation, we cannot compete in the global marketplace on price alone. To stay competitive, we have to invest in our people and their creative capacity, and in particular, their capacity to innovate.” The consequences of failing to invest in creative education now, is to risk Australia slipping regionally and globally as 21st century creative economies advance. Our national creative economies body, *Creative Australia*, notes “Australia’s increased focus on our engagement with nations in Asia provides unprecedented opportunities to grow our creative economy,” and the study addressed here seeks to work collaboratively and interculturally towarad becoming a leader in creative education. In so doing, this project advances knowledge in both the education and economics sector, contributing to a national agenda to develop a stronger ‘creative climate’ (McWilliam 2008; Isaksen and Kaufmann 1990) in Australia and across our region.

A desire for greater creativity and innovation are now widespread in education, industry and government initiatives for the 21st century the world over (Cho & Lin 2011; Craft 2005; Flew 2012). But with “over 700,000 primary school children in Australia who don’t have specialist teaching in the arts” (Caldwell & Vaughan 2012), Australia is already falling behind in training our young people for these emerging creative economies that will take us into a globally-focused future. This number does not begin to address the additional gap between primary students and their secondary school counterparts. The great need for sustainable education strategies can be seen in the UK and elsewhere globally where previous models of creativity education (Creative Partnerships model etc) are being defunded under contracting economies, while government policies reiterate the need for creative skills for participation in competitive global economies.

In 2012, the Australian Curriculum Assessment and Reporting Authority (ACARA) included creative and critical thinking in its General Capabilities for the first time, yet some argue that ACARA has limited creativity in the curriculum to nothing more than helping students “to clarify concepts and ideas, seek possibilities, consider alternatives and solve problems” (2012). This new Australian Curriculum (2012 implementation of Arts) has put special emphasis on promoting integrated creativity development across a range of learning areas, rather than discipline-based arts training; and whilst primary education has long boasted a strong cross-curricular creativity focus, the siloed nature of secondary education has made this more challenging. In Australia, creative industries are seen as the crucial 21st century economic replacement for mining and other export drivers, yet creativity continues to be under-represented and misunderstood in teacher education courses especially for secondary school student teachers.

This project addresses this gap of understanding and training in tertiary teacher education courses, but also takes a much-needed holistic or *creative ecological* approach to whole-school change. The Australian education sector – particularly secondary school curricula and teacher-education programs – has been slow to respond to creative and cultural industries changes in the workplace, and the study addressed in this report offers a consistent and measurable definition of creativity, the appropriate methods to develop creativity, and approaches for up-skilling preservice teachers to enter the workforce ready to nurture these skills and capacities in their students. While other countries have developed various tools for enhancing and measuring creativity in schools (see for example Craft 2011; Cho & Lin 2011; Taddei 2009), all stress the need for context-specificity, making the job of finding ‘consistent’ or standardised national approaches difficult if not undesireable. This study addresses that need by suggesting ways in which schools can attend to their own needs while referencing consistent definitions and goals, avoiding the trap of constantly ‘reinventing the wheel’ or floundering in attempts to initiate creative approaches, as so many educators and institutions do.

At the forefront of research into creativity in schools is the transferability of creative dispositions and skills, and its impact on improving literacy, numeracy and other ‘core’ skills (Taddei 2009). Scholars agree that cognitive flexibility will be the greatest advantage for engaging within a global economy critically and creatively – and in Australia we have not even yet begun to address the core skills needed to nurture this in our students. A new and consistent approach to creativity in education is crucial for a cohesive understanding of how to nurture it through not only teaching and learning practices, but through *creative ecologies* approach in which the whole school environment works together for creative change.

***International contexts for creativity education***

Increasingly, national governments have stressed the importance of developing creativity education and creative industries strategies: UK creating the Creative Industries Task Force in 1997, Australia and New Zealand in 2002, Hong Kong’s Creativity Index in 2004, the EU launched the European Year of Creativity and Innovation 2009 and Beijing’s Creative City Index in 2012. Yet despite this high-level attention, education remains strangely distant from the work of nurturing a creative workforce. In the last five years, Australia has entered into official co-production treaties with China and Singapore, and is due to sign agreements with at least three other nations in Asia. It will be of national benefit to Australian creatives and educators alike to understand the diverse Asian region processes, definitions and approaches to creativity education and its development across the entire Australasian region. Australia’s economy is becoming more focused on service-delivery, both domestic and internationally. This will only be enhanced as “our engagement with Asia increases. The creative economy will be a central contributor to this shift” (Creative Victoria, 2016), a focus last highlighted in the *Australia in the Asian Century White Paper* (Henry 2012).

This project extends research on creativity in schools in the UK and Europe (Warwick Report 2015; Arts Council Wales 2015; Claxton & Lucas 2015; Lucas, Claxton and Spencer, 2013; Thomson et al 2012; Burnard 2011, 2010; Thomson & Sefton-Green 2010; Thomson et al 2009; Thomson et al *n.d.*; Claxton et al 2006; Jeffrey 2006a, 2006b; Jeffrey & Woods 2003; Craft 2003, 2005; Craft et al 2001; Craft et al 2008; Lucas 2001; NACCCE 1999), as well as the Scottish resource *Journey to Excellence* research summary “Fostering Creativity” (Education Scotland, *n.d.*).

In Korea, Cho et. al (2011) focused specifically on the secondary context (only Lucas in the UK also focused specifically on secondary), and made explicit recommendations for creative education policy. Similarly, in the USA (Lubienski, 2009; Looney, 2009) not only educators, but economists too have called for students to be equipped with creative 21st century skills (Sefton-Green 2011, Leadbeater 2010; Araya & Peters 2010; Robinson 2009; Burnard & White 2008; Florida 2002) enabling them to compete successfully in global markets in a time of rapid change, diversity and technological advances (McWilliam & Haukka, 2008; Pink, 2006). In addition this study follows a number of national Creativity Indexes including those of Hong Kong, Scotland, the USA, Ireland (Leahy 2016) and the European Creativity Index (ECI), most of which outline national or regional creative economic strategies, yet many of which still keep arts education, arts partnerships and cultural economies central to those approaches (as with the Welsh Government Action Plan *Creative Learning through the Arts 2015-2020*, and their Creative Lead Schools scheme).

A pervasive lack of clarity regarding creativity education also influences government policy. The OECD’s persistent and proactive focus on creativity and innovation is having a profound impact on governments globally (Kohl 2011; Looney 2009; Lubienski 2009; Taddai 2009; Woronov 2008), including in the Australasian region (Cho et al 2011; Oh-seok 2012). Internationally, creativity is a significant keystone to successful and dynamic engagement in a global economy; yet major Australian education policy documents including the ‘Australia in the Asian Century White Paper’ (Henry 2012) largely ignore creativity and innovation altogether. This contrast represents the significant challenge for educators that this study has addressed.

***Australian context***

The recent development of the Australian Curriculum (Australian Curriculum Assessment and Reporting Authority ([ACARA], 2012) too provides additional context for this research. This process of defining, locating, theorizing and implementing creativity and innovation in schools supports the aims of the Australian national curriculum’s inclusion of creative and critical thinking as one of its General Capabilities. ‘Critical and creative thinking’ is described as being “evident in the content of the English, mathematics, science and history learning areas” (ACARA, p.1) which is consistent with curriculum reframing in most other OECD countries, and makes clear the government’s position on integrated creativity development rather than discipline-based arts training. This study included an examination of ACARA’s General Capabilities document as part of its analysis of the interrelationship between innovation, critical and creative thinking, and how exactly schools can (and in some cases are) nurturing international models such as Bill Lucas’ 5 Creative Dispositions (inquisitiveness, persistence, imagination, collaboration, and discipline).

More extensive reviews of creative and cultural education and employment strategies in Australia can be found in a range of published reports and research, including but not limited to: Creative Victoria 2016; Harris & Ammerman 2016; Harris 2016, 2014; *Creative Australia* Australian Government 2013; Flew & Cunningham 2010; McWilliam 2009, 2007; McWilliam & Dawson 2008, 2007a, 2007b; McWilliam et al 2008; McWilliam & Haukka 2008a, 2008b; and White 2006. In November 2016, the Australian Government’s Standing Committee on Employment, Education and Training adopted a new *Inquiry into innovation and creativity: workforce for the new economy* (Parliament of Australia 2016) in order to “ensure Australia’s tertiary system - including universities and public and private providers of vocational education and training -  can meet the needs of a future labour force focused on innovation and creativity” (n.p.). Such rapid developments form the domestic backdrop for this study, and indicate a groundswell of attention to creativity education that drives the need for this work.

***This study***

This report and the research it describes documents the first Australia-wide mixed-method study to focus on the ways that creativity is defined within secondary schools, and the ways that creativity presents itself in existing school, student and teacher practices and environments. It was funded by an Australian Research Council DECRA grant (#DE140100421) entitled *The Creative Turn: An Australia-wide Study of Creativity and Innovation in Secondary Schools*, which was subsequently expanded to include international comparative data from Singapore, Canada and the USA. It follows recent economic and education policy attention to creativity and innovation as an emergent economic driver in Australia, expressed through a range of policy and position papers.

This project seeks to offer economic, environmental and social benefit to the Australian and international community through producing a reliable set of regionally- and internationally-comparable data, in conjunction with the international working party established in this Advisory Group. Additionally, by locating such a study in a Australasian regional context, it provides education and creative industry policymakers with a context-specific resource for curriculum, pedagogy, and economic innovation. The project also has significant potential for sustainable expansion beyond this stage, to support governments and departments of education and economic development in implementing creativity across the education lifespan into the 21st century. This study’s contribution addresses a significant gap in our understanding and implementation of Australia’s needs for its new knowledge economy. The need for such research is reflected in the number of national, regional and global policy documents attending to the challenge of creative and cultural industrial training and a globalizing workforce.

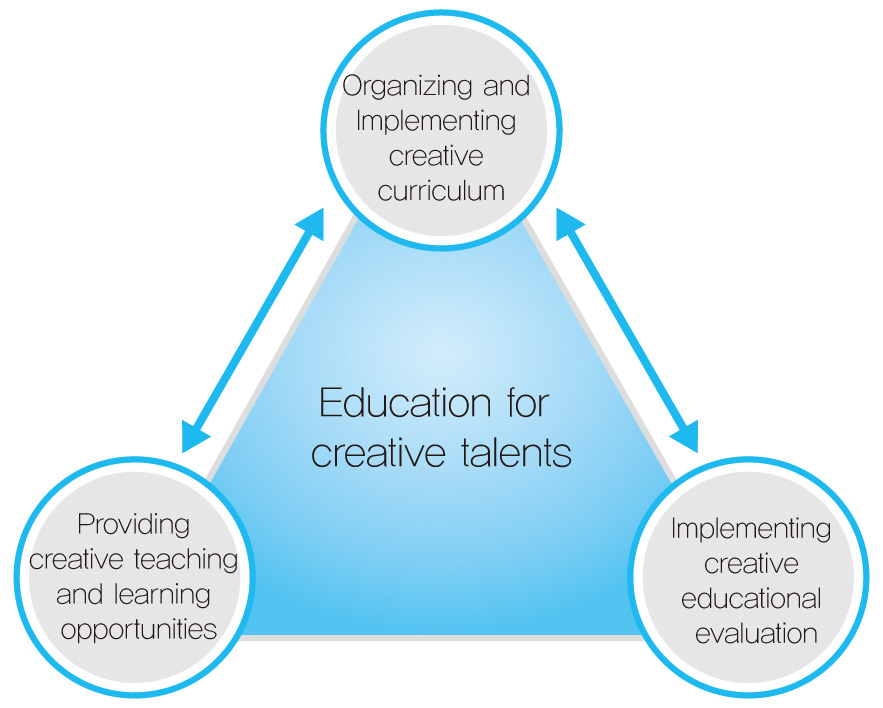
***The role of the Advisory Group***

The outcomes of this study have been monitored and critically informed by an international Advisory Group since the project’s inception. Members of the Advisory Group have been recruited based on their expertise and positions as creativity-related teacher educators, coordinators and managers from a cross-section of higher education, secondary, and research contexts. Data from this group of creativity experts has been vital for evaluating the evidence base that emerged from this study, including school-based findings, as well as disseminating the outcomes from the project across the education and other sectors.

|  |  |
| --- | --- |
| **Advisory Group Membership** | |
| International members | Prof Bill Lucas (Univ of Winchester, UK); Professor Jonothan Neelands  (Warwick Univ, UK); Professor Pat Thomson (Univ of Nottingham, UK);  Distinguished Prof Kathleen Gallagher (University of Toronto, CAN);  Professor Kate Pahl (Univ of Sheffield, UK); Dr. Dalene Swanson  (Univ of Stirling Scotland); Assoc Prof Diane Conrad (Univ of Alberta,  Canada); Patricia Leavy (editor and independent scholar, USA); Colin  Goh (The RICE Corporation and Mininstry of Education, Singapore) |
| Australian members | Prof Justin O’Connor (Monash University); Lindy Joubert  (UNESCO Observatory and University of Melbourne); Dr. Christine  Sinclair (Univ of Melbourne); Dr Sue Smith and Dr Al Strangways  (Charles Darwin Univ); Dr Georgina Barton (Griffith Univ); Assoc Prof  Margaret Baguley (Univ of Southern Queensland); Dr Mary Ann Hunter  (Univ of Tasmania); Prof Michael Anderson and Prof Robyn Ewing  (Univ of Sydney); Prof Dawn Bennett (Curtin University). |

**Figure 1: Constitution of the expert panel Advisory Board for this study**

This project addresses the need for a consistent, appropriate and measurable definition of and environmental approach to creativity in secondary schools. Lucas et. al (2013) recently asserted this same need in the UK context, arguing that “if creativity is to be taken more seriously by educators and educational policy-makers then we need to be clearer about what it is,” (p. 7). Such clarity assists educators in identifying the emphases in educational programs and environments that support the development of creativity in young Australians.

****

**Figure 2: Cho et. al, 2011, p. 4**

***Creative Ecologies – An environmental approach to fostering creativity education***

An important component of this study is the development of a new conceptual model for approaching creativity in secondary schools, which builds upon the ‘Education for Creative Talents’ model put forward by Cho et. al (2011). Extending this model, the *Creative Ecologies* conceptual framework attempts to establish a joined-up and more holistic approach to enhancing environmental creativity in the secondary school environment. *Creative Ecologies* expands Cho’s ‘education for creative talents’, which has largely gone undefined. In this study, I’m beginning to articulate a conceptual model and approach that functions like a holistic creative ecology rather than a single thread, rubric or list for addressing creative teaching, learning, etc., a conceptual project that began with my book *The Creative Turn* (2014) and recognises the important practice- , policy- and outcome-based links between compulsory schooling and creative/cultural industries.

#### Research Design

***Overview of study***

This project is the first to provide an in-depth, critical examination of creativity and innovation in Australian secondary schools. The project investigates how creative thinking and capacities can be nurtured, set against international standards (Outcome A). By drawing on well-established and international validated tools for establishing a workable definition of creativity that is responsive to and consistent with international trends and adapting a recognised model for the assessment of creativity in secondary schools, this project extends my foundational work on the commodification of creativity and its relationship to national educational goals (Harris 2014). By drawing on the expertise within schools and consulting with principals, teachers and students alike, this mixed method study has benefitted from a statistically valid large quantitative data set, yet retains the narrative richness of thick qualitative data.

There is now extensive evidence that states that schools need to identify and develop programs that foster creativity, collaboration, problem-posing and critical thinking (Cormier, 2010), yet there remains widespread consternation about how to accomplish this. In both this study and in my books *The Creative Turn* (2014) and *Creativity and Education* (2016), I address this gap by focusing on the call for a more consistent approach to fostering creativity in the secondary context, including concerns about time, measurement, interdisciplinarity and reporting. In an education era dominated by a discourse of transferability and scalability, creativity continues to represent both a neoliberalisation of arts education and a more widespread attention to the economic potential of diverse creativities. Secondary schools in particular offer a site of tension between these competing agendas, and this study draws on literature and empirical evidence from four countries that suggests that while standardised testing is seen to be a major impediment to fostering creativity in the secondary environment, it is also one of its most powerful drivers across the education lifespan. This study set out to look at how schools might enhance their whole-school, environmental attention to creativity from a range of stakeholder perspectives including teaching, learning, school community, and creative partnerships perspectives.

I visted and conducted interviews and focus groups in a range of diverse schools from around Australia as well as international teachers and school leaders from three additional countries (Singapore, Canada and USA) in order to consider geographic, socioeconomic, cultural and demographic differences in observing and investigating creativity. In collaboration with school principals, students and teachers were identified who have emerged as invested in creativity education (as defined largely by the principal or school leader). Two teachers and one school leader were interviewed at each school. During the interviews, teachers were asked to identify such environmental factors as their own formative experiences with creativity, their professional creativity education development, opportunities for their creative approaches in their own classrooms, and ‘hot spots’ (classes, extracurricular groups and activities, spaces) in which creativity is thriving in their schools, or in which they as teachers and leaders feel they can experience or lead creative pursuits. From these initial interviews, year levels or classes were selected from Years 8 or 9 and the student cohort surveyed (either online or paper, depending on the preference of the school). From the cohort, one focus group of 5-10 students per school was conducted in which students were asked to imagine their ideal creative school of the future, and describe or draw it.

Student surveys were administered via Qualtrics or by hand for obtaining contextual quantitative data, and similarly targeted what the students felt was their most creative space, experience, and teacher practices at their school. The target sample group for focus goup and interview was 301 participants overall (43 per school), comprised of students and teachers (Objective C), and an additional target sample of 500 online survey respondents nation-wide (Outcome B). These goals were exceeded in all areas (see participant demographics below).

The additional contextualising countries (Singapore, USA, Canada) were selected due to the preponderance of data emerging from the American and British contexts, and the contrasting allowed by selecting one Pacific Rim country (as well as Australia). Singapore was the perfect choice, as by the 2015 Global Creativity Index, Singapore was alone from the Asia Pacific as ranking in the top ten.

***Participant statistics*[[1]](#footnote-1)**

**Total (Australian and international): 75 interviews**

|  |  |  |  |
| --- | --- | --- | --- |
| **Country** | **Total activity** | **Demographics** | **Subject areas** |
| **Australia** | 41 Australian teachers in 6 states (QLD, NSW, VIC, TAS, WA, NT) | 21 female (51.2%) and 20 (48.8%) male | 14 (35%) taught in the Arts; 26 (65%) in non-Arts subjects +26 schools leaders |
|  | 681 **surveys** (total submitted 747, however after deletion of incomplete or incoherent surveys, total usable was 681). | Year 8 & 9 students | unknown |
|  | 24 **focus groups** | comprised of 5-10 students from same cohorts |  |
| **USA** | 21 teacher interviews | 8 female; 13 male | 9 from arts; 12 from non-arts;  5 were vice-principals, 15 secondary teachers, + 1 primary/secondary. |
| **Canada** | 6 interviews | 4 male and 2 female | 4 were from non-arts disciplines and 1 from arts. 2 were curriculum leader/coordinator and 4 simply teachers. |
| **Singapore** | 7 interviews | 3 male, 3 female and 1 unknown | 3 from arts disciplines and 4 from non-arts. 1 Principal and the rest a variety of teachers and curriculum leaders. |

**Australian Data**

|  |  |  |
| --- | --- | --- |
| **Years teaching** | **Number** | **Percentage** |
| 0-5 | 4 | 11.8 |
| 6-10 | 2 | 5.9 |
| 11-20 | 12 | 35.3 |
| 21+ | 16 | 47.1 |

|  |  |  |
| --- | --- | --- |
| **School role** | **Number** | **Percentage** |
| Coordinator | 4 | 9.8 |
| Curriculum leader | 8 | 19.5 |
| Primary | 1 | 2.4 |
| Secondary teachers | 16 | 39 |
| Principal | 7 | 17.1 |
| Vice-Principal | 5 | 12.2 |

|  |  |  |
| --- | --- | --- |
| **State** | **Number of interviewees** | **Percentage of total** |
| **NSW** | 8 | 19.5 |
| **NT** | 3 | 7.3 |
| **QLD** | 6 | 14.6 |
| **TAS** | 11 | 26.8 |
| **VIC** | 9 | 22 |
| **WA** | 4 | 9.8 |
|  | 41 | 100% |

**Figure 3: Participant statistics, Australian and international**

***Interviews***

In Australia, interviews were conducted with two teachers and one school leader from each school. Participants were recruited by the program coordinator through a combination of snowball sampling and recommendations from state-based Departments of Education. In Canada, USA and Singapore, teachers/school leaders were selected based on diversity of schools and education contexts, and were all from urban areas. The interview tool consisted of 15 questions and the interviews lasted approximately 30-60 minutes depending on respondent answers.

***Focus groups***

One to two focus groups were conducted at each school with a subset of the survey group of students, selected by teacher or principal. The focus groups consisted of 5-10 students (Year 8-9), who were asked to imagine their ideal creative school. They were given 30 minutes and arts supplies, and asked to creatively develop that vision (draw, act, sing, write, tell) as a group and then convey the vision to the researcher. The student responses were tape recorded.

***Survey tools/protocols***

The search for the adoption or creation of the right survey instrument for this study took a large part of the first half year of the project. I reviewed tools and protocols and corresponded with the creators of tehse tools to explore the means and methods for generating the best data and information for the target group. While most creativity in education tools measure the invigidual (see Lucas, Cho, etc.), I determinted that the best measurement tool for the basis of the study was my environmental approach. It became clearer to me as the initial stages of the study progressed that an environmental approach that is more traditionally used in business offered effective aspects for assessing the whole school environment for creative efficacy, and yet most of the business sector tools did not attend to the ‘workers’ as children, or without profit motivation etc. Therefore, an initial survey and comparison of creativity measurement tools was conducted (see Harris & Ammerman 2016), which found some notable patterns in the orientations of existent creativity tools. These topics have been covered more thoroughly in Harris (2016) but for the purposes of adequately contextualising and describing my tool-development process, the following summary may of interest to current and future creativity researchers:

**Teresa Amabile’s KEYS** **tool**, while attractive for a range of reasons was both expensive and difficult to adapt regarding both the questionnaire and the contexts in which it could be used (mostly it’s been used in business or corporate settings, not schools). It also required a qualified facilitator, suffered from a lack of focus on environment, and included language that was sophisticated byeond the level of the students who would be using it.

#### Creativity measurement tools exemplars

***What the KEYS protocol measures***

|  |  |
| --- | --- |
| **KEYS protocol measures** | |
| **Management Practices** | * Freedom: Deciding what work to do or how to do it; a sense of control over one’s work * Challenging Work: A sense of having to work hard on challenging tasks and important projects * Managerial Encouragement: A boss who serves as a good work model, sets goals appropriately, supports the work * group, values individual contributions, and shows confidence in the work group * Work Group Supports: A diversely skilled work group in which people communicate well, are open to new ideas, * constructively challenge each other’s work, trust and help each other and feel committed to the work they are doing |
| **Organizational Motivation** | * Organizational Encouragement: An organizational culture that encourages creativity through the fair, constructive judgment of ideas, reward and recognition for creative work, mechanisms for developing new ideas, an active flow of ideas and a shared vision * Lack of Organizational Impediments: An organizational culture that does not impede creativity through internal political problems, harsh criticism of new ideas, destructive internal competition, an avoidance of risk and an overemphasis on the status quo |
| **Resources** | * Sufficient Resources: Access to appropriate resources, including funds, materials, facilities and information * Realistic Workload Pressures: Absence of extreme time pressures, unrealistic expectations for productivity and distractions from creative work |
| **Outcomes** | * Creativity: A creative organization or unit, where a great deal of creativity is called for and where people believe they actually produce creative work * Productivity: An efficient, effective and productive organization or unit |

**Figure 4: KEYS protocol measures, from Harris 2016, pp. 87-88.**

***Analysis of the KEYS protocol***

|  |  |
| --- | --- |
| **KEYS protocol analysis** | |
| **Audience** | Organizational Development managers/executives, team and project  leaders and innovation consultants. |
| **Outcomes** | * Measures specific management practices that impact innovation. * Quantifies how productivity and creativity are perceived across an organization. * Provides a benchmark for improvement, comparing an organization’s innovative climate with organizations in CCL’s KEYS normative groups. * Identifies areas of excellence as well as areas of critical development needs. * Quantifies the most important factors that support, inhibit and suggestions for improving the climate for creativity and innovation. |
| **Benefits** | * Flexible. KEYS allows for custom group comparisons targeted to your organizational structure. * Valid and reliable. Accurately measures the climate for creativity and innovation. * Easy to use. Survey can be completed in 20 minutes. |

**Figure 5: KEYS protocol analysis overview**

Isaksen’s **Situational Outlook Questionnaire (SOQ)** was another possible tool, a tool which did allow for modifications, yet in the end it was rejected because of the requirement for close alignment with Isaksen and the need to be trained in the tool or rely on the administering organisation to aggregate the data. Other environmental tools that were vetted and not chosen included most significantly **Forbes and Domm** (2004) (in Kaufman and Sternberg 2010, p. 61)and**Eysenck Creativity Index**, a more standard market-oriented creativity index. The ECI included indicators that measure the relative share of creative industries, cultural trade and the economic returns driven by electronic commerce in local economy, indicators of creativity as wealth-creators but could also the economic activity of knowledge creation, diffusion and adaptation, or a process of creating new products and services, brand-building ability of local enterprises, the extent of technology diffusion in local firms as well as knowledge creation in terms of patent applications. While the team eventually decided this was not a good fit for the strictly in-school study, it offered a good option for future studies which bridged the in/out of education lifespan creative ecologies continuum.

I also looked at the **Student Product Assessment Form (SPAF) Joseph S. Renzulli & Reis,** a tool used in enrichment programs such as in gifted education programs, a tool I ultimately rejected on the basis of its purpose to ‘be used to guide students toward excellence.’ Because the student participants of this study were not actively involved in the development process, and the tool did not have an environmental aspect to it, it was rejected.

***The survey tool developed for this study***

Both the survey/questionnaire tool that was used for students, and the interview questions for teachers and school leaders, drew on Amabile’s KEYS protocol on environmental creativity, a good match for my **environmental whole-school focus** and Bill Lucas’ **Five Dispositions** from his *Creative Schools Development Framework* (Lucas, via the CCE and Creative Partnerships UK), as it was one of the only secondary-specific studies available. A range of constraints associated with this study including length, budget and team size meant that the tool required to measure creative environments in schools would have to be created out of existing protocols and new areas of enquiry. The unifying question in developing both the survey and the interview question schedule was: What if we approached schools either as creative workshops (which rising standardisation is working against), or as creative industries workplaces (per Florida, Seelig, and Amabile)? Would such an approach suggest the need to foster different aspects of learning environments than the standard ‘creative teaching and learning’ approach?

* **Teachers & school leaders:** 15 questions on their own creative experiences in both learning and teaching, how to foster creativities in their work and workplaces, general creative environment enhancement, creative partnerships and on assessment.
* **Student survey:** on creative experiences they have had in school, what it felt like, and how their school might increase these experiences.
* **Focus groups:** to imagine a creative school of the future – draw, sing or describe it.
* **The survey tool:** extended Theresa Amabile’s KEYS protocol on environmental creativity, a good match for my whole-school focus and Bill Lucas’ Five Dispositions model (secondary specific), incorporating aspects of *Creative Schools Development Framework* (Lucas, via the CCE and Creative Partnerships UK).
* Survey delivered using Qualtrics and analysed using Dedoose.

In the end,the two protocols that were proposed in the pilot stage of the study (Lucas’ Creative Schools Development Framework, and Amabile’s environmental measure), worked best; for the development of a new conceptual framework for an environmental approach to school change, or what a set of *Creative Ecologies* in schools might look like, I returned to Cho et. al (2011).

#### Data / Findings Overview

1. ***Summary of themes – Australia***

*The habit on the part of the schools is to count. When in doubt about something, they start counting. They start counting up with statistics that will give you – he doesn’t go this far, but I’ll go as far as – I’m giving you the illusion of understanding the problem.* (Teacher, San Jose USA)

|  |  |
| --- | --- |
| **Summary of themes - Australia** | |
| **Definitions/ understandings of creativity** | No concensus, except that creativity is now universal, not just associated with the arts, and that it is of general benefit to students despite the obstacles in instrumentalising it. |
| **Changing definitions of ‘creativity’** | Most interviewees agree, changing definitions of creativity is a global trend driven by economics, workforce needs & uncertainty, & digital technology. Disconnect there. |
| **Formative experiences of creativity** | Diverse and very individual, yet powerfully determinant by presence. For both students AND teachers. |
| **Approaches to Enhancement** | **Primarily teachers’ pedagogies** including (in order) differentiation (no one size fits all), team teaching, cross-curricular collaboration, dispersed learning approaches due to rise of internet, need to balance scaffolding and then freedom of creative individuation – mostly blocked by current school structures and national curriculum. Most reported that creative pedagogies were appearing ad hoc, and needed more institutional approaches/consistency. |
| **Impediments** | Described in both pedagogical (teacher skills and preparedness) and institutional terms:  #1 – Time & space  #2 - Need to redefine ‘academic success’ as it is currently too tied to reproductive knowledge.  #3 - Poor teacher skills  #4 – Structural: sector/timetable/leadership  #5 – Resources |
| Spaces/environments | * Opening up spaces to encourage collaboration. * The *set-up* of the room eg They have a room called the robotics room – but there was awareness that the ingredients don’t necessarily add up to a creative space. * Taking maths outside, eg up a hill, measurements with string, taking photos, hands-on, making 3D solid shapes; practical activities. * ‘Maker spaces’ * Student-led “Hot spots” - co-opting library space at lunchtime to play a self-devised war strategy game out of bits of cardboard and dice. * Headmaster consideration of how architecture facilitates the pedagogy of middle years' education, including light, acoustics, design. |
| Leadership | * Based on trust in teachers. * Leadership trust allows you to play in classrooms * Effective Professional Learning Teams * Lesson plan innovation |
| Real world relevance | * Real live maths situations eg NASA’s site * Computer coding * Professional photographer-mentors for students * Indigenous communities teaching in a culturally appropriate way * Creative partnerships with local businesses, organisations and artists but not just artists |
| Risk | Outdoor ed can facilitate creativity because it models risk and cultural and moral capital return. One principal said, “To put it this way, as the leader of a school you have to answer yourself this question, what is my appetite for risk? Do I create a safe place where we get good marks and the kids go off to uni, and now it’s someone else’s problem, or do I sit with my families and my staff and say to them “If we don't teach your boys to take risks, and that’s calculated and sensible risks, then they will never take a risk or they won’t know how to take a risk, or if they get attracted to risky behaviour how do they deal with it?” |

***Figure 6: Summary of themes – Australia***

***2. Summary of themes – International***

*I think in many ways, in Ontario, especially; I’m not in a position to comment on other jurisdictions; but in Ontario we are engaged in a, I guess if I could borrow Orwell’s term in a double think, we pay lip service to the importance of creativity and creative thinking, we invest wisely and differentiated instruction and workshopping teachers and so on. But, and at the same time, we’re moving in this, as I’m sure most jurisdictions are, in this data driven, quantitative, neo-liberal, sort of, approach to measuring student outcomes. So we talk a lot about creativity, but we are in Ontario moving very rapidly and aggressively toward more standardised testing, and a narrower version of curriculum, whilst simultaneously pulling in the other direction. So in our curriculum, in our classrooms, the curriculum is opening up while the high stakes standardised tests are narrowing.* (Teacher, Toronto CAN)

|  |  |
| --- | --- |
| **Summary of themes - International** | |
| **Country** | **Facilitators and Blockers** |
| CANADA | sophisticated and layered understandings of creativity and creative pedagogies, as well as extensive personal experiences with creativity. Creativity understood **as assessable**. Institutional blockers were timetabling, over-reporting, and risk-aversion. |
| SINGAPORE | creativity seen as primarily artistic mastery, and also seen as problem-solving flexibility. More comfortable with seeing creativity as ‘innovation’ - getting the edge over other enterprises – a 21C competency. High-stakes national exams (tied to Cambridge), large class sizes, and lack of freedom of expression culturally overall, all seen as limiting more open and creative pedagogies. |
| USA | Teachers were comfortable with the notion of creativity, understood in rich terms and primarily as a **process**. Technology as strong driver, linked to teachers ‘letting go’ of power/control of the learning process. Common Core NOT seen as a constraint, but teacher knowledge and standardised testing WERE. Assessment necessary and not contra-creativity. |

***Figure 7: Summary of themes – International***

**Case study: Singapore**

While the small sample size of teacher interviews in each of the contextual countries prevents this study from drawing any generalisable conclusions, there were clearly discernable emergent themes that – in the case of Singapore, the only Asia Pacific country in the stuudy – bear further reporting:

## *Definitions of creativity*

In Singapore, parents defined creativity and academic ‘success’ in somewhat narrow ways. Witnessing their children performing and engaging in arts productions and creative school activities was beginning to turn that around as they saw the growth of confidence in their children. For engagement in the arts to be valued the skills needed to be transferable to other areas. Creativity is opposed by parental pressure for measurable gains in academic areas. In this sense there is recognition that creativity is not ‘just’ play – a waste of time, because performance can lead to higher levels of confidence which have spill-over benefits.

Teachers offered a range of definitions including: thinking out of the box, exploring possibilities that you can imagine for your own life, creativity as a way of thinking and working, and can involve conflict as an integral aspect of collaboration, problem solving and flexibility (able to make moment by moment creative decisions which respond to the possibilities in the moment and in the context). One participant commented that in Singapore, parents hold narrow definitions of what academic ‘success’ is and witnessing their children performing and engaging in arts productions was beginning to turn that around because they could see the growth of confidence in their children. For engagement in the arts to be valued the skills needed to be transferable to other areas. Teachers reported that creativity is generally opposed by parental pressure because they are looking for measurable gains in academic areas which will lead to ‘success’.

One teacher commented:

We perhaps don’t use the word creativity as much, but maybe we use the word innovation which gives a more utilitarian feel of it because it’s like the innovation has to lead to something, not just being creative on its own. So it ties back to my own personal notion as part of this profession. I think what we are really thinking about is the ability to get students to think – to have the flexibility in thinking, to be able to solve problems and to try and use what they’ve learnt in class back to how to solve problems

Teachers widely reported that school cultures are expected by the Education Ministry to be innovative school cultures, teaching 21st Century competencies (creative and critical thinking, as in Australia), with a utilitarian economic imperative edge.

## *Creative learning environments*

Participants described the pedagogies used, the learning environment they tried to create and the school or institutional environment factors that affected creativity. The **learning environment** they tried to create was described as an ‘incubation bed’, with teachers as ‘trainers’ who mentored the students and acted as role models. They stressed the value of environments which facilitated students’ learning at their own pace. Participants described that it took time for students to learn to be creative, where initially some would wait for instructions. Patience and taking the time for the student to develop was noted by a number of participants. One participant put it: ‘we go as fast as we can but as slow as we must’.

They cultivate an environment in which it is safe to take risks and to fail, in which they have permission to explore, take risks. The relationship between teacher and student was described as the centre of **creating safe creative learning environments** in school contexts, an environment that is open, conducive to openness and express, and trying to bring out kids’ curiosity. One participant described a student at risk being commissioned to paint a whole level of the school after he’d graffiti’ed a door, converting creative processes into leadership decisions in a way that can positively affect the whole school landscape.

### ***Institutional factors in the school***

Singaporean respondents expressed a widespread observation that schools have a system of appraisal in which schools are always expected to cultivate an innovative culture, yet maintaining risk-aversion. School teachers are surveyed by the Ministry about their school and feedback is acted upon.

To achieved this innovative culture, how school leadership, including middle managers, manage problems and issues is seen as a way of impacting on that culture, often as a way of building confidence and responsibility. Respondents were conscious of counteracting their culture of not making mistakes and being worried about making mistakes. So for example, they proactively sought out opportunities for younger colleagues to do committee work (for example), and to support them if they ‘failed’.

Institutional factors included making choices about the school’s focus and also its values, particularly the value of tolerating mistakes or failure if the school’s aims including a mandate to innovate. One participant shared:

I think in trying to teach creativity we take too much of a proactive approach where we always see teachers do, do, do, but then we’re not allowing the kids to exercise their judgement, their opinions and I think to nurture creativity, there must be a certain freedom of expression for the students. They must be allowed to make mistakes. . . So fundamentally the school or the institution must first of all tell itself, “if I want to nurture creativity I must be prepared to accept failure in certain things.”

### ***Pedagogical approaches***

Participants widely described mentors as asking a lot of *questions*, and questioning as a key pedagogy. A strengths-based approach was seen as crucial to building trust and establishing creative environments via pedagogical trust relationships. One participant shared a process of questioning between students and teachers as part of creative process:

Why do you do that, what is your purpose? A lot of questions, and the process is very important. We want to find out from them why do they even do that in the first place. Then you may even question whether maybe this is a new original material, this is how this person has their own unique way of learning.

**Pedagogies of empathy** were also mentioned by several respondents in Singapore. Creativity can include using feelings as an entry point, an approach based in notions of ‘understanding’, empathy, and experience and one that moves beyond simple ‘skills-based approaches’ (despite creativity curricular definitions frequently still reflecting a ‘skills and capacities’ orientation). A Singaporean example from a Drama teacher is of a guided scenario pedagogy involving collaboration to teach imaginative empathy:

I think understanding is also experiential. It’s not just reading. So certain concepts are difficult for kids, like at the start of a concept, you talk to them about, say, economic inflation for example: they’re not working it out. How would they know what inflation is? So you’ve got to show them *how it feels* to be deprived of certain things and using drama I did that and the kids felt it. So after they were deprived, I, in role, came in as a pizza guy and I started saying okay, the pizza will go to the highest bidder and I think you guys are all hungry. So one of them put up – because they had fake banana notes. Banana notes were a Japanese currency in inflation. So they started saying okay, I’m going to offer all my money and then another group said ‘these two groups – let’s just combine, combine all our money and give it to him’. So they started doing that. So I’m getting all the money and one kid suddenly says, “You can have mine now.” So see, that’s creativity and then I stopped the lesson and I said, “Now you guys understand how desperate people were then when their currency was worthless and they would do anything to fix the situation, so do you understand how Hitler came to power?” So that’s what I meant by understanding and I consider their work in that class to be creative because they came up with the solutions without me giving them anything.

## *Impediments to creativity in schools*

Teachers in Singapore reported several impediments including a lack of **discipline mastery**, which impeded confidence to experiment or ‘productively risk-take’. Many also identified **assessment** as a major impediment. Despite the syllabus stipulating that there must be room for creativity and exploration, it is the **assessment regimes** (particularly national exams) that mitigate against creativity.

***3. Summary of student surveys – Australia only***

|  |  |
| --- | --- |
| **Summary of student surveys - Australia** | |
| The **most positive responses** were to the questions: | 1. (agree strongly) I felt pride in what I achieved (49%?) 2. (highest combined agree/strongly agree) I felt completely into it. (44% and 41% strongly agree = 85%). 3. (agree) I had time to work on it. (49.5%) 4. “I could explore and investigate what I was interested in” (agree 41% and strongly agree 32% = 73%). |
| **And overall the least positive scores went to:** | 1. (disagree) I felt bored at times (57%) 2. (strongly disagree) I had to do some research to be able to do it. (47%) |

**Comparative analysis by age groups**

|  |  |
| --- | --- |
| **Summary of student surveys - Australia** | |
| **12-14 year olds** | Highest ‘agree/absolutely agree’ both went to ‘students can get involved in how student work is displayed around the school or in the school newsletter’.  Highest ‘disagree’ response is: ‘the school listens to the students’ tied with ‘school supports the students making decisions that affect how the school runs’.  Highest ‘strongly disagree’ response is: ‘get the chance to do a project or activity that cuts across subjects’. This is particularly interesting, because it’s with year 8/9, so per the curriculum it would still be easily programmable to do so, not in conflict with Senior Secondary (moderated) subjects/tests/specialisations, indicating *this is a problem of the will to create change,* even though the efficacy of this kind of change is indicated in the research literature. |
| **15-16 year olds** | Highest ‘agree’ response is: ‘I have the chance to initiate activities and projects’. Highest ‘absolutely agree’ is a 3-way tie between:   1. students are encouraged to advocate for things at my school and the leadership wil llisten; 2. teachers encourage me to personalise aspects of my learning so it’s more meaningful to me; 3. every year I get the chance to do a project or activity that cuts across subjects.   Highest ‘disagree’ response: “every year I get the chance to do a project or activity that cuts across the subjects.” Highest ‘strongly disagree’ response is a 5-way tie. |
| **The most significant difference between the ages is that:** | 1. 12-14 yo’s ‘disagree’ and 15-16 yo’s ‘strongly disagree’ that they get a change for cross-curricular projects.  2. No diff between frequency of ‘agree’ to the question ‘Creative achievements are recognised and celebrated at my school’ (40%) for both age ranges; but huge differences between ‘I absolutely agree!” (12-14’s) and ‘disagree’ (15-16).  3. cumulative 30% of 15-16 yo’s answered ‘disagree’ or ‘strongly disagree’ to ‘creative achievements are recognised and celebrated at my school’, while no year 12-14 yo’s said ‘disagree’. (indicating a declining celebrations of creative achievements at the school in the higher age range)?  4. both age ranges agreed that at the school they “have the chance to initiate activities and projects” (60% of 15-16 yo’s, and 50% of 12-14s).  5. equal ‘agree’ responses to ‘The teachers encourage me to personalise aspects of my learning so its more meanignful to me’. A good sign of creativity conditions.  6. cumulative 60% of 12-14’s said they agree/strongly agree that they have the chance to do a cross-curricular project or activity, while only 30% (half) of the 15-16s. |

***Figure 8: Summary of student surveys – Australia only***

Finally and perhaps most dishearteningly, the overall lowest/least positive score went to the crucially important ‘cross-curricular’ question: “Every year I get the chance to do a project or activity that cuts across subjects” (less than 10% positive response nationally). Cross-curricular, or interdisciplinary, collaboration is among the top ten creative skills and capacities cited in most creativity literature globally. This question elicited the highest instance of ‘no strong feelings either way’, highest ‘I disagree’ responses, and also the 2nd-highest ‘strongly disagree’ responses. This indicates a clear locus of dissonance between the creativity literature and the current practices in Australian schools. Based on the data, it was possible to do a sort by school to see which schools ‘rated’ highest on certain creative practices and environmental factors, but this is not a comparative study. As stated in the project aims, and declared to schools and state-based Departments of Education, this study is focused instead on finding the overall best practices that create the conditions for creativity in secondary school environments.

**Focus groups**

At each school visit across Australia, at the completion of the surveys, a cohort of 5-10 students formed a focus group and were asked to imagine their ideal creative school. Then were given 30 minutes to brainstorm and draw or otherwise render the response, then share their thoughts with the researcher. Responses were tape recorded, transcribed, coded and analysed. There was remarkable consistency across the responses, with students imagining ‘better’ versions of the schools they, but not institutionally different schools. They cited ‘better tuck shop’, ‘more PE’, ‘more outdoor time’ and ‘Science towers’ as enhancements of already-siloed, already-indoor-dominated school existences. Only one respondent (in NSW) suggested that teachers be replaced with internet glasses through which students could study with the ‘greatest minds in the world’ and have only a few ‘flesh teachers’ around for consultant (usually practical) advice. One hundred percent rejected the suggestion that there might be no further need for physical schools as a place to gather, and when challenged asserted the need for school as a place to ‘become socialised’ and make friends, which they thought they could not sufficiently do at work or work placements when older.

***4. Quantitative findings***

**Surveys overview**

Surveys (total of N=747, but only 681 were usable) were completed in two ways, a combination of by hand on paper, and online (according to the needs of the school).The survey was comprised of 11 questions overall, a combination of quantitative and qualitative questions. The qualitative questions were coded and analysed using Dedoose software rather than Nvivo in the end, which provided more options for sorting appropriate to this study.

***Surveys summary:`***

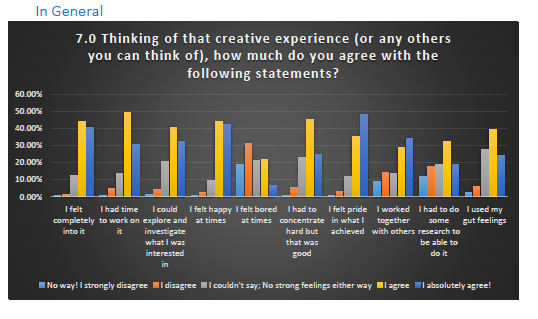
82% were completed by Year 8 students (12-14yo’s), while 18% completed by 15-16 yo’s.

The data represent 14 schools, across 6 states (NT, QLD, WA, NSW, VIC, & TAS).The schools (de-identified):

|  |  |  |
| --- | --- | --- |
| **State** | **Type** | **#** |
| NSW | state | 2 |
|  | Independent (secular, co-ed) | 1 |
| TAS | Independent, anglican (boys) | 2 |
|  | Catholic (co-ed) | 1 |
| VIC | State (1 select entry; 1 general, both co-ed) | 2 |
|  | Catholic | 1 |
| WA | State (co-ed) | 1 |
|  | Independent (girls) | 1 |
| NT | Catholic (co-ed) | 1 |
| QLD | State (co-ed) | 1 |
|  | Independent (boys) | 1 |

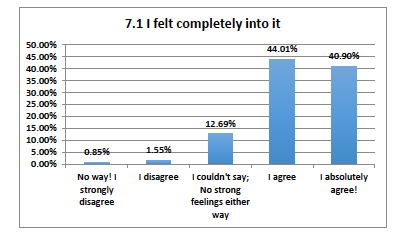
***Figure 9: Survey demographics***

The following sections (arranged thematically) summarise and interpret some of the most significiant aggreggated quantitative or mixed quantitative/qualitative responses with particular attention to consistencies and discrepancies across regions, ages and sectors.

******

***Figure 10: Question 7: In general***

***5a. Qualitative findings: Thematic cross-comparison with quantitative responses (Australia only)***



***Figure 11: Question 7.1: Findings graph***

**Theme # 1: Formative experiences of creativity**

***What the teachers/school leaders said:***

Many of the respondents refer to people in their family, rather than in their school life, who modelled living creatively in the way they lived, made choices and decisions and in relation to art in their lives. Some refer to great teachers – in every subject – who modelled creativity, or who introduced them to creative processes, which they experienced themselves and which transformed them and hence transformed the possibilities they envisage for others and their role in enabling that to happen.

***What the students said:***

Students were asked to recall a “particular situation in the past year when you feel you really had a chance to 'put your stamp' on some work, be creative and apply yourself. It doesn't matter what - it could have been a maths game, the school band, a play, planning the school formal, the 'Night of the Notables' event (if you do that), a science experiment – or anything else you can think of!”. The aim in structuring the prompt this way was to guide students away from a narrow arts/creativity correlation in the ways they thought about creativity for the purposes of this study, and encourage them to think broadly, environmentally, and interdisciplinarily.

Out of the 681 surveys useably completed by students ages 12-16, the respondents had this to say about a recalled experience of creativity at school:

* 84.91% said (they agree or strongly agree) that “I felt completely into it!”
* 73% said that “I could explore and investigate what I was interested in.”
* 86.3% said that “I felt happy” working this way.
* 70% said “I had to concentrate hard but that was good”
* 63% said “I worked together with others”
* 51.5% said “I had to do some research to be able to do it”
* 64% said “I used my intuition (gut feelings)”

***Figure 12: Findings graph - how much do you agree?***

**Theme # 2: School environmental creativities**

***What the teachers/school leaders said:***

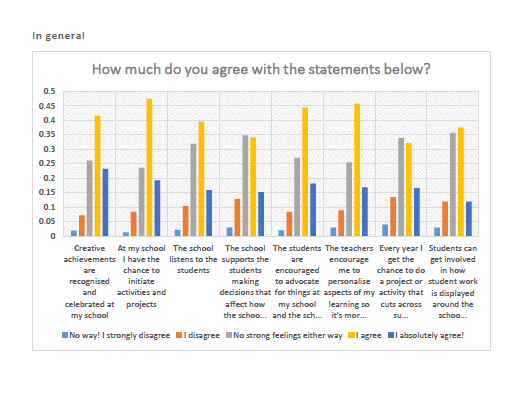
The most prevalent example refers to principal-supported, **cross-disciplinary** learning predominantly in the middle years (Years 5-9). It involved commitment from the top (the principal) to cross-the-board timetabling to support creativity. The purpose of working this way was to break down discipline silos, and usually referred to a curriculum focus on cross-disciplinary problem solving, “what if?” type questioning, and exploring creative ways of conducting and presenting on projects. (e.g. In one example to avoid a checklist approach and to get teachers to think about: How is a physicist creative? How is a maths bureau of meteorology person creative? How is a person in painting or sculpture creative?). It was sometimes supported by other strategies to encourage trust and professionalism of teams by locating the team staff together (usually a year level) in a particular area of the school where they could collaborate more easily and share information. They say things like “The learning can be painful at times but it leads to growth and that’s part of creativity”. (For standout examples, see Harris 2016 exemplars of practice from the Australian context).

Teachers/leaders were asked about ‘hot spots’ of creativity in the school (formal or informal), the atmosphere of trust, the importance of relationships, and the physical environment. The physical plant in particular (both outside and inside buildings) can be done poorly where spaces disaggregate students, out of bounds areas, things you can’t touch or areas where they are encouraged to congregate, collaborate or areas in buildings that don’t connect internally. A K-12 school saw the lack of boundaries as giving energy and vitality as it had pre-schoolers as well as Year 12s transiting the same space; others saw having a middle school for example as a great source of providing for the needs of this age group to create a sense of community and belonging.

The question also refers to teacher spaces, as spaces where teachers sit together and communicate in teams and students know who/where their teachers are, encouraging connections and relationships. Selective schools generally devalued the multi-skilled, multi-talented environments that are shown with hard data to improve learning outcomes. Creative school environments are forstered, on the other hand, by principals who adopt approaches that are ‘glass half full,’ that encourage working from within to try to build staff capacity that grows its own confidence amongst those with whom the work is done. Language used included: “building capacity”, “celebrating her capacity”, “giving her permission to develop the capacity of others.” Principals can affect the environment of the school and classroom through activating strategies that address the ‘fear of failure’ – creating a culture or a shared philosophy in which it’s the expectation that teachers try new approaches and failure is part of the learning journey (ie, ‘it’s OK to fail as long as you are trying and learning from it’). These responses connect strongly to the theme of risk, and the data shows that this productive risk-taking (high on the list of creative skills and capacities in all the literature) must be modelled all the way through the school hierarchies and across the whole school community in order to foster a truly *creative ecology*.

***What the students said:***

* 64.90% said (they agree or strongly agree) that “Creative achievements are recognised and celebrated at my school.”
* 66.76% said that “At my school I have the chance to initiate activities and projects.”
* A scant 55.55% said that “the school listens to the students”.
* 49.30% said “the school supports the students making decisions that affect how the school runs”
* 62.56% said “the students are encouraged to advocate for things at my school and the school leadership will listen”
* 62.61% said “The teachers encourage me to personalise aspects of my learning so it’s more meaningful to me.”
* Sadly, the lowest result was interdisciplinary opportunities, at 48.72% said “Every year I get the chance to do a project or activity that cuts across subjects,” the primary condition for creative productivity in the creative industries literature.
* 49.43% believed that “students can get involved in how student work is displayed around the school or in the school newsletter.”

****

***Figure 13: Findings graph - Creative achievements recognised***

These results in particular have shown that what the teachers say was formative for them, what teachers and leaders aspire to offering in terms of creativity skills and environment enhancement, and what students are experiencing, is very different. When asked, for example

***How can your school be more creative****?*, teachers described creativity as involving a pattern of identifiable transferable skills and abilities invovling problem-solving, imagining possibilities, criticality/critical reflection, open-mindedness/flexibility thinking, teamwork/collaboration, risk-taking, questioning, mastery/toolbox of theoretical and practical ways of working, engagement as a bridge to more widespread curiosity/independence, empathy, analytical skills, resilience, complexity, communication. Yet students expressed very different views, including a more closely aligned view of creativity as artistic ability and schools becoming more creative by allowing students to make art.

**Theme #3 – Curriculum and pedagogy**

Strategies, considerations and/or pedagogical approaches for enhancing creativity, which emerged from the data included differentiation, constraints, structure (task structure and relational structure), systemic development v. staff development, boundary crossing/cross-disciplinary, spaces/environments, leadership (see also Policy), real-world relevance, partnership and inspiration, student agency/encouraging action, risk, tool-mediated creativity, collaboration/Communities of Practice, and resources. The literature shows that while interdisciplinary approaches (at work, in school) actually provide the conditions for creativity more than any other single factor, in this study, the students’ least positive response was concerning their lack of opportunity to engage in cross-curricular work. This indicates a clear dissonance between the creativity literature and the practices of the schools.

***The most significant differences between the ages were:***

1. 12-14 yo’s ‘disagree’ and 15-16 yo’s ‘strongly disagree’ that they get a change for cross-curricular collaborations.

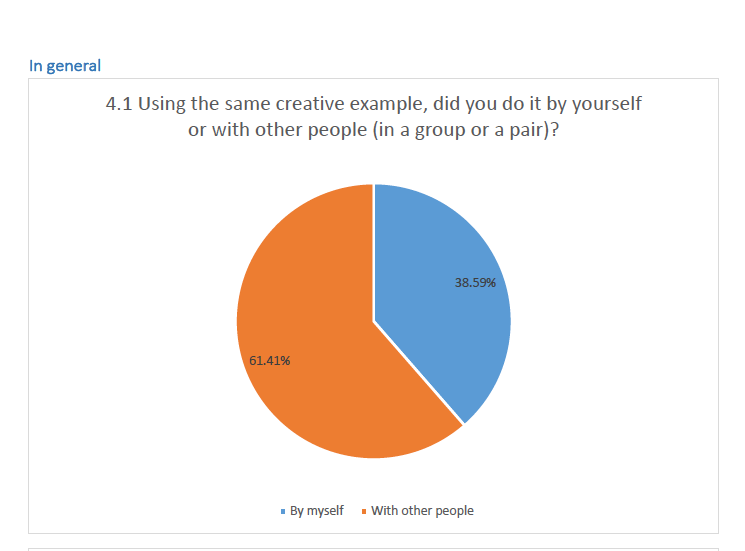
2. No difference between frequency of ‘agree’ to the question ‘Creative achievements are recognised and celebrated at my school’ (40%) for both age ranges; but huge differences between ‘I absolutely agree!” (12-14’s) and ‘disagree’ (15-16).

3. Cumulative 30% of 15-16 yo’s answered ‘disagree’ or ‘strongly disagree’ to ‘creative achievements are recognised and celebrated at my school’, while no year 12-14 yo’s said ‘disagree’. (indicating declining valuing of creative achievements at schools in the higher age range).

4. Both age ranges agreed that at school they “have the chance to initiate activities and projects” (60% of 15-16 yo’s, and 50% of 12-14s).

5. Equal ‘agree’ responses to ‘The teachers encourage me to personalise aspects of my learning so its more meanignful to me,’ a good sign of creativity conditions.

6. Cumulative 60% of 12-14’s said they agree/strongly agree that they have the chance to do collaborate on a cross-curricular project or activity, while only 30% (half) of the 15-16s did.

****

***Figure 14: Findings graph - Alone or with others?***

***Theme #4 – Policy, leadership, whole-school approaches***

***What the teachers/school leaders said:***

This code referred to situations described by participants where enhancement derives from policy supporting creativity. This policy without exception involves commitment/ encouragement/vision/enforcement by the school principal. In this way it can just as easily be interpreted as ‘leadership’. The domains in which policy drove creativity were:

* Commitment to fund learning spaces.
* The role of timetabling
* School based professional learning
* The adoption of a school-wide policy to use design thinking (or other approach such as Five Minds of the Future)

School-wide approach is key: at first teachers have to teach and scaffold its application to problems, but after a few years, it becomes a tool that students spontaneously draw on. Because it involves the school community in a shared vocabulary and understanding/ culture, the need for continuing explanation of terms of reference/engagement diminishes. An environment enabled by the principal in which **risk** and learning through making mistakes is accepted as part of professional learning and it was therefore ‘safe’ to take risks with pedagogical experiments knowing that you had the backing of your principal.

**Theme #5: Creative partnerships**

Some examples of links with other schools and overseas partners of different kinds, but there was strongly voiced anxiety by a number of participants about whether the focus of the school on what was good for students would be compromised by the profit motive of industry. Participants worried that it might trend into trying to produce people who will fill the workplace, pigeonholing kids and stifling social mobility, and voiced a values set that education is for something more. It also raised the issue of equity between urban and regional school opportunities.

**Theme #6 – Risk**

The creativity literature has a lot to say about attitudes to risk and fear of failure, but education very little. In the theme on risk, we find teacher/leaders’ comments focus on a range of aspects attendant upon risk-taking:

* school principals taking risks with regulations in the interest of student outcomes,
* changing or setting school cultures to support shared philosophies of *teachers* taking risks with trying new pedagogies,
* Changing or setting school cultures to support *students* taking risks with their learning.
* Definitions of ‘success’ which put pressure on principals, teachers and students to play it safe, get the right answers and not to take risks.
* Pre-service teacher education institutions teaching for conformity and being risk averse.

**Theme #7 – Australian curriculum and creativity**

A range of views in this Australian data set, but no general feeling that a standardised national curriculum inhibits creativity, a response which matches the international respondents. The large data set clearly indicates in these major areas of emergent thematic correllation a need for further and sustained research, including measuring the impacts and efficacy of capacity-building in most of these areas.

***5b. Qualitative findings: Thematic comparison (Australia /international interviews)***

|  |  |
| --- | --- |
| **Assessment (assessing creativity)** | |
| **Australia** | A key question in assessing creativity is whether to measure the process or the product, ie the inability to use a product measurement (most predominant in secondary) to measure a process. For example, if assessing creativity as a process, you would include willingness to take risks, to act on feedback, etc, rather than assessing creative outputs. Teacher comment: “My view is that creativity is a process, but what we measure is outcomes. So unless that creativity produces an outcome that fits into the measurable, it’s really hard for it to be judged in the secondary school environment.” Another key perspective is a metacognitive perspective that puts emphasis on formative assessment. Getting kids to articulate how their thinking has changed and developed before and after an experience, in both qualitative and quantitative aspects of change, was one proposal. In relation to this idea one teacher suggests: “Is it about assessing it though or is it about conscious raising around it, so I’m naming it, I’m actually identifying it and then in the naming and identifying and building into something, then I’ve added a level of importance to it without necessarily assessing it. Can that happen do you think?”.  Bloom’s taxonomic levels provide one structure for helping to do this too, but from the perspective of the teacher, because it can address questions such as “At what level are they entering the learning experience? At what level are they exiting it?” It is perhaps in this sense that most respondents thought you could measure its *growth* within an individual but not necessarily against a standardised scale. One respondent mentioned creativity in relation to using a variety of Gardner’s intelligences - so as to encourage students to leverage off and flex between different modes as means of responding to situations.  One strand of possibility for creativity assessment centred on **criterion-based assessment** that included some forms of signposts or steps or outcomes that could be identified and given value. This implies using very clear rubrics with development signposts (for example using alliteration, rhythm, mood, atmosphere, projecting your voice, synthesising…) which locks it into a **skills and capacities** focus.  Here it is important to highlight the difference between assessment and measurement, with measurement being more standard-oriented. To the extent that measurement implies a standardisation of creative outcomes, or some kind of comparative judgement, it remains seen as highly problematic regarding creativity in education. “As long as we keep trying to measure product we are going to get it wrong”, said one person (principal).  The International Baccalaureate was mentioned by several participants because it uses levels rather than grades of 70% or 80%. One teacher talked about how their science report required in the analysis and evaluation section, a part where you talk about the difficulties you came up with designing or creating yoru model and how you overcame them; another suggested a process of having a concept, doing some research to find out what has already been done or is known, coming up with a way of doing it a bit differently, and getting a different result, and then having a creative response to the problem. Quite a few respondents expressed scepticism that you could assess creativity. Cross-curricular assessment was seen as very problematic because staff lacked the knowledge and skills to be able to make clear evaluation of creativity in their area. |
| **Singapore** | High stakes national exams and large class sizes (40) impedes more creative pedagogies and curriculum, while noting slightly more freedom at junior levels and little or none at senior level. |
| **Canada** | Creativity was understood as assessable and rubrics with continua for development of skills can be used, but it is a fraught area because you don’t want to discourage kids taking risks and losing out if it doesn’t work. Reflection as assessment. |
| **USA** | The pace of learning – that it allowed to be ‘slow’ or to paced to be student centred was mentioned, though pressure could be used constructively in performances and assessment. That assessment need not remain strictly individual, as creativity productivity stresses collaboration, so why can’t school-based assessment? Rubrics and performances were suggested as successful ways of assessing creativity because performances internally motivated students and rubrics explicitly guided kids to develop mastery. The opportunity to justify answers, reflection and self-assessment was also key to activating kids’ agency/control of their own learning and hence their creativity. |
| **School Environment (creative ecologies)** | |
| **Australia** | Highly risk-averse environments, no discernable differences between elite private schools versus public, single-sex versus co-educational, or regional/rural versus urban (except for resourcing and creative partnering due to environment). Teacher pedagogies were highly creative and the data evidenced slightly more freedom to innovate and collaborate in country schools versus urban schools. Institutionally almost all were highly constrained and considered themselves hampered by testing cultures. |
| **Canada** | Teachers listening to other teachers, or external partnerships which involve great models of practising teachers/schools are the ways proposed to make leaps in how schools function to grow the creative potential of students. Teachers (like kids) need safe containers to try new ways of working and be supported while doing so. |
| **USA** | Feeling safe and creating a trusting school or classroom environment is key to kids being comfortable to be creative. Technology was seen to be snowballing creativity because of students level of comfort and familiarity in everyday use meant they naturally used it for their own purposes when left to their own devices. As unleashing students’ creativity was seen to involve ‘letting go of the (teacher’s) power’, perhaps this is why. However, tech could be used faddishly and reduce students development of critical questioning if they accepted everything could be googled rather than thought about. Shift of emphasis onto ‘curating’ rather than only researching. |
| **Singapore** | Participants described the learning environment they tried to create and the school or institutional environment factors that affected creativity. Sinapore has an education system of appraisal that includes schools cultivating an ‘innovative culture’, school leaders actively working against a national culture of ‘not making mistakes’, actively cultivating freedom of expression. A whole-school culture of: “if I want to nurture creativity I must be prepared to fail in certain things”. Kids leading the charge with their use of technology because it’s interactive, quick, and feeds into their identity formation but schools resist using these common social media platforms in favour of ones they control.Technology seen inevitably as linked to rise of creativity, integral to creative processes. |
| **Policy influences** | |
| **Singapore** | Curricular, cultural and testing constraints (including international moderation processes) were identified as policy impacts on the development and support of creative practices and environments. Lack of mastery, assessment processes, and parental support for arts and/or creativity that was not oriented toward market outputs. |
| **Canada** | Overall curricular policy was not seen as a constraint. Primary policy influences were seen as constraints at the school/department/institutional level and included: control over teachers, timetable constraints, limited collegiality/cross pollination, teacher resistence to creative collaboration, lack of teacher flexibility/skills. |
| **USA** | Most participants said policy-level influences, including the incoming Common Core was not a constraint on creativity; they saw creativity as being constrained by the qualities of the individual teacher; institutional constraints did not figure much in the picture they drew (in contrast to Canada, in particular). However, standardised testing was universally seen as detrimental to teachers’ and students’ developing their own creativity and the school environment because it is based on one right answer and discourages risk and the seeking of alternative solutions. |
| **Australia** | A range of views but no unified position that a standardised national curriculum inhibits creativity – which matches the international respondents.There was no consensus on whether the national curriculum was conducive or constraining to creativity. Apart from a lack of time, the main three hindrances/criticisms at the policy or institutional level identified were:   1. Too much content, a ‘crowded curriculum’. 2. Onerous levels of oversight, documentation and repetitive paperwork 3. The way STEAM is interpreted is that creativity is integrated across all subjects so the arts can disappear from the picture entirely even though it is there that their expertise lies. In addition, time for the arts has been reduced and art, drama, music, dance, media and teach are all needing to taking a slice of the art pie – so less time for each one.   Some respondents were of the view that it is the type of assessment, not the curriculum, that determines whether it allows for creative teaching and learning. |

***Figure 15: Thematic comparison table (Australia/international)***

#### Outcomes

As stated in the funding application to this study, the following objectives and outcomes were addressed, as a conceptual and methodological innovation in fostering creativity in secondary schools using an environmental approach.

***Objectives***

1. develop a workable and measurable **DEFINITION** of creativity for Australian secondary schools;
2. develop a **NEW THEORETICAL FRAMEWORK** for approaches to cultivating creativity in schools that is internationally comparative (adapted from Cho);
3. **MEASURE CREATIVITY** in secondary schools across Australia from a range of geographical, socio-economic and demographic sites;
4. **MAKE RECOMMENDATIONS** to Australian education policy-makers.

In meeting these objectives, the project produced the following **OUTCOMES**:

1. Articulate **A NEW DISCOURSE** of creative and innovative skills and dispositions which can be embedded in Australian secondary education policy, contextualised against an international literature review of research in this area.
2. To **ANALYSE AND DISSEMINATE** the results of an online survey of students, teachers, administrators and staff across Australia, about their current practices and attitudes toward creativity (eg “What do educators across Australia describe as the key elements of creativity education?” and “where is it most clearly evident?” etc) (see *Findings* Section);
3. Propose a **NEW THEORETICAL FRAMEWORK** for comparative and consistent integration with international standards in creativity and innovation discourses and practices in education**.**

***1.* *Workable and measureable definition of creativity***

I adapted definitions of creativity found in Lucas et al (2012; 2013) and the American International Center for Studies in Creativity (ISCS) who assert that it must have a practical application, and must be “complex and multi-faceted, learnable, capable of being analysed at an individual level in terms of dispositions, and strongly influenced by context and social factors” (2013, p 7). Through an extensive international literature review, and a rigourous process of coalescing best practice models and definitions of creativity, I have developed the following workable definition of creativity for secondary educational contexts.

**Top 10 Creativity Skills and Capacities**

|  |  |  |
| --- | --- | --- |
| **#** | **SKILL or capacity to be fostered** | **Per creativity scholar or evidence** |
| #1 | **Curiosity -** stimulating and rewarding curiosity and exploration in students | Lucas 2013; Sternberg & Lubart 1999; Csikszentmihalyi 1999; Hunter |
| #2 | **Collaboration** / teamwork | All major studies |
| #3 | **Problem-posing / problem solving** itself rather than its impact or outcome. Amabile (1983) described situations in which creativity in problem solving included a phased step-by-step process or a combination of pathways of steps. Research using laboratory investigations of this notion of creativity typically begin with the presentation to the participants of problems that are already well-defined. | Amabile 1983; Newell, Shane & Simon 1962, and Mumford et al., 1998, cited in Nickerson, 1999). (Walsh et al. 2011, p. |
| #4 | Lots of **divergent thinking exercises** (such as brainstorming programs) & evaluating those divergent ideas. “Being imaginative can be seen as the divergent aspect, while being disciplined can be seen as the **convergent.** | Runco 2010, p 424; Australia 2020 Summit (2007) |
| # 5 | **Motivation, confidence and persistence**, especially intrinsic motivation must be built over time. | Lucas, Claxton & Spencer 2013, p 17; + Amabile (1999; 2010); Cole, Sugioka and Yamagata-Lynch (1999, p 288). |
| #6 | **Innovation** (the implementation or application of creativity in industries and in value-added production of goods or services); the process by which new ideas are implemented | Flew & Cunningham 2010; Hartley in McWilliam 2011. Robinson ; Melbourne Declaration on Educational Goals for Young Australians (2008, p 8); 1999 Robinson Report *All our Future: Creativity, Culture and Education* |
| #7 | **Discipline/mastery** (by which is meant developing expertise or mastery in a range of discipline-rich technical skills and knowledge; encouraging the acquisition/mastery of domain-specific knowledge and skills) | Lucas 2013; Sternberg & Lubart 1999; Csikszentmihalyi 1999; Jeffrey & Craft 2004; Nickerson 1999 |
| #8 | **Risk-taking / Mistake-making** – productive risk-taking that is not penalised by teacher or education system, in order to build creative ‘trust’. | Australian Government National Innovation and Science Agenda, 2015; Cropley 1992 |
| #9 | **Synthesising**: The capacity to make connections – the ability to bring together previously unconnected ‘frames of reference’ | Koestler 1964; and in Nickerson 1999, p 394. |
| #10 | **Critical thinking** - creativity as a *thinking process* – again, must be assessable to be environmentally-enhanced/valued. Lucas et al proposed a formative assessment criteria and process for the progressive development of creativity skills in UK children aged 5-14 (NOTE: pre-senior secondary) | One of 7 ‘general capabilities’ in the ACARA Australian National curriculum and Amabile’s work on intrinsic and extrinsic motivation (1999; 2010) and Csikszentmihalyi (1999); Lucas, Claxton & Spancer 2013. Ramsden 1992; Boud 2010 |

***Figure 16: Top 10 list from Harris (2016, p. 42)***

By drawing on these established criteria, this definition is both **workable and measureable** for the purposes of secondary schooling, in particular in relation to the Australia National Curriculum’s General Capability of *Critical and Creative Thinking*:

|  |
| --- |
| *Evidence of creativity in secondary school contexts must display, in order to be assessable in part or whole, the following ‘top ten characteristics’ drawn from international creativity literature in and beyond education discourses:* **curiosity, collaboration, problem-posing, divergent thinking exercises, persistence, innovation, mastery, productive risk-taking, synthesising, and critical thinking.** (Fulfills Objective A) |

***2. Creative Ecologies: A New Conceptual Framework (fullfils Objective B, Outcome G)***

In working toward Objective B, I drew on an extensive literature review of international scholarship concerning the nature and practices of creativity in schools in a rapidly globalising context [**Outcome E**]. By integrating Amabile’s approach to fostering environemental creativity with Luca’s 5 Dispositions model, I examined the ‘function of creative dispositions and the evidence of knowledge, imagination and evaluation’ alongside environmental factors within secondary schools across six Australian states and territories, from a range of geographical and socio-economic contexts [**Objective C**]. As noted, the study expanded to include snapshot data sets from teachers in three additional countries, for the purposes of comparison across emergent themes (see *Findings* section). Establishing an international Advisory Group allowed this study to be checked and informed by international best-practice expertise from a range of contexts, informing both the development of the new theoretical frame [**Outcome C**] and the policy advice and general dissemination of findings which resulted from the investigation [**Objective D and Outcome F**]. The research publications and international presentations generated by this project extend Australian scholarship generally and add Australian expertise to the growing field of Australasian and global creativity studies as an academic discipline.

**Creative Ecologies: A New Conceptual Framework**

This study and report are innovative in two structural ways: first by placing Australia at the centre of an international study on creativity education for the first time, and secondly in moving toward explicit links with Asian methodological and conceptual notions of creativity across the education lifespan. As briefly noted in this report, there are discernable cultural distinctions between conceptions and instrumentalisations of creativity in education and into the creative industries. Australia has, until now, mainly looked to our cultural forebears in the west and north for alliance and precedent across these concepts and practices. However as this study and considerable Australian and international evidence-based literature makes clear, now is the time to work more regionally and collaboratively across global markets, rather than remaining nation-based in orientation, and nowhere more necessarily than in the creative and cultural industries. Therefore, the conceptual contribution of this study is the identificaiton of a need for, and nascent formulation of, a new conceptual framework for creativity that takes a more holistic, environmental approach and which requires what I am calling a *creative ecological approach.*

Cho et. al (2011) has argued that systems as well as curricular and pedagogical approaches are required in order to achieve a consistent and implementable creativity education to prepare young people for 21st century life. However, Cho et. al have also noted that despite Korea’s leading role in incorporating creativity in the national curriculum in 2009, additional steps are required in order to implement more systematic and comprehensive creativity education. I extend Cho’s multi-pronged approach by offering the concept of creativity in secondary school environments as an *ecology,* one in which high-stakes testing for university entrance and rankings can (and should) live together with productive risk-taking and creative experimentation.Scholars have well documented the value of cognitive flexibility in rapidly-changing social and work environments (Tepper and Kuh 2011; Cormier 2010) yet schools continue to constrain students’ (and teachers’) ability to exercise the skills for cognitive flexibility. Since Florida’s conceptualisation of creative economies, creative industries have understood creative and cultural industries to function interdependently as an ‘ecosystem’ of practices, mobilities, and stimuli, but schools still focus on the individual. The materiality of language, and the hybrid nature of online/offline worlds and worldings now suggests that schools must change. This study has shown that not only students, but teachers too want change. Teachers and students alike often identify ‘expertise and excitement’ outside of the school, and desire greater permiability “between schools and business, but also between schools and parents” (Teacher, San Jose, USA).

*Creative Ecologies* as a conceptual lever for secondary education returns educators and learners to a recognition of collaboration as creative pedagogies, digital technology as a productively explosive bomb, exploding barriers between outside and inside the school, and micro-cultures as vital global/local communities of curatorial practice.

British and Korean research has identified the secondary years as optimal for enhancing creative attributes and dispositions in developing learners. Returning to Cho’s 3-pronged model which prioritises creative curriculum, evaluation, and teaching/learning opportunities as the core components for ‘education for creative talents’, a *creative ecological model* takes Cho further by addressing the field (environment) in which these creative practices occur. As Cho’s model formalises three key elements of creative education research: the importance of a curriculum that formally organises and implements creativity education; the importance of creative pedagogies that nurture not only creative arts but wider creative and innovative dispositions; and developing the means for evaluating such pedagogies and programs, a new attention to the creative ecology or field of relationships within creative schools might offer a joined-up approach to the interconnections between place, space and practices. As Hearn et. al (2007) has suggested, a *creative ecological approach* identifies an important shift from ‘consumers to co-creators of value; the shift from thinking about product value to thinking about network value; and the shift from thinking about cooperation or competition to thinking about co-opetition’. I suggest this creative industrial shift is already emerging in schools, and by more consciously adopted the language and strategies of creative industries’ ‘pro-sumers’ rather than producers orconsumers, of ‘co-opetition’ instead of collaborators or competitors, and the shift from industrial/production education economies to networked knowledge economies, schools will re-active as important knowledge hubs in 21st century creative economies.

Methodological Toolkit

|  |
| --- |
| **Harris Creativity Index** |
| *Based on current creativity literature and emergent themes from the australian study, and representing the contemporary shift from individual to social, cultural and collective creativities, the* ***Harris Creativity Index*** *provides one consistent and measurable tool for fostering creativity across the education lifespan. a comprehensive program may be that schools use the* ***Harris Creativity Index****, together with the Whole School audit, the top Creative Skills and Capacities from Chapter 3, and the Creative education Skills Checklist, as their step-by-step guide to fostering better marco-cre- ativity across their school community, not just at the individual level.* |
| Strategy 1 – creative approaches / teacher development  Strategy 2 – cross-curricular collaboration  Strategy 3 – allowing students to lead  Strategy 4 – real-world skills and assessment  Strategy 5 – creative partnerships / links with community  Strategy 6 – better resources |
| *Through these areas of professional development, school leaders should commit to ongoing development serving the following three core foci:*  **Focus 1** – Creative environments (Amabile)  **Focus 2** – assessing Creative processes and products (Spencer, Lucas & Claxton 2012)  **Focus 3** – Creative Industry partnerships |

***Figure 17: Harris Creativity Index (Harris 2016, p 118)***

The Harris Creativity Index provides a set of tools that, when used together, can assist schools or policy-makers to comprehensively address creativities education in an *ecological* way. For more on the Index and using it in conjunction with the Whole School Creativity Audit (Appendix B), see Harris (2016).

***Additional outputs***

**Creativity Summits**

This study produced two international gatherings focused on creativity across the education lifespan, and on creativity education joining the ‘creative and cultural industries’ global conversation. The impact of these two events was not only effective dissemination of the study findings, but also to advance the field of Australian creativities education through international collaboration and dialogue, integrating these emergent Australian findings alongside more established creative education research internationally. It also helped to reinforce the Advisory Group as a community of practice committed to advancing a network of scholars globally working in this field.

***Creativity Summit #1 (2015)***

The *Creative Education Forum,* held at the State Library of Victoria on Friday, November 13th, was a full day gathering attended by approximately 40 attendees both Australian and international. This is a 1-day forum on the intersection of creativity, arts, education and the creative and cultural industries across the ‘education lifespan’. This invite-only event is capped at 20 participants in order to devote focused and dialogic time to assessing where we are and where we would like to go in creative education policy and practice. Building upon the international Advisory Board of Anne’s ARC DECRA fellowship (2014-2016), this gathering aims to identify policy and practice recommendations, and to expand our ongoing creative education network and vertical conversation in the education sector. Participants include creativity expert Professor Bill Lucas (University of Winchester, UK); Professor Erica McWilliam (Creative Industries Faculty, QUT); Professor Michael Anderson (Education, Univ of Sydney); Dr Mary Ann Hunter (Curious Schools, Univ of Tasmania); Mr Adam Jefford (Pimpama State Secondary College, QLD); Michelle Anderson and Sara Glover (Mitchell Institute); Dr James Oliver (VCA); Erica Sanders (Creative Victoria); Professor Kathleen Gallagher (Univ of Toronto); Professor Robyn Ewing (Univ of Sydney); Ms. Kellie Mackereth (NIDA), Dr Sue Davis (Central QLD Univ) and others.

The working nature of the gathering produced the following emergent actionable recommendations to the sector:

**Recommendations - Policy**

1. **Language** - Attention to establishing consistent definitions and approaches to enhancing creativity in teacher education and compulsory schooling
2. Sector demonstration of a greater value on **key skills and capacities** of creativity (including collaboration, experimentation, ideation for example), through curriculum assessment and AITSL standards. (ministerial support for cross-sectoral approaches including govt/ industry/education).
3. **Updating teacher education** in collaboration with principals and professional organisations and creativity skills in AITSL standards

**Recommendations - Practice**

1. **Developing the ‘creative confidence’** of teachers and principals across all subject areas, and an acknowledgement in teacher education that all subject areas are using creative teaching and learning practices, not just arts educators.
2. **Improved teacher education** in creative pedagogies (especially concerning assessment, especially in senior secondary years).
3. **Better collaboration** between principals and higher education for improving creative teaching and learning: support, time and professional development at school level, in collaboration with teacher education.

***Creativity Summit #2 (2016)***

The *Creative Education Forum,* held at the Australian Centre for the Moving Image (ACMI) on Sunday, November 27th 2016, was again a full day gathering attended by over 80 attendees. Speakers included leaders in creativity education from Australia and internationally, including Associate Professor Anne Harris (Monash University), Professor Pamela Burnard (Cambridge University), Professor Pat Thomson (University of Nottingham), Professor Robyn Ewing (University of Sydney), Dr Mary Ann Hunter (University of Tasmania), Robyn Heckenberg, (University of Southern Queensland) and Erica McWilliam, Adjunct Professor, QUT. This report constitutes the completion of all project objectives and outcomes, including Objective D**,** providing recommendations to government, education sector and schools – namely, through the principals’ associations that participated, through the participating schools, professional organisations, peak bodies including the Australian Council of Deans of Education, Creative Victoria, Creative Australia, and through both Creativity Summits, including the last one held on November 27, 2016 at Australian Centre for the Moving Image, where attendees received a print copy of this report.

#### Recommendations

***For schools***

The research in this studyhighlights the importance of systemic change in compulsory education, not just ad hoc creative programming. Use of standardising and holistic tools like the **Harris Whole School Creativity Audit** take a more interconnected or ecological approach to enahncing creativity throughout the entire school community and its programs. The Harris **Whole School Creativity Audit** measures:

* School policies and practices
* The product (curriculum, assessment, timetabling)
* The process
* The school environment
* Creative partnerships

***For creative workforce***

**Teacher education creativity preparedness**

There is a significant need for sustainable creativity education strategies in all subjects across the tertiary, secondary and primary curricula and whilst ACARA has included creative and critical thinking in its General Capabilities, it limits the description to helping students “to clarify concepts and ideas, seek possibilities, consider alternatives and solve problems” (2012). Creativity training in teacher education is still an underdeveloped area, with a refocus on Science, Technology, English, and Maths (STEM) subjects lacking a creativity integration. The Australian education sector is missing the appropriate methods to develop creativity, and approaches for up-skilling pre-service teachers (PSTs) to enter the workforce ready to nurture these skills and capacities in their students. Flew (2012) and others have demonstrated that a significant impediment to implementing creative pedagogies in classrooms is teachers’ fear or unfamiliarity with creative approaches and skills.

Graduate attributes for many teacher education programs in Australia foreground creativity as an essential skill, thus teacher education programs are fertile sites for enhancement of creativity in students across the lifespan. Any development of new teacher education tools or resources must be done in consultation with schools (the end-users) and university programs (the implementers), as this project has done. Further research is required to develop consistent capstone units that recognise the importance of both creative environment-building and approaches that nurture broad creative and innovative dispositions as well as developing the means for evaluating such programs and spaces. Cho & Lin’s (2011) model emphasises that the connection between curriculum, teaching, learning, and assessment that are crucial for developing multi-faceted *creative ecologies* in schools.

***For government***

**Australian / Australasian Creativity Index**

Policy reform that reaches across education and economic platforms requires a more international comparative tool, and following other nation-based and region-based Creativity Indexes, this report recommends the commissioning of a Creativity Index of Australasia that begins to look at economic and educational approaches to and issues within creative economies in a more networked and threaded fashion. By extending the model of *Creative Ecologies*, policy-makers will be able to build more joined-up approaches to a creative 21st century workforce. This recommendation follows an increasing wave of national and regional Creativity Indexes (including Ireland, the US, Scotland, Hong Kong, the European Creativity Index, the Welsh Govt Action Plan) that keep arts, cultural education and arts partnerships central to that economic and educational agenda.

**Intercultural creativity across Australasia**

National-level approaches to the sustained development of a creative and cultural industries workforce that collaborates with core education and creative industries agendas, across the education lifespan. This report recommends intercultural collaboration as one important approach to non-standardised context-specific creativities education (building fluidity, flexibility, collaboration, persistence, adaptability), and return to the combination of creative and cultural industries evident in recent national statements including Wales and Singapore. This project also suggests the need for further substantive study of pan-Asian creativity as a regional focus, including the development of new methodological approaches for understanding and critically situating this regional creativity within the discipline of creativity studies (still largely dominated by northern western nations’ discourses).

**Comprehensive national funding for creativity education research and evaluation**

Thomson et al (2009) in *Creative whole school change, final report* state that the UK’s

Creative Partnership’s commissioned research was designed to provide ‘evidence’ of impact, but also to inform the development of the programme through theory building and the provision of heuristics for teacher and school learning. This is an approach of interest to future arts and creativity initiatives. However, CP did not develop a longitudinal study tracking students and teachers learning over time: this is something any future national arts based or cultural programme needs to do.

and indeed, this report recommends more fulsome funding at the national level for a comprehensive creativity education research program and evaluation for Australia.

#### Conclusion

Legendary Drama educator Dorothy Heathcote said “The very word creativity frightens me.”

The biggest obstacle to being creative in our classrooms, Heathcote claimed, is not **time**,

or **testing…**it’s a FEAR OF FAILING.

Schools are, by nature, risk-averse. The metaphor of ***creative ecologies*** asks schools to approach risk in the same way that businesses do – not to avoid risk completely (without it, there is no growth), but rather to network the investment and outputs so that the inevitable failure of innovation still results in forward progress and creative accomplishment. Heathcote believed that if we could deal with education’s fear of failure, our classrooms would become the **most** creative places on earth, because classrooms are already laboratories, just **risk-averse** ones. Ten years ago, famed British creativity education scholar Anna Craft wrote:

“Creativity is experiencing a global revolution” (p. 35), and she offered the concepts ‘possibility thinking’ and ‘problem posing’ to help us get there. Craft and Heathcote knew that the good of creativity is to be found not in its quantity, but its quality. In its doing rather than its assessing. That creativity is a pile, not a list. It's the way we clear our minds, not fill them. And those views of two creative education experts is certainly reflected in the testimony of the students, teachers and school leaders in this 4-country study.

This report and *Creativity and Education* (Harris 2016) together represent not only the outcomes of this study but my argument for an environmental approach to enhancing creativity in secondary school, a ***Creative Ecologies*** ***Approach***, by interweaving educational creativity theory with creative industries systems approaches. I argue that education policy should be supporting a birth-to-workplace approach to developing creative skills and capacities that extends across the educational lifespan and across multiple interlocking sectors. It will do no good to train a new generation of teachers in creative teaching and learning, if the static and standardised nature of school systems remains the same. Overall, the report argues that secondary schools must find a way to make more room for creative risk, imagination and iteration in order to adequately prepare students for creative workplaces and publics, and that this can best be achieved by a globally-networked environmental approach known as ***Creative Ecologies.***

#### Appendix A: Creativity Assessment Tools

***Comparison of creatiity measure tools: Creativity assessment tools***

**Creativity Self-Assessment**

*Hocevar and Bachelor (1989) have suggested that the self-report inventory is the most easily defended method of assessing both creative achievement and creative talent. Most such inventories are checklists that ask the participant to check off achievements in various areas of creative endeavor.*

|  |  |  |
| --- | --- | --- |
| Creativity Attitude Survey | Schaefer (1971) | * focuses on attitudes associated with creativity, including confidence in one’s own ideas, appreciation of fantasy, theoretical and aesthetic orientation; * 30 self-rating items to be answered with *yes* or *no*, suitable for grade 4-6; * this instrument may be effective for evaluating programs designed to increase creativity in elementary school-age kids (McKee 1985). |
| Group Inventory for Finding Creative Talent (GIFT) | Rimm (1980);  Davis and Rimm (1982) | * self-report form designed to assess the creative potential of students grades 1-6; * test was upgraded for junior and senior high school students (Group Inventories for Finding Interests (I and II)); * students respond *yes* or *no* to a series of statements designed to assess the traits of independence, flexibility, curiosity, perseverance; * sample statement: “I like to make up my own songs”; * instrument yields a total score and scores for imagination, independence and many interests; * reviewers have stressed the need for additional validity data, but they have viewed the scale as a useful tool for decision making when used in conjunction with other types of assessment (Dwinell 1985). |
| Adjective Check List (ACL) (including the Creative Personality Scale (CPS) | Gough and Heilbrun (1983)  Gough (1979) | * widely used personality measure for adolescents and adults; * can be used for both self-ratings and ratings by observers; * consists of 300 adjectives commonly used to describe attributes of a person; * there are 37 subscales, including the Creative Personality Scale (Gough 1979); * Creative Personality Scale includes 30 adjectives (eg capable, inventive, conventional, suspicious); * CPS is the most widely used paper-and pencil measure of the creative personality (cf. Domino 1994; Kadusa & Schaefer 1991); and is one of the most valid as well (Hocevar 1981). * Alternatively: Domino Creativity Scale (Domino 1970) consists of 59 items that are embedded within the 300-item ACL-List; * discriminates between several groups of more and less creative college students. |
| Creatrix Inventory (C & RT) | Byrd (1986) | * integrates cognitive and motivational dimensions of creativity; * based on the concept of ‘idea production’: creativity is regarded as the result of an interaction between creative thinking and the motivational dimension of risk taking; * consists of 56 self-rating statements, 28 measuring creative thinking and 28 risk taking; - answered with the help of a 9-point scale ranging from complete agreement to complete disagreement; * each person’s score is plotted on a two-dimensional matrix (creativity versus risk taking); * respondent is assigned to one of eight styles: reproducer, modifier, challenger, practicalizer, innovator… |
| Abedi-Schumacher Creativity Test | O’Neil, Abedi, Spielberg (1994) | * multiple choice test, students rate themselves on a three point scale; * 60 questions regarded as indicators for fluency, flexibility, originality or elaboration; * sample question: “How do you approach a complex task?” * reliability and validity of this test were examined in a study conducted in Spain on a group of 2,270 students (Villa, Auzmendi, & Abedi, 1996). |
| Villa and Auzmendi  Creativity Test (VAT) | Villa, Auzmendi & Abedi (1996) | * students rate themselves on a list of 20 adjectives, such as imaginative or flexible; * uses a 5-point scale ranging from very to not at all; * this test also yields scores for fluency, flexibility, originality. |
| Basadur Preferential Scale | Basadur and Hausdorf (1996) | * contains statements to which respondents express their degree of agreement/disagreement on a five point scale; * emphasize attitudes favourable to creativity (eg placing a high value on new ideas); * 24 items include: “creative people generally seem to have scrambled minds”; “new ideas seldom work out”; |
| Creativity Styles Questionnaire (CSQ) | Kumar, Kemmler and Holman (1997) | * questionnaire measures beliefs about and strategies for going about being creative; * includes statements identifying the various ways, procedures, and environmental control manipulations a person may use to be creative; * uses seven subscales including: belief in unconscious processes ("I have had insights, the sources of which I am unable to explain or understand"); use of techniques ("I typically create new ideas by combining existing ideas"); use of other people ('When I get stuck, I consult or talk with people about how to proceed"); etc. * respondents rate themselves on 72 items; using a 3-point scale consisting of 3 (true), 1 (false), and *2* (unsure). |
| Creative Achievement Questionnaire  (CAQ) | Carson et al. (2005) | * self-report measure of creative achievement that assesses achievement across 10 domains of creativity in the arts, sciences and culinary (plus three additional domains: individual sports, team sports, and entrepreneurial); * each domain includes eight ranked questions weighted with a score from 0 to 7; * consisting of 96 items; part 1: respondent marks areas in which he or she has more self-perceived talent or ability than the average person; part 2: respondent lists concrete achievements in the 10 standard domains   . |
| Creative Self-Efficacy | Beghetto (2006) | * Tierney and Farmer (2002) proposed a concept of creative self-efficacy as representing a person’s beliefs about how creative he or she can be; * measures of self-efficacy are often brief, for example Beghetto (2006) used a three-item scale: “I am good at coming up with new idea”; “I have a lot of good ideas,” “I have a good imagination”; evidence of reliability and validity have been gathered, although theoretical and psychometric distinctions between measures of creative self-efficacy and instruments which have similar items have yet to be clarified. |

**Creativity of Products**

*The majority of creativity researchers and theoreticians believe that the key to understanding this phenomenon lies in the study of individual difference variables and the unique constellation of traits that make up a creative person. Others focus on the creative process and the creative product. The product creativity can be reliably and validly assessed based upon the consensus of independent expert raters. Although creativity in a product may be difficult to characterize in terms of specific features, it can be recognized and agreed upon. Baer et al. (2004), among others, suggest that product assessments are the most appropriate assessment creativity.*

|  |  |  |
| --- | --- | --- |
| Creative Product Inventory | Taylor (1975) | * measures 7 criteria such as generation, originality, relevance, hedonics, reformulation, originality, complexity and condensation |
| Creative Product Semantic Scale | Besemer and O’Quin (1986, 1999). | * based on Creative Product Analysis Matrix (CPAM) (Besemer & Treffinger 1981); * assessment on three dimensions: Novelty (the product is original, surprising and germinal), Resolution (the product is valuable, logical, useful, and understandable), and Elaboration and Synthesis (the product is organic, elegant, complex, and well-crafted); * these dimensions are assessed by raters using a semantic-differential rating scale (eg *surprising-unsurprising, logical-illogical,* or *elegant-inelegant)* with 43 items. |
| Student Assessment Form (SPAF) | Renzulli & Reis (1997) | * instrument to assess students’ creative products * used to rate student products on nine factors (eg diversity of resources, originality of the idea, attention to detail…); * not all factors are appropriate for every kind of product, but item descriptions provide clarity in the judgment of each factor and contribute to the reliability of the instrument. |

**Creative Thinking**

*During the 1950s and 1960s J. Paul Guilford developed his* ***Structure of Intellect (SOI)*** *theory that differentiated 180 kinds of thinking. Guilford’s concept of divergent thinking has had a great impact on the planning and ideas of creativity, although the subsequent assessment protocols are not as useful as they once were in pinpointing creative behaviour or potential. Creativity is not just about divergent thinking, it also requires evaluative and convergent thinking, as well as domain knowledge and skills. One of the most influential models of creativity, Campbell’s* ***Blind-Variation and Selective-Retention Model****, requires a combination of chance variation to produce new ideas (divergent thinking) and selective retention of more workable ideas (evaluative and convergent thinking) to produce creative breakthroughs (Campbell 1960; see Simonton 1999, 2011 for more recent versions of this model).*

|  |  |  |
| --- | --- | --- |
| Guilford Battery  (Guilford Consequences Test) | Guilford (1957, 1967) | * creativity test for children, based on his Structure of Intellect (SOI) model which led to categorization of different types of divergent thinking and resulting products; * “divergence” means the production of a multiplicity of ideas in response to a situation, rather than seeking a single ‘right’ answer; * test focuses on the operation of divergent production and involves six kinds of product (units, classes, relations, systems, transformations, implications). * Guilford Consequence Test (Christensen, Merrifield and Guilford, 1953) asks respondents to list the outcomes of unlikely events such as: “what would happen if gravity was cut in half”; * participants are scored on the total numbers of responses (fluency), the number of statistically rare responses (originality), the number of different categories the responses fall into (flexibility), and the degree of detail and description provided for each response (elaboration); * Mumford et al. (1998) administered the Guilford Consequences test to over 1800 US Army Officers; |
| Remote Associates Test (RAT) | Mednick (1962) | * creativity is believed to be the result of mental associations (the more numerous and diverse the associations an individual can make, the more opportunities he or she has for creativity); * attempts to assess the number of verbal associations at an individual’s disposal by providing three stimulus words and asking the respondent to generate a word that can be associated with all three; * validity of RAT has been questioned on theoretical grounds; test hasnot shown more than moderate correlations with creative behavior in non-test situations (Kasof 1997); * no validity data available for the high school version of the test. |
| Wallach and Kogan Test | Wallach and Kogan (1965) | * series of tests requiring divergent thinking; * test consists of three verbal subtests and two subtests consisting of ambiguous figural stimuli; * five subtests include: Instances (eg “ Name all the things with wheels you can think of”), Alternate Uses, Pattern Meanings; * emphasis on a game-like atmosphere, absence of time limits in the testing procedure * not commonly used in schools, but frequently used in research involving creativity and conducted in a unique testing atmosphere * Hocevar and Bachelor (1989) conducted analysis of TTCT and Wallach-Kogan Test, and they concluded that despite shortcomings both measure verbal fluency. |
| Structure of the Intellect Learning Abilities Test: Evaluation, Leadership and Creative thinking (SOI: ELCT) | Meeker (1985) | * uses concept of divergent thinking introduced by Guilford; * measures eight cognitive activities connected with creativity, all of them involving divergent production (divergent symbolic relations, divergent figural units…) * studies support the construct validity of this test and inter-rater reliabilities are high; but has not been used a lot. |
| Torrance Test of Creative thinking (TTCT) | Torrance (1966, updated 1998); Torrance and Ball (1984) | * assesses creative thinking in forms of words and in the form of pictures; * TTCT-Verbal consists of five activities: ask-and-guess, product improvement, unusual uses, unusual questions, and just suppose. The stimulus for each task includes a picture to which people respond in writing; * TTCT-Figural has two parallel forms, A and B, and consists of three activities: picture construction, picture completion, and repeated figures of lines or circles; * tests evaluate creativity in terms of fluency, flexibility, originality and elaboration; * doubt has been cast upon the role of divergent thinking as a form of creativity, because statistical correlations between divergent thinking and subsequent creative performances are very low; * use is supported by more evidence of validity than other tests of creativity. * most widely used in research as well as in practice (Anastasi, 1988; Feldhusen & Clinkenbeard, 1986; Torrance & Goff, 1989). * Baldwin Identification Matrix (1984) includes these tests as a part of its total profile of students’ strengths, with creativity being an important aspect of this profile; * Argulewicz & Kush (1984) found that Mexican American children scored lower than European American children on two of the three TTCT verbal scores (no differences between groups on the figural form of the test (Renzulli et al., 1976). |
| Test of Creative Thinking (Drawing Production (TCT-DP)) | Urban and Jellen (1996) | * respondents' productions are rated according to dimensions derived from a Gestalt-psychology theory of creativity; * dimensions include: Boundary Breaking, New Elements, and Humor and Affectivity; * respondents are presented with a sheet of paper containing incomplete figures; their task is to make a drawing or drawings containing the fragments, in any way they wish; * emphasises image production (not statistical frequency or uncommonness of the figure produced, but figures are rated on 12 dimensions yielded by the theory of creativity). |
| Triarchic Abilities Test | Sternberg (1997) | * emphasizes that intellectual ability can be better understood in terms of several *facets,* in this case analytical ability, practical ability, creative ability; * test includes material for two age levels: 8-10 years and 15 years and up; * test involves multiple-choice items, an essay, novel numerical operations.   One tool that measures creativity that is based on Sternberg’s theory is: Aurora r. It is part of an assessment battery for intelligence in students aged 9 -12. Using Aurora r, teachers rate their students on a five point scale, responding to questions about their memory, analytical abilities, practical abilities. |
| Evaluation of Potential for Creativity (EPoC) | Barbot, Besançon & Lubart (2011) | * measurement tool for children in elementary and middle-school students; * based on current theoretical framework, envisioning creativity as a multifaceted, domain-specific construct; * measures divergent-exploratory and convergent-integrative components of creative expression; * composed of eight subtests, testing verbal and graphic expression (eg “Propose as many story endings to a single story beginning as possible”; “Generate a drawing which combines a set of elements presented on a photo, including a candle, a fruit, a suitcase”). |

**Creative Environments**

*The environment dimensions of creativity are often overlooked by educators, creativity assessment models and theories. (see Thomas & Beck 1981, Treffinger 1986). Amabile has added to a conceptual understanding of the creative environment and ways in which it might be assessed.*

|  |  |  |
| --- | --- | --- |
| KEYS ‘Assessing the Climate for Creativity’ instrument | Amabile (1995); Amabile et al. (1996) | * assesses the organizational environment for creativity, its supportive factors and environmental obstacles; * self-report instrument; * assesses individuals’ perception and the influence of those perceptions on the creativity of their work.   Forbes and Dimm (2004), influenced by the work of Amabile, developed an environment survey that required participants to rate the importance of items related to a recent, successful, creative project on which they worked.  six factors emerged from the data: mental involvement, intrinsic motivation, time and resource constraints, extrinsic motivation, external control and team management. |
| Creativity Index | Eyseneck (1996) | * highlights the importance of sociocultural factors in the measurement framework of creativity ; * proposes model that differentiates:   + Cognitive variables (Intelligence, Knowledge, Technical skills, Special talents); Environmental variables (Politico-religious factors, Cultural factors, Socio-economic factors, Educational factors)   + Personality variables (Internal motivation, Confidence, Non-conformity, Creativity (trait); * used in Hong Kong Study on Creativity Index (Home Affairs Bureau 2004). |

**Creative Problem solving**

*The Creative Problem Solving (CPS) model, a well-validated practical approach to creativity enhancement on the level of everyday creativity and problem solving, requires both divergent thinking and evaluative judgement (Isaksen & Treffinger 1985; Puccio, Murdock & Mance 2005; Treffinger, Isaksen, & Dorval 2006).*

|  |  |  |
| --- | --- | --- |
| Adaptation-Innovation Inventory (KAI) | Kirton (1989) | * frequently cited in creativity research, distinguishes between people who seek to solve problems by making use of what they already know (adaptors) and people who try to restructure and reorganise the problem (innovators) * supports view that both adapting and innovating are involved in creative problem solving, but the innovative style (which is accompanied by greater motivation to be creative, higher levels of risk-taking, and greater self-confidence) leads to higher productivity. * scale consists of 32 items (e.g., “Will always think of something when stuck,” “Is methodical and systematic,” “Often risks doing things differently”); * on this scale respondents rate themselves, indicating how difficult it would be for them to be like this on a 5-point scale *(very easy* - *very hard).* * yields an overall score and scores on three subscales: originality, conformity, and efficiency. * Puccio, Treffinger, Talbot (1995) report on test reliabilities. |
| Creative Reasoning Test (CRT) | Doolittle (1990) | * test has two levels (grades 3-6; secondary and college level); * 20 items designed to assess creativity; * problems to be solved are presented in the form of riddles; * *I grow in the park / Where I stand tall and green / For birds I am home / When the wind blows I lean.* * respondents are required to find the correct answer, and a scoring key is provided that contains these answers; * test reminiscent of the RAT (see above): requires associative, inductive and divergent thinking; * even most basic technical information on this test is unavailable; * no information on the groups on which the test was standardized. |

**Testing Personal Properties and Dispositions**

|  |  |  |
| --- | --- | --- |
| Creativity Checklist (CCL) | Johnson (1979) | * assesses on eight dimensions: ingenuity, resourcefulness, independence, positive self-referencing, etc. * rating people at all age levels, including adults in work settings; * on a 5-point scale ranging from *never* to *consistently,* observers rate the behavior of the people being assessed; * in addition to cognitive dimensions (fluency, flexibility, and constructional skills), personal properties are assessed (ingenuity, resourcefulness, independence, positive self-referencing, and preference for complexity). |
| Creative Activities Checklist | Runco (1987) | * test asks participants how frequently they participate in real-life activities in six areas: literature, music, drama, arts, crafts, and science; * suitable for use with children in grades 5 – 8; * scoring by simply adding the number of instances of participation: (eg writing a story or poem in the last year); * in some studies respondents merely list their three most creative achievements to date. |
| Creative Behavior Inventory (CBI) | Kirschenbaum (1989) | * rates the frequency with which the child behaves in a certain way; * test has two forms (grades 1-6, grades 7-12); * involves ratings by observers, teachers; * contains 10 items (with ratings ranging from 1-10): ‘*This child notices and remembers details’* * ratings yield scores on five dimensions: contact, consciousness, interest, fantasy, and total score; * reliability assessments are promising, but reviewers did not recommend the CBI for educational decision making (Clark 1992); * instrument is theory based; other validity data are limited and unclear. |
| Tel-Aviv Activities and Accomplishment Inventory (TAAI) | Milgram (1998) | * measures out of school activities and accomplishments; * Talents in science, leadership and dance are assessed (13 items tap the science domain, 12 the social leadership and 10 the dance area); * examples of accomplishments: receiving an award, being chosen for a leadership position in a youth group; * various studies gave evidence for the discriminant, predictive and factorial validity of the TAAI (Milgram & Hong 1999). |
| Creativity Scale  (of the Scales for Rating the Behavioral Characteristics of Superior Students) | Renzulli et al.(2002) | * checklist or observation form; * teachers identify students whose behaviors match descriptions of activities associated with creativity; * creativity scale: 9-item checklist describes behaviors such as: imaginative thinking ability and “a non-conforming attitude”; * teachers use a 6-point scale to rate each student on each behaviour; * test-retest and interrater reliabilities data for this instrument are strong; * strong correlation with verbal scores on the Torrance Test of Creative Thinking (TTCT), but not with figural scores. |

***Figure 18: Creativity Assessment Tools***

**Comprehensive surveys of creativity measurement:**

Cropley, A. J. (2000). Defining and measuring creativity: Are creativity tests worth using. *Roeper Review*, 23 (2), 72-78.

Houtz, J., & Krug, D. (1995). Assessment of creativity: Resolving a mid-life crisis. *Educational Psychology Review*, 7 (3), 269-300.

Feldhusen, J. F., & Goh, B. E. (1995). Assessing and accessing creativity: An integrative review of theory, research and development. *Creativity Research Journal*, 13 (8), 231–247.

#### Appendix B: Whole School Creativity Audit

|  |  |  |
| --- | --- | --- |
| **School policies and practices** | | |
| **External policies** | | |
| 1.1 | Are we aware of the national economic and education policies that address creative education? | YES/NO/ Review |
| 1.2 | Are we aware of the state-based policies and initiatives that support creative education? |  |
| 1.3 | Are we aware of the ways in which the national curriculum or department of education in our district addresses creativity in education? |  |
| 1.4 | Do we effectively share these documents and visions with our students and staff? |  |
| **Internal policies** | | |
| 1.5 | Do we actively pursue ongoing development of internal evaluations of our creative capacities, rather than defer to external requirements? |  |
| 1.6 | Do our creativity policies and structures reflect the uniqueness of our community and place? |  |
| 1.7 | Do our students and staff have input into our creative strategies? |  |
| **Teacher professional development** | | |
| 1.8 | Do we demonstrate a commitment to creativity by proactively and universally offering creativity PD to all staff and students? |  |
| 1.9 | Do we recognise creativity as a skill that must and can be developed, reflected in our PD program? |  |
| **Whole-school creative practices** | | |
| 1.10 | Do we actively program whole-school activities that foreground creativity as artistry or innovation? |  |
| 1.11 | Do we have (or are we working toward) commitment to improving our creative skills and capacities as a learning community, including the leadership of the school? |  |
| **The Product (curriculum, assessment, timetabling)** | | |
| **Individual creativity** | | |
| 2.1 | Do we actively reward setting creative outcomes across the curriculum? |  |
| 2.2 | Do all teachers in our community share equally in offering more creative modes of student demonstration of knowledge, and incorporating assessment criteria that assess the creativity component of all student work? |  |
| 2.3 | Do our school leaders prioritise creative education here by adjusting the timetable to allow both students and staff time for practicing creative skills and capacities including: curriculum innovation, cognitive creative exercises and games, tolerance for ambiguity, peer- and student-led brainstorming and information-sharing? |  |
| **Collective creativity** | | |
| 2.4 | Do we reinforce the notion that creativity is nurtured in collaborative and collective endeavour? |  |
| 2.5 | Do we provide opportunities for students and staff to work collectively in creative ways? |  |
| 2.6 | Do we value the outputs of collective creativity in our school community, rather than ignore or discard the outputs? |  |
| **Thinking creatively** | | |
| 2.7 | Do we provide opportunities for our students and staff to demonstrate their creativity in class or outside of class time? |  |
| 2.8 | Do creative products and efforts receive as much academic status or value in our community as other subjects and outputs do? |  |
| 2.9 | Do we actively articulate the belief that creativity is a thinking capacity, and is not the same as artistic ability? |  |
| **Doing creativity** | | |
| 2.10 | Do we provide opportunities for our students and staff to demonstrate their creativity in class or outside of class time? |  |
| 2.11 | Do students and staff ALL have opportunities (and an obligation) to practice creative thinking, doing and sharing in our school? |  |
| 2.12 | Is creative endeavour reinforced as a core component of academic success at this school, not just a ‘time out’ of serious academic work? |  |

|  |  |  |
| --- | --- | --- |
| **The Process** | | |
| **Individual creativity** | | |
| 3.1 | Do we actively work against test-like activities as often as possible, knowing this inhibits creative thinking? |  |
| 3.2 | Do we actively work toward re-balancing our assessment structures toward measuring process rather than product? |  |
| 3.3 | Do we prioritise collectivity and collaboration? |  |
| **Collective creativity** | | |
| 3.4 | Do we prioritise collectivity and collaboration in our timetable? |  |
| 3.5 | Are we committed to timetable changes to enhance opportunities for collective creativity? |  |
| 3.6 | Do we reward collective-developed original and innovative work at our school? |  |
| **Thinking creatively** | | |
| 3.7 | Do we encourage thinking creatively as a crucial skill for all students and staff? |  |
| 3.8 | Do we reinforce the tangible value of process over product in the creative lifecycle? |  |
| 3.9 | Do we explicitly teach creative thinking as part of all subject areas? |  |
| **Doing creativity** | | |
| 3.10 | Do we actively program whole-school activities that foreground creativity as artistry or innovation? |  |
| 3.11 | Do we allow students to demonstrate creative thinking in non-arts-based areas of enquiry? |  |
| 3.12 | Do we explicitly reward creative innovation as a workplace skill that this school champions? |  |

|  |  |  |
| --- | --- | --- |
| **The School Environment** | | |
| **In relationship with students** | | |
| 4.1 | Are we prepared to give students more autonomy, emphasising the need for self-discovery as a core creative skill, even as it impacts a change in the timetable, bells, or student movements throughout our school? | YES/NO/ Review |
| 4.2 | Do we reinforce the importance of communication in creative idea-sharing? |  |
| 4.3 | Do we actively reinforce the importance of risk-taking and nonconformity in problem-solving, for both academic, creative and real-world successes? |  |
| **In relationship with staff** | | |
| 4.4 | Do we make opportunities for staff to intermingle, talk informally, and share ideas? |  |
| 4.5 | Do staff feel a sense of control and autonomy in their work? |  |
| 4.6 | Do we encourage curiosity in our staff, or compliance? |  |
| **The physical environment** | | |
| 4.7 | Does the school site clearly provide collaborative spaces? |  |
| 4.8 | Does the school site encourage both individual and collaborative brainstorming? |  |
| 4.9 | Does the school layout work actively against centralising the standardised subjects and marginalising the creative subjects and practices? |  |
| 4.10 | Does the school work to integrate a range of environments (eg outdoor, indoor, quiet, interactive). |  |

|  |  |  |
| --- | --- | --- |
| **Creative Partnerships** | | |
| **Local** | | |
| 5.1 | Do we creatively contribute to our local community, including parents, local organisations, and local government? |  |
| 5.2 | Do our school community members have a clear and creative vision of who we ‘are’ and what the school might be in 5, 10, 20 years’ time? |  |
| 5.3 | Do our students and staff actively seek ways to break down the walls between our school and local community? |  |
| **Global** | | |
| 5.4 | Do we pursue new opportunities to link to the non-local world? |  |
| 5.5 | Does our school nurture links between the local-global in our students? |  |
| 5.6 | Do we actively nurture creative global connections, or share the ones we already have in our student and staff body, as real world learning opportunities? |  |
| **Artistic** | | |
| 5.7 | Are we proactive in recognising the creative value of artistic input into our school? |  |
| 5.8 | Do we pursue links with expert artists in the same way we pursue relationships with expert business, science, or industry professionals? |  |
| 5.9 | Do we as a school make explicit links between creative, artistic and marketplace success – and work against outmoded science/business/arts dichotomies? |  |
| **Business** | | |
| 5.10 | Do we initiate opportunities for creative sponsorship, mentorship or project-based links? |  |
| 5.11 | Do we actively celebate the creative potential of industry links, and share the responsibility of developing these links amongst the students and staff community? |  |
| 5.12 | Do we showcase the creative and innovative work in our school to local and global industry leaders, not just others in education? |  |

***Figure 19: Whole-School Creativity Audit (Harris 2016, p. 37)***

#### Bibliography

Allam, C. (2008). Creative activity and its impact on student learning - issues of implementation. *Innovations in Education and Teaching International, 45*(3), 281-288.

Amabile, T., M. (1983). *The social psychology of creativity*. New York: Springer-Verlag.

Amabile, T. (2010). The three threats to creativity. HBR Blog Retrieved from http://blogs.hbr.org/2010/11/the-three-threats-to-creativit/

Amabile, T. M. (1995). *KEYS: Assessing the climate for creativity*. Greensboro, NC: Center for Creative Leadership.

Amabile, T. M.; Conti, R.; Coon, H.; Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 19, 1154-1184.

American ArtsEdSearch. 2012. ‘Engaged, Successful Students: the impact of arts education on student success in school’. Arts Ed, US Government. Available at:

<http://www.artsedsearch.org/engaged-successful-students>

Anastasi, A. (1988). *Psychological testing.* New York: Macmillan.

Araya, Daniel E. and Michael A Peters (eds). 2010. *Education and the creative economy: Knowledge and learning in the age of innovation.* New York: Peter Lang.

Argulewicz, E. N., & Kush, J.C. (1984). Concurrent validity of the SRBCSS Creativity Scale for Anglo-American and Mexican-American gifted students. *Educational and Psychological Research*, 4, 81-89.

Arts Council Wales. (2015). *Creative Learning through the Arts: An action plan for Wales 2015-2020.* Cardiff, Wales: Department for Education and Skills.

Australian Curriculum, Assessment and Reporting Authority (ACARA) (2012) The General Capabilities: <http://www.australiancurriculum.edu.au> and on The Arts: [www.acara.edu.au/arts.html](http://www.acara.edu.au/arts.html)

Australian Curriculum, A. A. A. (2013). General capabilities in the Australian Curriculum. Retrieved 04.07.2015, 2015, from http://www.australiancurriculum.edu.au/generalcapabilities/overview/general-capabilities-in-the-australian-curriculum

Australian Government. (2013). *Creative Australia: National Cultural Policy.* Available at: <http://creativeaustralia.arts.gov.au/assets/Creative-Australia-PDF-20130417.pdf>

Baer, J., Kaufman, J. C., & Gentile, C. A. (2004). Extension of the consensual assessment technique to nonparallel creative products. *Creativity Research Journal*, 16, 113-117.

Baldwin, A. Y. (1984). The Baldwin Identification Matrix 2 for the identification of the gifted and talented: A handbook for its use. New York: Trillium Press.

Barbot, B.; Besançon, M., & Lubart, T. I. (2011). Assessing creativity in the classroom. *Open Education Journal*, 4, 58-66.

Basadur, M., & Hausdorf, P. A. (1996). Measuring divergent thinking attitudes related to creative problem solving and innovation management. *Creativity Research Journal*, 9 (1),21-32.

Beghetto, R. A. (2013). Nurturing creativity in the micro-moments of the classroom. In K. H. Kim, J. Kaufman, J. Baer & B. Sriraman (Eds.), *Creatively gifted students are not like other gifted students: Research, theory and practice*. Rotterdam: Sense Publishers.

Beghetto, R. A., & Kaufman, J. C. (2009). Intellectual estuaries: Connecting learning and creativity in programs of advanced academics. *Journal of Advanced Academics, 20*(2), 296-324.

Beghetto, R. A. (2006). Creative self-efficacy: Correlates in middle and secondary students. *Creativity Research Journal*, 18, 447-457.

Besemer, S., & O’Quin, K. (1999). Confirming the three-factor creative product analysis matrix model in an American sample. *Creative Research Journal*, 12 (4), 287-296.

Besemer, S. & O’Quin, K. (1986). Analyzing Creative Products: Refinement and test of judging instrument. *The Journal of Creative Behavior*, 20 (2), 115-126.

Besemer, S., & Treffinger, D. J. (1981). Analysis of creative products: Review and synthesis. *The Journal of Creative Behavior*, 15, 158-178.

Bilton, C. (2007) *Management and creativity: From industries to creative management*. Malden, MA: Blackwell.

Burnard, P. & White, J. (2008). Creativity and Performativity: Counterpoints in British and Australian Education. *British Educational Research Journal, Special Issue: Creativity and Performativity in Teaching and Learning*, *34*(5), 667-682.

Burnard, P. (2011) Creativity, Performativity and Educational Stands: Conflicting or Productive Tensions in Music Education in England, *Studies in Music from the University of Western Ontario*. 23, 21-44.

Burnard, P. (2010) Creative learning in music and educational renewal. In J. Ballantyne and B. Bartleet (Eds.) *Navigating Music and Sound Education* (pp. 51-76). Newcastle-upon-Tyne: Cambridge Scholars Publishing*.*

Byrd, R. E. (1986). C&RT: the Creatrix Inventory. San Diego, CA: University Associates.

Caldwell, B. & Vaughan, T. (2012). *Transforming education through the arts.* NY: Routledge.

Campbell, D. T. (1960). Blind variation and selective retentions in creative thought as in other knowledge processes. *Psychological Review*, 67 (6), 380-400.

Carson, S.; Peterson, J. B., & Higgins D. M. (2005). Reliability, Validity, and Factor Structure of the Creative Achievement Questionnaire*, Creativity Research Journal*, 17 (1), 37-50.

Cho, N., Oh, E., Kwon, J. Kim, H., Chi, E., Hong, W. (2011). *A study on the improvement of secondary school education to bring up students’ creative talents.* *KICE Research report*. Seoul: Korea Institute for Curriculum and Evaluation.

Christensen, P.R.; Merrifield, P.R., & Guilford, J. P. (1953). *Consequences Form A – I*. Beverly Hills, CA: Sheridan Supply.

Clark, R. M. (1992). Review of Creative Behavior Inventory. In: J. J. Kramer & J. C. Conoley (Eds.) *The eleventh mental measurements yearbook*, 249-250. Lincoln, NE: University of Nebraska Press.

Claxton, G., Edwards, L., & Scale-Constantinou, V. (2006). Cultivating creative mentalities: A framework for education. *Thinking Skills and Creativity, 1*, 57-61.

Claxton, G., & Lucas, B. (2015). *Educating Ruby: What our children really need*. Carmarthen, Wales. UK: Crown House Publishing Limited.

Collins, M. A., & Amabile, T. A. (1999). Motivation and creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 297-312). Cambridge Cambridge University Press.

Cormier, D. (2010). Community as Curriculum, in D. Araya & M. A. Peters (Eds) *Education in the Creative Economy: Knowledge and learning in the age of innovation*. New York: Peter Lang, pp. 511-524.

Corso, R., & Gluth, S. (July 9-12, 2007). *Knowledge Application – A Creative Dimension*. Paper presented at the Connected, International Conference on Design Education University of New South Wales, Sydney.

Cowdroy, R., & de Graaff, E. (2005). Assessing highly creative ability. *Assessment and Evaluation in Higher Education, 30* (5), 507-518.

Craft, Anna. (2005). *Creativity in Schools: Tensions and dilemmas.* Abingdon: Routledge.

Craft, A. (2003). The limits to creativity in education: Dilemmas for the educator. *British Journal of Educational Studies, 51*(2), 113-127.

Craft, A., Cremin, T. and Burnard, P. (2008) (Eds.) *Creative Learning 3-11 and How We Document It.* Stoke-on-Trent: Trentham Books.

Craft, A., Jeffrey, B., & Leibling, M. (2001). *Creativity in education*. London: Continuum.

Creative Victoria. (2016). *Creative State Global City: Creative Industries Taskforce Report 2015.* Available at: <http://www.strategy.creative.vic.gov.au/application/files/8414/4857/8019/Taskforce_Report_updateder.pdf>

Creative Victoria. 2016. *Creative industries, commerce and the creative economy: What has been achieved.* Access at: <http://creativeaustralia.arts.gov.au/archived/module/creative-australia-pathways/theme-connecting-to-national-life-for-a-social-and-economic-dividend/pathway-creative-industries-commerce-and-the-creative-economy/creative-industries-commerce-and-the-creative-economy-what-has-been-achieved/>

Cropley, A. J. (1992). *More ways than one: Fostering creativity*. Norwood, New Jersey: Ablex.

Csikszentmihalyi, M. (1996). Where is creativity? *Creativity: flow and the psychology of discovery and invention* (pp. 23-50): Harper Collins Publishers.

Csikszentmihalyi, M. (1999) Implications of a systems perspective for the study of creativity in R.J.Sternberg and T.L.Lubart (eds) *Handbook of Creativity*, Cambridge Cambridge University Press, 313-335.

Davis, G. A., & Rimm, S. (1982). Group Inventory For Finding Interests: (GIFFI) I AND II: Instruments for Identifying Creative Potential in the Junior and Senior High School. *The Journal of Creative Behavior*, 16 (1), 50–57.

Domino, G. (1970). Identification of potentially creative persons from the Adjective Check List. *Journal of Consulting and Clinical Psychology*, 35, 48-51.

Domino, G. (1994). Assessment of creativity with the ACL: An empirical comparison of four scales. *Creativity Research Journal,* 7, 21-33.

Doolittle, J. H. (1990). *Creative Reasoning Test.* Pacific Grove, CA: Midwest Publications/Critical Thinking Press.

Dwinell, P. L. (1985). Review of Group Inventory for Finding Interests. In: J. Mitchell (Ed.). *The ninth mental measurements yearbook*, Vol. 1, 362-363. Lincoln, NE: University of Nebraska Press.

Education Scotland. (*n.d.*). *Research summary: Fostering Creativity.* Available at: <http://www.journeytoexcellence.org.uk/resourcesandcpd/research/summaries/rsfosteringcreativity.asp>

Engestrom, Y. (1999) ‘Activity theory and individual and social transformation’, in Y. Engestrom, R. Miettinen and R.L. Punamaki (Eds.) *Perspectives on Activity Theory* (pp. 19-38)*,* Cambridge, Cambridge University Press.

Eysenck, H. J. (1996). The Measurement of creativity. In: M. A. Boden (Ed.). *Dimensions of Creativity,* 208-209. Cambridge, MA: MIT Press.

Feldhusen, J. F., & Clinkenbeard, P.A. (1986). Creativity instructional materials: A review of research. *Journal of Creative Behavior*, 20 (3), 153-182.

Flew, T., & Cunningham, S. D. (2010). Creative industries after the first decade of debate. *The Information Society, 26*(2), 113-123.

Freeman, N. (2009). From Aristotle to the avant-garde - the conundrum of assessing creative work in the context of wider academia.

Florida, Richard L. 2002. *The rise of the creative class: how its transforming work, leisure, community and everyday life.* Basic Books.

Forbes, J. B., & Domm, D. R. (2004). Creativity and productivity: Resolving the conflict. *SAM Advanced Management Journal*, 69, 4-27.

Fryer, M. (2006). Facilitating creativity in higher education: A brief account of National Teaching Fellows’ views. In N. Jackson, M. Oliver, M. Shaw & J. Wisdom (Eds.), Developing creativity in higher education: An imaginative curriculum. Abingdon: Routledge.

Getzels, J. W., & Csikszentmihalyi, M. (1988). Creativity and problem finding in art. In F. G. Farley & R. W. Neperud (Eds.), *The foundations of aesthetics, art, and art education* (pp. 91-106). New York: Praeger.

Glaveanu, V.P. (2010) Towards a cultural psychology of creativity *Culture & Psychology*, *16*(2).

Gough H. G., & Heilbrun, A.B. (1983). *The Adjective Checklist Manual*. Palo Alto, CA: Consulting Psychologists Press.

Gough, H. (1979). A Creative Personality Scale for the Adjective Check List. *Journal of Personality and Social Psychology*, 37, 1398-1407.

Greene, M. (1995). *Releasing the imagination: Essays on education, the arts, and social change*. San Francisco: Josey-Bass Publishers.

Griffiths, T. (2009). History and the creative imagination. *History Australia, 6*(3), 74.71–74.16.

Guilford, J. P. (1957). Creative abilities in the arts. *Psychological Review,* 64, 110-118.

Guilford, J. P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.

Han, M. (2010) How can creativity in a social context be possible? *Culture Psychology, 16(2) (*pp. 165-173)

Harris, Anne. (2016). *Creativity and Education.* London/ NY: Palgrave Macmillan.

Harris, A. (2016). ‘Why creativity sucks so bad’. In *NJ: The Journal of Drama Australia.*

Harris, A. (2014). *The Creative Turn: Toward a new aesthetic imaginary.* Rotterdam: Sense Publishers.

Harris, A. (2012). *Ethnocinema: Intercultural Arts Education* (book and films). The Netherlands: Springer.

-------. (2011). ‘Singing into Language: Creating a public pedagogy’. *Discourse: Studies in the Cultural Politics of Education,* 32(5),729-743.

Harris, A. & Ammerman, M. (2016). ‘The changing face of creativity in Australian education’. *Teaching Education,* Vol. 27(1), pp. 103-113.

Harris, A. and Holman Jones, S. 2014. ‘The Ethics, Aesthetics, and Politics of Creativity in Research.’ *Departures in Critical Qualitative Research.* Vol 3, No 3, Fall 2014, pp 186-195.

Harris, A & Farrington, D. 2014. ‘It Gets Narrower’: Creative strategies for re-broadening queer peer education.’ *Sex Education: Sexuality, Society and Learning.* Vol 14:2, Pp 144-158.

Harris, A. & Lemon, A. (2012). ‘Bodies that shatter: creativity, culture and the new pedagogical imaginary.’ *Pedagogy, Culture and Society journal.* *Sept 2012, Vol 20*(3), 413-433.

Hearn, G., Roodhouse, S., & Blakey, J. (2007). From value chain to value creating ecology: Implications for creative industries development policy. *International Journal of Cultural Policy*, *13*(4), 419-436.

Henry, K. (2012). *Australia in the Asian Century White Paper*. Retrieved from http://pandora.nla.gov.au/pan/133850/20130914-0122/asiancentury.dpmc.gov.au/white-paper.html.

Hocevar, D. (1981). Measurement of creativity: A review and critique. *Journal of Personality Assessment*, 45, 450-460.

Hocevar, D., & Bachelor, P. (1989). A taxonomy and critique of measurements used in the study of creativity. In: J. Glover, R. Ronning, & C. Reynolds (Eds.), *Handbook of creativity*, 53-75. New York: Plenum Press.

Home Affairs Bureau, The Hong Kong Special Administrative Region Government, A Study on Creativity Index, 2004, http://www.uis.unesco.org/culture/Documents/Hui.pdf.

Isaksen, S.G., & Treffinger, D.J. (1985). Creative problem solving: The basic course. Buffalo, NY: Bearly.

Jackson, N. Aid to reflection on creativity in teaching and learning. *Palatine*.

Jackson, N. (2006). Creativity in higher education: Creating tipping points for cultural change. *SCEPTrE, Scholarly Paper 3: March 2006*, 1-26.

Jackson, N. (December, 2003). Nurturing creativity through an imaginative curriculum. *HERDSA News, 25*(no. 3), 21-26.

Jackson, N., & Shaw, M. (2006). Imaginative curriculum study: Subject perspectives on creativity: a preliminary synthesis: The Higher Education Academy.

Jackson, N. J., Oliver, M., Shaw, M., & Wisdom, J. (2006). Developing subject perspectives on creativity in higher education. In N. J. Jackson & M. Shaw (Eds.), *Developing creativity in higher education: An imaginative curriculum* (pp. 89-108). London: Routledge.

Jackson, N., Martin, O. & Shaw, M. (Eds.), (2006). *Developing creativity in higher education: The imaginative curriculum.* London: Routledge*.*

Janesick, V. J. (2001). Intuition and creativity: A pas de deux for qualitative researchers. *Qualitative Inquiry, 7*(5), 531-540. doi: 10.1177/107780040100700501

Jeffrey, B. (2006a). Creative teaching and learning: Towards a common discourse and practice. *Cambridge Journal of Education, 36*(3), 399-414.

Jeffrey, B. (2006b) (Ed.) *Creative Learning Practices: European Experiences.* London: The Tufnell Press.

Jeffrey, B. and Woods, P. (2003) *The Creative School: A Framework for Success, Quality and Effectiveness.*  London: Routledge/Falmer.

Johnson, D. L. (1979). *The Creativity Checklist.* Wood Dale, IL: Stoelting.

Kadusa, H., & Schaefer, C. (1991). Concurrent validity of the Creative Personality Scale of the Adjective Check List. *Psychological Reports,* 69, 601-602.

Kasof, J. (1997). Creativity and breadth of attention. *Creativity Research Journal*, 10,303-315.

Kaufman, J. & Sternberg, R. (Eds.) (2010). *The Cambridge Handbook of Creativity.* Cambridge/NY: Cambridge University Press.

Kirschenbaum, R. J. (1989). *Understanding the creative activity of students.* Mansfield, CT: Creative Learning Press.

Kirton, M. J. (Ed.). (1989). *Adaptors and innovators: Styles of creativity and problem solving,* 56-78. London: Routledge.

Kleiman, P. (2007). Towards transformation: Conceptions of creativity in higher education. *Innovations in Education and Teaching International, 45*(3), 209-217.

Koestler, A. (1964). *The act of creation*. New York: Macmillan.

Kumar, V. K.; Kemmler, D., & Holman, E. R. (1997). The Creativity Styles Questionnaire-Revised. *Creativity Research Journal,* 10 (1), 51-58.

Leadbeater, Charles. 2010. *We-Think: Mass innovation, not mass production.* London UK: Profile Books Limited.

Leahy, K. (2016). Winning the Future: An Investigation into the Creativity Capacity Across the Levels of Education in Ireland. *Creativity Research Journal*, *28*(2), 188-197.

Lehrer, J. (2012). *Imagine: The science of creativity*. Melbourne, Australia: The Text Publishing Company.

Littleton, K., and Mercer, N. (2012) Communication, collaboration and creativity: How musicians negotiate a collective ‘sound’. In D. Hargreaves, D. Miell, and R. MacDonald (Eds) *Musical Imaginations: Multidisiplinary Perspectives on Creativity, Performance and Perception,* (pp.233-241)*.* Oxford: Oxford University Press.

Looney, J. W. (2009), "Assessment and Innovation in Education", *OECD Education Working Papers*, No. 24, OECD Publishing.

Lubienski, C. (2009), "Do Quasi-markets Foster Innovation in Education?: A Comparative Perspective", *OECD Education Working Papers*, No. 25, OECD Publishing.

Lucas, Bill; Guy Claxton and Ellen Spencer. 2013. ‘Progression in Student creativity in school: first steps towards new forms of formative assessments. OECD Education Working Papers. Available at: <http://www.oecd-ilibrary.org/education/progression-in-student-creativity-in-school_5k4dp59msdwk-en>

Creative Partnerships UK. *Creative Schools Development Framework.*

Accessed at: <https://creativeweb.creative-partnerships.com/guidance/090921/change-school-csdf-planning-form-guidance>, descriptors-and-form.pdf"

Lucas, Bill, Guy Claxton and Ellen Spencer. 2012. ‘Progression in creativity: developing new forms of assessment. Background paper for the OECD conference ‘Educating for Innovative Societies’.

Lucas, B. (2001). Creative teaching, teaching creativity and creative learning. In A. Craft, B. Jeffrey & M. Leibling (Eds.), *Creativity in education* (pp. 35-44). London: Continuum.

Martingdale, C. (1999). The biological basis of creativity. In R. Sternberg (Ed.), *Handbook of creativity*. Cambridge: Cambridge University Press.

MCEECDYA (Ministerial Council for Education, Early Childhood Development and Youth Affairs). (2008). *The Melbourne Declaration on Educational Goals for Young Australians.* Retrieved from: [*http://www.mceecdya.edu.au/mceecdya/melbourne\_declaration,25979.html*](http://www.mceecdya.edu.au/mceecdya/melbourne_declaration,25979.html)

McKee, M. G. (1985). Review of Creativity Attitude Survey. In: D. Keyser & R. Sweetland (Ed.) *Test Critiques*, 3, 206-208.

McWilliam, E. (2009). Teaching for creativity: From sage to guide to meddler. *Asia Pacific Journal of Education, 29*(3), 281-293. doi: 10.1080/02188790903092787

McWilliam, E., & Dawson, S. (2008). Teaching for creativity: Towards sustainable and replicable pedagogical practice. *Higher Education, 56*, 633–643. doi: 10.1007/s10734-008-9115-7

McWilliam, E. (2007). *Is creativity teachable: Conceptualising the creativity/pedagogy relationship in higher education.* Paper presented at the 30th HERDSA Annual Conference: Enhancing Higher Education, Theory and Scholarship, , Adelaide.

McWilliam, E., & Dawson, S. (2007a). *Understanding Creativity: A survey of 'creative' academic teachers: A report for the Carrick Institute for Learning and Teaching in Higher Education*. Retrieved from http://www.altcexchange.edu.au/system/files/handle/fellowships\_associatefellow\_report\_ericamcwilliam\_may07.pdf.

McWillian, E., & Dawson, S. (2007b). *The creative application of knowledge in university education: A case study*. Paper presented at the Creative Industries and Innovation Conference. http://www.google.com.au/search?hl=en&source=hp&q=mcwilliam+the+creative+application+of+knowledge+in+university+education&btnG=Google+Search&meta=&aq=f&aqi=&aql=&oq

McWilliam, E. & Haukka, S. (2008a). ‘Educating the creative workforce: new directions for twenty**‐**first century schooling’. *British Educational Research Journal*, *34*(5), 651-666.

McWilliam, E., & Haukka, S. (2008b). Educating the creative workforce: New directions for twenty-first century schooling. *British Educational Research Journal, 34*(5), 651–666.

McWilliam, E., Hearn, G., & Haseman, B. (2008). Transdisciplinarity for creative futures: What barriers and opportunities? *Innovations in Education and Teaching International, 45*(3), 247-253.

McWilliam, E. L., Dawson, S. P., & Tan, J. P.-L. (2008). From vaporousness to visibility : What might evidence of creative capacity building actually look like? *UNESCO Observatory, Faculty of Architecture, Building and Planning, The University of Melbourne Refereed E-Journal, Multi-Disciplinary Research in the Arts, 1*(3).

McWilliam, E., Poronnik, P., & Taylor, P. G. (2008). Re-designing science pedagogy: Reversing the flight from science. *Journal of Science Education and Technology, 17*(3), 226-235. doi: 10.1007/s10956-008-9092-8

Mednick, S. A. (1962). The associative basis of the creative process. *Psychological Review, 69,* 220-232.

Meeker, M. (1985). *Structure of Intellect Learning Abilities Test.* Los Angeles: Western Psychological Services.

Milgram, R. M. (1998). *Tel-Aviv Activities and Accomplishments Inventory*. Ramat Aviv, Israel: Tel-Aviv University, School of Education.

Milgram, R. M., & Hong, E. (1999). Creative out-of-school activities in intellectually gifted adolescents as predictors of their life accomplishments in young adults: A longitudinal study. *Creativity Research Journal*, 12,77-88.

Moran, S., & John-Steiner, V. (2003). Creativity in the making: Vygotsky's contemporary contribution to the dialectic of creativity and development. In R. K. Sawyer, V. John-Steiner, S. Moran, R. J. Sternberg, D. H. Feldman, H. Gardner, J. Nakamura & M. Csikszentmihaly (Eds.), *Creativity and development* (pp. 61-90). New York: Oxford University Press.

Morley, D. (2007). Creative recognitions: Science, writing and the creative academy. *LUMAS on-line journal*. http://www.liv.ac.uk/poetryandscience/essays/creative-recognitions.htm

Mumford, M. D.; Marks, M. A.; Connelly, M. S.; Zaccaro, S. J., & Johnson, J. F. (1998). Domain-based scoring of divergent-thinking tests: Validation evidence in an occupational sample. *Creativity Research Journal,* 11, 151-163.

NACCCE (1999). *All our futures: Creativity, culture and education.* London: Department for Education and Employment.

Nickerson, R. (1999). Enhancing creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 392-430). Cambridge University Press: Cambridge.

Oh-seok, Hyun. (2012). ‘Korea’s creativity is fuel for Asian powerhouse’. *The Natiional.* Availabe at: <http://www.thenational.ae/business/industry-insights/economics/koreas-creativity-is-fuel-for-asian-powerhouse>

Oliver, M. (2002). Creativity and the curriculum design process: A case study. York: Learning and Teaching Support Network, Generic Centre.

Onsman, A., & Paganin, D. (2006). *Perturbative analogies: Fostering creativity in postgraduate research students*. Paper presented at the AARE International education research conference, Adelaide. Conference of the Australian Association for Research in Education retrieved from http://www.aare.edu.au/06pap/ons06061.pdf

O'Neil, H. F.; Abedi, J., & Spielberger, C. D. (1994). The measurement and teaching of creativity. In: H. F. O'Neil, & M. Drillings (Eds.), *Motivation: Theory and Research*, 245-263. Hillsdale, NJ: Lawrence Erlbaum.

Parliament of Australia (Standing Committee on Employment, Education and Training). (2016). *Inquiry into innovation and creativity: workforce for the new economy (10 Nov 2016).* Available at: <http://www.aph.gov.au/Parliamentary_Business/Committees/House/Employment_Education_and_Training/Innovationandcreativity>

Pink, D. H. (2006). *A whole new mind: Why right-brainers will rule the future.* New York: Penguin.

Policastro, E., & Gardner, H. (1999). From case studies to robust generalisations. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 213-225). Cambridge: Cambridge University Press.

Puccio, G. J., Treffinger, D. J., & Talbot, R. J. (1995). Exploratory examination of relationships between creativity styles and creative products. *Creativity Research Journal*, 8, 157-172.

Puccio, G. J., Murdock, M. C., & Mance, M. (2005). Current developments in creative problem solving for organizations. *The Korean Journal of Thinking & Problem Solving*, 15, 43-76.

Renzulli, J. S., & Reis, S. M. (1991). The assessment of creative products in programs for gifted and talented students. *Gifted Child Quarterly*, 35 (3), 128-134.

Renzulli, J. S.; Smith, L. H.; White, A. J.; Callahan, C. M.; Hartman, R. K., & Westberg, K. L. (2002). *Scales for rating the behavioral characteristics of superior students: Technical and Administration Manual*. Mansfield, CT: Creative Learning Press.

Renzulli, J. S.; Smith, L. H.; Callahan, C.; White, A., & Hartman, R. (1976). *Scales for rating the behavioural characteristics of superior students*. Mansfield, CT: Creative Learning Press.

Robinson, K. (2011). *Out of our minds: Learning to be creative*. Oxford: Capstone Publishing Limited.

Robinson, K. (2009). *The Element: How finding your passion changes everything.* NY: Penguin.

Robinson, K. (1999). All our futures: Creativity, culture and education. London: National Advisory Committee on Creative and Cultural Education (NACCCE).

Runco, M. (2010). Education based on a parsimonious theory of creativity In R. Beghetto & J. Kaufman (Eds.), *Nurturing creativity in the classroom* (pp. 235-251). New York: Cambridge University Press.

Runco, M. A. (1987). Interrater agreement on a socially valid measure of students' creativity. *Psychological Reports*, 61,1009-1010.

Rimm, S. B. (1980). *Group inventory for finding creative talent (GIFT).* Watertown, WI: Educational Assessment Service.

Schaefer, C. I. (1971). *The Creative Attitude Survey.* Jacksonville, IL: Psychologists and Educators.

Scott, G., Leritz, L., & Mumford, M. (2004). The effectiveness of creativity training: A quantitative review. *Creativity Research Journal, 16*(4), 361-388.

Sefton-Green, J. (2011). *Creative Learning: policies, practices, schools and young people*. Sydney: The Creative Learning Forum/ The Dusseldorp Foundation. Retrieved from: <http://www.julianseftongreen.net/>

---- (2010). *Creative Agents: A review and research project.* London: Creativity, Culture and Education (CCE).

Sefton-Green and Bresler, L. (2011) Theories and histories: Creative learning and its context. In J. Sefton-Green., P. Thomson., K. Jones., and L. Bresler (Eds.) (2011) *The Routledge International Handbook of Creative Learning*. (pp.9-14), London: Routledge.

Simonton, D. K. (1999). Creativity as blind variation and selective retention: Is the creative process Darwinian? *Psychological Inquiry*, 10, 309-328.

Simonton, D. K. (2011). Creativity and discovery as blind variation: Campbell’s (1960) BVSR model after the half-century mark. *Review of General Psychology*, 15 (2), 158-174.

Smolucha, F. (1992). The relevance of Vygotsky's theory of creative imagination for contemporary research on play. *Creativity Research Journal, 5*(1), 69-76.

Smolucha, L. W., & Smolucha, F. C. (1985). A fifth Piagetian stage: The collaboration between analogical and logical thinking in artistic creativity. *Visual Arts Research, 11*(2(22)), 90-99.

Spencer, E., Lucas, B., & Claxton, G. (2012). Progression in creativity - developing new forms of assessment: A literature review *Creativity, Culture and Education Series (CCE)* (Newcastle upon Tyne ed.).

Sternberg, R. J., & Lubart, T. I. (1999). The concept of creativity: Prospects and paradigms *Handbook of creativity* (pp. 3-15). Cambridge: Cambridge University Press.

Sternberg, R. J. (1997). Intelligence and lifelong learning. What's new and how can we use it? *American Psychologist, 52,* 1134-1139.

Taber, K. S. (2012). The natures of scientific thinking: Creativity as the handmaiden to logic in the development of public and personal Knowledge. In M. S. Khine (Ed.), *Advances in nature of science research: Concepts and methodologies* (pp. 51-74). Dordrecht: Springer.

Taddei, Francois. 2009. *Training creative and collaborative knowledge-builders: a major challenge for 21st century education.* OECD Background paper.

Taylor, S. and Littleton, K (2012). *Contemporary Identities of Creativity and Creative Work.* Farnham, Surrey: Ashgate.

Taylor, A. (1975). An emerging view of creative actions. In: I. A. Taylor, & J. W. Getzels (Eds.), *Perspectives in creativity*, 297-325. Chicago: Aldine.

Tepper, S. J. & Kuh, G. D. (2011). ‘Let’s get serious about cultivating creativity.’ *The Chronicle Review.* Sept 4, 2011. Retrieved from: <http://chronicle.com/article/Lets-Get-Serious-About/128843/>

ThecreativitycentreLtd. (2006). Facilitating creativity in higher education: The views of national teaching fellows (pp. 41).

Thomas, N. G., & Beck, L. E. (1981). Effects of school environments on the development of young children’s creativity. *Child Development*, 52 (4), 1153-1162.

Thomson, P. & Sefton-Green, J. (2010). (Eds) *Researching Creative Learning: methods and approaches*.London: Routledge.

Thomson, P., Hall, C., Jones, K. and Sefton-Green, J. (2012). The Signature Pedagogies Project: Final Report. Newcastle: CCE

Thomson, P., Coles, R., Hallewell, M., & Keane, J. (n.d.). *A critical review of the Creative Partnerships archive: How was cultural value understood, researched and evidenced?* Retrieved from <http://www.creativitycultureeducation.org/a-critical-review-of-the-creative-partnerships-archive>

Thomson, P., K. Jones, and C. Hall. 2009. Creative whole school change, Final

report. London: Creativity, Culture and Education; Arts Council England. See

also <http://www.artsandcreativityresearch.org.uk>

Tierney, P., & Farmer, S. M. (2002). Creative self-efficacy: Potential antecedents and relationship to creative performance. *Academy of Management Journal, 45,* 1137-1148.

Torrance, E. P. (1966). *The Torrance Tests of Creative Thinking-Norms-Technical Manual Research Edition.* Princeton, NJ: Personnel Press.

Torrance, E. P. (1998). *The Torrance Tests of Creative Thinking-Norms—Technical Manual Figural (streamlined) Forms A & B.* Bensenville, IL: Scholastic Testing Service.

Torrance, E. P., & Ball, O. E. (1984). *The Torrance Tests of Creative Thinking Streamlined (revised) Manual, Figural A and B.* Bensenville, IL: Scholastic Testing Service.

Torrance, E. P., & Goff, K. (1989). A quiet revolution. *Journal of Creative Behavior*, 23 (2), 136-145.

Treffinger, D. J. (1986). Research on creativity. *Gifted Child Quarterly*, 30, 15-19.

Treffinger, D.J.; Isaksen, S.G. & Stead-Dorval, K.B. (2006). Creative problem solving: An introduction. Waco, TX: Prufrock.

United National Educational, Scientific and Cultural Organisation (UNESCO) 2013. *Creative Economy Report 2013 Special Report: Widening Local Development Pathways.* New York/Paris: United Nations Development Programme.

Urban, K. K., & Jellen, H. G. (1996). *Test for Creative Thinking - Drawing Production (TCT-DP).* Lisse, Netherlands: Swets and Zeitlinger.

Villa, A., Auzmendi, E., & Abedi, J. (1996). Reliability and validity of a newly constructed multiple choice creativity instrument. *Creativity Research Journal*, 9 (1), 89-95.

Victorian Curriculum and Assessment Authority (VCAA). (2016). *Whole School curriculum planning.* Available at:<http://curriculumplanning.vcaa.vic.edu.au/home>

Vygotsky, L. S. (2004). Imagination and creativity in childhood. *Journal of Russian and East European Psychology, 42*(1), 7-97.

Vygotsky, L. S. (1984). Imagination and creativity in the adolescent *The collected works of L. S. Vygotsky* (Vol. 4, pp. 199-219). Moscow: Izdatelstvo Pedagogika.

Wales 2015 – *see Arts Council Wales*

Wallach, M. A., & Kogan, N. (1965). *Modes of thinking in young children.* New York: Holt, Rinehart and Winston.

Ward, T., Smith, S., & Vaid, J. (Eds.). (1997). *Creative thought: An investigation of conceptual structurtes and processes*. Washington, DC: American Psychological Association

Warwick Commission, The. (2015). *Enriching Britain: Culture, Creativity and Growth.* Coventry, UK: University of Warwick.

Weisberg, R. W. (1999). Creativity and knowledge: A challenge to theories. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 226-249). Cambridge: Cambridge University Press.

White, J. (2006). Arias of learning: Creativity and performativity in Australian teacher education. *Cambridge Journal of Education, 36*(3), 435-453.

Woronov, T.E. 2008. ‘Raising quality, fostering ‘creativity’: Ideologies and practices of education reform in Beijing. *Anthropology and Education Quarterly.* Vol 39, n4, 401-422.

Young, L. (2009). Imagine creating rubrics that develop creativity. *English Journal, 99*(2), 74-79.

1. These demographics are updated since the publication of *Creativity and Education* in mid 2016, as the analysis of data continued and was finalised during the second half of the year. There are minor discrepancies due to disallowed data, but the overall findings are consistent with the emergent findings reported in that publication. [↑](#footnote-ref-1)