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Creative Agency / Creative Ecologies

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'You can lead a horse to water, but you can't make it drink' goes the old chestnut. Considerable creativity education and creative industries research these days is stalling somewhere around this challenge of matching up the contemporary thirst for creativity, with action based on the well-documented pools of its evidence in and outside of education. It is not more creativity research we need, perhaps, but a different way of joining up the creative horse and water. My current and most recent research into a kind of creativity that is at once commodified (Harris 2014), agentic (Barad 2007) and networked (Craft 2013; Harris 2016), has led to the

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establishment of Creative Agency, an interdisciplinary and cross-sectoral research lab at RMIT University in Melbourne, Australia.

Creative Agency is an ecosystem of like-minded artists, activists, researchers and citizens who wish to break down the walls of siloed productivity that keep us atomised, alienated, and individual versus communal; it is an intervention into both the neoliberal academy as well as the commodification of the arts, creative and cultural industries more broadly. Creative Agency is an embodiment of what Barad has described as the kind of creative intra-action ("the mutual constitution of entangled agencies," [Barad 2007, p. 33]) that is an encounter rather than an output of pre-existing individuals, identities, or any other fixed notion of expression and experience. Creative Agency is an emergent assemblage of disjunctive subjectivities and perspectives, events that have drawn diverse actors and *actants* into its web, a kind of research-by-living that responds to the new 'impact and engagement' focus of 21st century research culture.

A brief review of arts education and 'gifted and talented' education psychology scholarship shows a robust history of creativity in education, in both individual and collective ways. There is ample evidence that creativity is now a ubiquitous economic driver and educational imperative in syllabi, curricula and policy documents, including within Australia as evidenced in the Melbourne Declaration on educational goals for young Australians (MCEETYA 2008), The Australian Curriculum (ACARA 2011), the Australian Quality Framework (AQF) and Australian Institute for Teaching and School Leadership (AITSL) Standards. Indeed, the need for creative change comes directly out of the Australian Government's *Inquiry into Innovation and Creativity* (Commonwealth of Australia 2017), *Recommendation 10 (2.94)*, which "recommends that the National Innovation and Science Agenda explicitly recognise the importance of STEAM, creative digital skills, the creative industries and the arts more generally" (p. 40), and the Creative Australia National Cultural Policy (2013).

The Australian government recently launched and funded a related innovation agenda identifying creativity as core to the globalising Australian workforce. And while other vision documents such as the Melbourne Declaration state that young people should engage in

curriculum and educational experiences that promote creativity, innovation, and cultural appreciation to become confident and creative learners (MCEETYA 2008), there is still no consistent, robust and nationally-implemented approach to support the development of students' creativity, as I have called for (2016). Many of the recent transdisciplinary frameworks used in Australia such as Quality Teaching in NSW Schools, (NSW DET 2003) and Productive Pedagogies (Queensland Government 2003) failed to address creativity explicitly. This leaves an unproductive gap for educators between policy expectation and classroom teaching, between national and state or local imperatives. As a consequence, many teachers and students lack the pedagogical skills, flexibility, resilience and creativity they need to cope with the escalation of change, and diversity of creativities, a core characteristic of the 21st century (Dikici 2014; Lucas et al. 2013; Gu et al. 2014; Wyn 2009). Yet it also signals a geopolitical divide between British/Australian/Canadian and US approaches to creativity education research: in the United States, creativity in education is strongly driven by education psychology disciplinary perspectives and values, while elsewhere the arts play a much stronger role or are conflated with creativity education (Munday 2016).

Moving beyond individualistically-conceived or pre-determined considerations, codifications, and practices of creativity, arts and design reveals a need for systems and mindset change, rather than just more definitional, assessment and individualist approaches. Across tertiary contexts, designers use coloured post-it notes; arts education scholars have games; many practice-led researchers start with the body and get us moving. But all of these approaches to 'fostering' creativity remain enthralled with the notion that people can be more creative, and that by 'activating' humans, something inherent can somehow be released, identified, measured, and reproduced. But what if, as Karen Barad has claimed, the real work happens in-between, in the agency—creative and otherwise—of the moment, an encounter, an exchange? In this chapter, I urge creativity education scholars and practitioners away from the pursuit of a measurable, standardised creativity, and towards a more personal, more political, and more-than-human, creativity. Drawing on my own experience, and my new research lab at RMIT University, *Creative Agency*, I chart how individual experience must expand into creative ecologies or environments

in which creativity research in education is pursued collectively, politically, and rhizomatically in order to demonstrate the power of the collective uncontained.

I have long advocated the need for a more dialogic relationship between the 'macro' and 'micro' approaches to improving the creative ecosystem of secondary and tertiary education, or what Craft called 'Big C and little c creativity' (2008), and Simonton has called the relationship between the individual and the field (2013). If an increasing number of national economic policies state the centrality of creativity to their regional and national agendas, the 'macro' of creativity education is clearly linked to economic policy and the need for globally-mobile creative workforces. Yet the 'micro' of education policy and curricular approaches continues to fail that goal, at both the individual and collective level. Partly a communication breakdown between the micro and the macro work of creativity education, it is also a failure to take a sufficiently systemic (or ecological) approach that considers school site, the school system and national education-and-economy strategies overall as a whole ecosystem that requires change, not just in the micro contexts of defining, assessing, or teaching a skill. A creative ecology approach to education reform is not just good business, it better prepares the workforce as a network of subjects for both individual and group success (Kacerauskas and Zavadskas 2015; Howkins 2011; Stankeviciene et al. 2011; Gollmitzer and Murray 2008; Hearn et al. 2007), agentically, educationally, and economically.

The ways in which creativity is grounded in the personal, while materialising the conceptual, is demonstrated in this chapter structurally as well as discursively. The structure interweaves some historical scenes that have been pivotal in my own creative development and thinking, with subheadings adapted from a design thinking model in order to structurally represent this movement and intra-action[1] (Barad 2007): Absorb (Vessel); Analyse (Micro); Interpret (Macro); Synthesise (Ecosystem). The chapter moves between 'moments' that serve as illustrations of creative agency, then pulls out to considerations of 'micro/macro' perspectives on creativity and its ecologies, then returns to the notion of creative agency arguing creative communities as a particular form of ecology or ecosystem, much needed and well-suited to education reform. Too often, creativity scholarship argues conceptual or pedagogical points with a

near-absence of creativity in the doing, and in this chapter I seek to foreground the necessity for creative methods in arguing creative change. To this end, I define and explore important component concepts of this creative ecological picture, including macro, micro and agentic creative becoming.

Absorb (Vessel)

When I travel and give talks on creativity, I ask people about the most creative moments from their childhoods, and specifically from school. This question matters because it links the study of creativity first and foremost back to our own experiences and memories, rather than just to a bunch of rubrics, indexes, and curriculum imperatives. In this chapter, I begin the first three sections with three of my own personal moments of artistic and creative emergence, three encounters which are embedded in and representative of environmental factors or whole ecologies that changed as a network in relation to my individual emergence. I use them to demonstrate the interdependent or intra-active relationship between the individual and the ecosystem, not in a pre-existing encounter way, but as an interdependent co-emergence. By starting here, as feminist scholarship reminds us, the personal is always political, and as feminist posthumanist theorist Karen Barad urges us, the personal is not pre-existent but rather co-emerges with the collective, always in cultural and collective context. Creativity too cannot be considered out of its spacio-temporal context.

Creativity in education too often begins with doing. It focuses on the practical side of things, the embodied learning that is inherent to creativity and arts in education. But design thinking begins with a more receptive stage. In some versions of the steps, *empathy* is first, while in other versions *observe* or *identify the problem* is stage one. While these have obvious differences in tone and orientation, they all link the creative and iterative process familiar to arts educators with a more outward-focused listening stage. Empathy is an evocative way to remind problem-finders that there is an emotional and interpersonal aspect to this step, whereas *identify the problem* and the more traditional anthropological *observe* can

leave the doer in an objectifying stance that de-contextualises any subject or problem to be 'solved' or observed. In this chapter I use the verb-noun combination *Absorb/Vessel* for my first stage to highlight the value of listening, receiving, and noticing, with an emphasis on holding. I choose not to use the design thinking stage of *empathy* in intercultural research contexts, because this too risks culturally imperialist assumptions about understanding the 'other'.

Moment #1 I grew up and attended school in a small town in upstate New York, about three hours out of New York City. That's important for two reasons: it was a small country school, so there was freedom and individuality, but it was close enough to benefit from New York City's cultural riches on school excursions and family holidays. These were two extremely different cultural contexts, but close enough to be mutually-informing. I graduated secondary school in three years rather than four, I was senior class president, and I graduated with almost a full year's worth of university credit due to a programme called 'Advanced Placement' available to senior secondary students. And I wasn't a brilliant student. Why was I able to do all this, in a shorter time than most of my peers? Because the system was flexible, and catered to students' individuality. I belonged to a programme called 'Gifted and Talented', which has been a controversial programme over the years, seen as elitist like all 'streaming' programmes are. The programme didn't necessarily give those of us in the programme better teachers, or different curriculum, but it did give us freedom. In the context of that high school, the 'problem' for kids like me was boredom, and the school's response was not to increase programming but to give us space to develop the things we were already intrinsically motivated towards. Because I was an 'arty' kid, I was able to go to the auditorium and the choir room. I wrote a musical and produced it, scoring it for six instruments. A group of students and I produced it as a second musical that year. I took extra music theory instruction from the music teacher when she was free and I was allowed to sit and play the grand piano for hours on end. But the sports-minded kids were allowed to go to the sporting area and advance themselves in their chosen field of endeavour too, with or without mentorship.

The most creative experiences I had in high school were found in these gaps of freedom: to get one-on-one musical tuition from a gifted music teacher (who by the way did that in her free time); to be alone in a dark auditorium playing and composing music on the kind of grand piano my family could never afford; to get other kids out of class to practise our musical and to paint the sets. We were supported in that work, and it nurtured my creativity and self-motivation. It moved me from being a kid who was easily bored, was more curious than most, and had some natural arts-based talents, to a member of a tightly-knit creative ecosystem in which we all played a unique role, who drew on each others' similarities and differences, who made the most of our individual gifts for the benefit of the group. It gave us the joy of belonging, while also seeing 'real-world' outputs from our labours. In short, it gave us creative agency within our school's ecosystem to make decisions for ourselves.

Why is such a formative experience relevant to a creative ecologies theoretic? For a more nuanced entry into creativity as an entanglement of events, environments and collectivities, I turn to Karen Barad. Barad's philosophy of agential realism (2007) avoids reinscribing the current materialist/discursive dichotomy, instead joining them in a mutually-beneficial and emergent process of intra-action. She says that neither material phenomena nor discursive practices are "ontologically or epistemologically prior. Neither can be explained in terms of the other…matter and meaning are mutually articulated" (Barad 2007, p. 152). One does not exist before or outside of the other. Barad's articulation of intra-action is different from *interaction* because interaction presumes the pre-existence of things that then come into contact. In intra-action there is no pre-existence, only the encounter, the entanglement. For Barad, agency bears a close relationship to intra-action because in agential realism, agency is neither limited to humans, nor is it simply expanded to include nonhumans, but instead Barad enjoys exploring the continuum along which human and non-human are but two creative co-constitutive emergences.

Scholars continue to conceptualise creativity in education as a thing to be done, to be measured, to be fostered. What if we move from a humanist creativity (a creativity which must be *had* by humans, *done* to humans), to a posthumanist approach in which the role of humans is really ancillary,

mainly there to help facilitate the space of possibilities for creativity (which might be considered as/in agency)? Sort of like a caterer sets the space for a great party, or a gifted director like Peter Brook makes the 'empty space' for a performance to emerge. Creativity as playful encounter, one of the central purposes of my Creative Agency lab in Melbourne. A creativity like Barad's notion of agency which "is not something that someone or something *has* to varying degrees, since I am trying to displace the very notion of independently existing individuals" (Barad 2012, p. 55). A body of creativity research in recent times has been doing just this—trying to help us move away from creativity as a characteristic, a trait, even a skill, and more towards creativity as encounter. How do we foster unpredictable creative possibilities, encounters, environments, in education contexts which pivot on the predictable?

Barad's notion of agency or agentic realism urges us away from trying to see an event as the encounter between pre-existing entities, and rather an emergent event that has no past and no future but only exists in the moment, a notion that shares much with what some performance and creativity scholars have talked about as improvisation (Sawyer 2011) or flow (Csikszentmihalyi 1996). In describing agential realism, Barad says "intra-actions to begin with are never determining, even when apparatuses are reinforcing. Intra-actions entail exclusions, and exclusions foreclose determinism. However, once determinism is foreclosed this does not leave us with the option of free will" (Barad in Dolphijn and van der Tuin 2012, p. 55). That is, if we began to think in education about creativity as the emergent, the encounter, or what Anna Craft called the "trusteeship of ideas" (Craft et al. 2007, p. 28), creativity can be celebrated for its resistant qualities, its refusal to be harnessed, its resilient attachment to new ideas.

If we can entertain the possibility that "Agency is not held, it is not a property of persons or things; rather, agency is an enactment, a matter of possibilities for reconfiguring entanglements. So agency is not about choice in any liberal humanist sense" (Barad in Dolphijn and van der Tuin 2012, p. 55), but more about creating conditions for something to arise, then creativity becomes the 'aha!' moment itself, not something to be measured but something that breaks beyond measurement of the known.

Anna Craft urged us to think about creativity and its potential "to act as a negative rather than a purely positive force, with what appears to be a life of its own, one which encourages innovation for innovation's sake and without reference to genuine need" (Craft et al. 2007, p. 28). Her work on wise creativity, and creative stewardship, remind us that creativity is central to human (and more-than-human) experience in ways that go far beyond the current love affair with creativity-and-innovation as market drivers. She (and others, including Torrance 1987) advocates for a *common-good* perspective on creativity that goes beyond a Pac-man mentality of producing and consuming for pleasure or profit. For Craft, creativity must always stay tied to collectivist concerns including environmental sustainability, a view that shares more with cultural industries, up-cycling, or sharing economies, than it might with a narrower 'creative industries' approach.

In a creative ecological theoretic, the macro and the micro aspects of collectivist and educational creativities are friends—they work together, they rely on one other—but they are not the same thing. By better networking creativity education as just one (but crucial) component of a whole sociocultural ecosystem, it becomes less frightening to take productive risks in an education system that no longer needs to (or can) stand alone (Harris 2016, 2017). In that new, more fluid world, creative individuals are only catalysts for whole-system change.

Analyse (Micro)

Moment # 2 I won a scholarship from the Young Playwrights' Festival to study playwriting and screenwriting at New York University, an elite American university which at the time was one of the three most expensive schools in the country, a school I could never have attended without the financial assistance. Our teachers included some of the most famous playwrights and screenwriters in the country, and there was general consensus that you can't teach someone to be a great writer, but you can teach them the rules of the form and validate it as a lifestyle, a practice, a way of being. Then it's up to them: they have to write. And then it's up to the fates: they have talent or they don't. And then it's up to culture, timing, a

host of uncontrollable factors. I believe the same thing is true about compulsory schooling: as teachers, we can't teach students to be creative, or even academic, but we can teach them the rules and structures of a range of creative forms, confirm the value of creativity, and make the creative environments for them to try.

Micro Conditions

The 'micro' considerations in the story above point to the value of making creative learning environments available to all students, and the often-classed nature of these kinds of opportunities. Educators can and do have an obligation to make better conditions for creativity, and that within those conditions, structures, and lifestyles, more creativity will happen. All people have not only the right to enjoy themselves through creative work, but now as a leading workforce requirement, there is no longer a conflict between what 'feels good' in doing creative artmaking, versus what is 'sensible' in terms of workforce skills and training; today, they are one and the same. So what's the problem? Formal education at each level of the educational system hasn't caught up. We are stuck in a STEM vortex, a schizophrenic hall of mirrors in which the only 'legitimate' creative and innovative endeavour is creative science, creative digital technology and design, creative English or engineering, and creative mathematics including coding. Notice the side-step there? It says 'okay we are going to acknowledge the economic value of creativity if we *have* to, but not creative arts. Only creativity linked to entrepreneurism and workplace innovation counts.' And so the arts/science divide is unnecessarily re-entrenched, and creativity is commodified (Harris 2014).

My experience as a young person in an elite playwriting degree learning from 'the best' theatre makers in my country taught me valuable (micro) lessons not only about the links between creativity and arts as co-emergent, but between the individual and the ecology in which the individual emerges. Creative processes and environments are always collective, and insisting on individualism of compulsory and tertiary learning contexts is antithetical to nurturing creative endeavour, one contributor perhaps to the current difficulty with 'measuring' creativity in education.

Arts and design processes are well-documented as catalysts for pedagogical and social transformation in classrooms as well as in the community more generally (Shin and Jang 2017; Ewing 2015, 2011; Ewing and Gibson 2015), but seldom have creative processes been allowed to change the education system itself. Globally, recognition of the contribution that creative arts processes can make to STEM, expanding it from an acronym of subject siloes to a symbol for more transdisciplinary approaches has been growing for more than a decade (Van Harpen and Sriraman 2013; Creative Australia 2013; Cho et al. 2011; Ambrose 2005). As identified by the British Educational Research Association Research Commission, the Warwick Commission (2015), and Welsh (2015), Korean (2015) and Australian (2017) national education and workforce vision reports, a move towards STEAM (science, technology, engineering, arts and mathematics) education as differently configured transdisciplinary practices that offer a new way of thinking and doing education, is now urgently required. Yet this increased policy focus has not been translated into sustained practice in compulsory and tertiary education (and even at times in arts faculties more broadly), even when the rising STEM agenda makes a STEAM approach a plausible way for these compatible but distinct agendas to come together (Harris and de Bruin 2017).

This critique responds directly to previous recommendations for clearer and more broadly-agreed methods of assessment of creativity in teacher education courses (see Bentley and Savage 2017). McWilliam et al. (2008) found that further research is needed "to engage academic teachers with creativity as a hard-edged professional capacity that can and should be fostered through higher education teaching and assessment" (p. 4), especially in Science education. This approach also serves to frame and support the need for increased government funded focus on teaching quality from a more transdisciplinary approach (Noh and Huh 2015; Tan 2014; Wright et al. 2013; Sawyer 2011; Reilly et al. 2011; Ferrari et al. 2009). Such widespread research findings support the need in both national and global contexts and ecologies for a more focused, networked, and *meta* approach to improving creativity in global education and workforce training, a goal which has a decidedly neoliberal sounding agenda. Yet the *meta* project of nurturing sustainable and economically effective education and workplace productivity is not so different from fostering

personal satisfaction, meaningful work, and growing a holistic sense of purpose and agency as human (and more-than-human) networks of beings.

Interpret (Macro)

Moment # 3 I taught secondary school in Australia in two places: at a Catholic school in Alice Springs for 5 years, and at a Catholic girls' school in Melbourne for 6. I have always been glad I didn't start teaching in a city, because I was shocked when I eventually did at how regulated and surveilled my work as a teacher was. I couldn't improvise, couldn't spontaneously take the kids off campus, couldn't change the curriculum, or on a hot Friday if things weren't working, put them in a van and drive them out bush to film the beautiful landscape around us. Working in the country suited me because it was improvisation based in necessity: with rich natural resources but few academic ones, when a passionate teacher came along, the school just about bent over backwards to let us do what we wanted. It made me more creative as a teacher, and the trust they had in me helped me trust myself. In my eleven years as a high school teacher, my students in the less-structured environment of that country school did the most creative work, far more creative than anything my students in Melbourne were able—environmentally—to do, were allowed by the system to do. My school in Melbourne was supportive of the arts, but it was also a strictly surveilled, structured, and aspirational environment. Like many schools, the timetable was chock-full and there was a clear hierarchy of subjects. The environment—the macro conditions of my teaching and learning activities there—was very different and it negatively impacted both my students' and my own creativity. This is a familiar story to many teachers.

Connecting to the Macro

Connecting Barad's notion of agency to *macro-creativity* and how it fits with the *micro-creativity* conversation in education, can help us move

beyond the current over-analysis of creativity at the *micro* level, which seems to keep us stuck in the foreclosure space, and can move the conversation into the emergent interpretation and risk-taking spaces so desperately needed. Most creativity education re/currently focuses on teacher and schools' anxiety about how creativity should be 'delivered', assessed, and reported. Discussions too often seem to begin and end with debates about a (any) national curriculum's creative and critical thinking general capability, but several years on, this micro-approach has not produced more creative environments or individuals. My research on a macro approach[2] urges educators to now look beyond the instrumental or micro strategies that have dominated creativity education research in Australia for the past several years.

One way of thinking about the problem is that it's not a creativity problem at all, but rather an education policy one. We do not lack a definition of creativity, just the will to make space and time it in schools. I've argued this must be addressed at both a national and international education policy level (2016, 2017), representing the integrated long view that can open the door to a more ecological, or systems approach. By better linking the policy macro to the practice-oriented micro, education might shift from a 'problem-solving' approach to what design thinking calls 'problem-posing', or what Barad reminds us is a co-emergent encounter.

If 'creativity education' reflects an increasingly commodified education system, then the macro focus is on questioning what education is for, how creativity might serve the real versus the stated goals, and the micro is how to work backwards from that goal. Our national economic policy in Australia, like so many other national contexts, recognises and calls for a creativity imperative in education and workplaces that drives innovation (see Commonwealth of Australia 2017), but that doesn't include an interwoven education, arts and cultural sectors approach that offers more sustainable and better participatory community-building of the kind Craft (2013) was talking about, nor the kind of agency-event that Barad calls us to.[3]

Creativity (and its research) is emergent and situational. You might hear in all of these stories the tension between individual 'versus' collective notions of creativity, 'elite' versus 'democratic'. You might find a conflation of 'the arts' (in other words playwriting and screenwriting) with

'creativity'. You might think that I am advocating an elite notion of creative arts in which some kids are 'gifted' and some are 'not', but you'd be wrong. I start with individual lived experience and link to the cultural big picture; my three pivotal moments are both contextualised in, as well as reflective of, the time and place in which they occurred—a factor all creativity education change-makers must take into greater account.

I believe, like my teachers did, that it is impossible to 'make' people creative. I have experienced that all people are not equally creative, both in orientation and in skill, an unpopular view to some, which I asserted in my 2014 book *The Creative Turn*. Students simply have different values, preferences and talents—a fact we have all seen in our classrooms. I wonder if these double standards are another expression of the anti-arts bias so pervasive in compulsory schooling? I have never heard Science or Mathematics educators argue that all students are mathematically gifted or equal. Yet education funders would never use this as an argument to not fund Science or Mathematics. Similarly, there are different kinds of creativity, different ability and skill levels in creative production, all of which require attending to (Simonton 2013). But that is different than nurturing a love of the creative, a respect for the arts, and investing robustly in establishing environments in which creative mindsets are valued and practised like mathematical times-tables. That would be a very different proposition, and—as Barad and others encourage us—would help move away from humanist projects of 'fostering creativity' altogether.

Synthesise (Ecosystem)

Redmond (2016) talks about 'cultural tremors' in which visual cultures are proliferating partly due to/embodied in visual online apps like Tumblr, Instagram, Snapchat, Kick. Circulation and recirculation is a core component of digital media but somehow not of education. Why are we still so reluctant in compulsory education to avoid the creative opportunities in workplaces and creative industries that are embedded in digital iteration and creative innovation? There seems to be a deep and pervasive aversion in education to admit that we are actually engaged in the

preparation of workforces. The rhetoric remains about preparing the whole child for 'the world', as if the world were inseparable from the workforce. We talk about socialisation, social change, multi-literacies, and collaboration, but we don't model it. The rhetoric about collaboration and multi-literacies falls quickly away in years 11 and 12 when students are tested individually, in writing, and in ways that reinforce the dominant values, most recently in relation to STEM. Even the timetable reflects these values. Students, thought-leaders and innovators are moving on without us. Students are learning, creating, and innovating outside of school, and the workforce is increasingly happy to work with new generations on their own terms, through alternate forms of credentialisation such as badging and internships, rather than university degrees and more traditional qualifications. The contemporary workforce is too agile, too flexible, and too rapidly shape-shifting to be satisfied by standardised testing and traditional disciplines in schools.

So why is STEM rising and STEAM falling? The narrowing of STEAM to STEM over the past several years mirrors in some ways the narrowing of 'creative and cultural industries' to the current digital-heavy 'creative industries'. Many university researchers are working so-called 'STEM' but not as an acronym for Science, Technology, Engineering and Mathematics, rather as a more generic acronym for 'interdisciplinary' or 'transdisciplinary' approaches to industry partnerships, 'real-world' impact, research and innovation for national and state-based agendas. They do not talk or worry about assessment of creativity in their STEM initiatives, they simply want more innovation, more collaboration across sectors, greater impact both culturally and economically through accelerating social change in and through creative cities. And where is the Education sector in those conversations? A ghost. Considered irrelevant by many, out of date by the others. In these funding streams and cross-sector collaborations, arts (or what is sometimes called 'creative practice') is central to all STEM collaboration, but it's creative practice for making roads more effective, for addressing housing issues, for social cohesion. Why doesn't school look or sound like these conversations and partnerships, and why are we too often not even at the table?

The problem, as I see it, is not that we don't know what a creative approach to our work can bring us, but that we don't trust that knowledge. We don't need more data, we need action; but action is frightening, so we prefer to accumulate more data. Yet research into contemporary networked cultures has well documented that accumulation of more data only presents new challenges like effective curation, use of the data, critical analysis skills, etc. Design thinking has become increasingly popular because it offers a practical model—some real steps—for working through problems in a generative and embodied way. But design thinking has its own neoliberal biases. When businesses seek creative consultants, it is to improve productivity. Schools 'outputs' or productivity is measured in grades and university entrance success, so logically creativity education seeks assessment first rather than environment-building. Yet university entrance scores are widely recognised as an increasingly outmoded measure of success, less tied to national and global economic goals of a rapidly changing workforce.

Businesses don't address underachievement by setting exams for their employees, they look to changing the terms of engagement, and the number one focus of creative workforce analyses is environmental. They seek to improve the conditions for creative innovation by their employees through engineering collaborative opportunities for play (ping pong etc.), they reward brainstorming, community-building, and recognise the power of the formative creative work going on in these 'team-building' activities. They encourage lateral thinking, flexible and interdisciplinary thinking, and problem solving. They change the conditions of employment and the workforce moves with them. Of course, performativity matters in any non-personal context, so some level of risk-aversion is understandable. There are ways in which failing is still penalised in work environments as well as schools. But the environment and the approach are markedly different, highlighting the ineffectuality of a standardised approach to doing and measuring creativity. Surely if multinational corporations can risk an investment in new ideas and productive risk-taking, then schools can too?

Creative Agency and Intercultural Research

Synthesising Barad's notion of agency as more than an inherent personal skill or capacity, with my own scholarship on creative ecologies offers the conditions for creative experimentation and expansion. My current research reflects this ecological notion of creative agency, and a globalised, networked approach to fostering creativity in education and workplace contexts or ecologies (Harris 2017). My Australian Research Council-funded project *"Transforming 21st Century Creativity Education in Australasia"* (2017–2021) uses some principles of design thinking to investigate regional creativity across the Asia Pacific (including Australia), and across the education-to-work trajectory. The project investigates intercultural understandings of, and strategies for, the need to build creativity as an education and workplace skill. As a core component of creative economic and cultural policy, this study argues there are benefits to working in a networked intercultural and regional way towards context-specific creative skills and strengths.

The study is concerned with generating new interdisciplinary and policy knowledge into how regional co-operation, marked by new models of educational and workplace training, are emerging and equally importantly are becoming embedded in cultural understandings of the knowledge economy. By drawing on creative environmental, digital and posthuman theories, this project is oriented towards multiple sectors including education, cultural and digital futures. Through improvement of creative education pathways and alignment with regional creative and cultural industries standards, this research holds both theoretical as well as policy contribution goals. To ensure creative and cultural industrial advancement in our region, it is necessary to conduct research into creativity that is more than just instrumental—that is, the macro (regional) joined with the micro (studying local practices and values) within linked nation-based contexts. That is, research that is onto-epistemological, as well as practice-led, and that is able to influence education and economic policy through a linked examination of both industry as well as university training.

Towards Creative Communities

So what of Barad's notion of agency, and the return to the posthuman as the event of creativity, the pleasure of creativity, and our Craftian commitment to making the conditions of creative emergence? A synthesis of creativity education, industries and agency converge in the kind of future-thinking I have contrasted here, building on some pivotal creative economies work from the USA. Theresa Amabile has said "Creative thinking refers to *how* people approach problems and solutions—their capacity to put existing ideas together in new combinations" (1998, n.p.) and it remains at the centre of the 'creativity problem'. She says that managers, like schools, more often kill creativity than nurture it because while "most believe in the value of new and useful ideas, creativity is undermined unintentionally every day in work environments that were established—for entirely good reasons—to maximize business imperatives such as coordination, productivity, and control" (1998, n.p.). Sound familiar?

Education has much to learn from workplace creativity studies. Amabile tells managers that to enhance creativity in their workplaces they should pay attention to what managerial practices affect creativity. They fall into six general categories: challenge, freedom, resources, work-group features, supervisory encouragement, and organisational support. Amabile's Progress Principle says that in organisational creativity, good managers are good collaborators, demonstrate positive emotions, are strongly motivated, and model positive thinking. She lectures widely on how to combat disengagement in the workplace –a challenge we confront in most schools. She says workers often feel de-motivated, through feeling devalued, and that both tangible and intangible motivators are really important! (Sounds like extrinsic and intrinsic motivators in education). So we can ask, as Amabile does about workers in workplaces, what is motivating students today? For one thing, and unsurprisingly, performance is higher when they are happier, have more positive feelings about their organisation and co-workers, and that positive performance results from an opportunity to be creative. In other words, there is a link between feeling happy and being creative, in seeing their contributions as valued.

Making sense of the events of their (work)day. It matters how people feel at work, and school. Making progress in meaningful work. Now can we say the same about the work we set and engage in with our students? Too often, I think that answer is no.

My interest in creativity in and beyond education contexts combines attention to both a macro, and a micro, view of change. This 'creative ecologies' approach recognises that building and enabling creative environments and networks allow all participants (both human and nonhuman) to creatively generate and evolve in more effective but also more satisfying ways, and in ways that are wonderfully impossible to predict. Facilitating encounters and opportunities is surely a best way forward as both educators and also creatives. This kind of networked intra-action becomes true creative agency.

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Notes

1. Like Barad's agential realism, a creative ecologies approach theorises the need to move from individualist projects (in Barad's case metaphysics, in mine creativity) to more collectivist.
2. including the 2016 Harris Whole School Creativity Audit, the Harris Creativity Index, and empirical data upon which it is founded, can be seen in Harris 2016)
3. For more national creativity education policies, see *Creative Learning through the Arts: An action plan for Wales 2015–2020,* still the only national transdisciplinary creative arts curriculum in the world (Arts Council Wales 2015); Forrester and Hui (2007) on creativity in Hong Kong classroom; OECD (2015) on Korean classroom creativity training.

References

Amabile, T. (1998). How to Kill Creativity. *Harvard Business Review.* https://hbr.org/1998/09/how-to-kill-creativity

Ambrose, D. (2005). Creativity in Teaching: Essential Knowledge, Skills and Dispositions. In J. C. Kaufman & J. Baer (Eds.), *Creativity Across Domains: Faces of the Muse* (pp. 281–298). Hillsdale: Lawrence Erlbaum Associates.

Arts Council Wales. (2015). *Creative Learning Through the Arts: An Action Plan for Wales 2015–2020*. Cardiff: Department for Education and Skills.

Australian Curriculum, Assessment and Reporting Authority (ACARA). (2011). Australian Curriculum. Available at: http://www.acara.edu.au/curriculum

Australian Institute for Teaching and School Leadership. Teacher Standards. https://www.aitsl.edu.au/teach/standards

Australian Qualifications Framework (AQF). https://www.aqf.edu.au

Barad, K. (2007). *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press.

Barad, K. (2012). Interview. In R. Dolphijn & I. van der Tuin (Eds.), *New Materialism: Interviews and Cartographies* (pp. 48–70). Ann Arbor: Open Humanities Press.

Bentley, T., & Savage, G. C. (Eds.). (2017). *Educating Australia: Challenges for the Decade Ahead*. Melbourne: Melbourne University Press.

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.

Commonwealth of Australia. (2017). *Innovation and Creativity: Inquiry into Innovation and Creativity: Workforce for the New Economy.* Parliament of the Commonwealth of Australia. Canberra: Government Printers. Available at: https://www.aph.gov.au/innovationcreativity

Craft, A. (2008). Studying Collaborative Creativity: Implications for Education. *Thinking Skills and Creativity, 3*(3), 241–245.

Craft, A. (2013). Childhood, Possibility Thinking and Wise, Humanising Educational Futures. *International Journal of Educational Research, 61*, 126–134.

Craft, A., Gardner, H., & Claxton, G. (2007). *Creativity, Wisdom and Trusteeship: Exploring the Role of Education*. Thousand Oaks: SAGE.

Creative Australia. (2013). *National Cultural Policy*. Commonwealth of Australia. ISBN: 978-1-922060-23-5.

Csikszentmihalyi, M. (1996). *Creativity: Flow and the Psychology of Discovery and Invention* (1st ed.). New York: HarperCollins.

Dikici, A. (2014). Relationships Between Thinking Styles and Behaviors Fostering Creativity: An Exploratory Study for the Mediating Role of Certain Demographic Traits. *Educational Sciences: Theory and Practice, 14*(1), 179–201.

Dolphijn, R., & van der Tuin, I. (2012). *New Materialism: Interviews and Cartographies* (pp. 48–70). Ann Arbor: Open Humanities Press.

Ewing, R. (2011). The Arts and Australian Education: Realising Potential. *Australian Education Review, 58*. Retrieved from http://research.acer.edu.au/aer/11

Ewing, R. (2015). Dramatic Play and Process Drama: Towards a Collective Zone of Proximal Development to Enhance Language and Literacy. In S. Davis, H. Clemson, B. Ferholt, S.-M. Jansson, & A. Marjanovic-Shane (Eds.), *Dramatic Interactions in Education: Vygotskian and Sociocultural Approaches to Drama, Education and Research* (pp. 135–152). New York: Bloomsbury Academic.

Ewing, R., & Gibson, R. (2015). Creative Teaching or Teaching Creatively? Using Creative Arts Strategies in Preservice Teacher Education. *Waikato Journal of Education, 13*(Special Issue on Creative Research and the Arts), 159–179. https://doi.org/10.15663/wje.v20i3.225.

Ferrari, A., Cachia, R., & Punie, Y. (2009). *Innovation and Creativity in Education and Training in the EU Member States: Fostering Creative Learning and Supporting Innovative Teaching*. JRC Technical Note, 52374.

Forrester, V., & Hui, A. (2007). Creativity in the Hong Kong Classroom: What Is the Contextual Practice? *Thinking Skills and Creativity, 2*(1), 30–38.

Gollmitzer, M., & Murray, C. (2008). *From Economy to Ecology: A Policy Framework for Creative Labour*. Ottawa: Canadian Conference of the Arts.

Gu, J., Zhang, Y., & Liu, H. (2014). Importance of Social Capital to Student Creativity Within Higher Education in China. *Thinking Skills and Creativity, 12*, 14–25.

Harris, A. (2014). *The Creative Turn: Toward a New Aesthetic Imaginary*. Rotterdam: Sense.

Harris, A. (2016). *Creativity and Education*. London: Palgrave Macmillan.

Harris, A. (2017). *Creative Ecologies: Fostering Creativity in Secondary Schools.* Final Report DECRA, Australian Research Council. Available at: https://www.creativeresearchhub.com/reports

Harris, A., & de Bruin, L. (2017). STEAM Education: Fostering Creativity In and Beyond Secondary Schools. *Australian Art Education, 38*(1), 54–75.

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.

Howkins, J. (2011). *Creative Ecologies: Where Thinking Is a Proper Job*. Piscataway: Transaction Publishers.

Kacerauskas, T., & Zavadskas, E. K. (2015). Creative Ecology in Academic Environment. *Filosofija Sociologija, 26*(3), 239–248.

Lucas, B., Claxton, G., & Spencer, E. (2013). *Progression in Student Creativity in School: First Steps Towards New Forms of Formative Assessments*. OECD Education Working Papers. Retrieved from http://www.oecd-ilibrary.org/education/progression-in-student-creativity-in-school_5k4dp59msdwk-en

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.

Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA). (2008). Melbourne Declaration on Educational Goals for Young Australians. Available at: http://www.curriculum.edu.au/verve/_resources/National_Declaration_on_the_Educational_Goals_for_Young_Australians.pdf

Munday, I. (2016). A Creative Education for the Day After Tomorrow. *Journal of Philosophy of Education, 50*(1), 49–61.

New South Wales Department of Education and Training (NSW DET). (2003). *Quality Teaching in NSW Public Schools: A Discussion Paper*. Sydney: Professional Support and Curriculum Directorate, NSW DET.

Noh, J., & Huh, N. (2015). Integrating Math and Music: Teaching Ideas. *Research in Mathematical Education, 19*(3), 177–193.

OECD. (2015). *Korea: Policy Priorities for a Dynamic, Inclusive and Creative Economy*, *Better Policies Series*. Paris: OECD Publications.

Queensland Government. (2003). *New Basics Project: Productive Pedagogies*. http://education.qld.gov.au/corporate/newbasics/html/pedagogies/pedagog.html

Redmond, E. (2016). *Keeping in Touch: The photography of Hobbes Ginsberg and Online Materiality* (Unpublished MA thesis). California College of the Arts.

Reilly, R. C., Lilly, F., Bramwell, G., & Kronish, N. (2011). A Synthesis of Research Concerning Creative Teachers in a Canadian Context. *Teaching and Teacher Education, 27*(3), 533–542.

Sawyer, R. K. (Ed.). (2011). *Structure and Improvisation in Creative Teaching*. London: Cambridge University Press.

Shin, N., & Jang, Y. J. (2017). Group Creativity Training for Children: Lessons Learned from Two Award-Winning Teams. *The Journal of Creative Behavior, 51*(1), 5–19.

Simonton, D. K. (2013). What Is a Creative Idea? Little-c Versus Big-c Creativity. In K. Thomas & J. Chan (Eds.), *Handbook of Research on Creativity* (pp. 69–83). Northampton: Edward Elgar Publishing.

Stankeviciene, J., Levickaite, R., Braskute, M., & Noreikaite, E. (2011). Creative Ecologies: Developing and Managing New Concepts of Creative Economy. *Business, Management and Education, 9*(2), 277–294.

Tan, A. G. (2014). Creativity in Cross-Disciplinary Research. In E. Shiu (Ed.), *Creativity Re-Search: An Interdisciplinary and Multidisciplinary Research Handbook* (pp. 68–85). London: Routledge.

Torrance, E. P. (1987). Teaching for Creativity. In S. G. Isaksen (Ed.), *Frontiers of Creativity Research: Beyond the Basics* (pp. 189–215). Buffalo: Bearly Limited.

Van Harpen, X. Y., & Sriraman, B. (2013). Creativity and Mathematical Problem Posing: An Analysis of High School Students' Mathematical Problem Posing in China and the USA. *Educational Studies in Mathematics, 82*(2), 201–221.

Warwick Commission. (2015). *Enriching Britain: Culture, Creativity and Growth*. Coventry: Warwick University. Retrieved from https://www2.warwick.ac.uk/research/warwickcommission/futureculture/finalreport/warwick_commission_report_2015.pdf

Wright, N., Davis, R., & Bucolo, S. (2013). The Creative Citizen: Understanding the Value of Design Education Programs in the Knowledge Economy. In *Proceedings of the 2nd International Conference for Design Education Researchers* (Vol. 4, pp. 2230–2248). Oslo: ABM-media.

Wyn, J. (2009). *Touching the Future: Building Skills for Life and Work*. Australian Education review/Australian Council for Educational Research (ACER). Available at: https://research.acer.edu.au/cgi/viewcontent.cgi?article=1008&context=aer