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Title:
Creativity in Education

Date:
2018

Citation:
Harris, A. & de Bruin, L. (2018). Creativity in Education. Oxford University Press.

Persistent Link:
https://hdl.handle.net/11343/311653

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Oxford Research Encyclopedia of Education

Creativity in Education

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Subject: Curriculum and Pedagogy Online Publication Date: Apr 2018
DOI: 10.1093/acrefore/9780190264093.013.383

Summary and Keywords

Creativity is an essential aspect of teaching and learning that is influencing worldwide educational policy and teacher practice, and is shaping the possibilities of 21st-century learners. The way creativity is understood, nurtured, and linked with real-world problems for emerging workforces is significantly changing the ways contemporary scholars and educators are now approaching creativity in schools. Creativity discourses commonly attend to creative ability, influence, and assessment along three broad themes: the physical environment, pedagogical practices and learner traits, and the role of partnerships in and beyond the school. This overview of research on creativity education explores recent scholarship examining environments, practices, and organizational structures that both facilitate and impede creativity. Reviewing global trends pertaining to creativity research in this second decade of the 21st century, this article stresses for practicing and preservice teachers, schools, and policy makers the need to educationally innovate within experiential dimensions, priorities, possibilities, and new kinds of partnerships in creativity education.

Keywords: creative ecologies, creative environments, pedagogies, policy, creative industries

The Growing Global Importance of Creativity in Education

Creativity is rapidly becoming a central aspect of scholarly discourse, research, and practice in education. The way creativity is understood, nurtured, and linked with industry, and how sites of education interpret and prepare learners for futures shaped by creative and innovative challenges, are emerging as significant aspects of the ways we approach creativity across the education life span (Harris, 2016). Increasingly there is evidence that supports Anna Craft's claim that "Creativity [is] experiencing a global

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revolution” (2005, p. i), and in many countries creativity now assumes increasing importance in educational policy, school curricula, school environments, and schools’ connections with industry.

Creativity scholars have both sought to define and diversify understandings of creativity’s influence on the development of core capacities, assessment, skills, thinking (Jeffrey, 2006A), immersive states of “flow” (Csikszentmihalyi, 1996), and “possibility thinking” as core to creative learning (Craft, 2005), involving convergent as well as divergent thinking. Conceptual differentiations between big “C” and little “c” creativities and how they synthesize with the needs of effective 21st-century learning continue to be explored and hotly debated. Big “C” creative enterprise—as a complex set of behaviors and ideas exhibited by an individual—and small “c” creativity locating creative and innovative enterprise in the processes and products of collaborative activity (Craft et al., 2008), or what Harris (2017) has called “macro” and “micro” creativities, continue to inform the debate.

The role of creativity in education has been described by Craft et al. (2008, p. 15) as “a capacity for significant imaginative achievement,” and the diverse applications of creativity within education continue to foster myriad investigations pertinent to creative and critical thinking in learners (Runco & Jaeger, 2012). Increasingly research in creativity education is turning to the school-to-workplace experiences and conditions that include dynamic teacher practices, spaces, environments, and learning atmospheres, and how these impact on the embodied practices of collaboration and knowledge exchange in climates of imagination and productive risk-taking.

Williams et al.’s (2016) survey of themes and the impact of creativity research over the past twenty-five years suggests a broad trend from descriptive to more recently applied predictive research themes that characterize a maturing and more refined creativity research paradigm. Prevailing concepts of creativity detail the connections between the individual and the environment, the self and others, and the creator and culture, emphasizing the role of sociocultural context within distributed notions of creativity (Glăveanu, 2014). They also implicitly reflect the emerging aesthetics and ethics toward the ways creativity is culturally embedded and co-constructed, perceptually understood, and procedurally developed and enhanced amongst educational systems, representing a discursive shift or “creative turn” in worldwide understandings of creativity (Harris, 2014).

Research has also argued for the development of specific teacher knowledge and skills that support and teach collaboration and divided creative problem solving among learners (Arvaja et al., 2009; Craft, 2008) and the interconnection between metacognition and creative and critical thinking. Creativity research focusing on problem solving and the regulation of learning that leads to creative outcomes amongst learners points to problem identification, analysis, planning, monitoring, and the need for learners to externalize problem-solving stages (Hesse et al., 2015). Studies have also suggested the importance of collaborative constructing, defining, interpreting, and communicating of tasks as they are being realized as significant building blocks toward developing

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creativity (Griffin & Gare, 2015), while Harris (2016, 2017) has further advanced creativity discourse pertaining to education by arguing for a networked “ecological” approach incorporating pedagogies, activities, relationships, and environments conducive to fostering creativity, rather than a fractured constituent approach to promoting whole-school creativities.

Creative Education Policy

Creativity education research has also experienced a significant increase in the depth and scope of outputs. Numerous policy-based studies centered in the UK and Europe[1] as well as the Asian region represent an increasing scholarship that addresses explicit recommendations for creative education policy specific to these regions.[2] Similarly, in the United States and Australia, not only educators but economists have called for students to be equipped with creative 21st-century skills[3] enabling them to compete successfully in global markets in a time of rapid change, diversity, and technological advances.[4]

Creativity has moved to the forefront of many education-based policies, including inclusion in the Australian Curriculum’s *General Capability of Critical and Creative Thinking* (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2012), the Welsh Government’s *Strategic Objectives for Creative Learning* (2015–2020), the UK’s Creative Industries Task Force (1997), China’s CDC for curriculum reform (2000), the EU’s launching of the European Year of Creativity and Innovation (2009) as well as the EU’s joint study of *Fostering Creative Learning and Supporting Innovative Teaching* (Ferrari et al., 2009), and Beijing’s Creative City Index (Hartley, Potts, & MacDonald, 2012). Policy recommendations have argued for the need for context-specific, individualized practices and tools for developing and measuring creativity in schools, such as the *Taking Design Thinking to Schools* project (Stanford University, 2012).

The Australian Government’s parliamentary “Inquiry into Innovation and Creativity: Workforce for the New Economy” (Parliament of Australia, 2017) asserts the importance of the arts within Science, Technology, Engineering, (Arts), and Mathematics [STE(A)M], recommending 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) in secondary schooling. Finland’s attention to quality teacher training and constructivist approaches to developing learning environments encourages a growth mind-set toward curriculum and pedagogical reform through multidisciplinary approaches, including policy that “gives a high priority to personalized learning and creativity as an important part of how schools operate” (Sahlberg, 2011, p. 37).

Across Asia, an outline of educational changes in Mainland China, Hong Kong, Taiwan, and Singapore (Cheng, 2004) has investigated the dilemmas of traditional Confucianist and collectivist educational traditions that uphold rigid and authoritarian concepts, and the

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coalescing of traditional cultural meanings and learning with Western “creativity” and the establishing of a perhaps distinctly Chinese model of creativity education.

Wide-ranging differences in definitions, approaches to, and assessment of creativity have thus made problematic the prospects of meta-analyses examining creativity across diverse education contexts. While terms of reference to such studies include creative learning across the life span or view creative products from education as being aligned with creative industries, a significant number of recent studies have enhanced the extant literature on creativity and the diverse educational research aspects afforded across this domain.

Internationally, governments, industry, and educational institutions continue to develop strategic objectives for creative learning, with aims of building successful education systems that can directly contribute to greater social and economic innovation and creativity, support the cultural capital of nations, and ultimately contribute to the development of creative, adaptable, and innovative professional workforces. While progressive and integrated approaches between workforce, governing bodies, arts and cultural organizations, and education consortia have organized themselves through product driven policies aligned with creative industries, education and educators remain inconsistent as to what creativity is, how to imbue and develop creativity in students, and how to develop critical thinking and creative processes that can equip learners with the qualities required to adequately thrive and compete in future complex global environments.

Creative Environments

Growing evidence from the literature indicates that creative school environments can positively influence creative abilities, dispositions, and educational development of students in classroom environments. Numerous qualitative studies have uncovered more fine-grained and rich data sets regarding aspects of creativity in schools. Facets of environments that facilitate learning have explored the educative spaces used by teachers in their promotion of creative endeavors. Materials, in particular tools and resources at hand in the classroom, have been explored. The integration of art, design materials, as well as technological tools such as iPads, add-on devices, and a battalion of applications that hold the possibility of enhancing creativity have been explored. Of significant interest are teaching strategies and interpersonal connections between teachers and students that stimulate learning, and the pedagogical environments that value, promote, and scaffold for creativity through dialogic as well as the modeling of creative behaviors.

A field survey of creative environments in education (Davies et al., 2013) revealed 210 studies relating to educational research, policy, and literature. This study found evidence for the importance of flexible use of space and time, the availability of appropriate materials, extensions of learning beyond the classroom and school, the positive influence

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of games-based approaches to learning that reinforced learner autonomy, and the necessity for respectful relationships between teachers and learners in forging meaningful processes of creativity. Literature reviews by Banaji and Burn (2006) and Banaji, Burn, and Buckingham (2010) have examined a range of literature, from which nine "rhetorics" of creativity emerged, including the following: creative genius; democratic and political creativity; ubiquitous creativity; creativity for social good; creativity as economic imperative; play and creativity; creativity and cognition; the creative affordances of technology; and the creative classroom. Reviews by Loveless (2002, 2007) have investigated creativity, new technologies, and learning. A study by Creativity, Culture and Education (CCE—formerly Creative Partnerships, 2012) in the U.K. produced a series of literature reviews on various partnership models and their interrelation with pedagogies and policies (Bragg, 2010; Fleming, 2010; Jewitt, 2008; Jones, 2009; Menter, 2010; O'Connor, 2010; Thomson, 2010), and Harris and Ammerman (2016) reviewed creativity education policy in Australia.

These reviews surveyed a wide range of learning environments including preschool centers, primary and secondary schools, tertiary settings, and adult learning centers. Most revealed similar networked strategies, but best practice implementation seems harder to achieve and document. HMIEE Scotland (2006) recommended a synthesis of elements of good practice that promotes creativity; the Office for Standards in Education (OfSTED, 2010) in the U.K. extracted inspection findings from 44 schools: two nursery schools, 22 primary schools, 19 secondary schools, and a special school, finding similar characteristics of effective creative teaching. A significant number of these studies related to "critical events" and projects normally not incorporated into "everyday" teaching and learning practice. Overall, the findings suggest that creative learning initiatives generally conform to the structure of a critical event, passing through well-defined stages of conceptualization, preparation and planning, convergence, divergence, and consolidation of knowledge and experience (Jeffrey, 2006B).

A number of studies have evidenced classroom spaces as an important factor in fostering creativity. Research investigating creative environments has evinced qualities such as a sense of openness and spaciousness (Bancroft et al., 2008), the ability to utilize different areas to support the growth of ideas (Gandini, Hill, Cadwell, & Schwall, 2005), as well as a teacher's flexibility. These all factor in promoting students' creativity (Addison, Burgess, Steers, & Trowell, 2010; Bancroft, Fawcett, & Hay, 2008; Jeffrey, 2006A). A series of case studies by Vecchi (2010) demonstrated the importance of sensory qualities in learning environments—light, color, sound, microclimate—and how these influence children's perceptions of how creative they are able to be within them. Small spaces that remained visually connected with the class were suggested as promoting microclimates of creativity in learners. The significance of visual stimuli (Addison et al., 2010), including the displaying of work within classrooms, is shown to actuate learner creativity. A number of studies provide strong support for a wide range of appropriate materials, tools, and other resources being made available to students (Addison et al., 2010; Bancroft et al., 2008; Gandini et al., 2005; Gkolia, Brundett, & Switzer, 2009; Grainger, Craft, & Burnard, 2007;

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Halsey, Jones, & Lord, 2006; Robson & Jaaniste, 2010). Halsey et al. (2006) found that stimulation of creativity is positively correlated to the accessing of new or different media and technologies, while Addison et al. (2010) identified the importance of a range of materials, technology, and reference resources available outside time-tabled hours as being conducive to creativity in secondary art and design education. A case study by Dillon et al. (2007) found a correlation between students' sense of ownership and engagement in spaces through working with architects in the school environment.

Several studies throughout a number of European countries assert evidence that suggests creative learning environments can enhance the creative thinking of students, which can lead to greater levels of originality, particularly where students can immerse themselves in learning processes and reflect on outcomes (Cremin et al., 2006; Webster & Campbell, 2006; Whitebread et al., 2009). Studies that assessed academic attainment and progress from immersion in creative environments, particularly with lower-achieving students, found positive impacts on pupils' academic attainment and progress (Craft, Chappell, & Twining, 2008; Freund & Holling, 2008; Grainger et al., 2005; Whitebread, Coltman, Jameson, & Lander, 2009; Schacter, Thum, & Zifkin, 2006). Studies have posited increased levels of student motivation, engagement, enthusiasm, enjoyment, concentration, attention, and focus associated with creativity initiatives in the learning environment (Bancroft et al., 2008; Craft et al., 2008; Cremin et al., 2006; Wood & Ashfield, 2008). Thomson et al.'s (2009) *Creative whole school change, final report* provided evidence of the impact of creative environments and also informed of theory building and the provision of heuristics for teacher and school learning in creative practices.

Environmental factors affecting creativity extend to the flexible use of class time (Addison et al., 2010; Burnard, Craft, & Cremin, 2006; European Commission, 2009; Halsey et al., 2006; Jeffrey, 2006A). Burnard et al.'s (2006) collaborative video-based study of three early years' settings found that young children needed sufficient time for immersion in an activity. A significant contributor to students' creativity has been observed in the relocating of sites for learning into galleries, museums, and installations. Evidence suggests that taking students out of school and into work environments within museums and galleries enhances their creative skills (Burgess & Addison, 2007; European Commission, 2009; Halsey et al., 2006; Kendall, Muirfield, White, & Wilkin, 2007; Rutland & Barlex, 2008). One study realized the acoustic potential of the gallery space that could influence creativity in students (Burgess & Addison, 2007). Making connections between mentors, staff, and student learners in out-of-school locations such as informal spaces, parks, or youth clubs has been found to increase engagement, motivation, and creative outcomes (Halsey et al., 2006). Indeed, numerous studies have found that student involvement with wider arts agencies and organizations can significantly contribute to a creative learning environment (Cumming, 2007; Gkolia et al., 2009; Grainger et al., 2005; Hall et al., 2007; Jeffrey, 2006B; Robson & Jaaniste, 2010) Professional learning cultures evident within, between, and beyond schools provide supportive collegial environments that allow the transfer of information, knowledge, skills, and conceptual, pedagogical, and larger structural affordances, such as time-tabling, the freeing of subject domains, and staffing

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organization (Downing et al., 2007; Thomson & Sanders, 2010; Troman et al., 2007). Wider ramifications of developing communities of practice through out-of-school collaborations and contact with mentors, teaching artists, and connectivity to the workforce and industry are explored further in the IMPLICATIONS FOR COORDINATED STRUCTURAL CHANGE section.

Worldwide, education researchers have advanced STEM (Science, Technology, Engineering, and Mathematics) orientations over that of STEAM, which utilizes the Arts to better conceptualize creativities as not domain specific. While Finland has adopted curriculum and pedagogical reform through multidisciplinary approaches and a "phenomenon approach" to the new national curriculum (FNBE, 2016), significant objectives articulated by Australian Creativity Summits (Harris et al., 2017) similarly reflect a striving to foster creativity through: (1) an interdisciplinary transferral of competences, (2) multiliteracy between domains of learning, (3) multidisciplinary learning modules (phenomenon-based learning), and (4) the use of out-of-school literacies to learning in school; developing connectivity between school creativities and adaptive, innovative workplaces, and enhancing creative learning and living within the "3rd space" (FNBE, 2014, 2016).

Educational research has also investigated trans-, inter-, and multidisciplinarity through learning experiences that provide interconnections between project-based learning (PBL) (Christensen et al., 2008), curriculum design (Dowen, 2007), pedagogical applications (Youngblood, 2007), interdisciplinary collaboration (Derry et al., 2014), specific interdisciplinary measures relating to STEM education (Asghar et al., 2012), as well as overall implementation of creative teaching approaches across all domains (Sawyer, 2015).

Organizational rethinking by teachers and researchers through multi-, trans-, and cross-disciplinary learning continues to highlight the need to dismantle the siloed nature of secondary and tertiary study. Reconfigurations of learning dimensions such as those created by STEAM approaches, if more broadly conceived and integrated with the arts, can become a means through which the sciences, mathematics, and structural and technological design learning can be more authentically, experientially, and holistically explored (Harris & de Bruin, 2017A).

While the powerful influence of co-curricular activities such as music, drama and visual arts is well-founded, critical creativity discourse questions the add-on approach to which many schools approach incorporating creativity involving these learning domains. Classrooms that promote creativity, curiosity and divergent thinking demonstrate effective teacher-student learning relationships that encourage, motivate and improve creativity and student self-efficacy to creative outcomes. Organizational rethinking by teachers through multi-, trans- and cross-disciplinary learning has, as research suggests, highlighted the need to move on from traditional siloed approaches.

Creative Pedagogies and Learner Traits

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Numerous creativity studies concern the teacher–student learning relationships within immersive, creative environments, and their power to encourage, motivate, and improve students' creative self-efficacy. Creative events such as learning beyond the classroom, experiencing arts studios, musical and theatrical creative art ensembles, museums, and digital and gaming engagements positively impact creative capacities and have been noted as necessary precursors to creative confidence in learners.

Creativity in education research has investigated various concomitant features and traits associated with promotion and development of creativity, including psychosocial pedagogical features, learning environments, and attributory factors beyond the physical architecture of the space in which learning takes place (Dudek, 2000). Similarly, creative thought processes (Mumford, Mobley, Uhlman, Reiter-Palmon, & Doares, 1991), creative problem-solving skills (Williamson, 2011), giftedness and talent (Gagné, 2004), creative thinking (Torrance, 1977), and more specific creative learning (Jeffrey, 2006A) and possibility thinking (Craft, 2000) could all be included within the broad term "creative skills," acknowledging that such skills have both cognitive and practical elements. Evidence spanning early-childhood to secondary-school curriculum and age ranges suggests that where students are given some control over their learning and are supported to take risks with adequate balance between structure and freedom, learner creativity can be enhanced (Burgess & Addison, 2007; Cremin, Burnard, & Craft, 2006; Ewing, 2011; Gandini et al., 2005; Grainger, Gooch, & Lambirth, 2005; Hall et al., 2007; Halsey et al., 2006; Wood & Ashfield, 2008).

A growing number of creativity studies have investigated the ways teachers can more mindfully promote creativity. Studies by Gkolia et al. (2009) and Rutland and Barlex (2008) suggest activities engaged by students require an element of novelty to stimulate creative responses from pupils, concurring with many "top ten" lists of creative skills and capacities (for more on this, see Harris, 2016). Halsey et al. (2006) identifies the importance of the "authenticity" of a task within as real a context as possible, and its "real world" value to the student. Within a secondary context, interdisciplinary approaches to promoting creativity have been investigated (Harris & de Bruin, 2017B; Tan, 2014), and Rutland and Barlex (2008) suggest the need for interesting, relevant, and motivating activities with exciting starting points and an ongoing stimulus of materials that can develop and open pupils' minds.

Studies have also examined the qualities students bring to the classroom. A study in Hong Kong by Chan and Yuen (2014), investigating primary schoolteachers' views on creativity enhancement, found personality traits such as motivation, attitude, and a sense of purpose as factors that facilitated creativity development crafted by teachers. Chan and Chan's (1999) study of Hong Kong primary and secondary schoolteachers' conception of characteristics of creative and uncreative students—while highly influenced by Runco's (1984) assertion of personality traits common to creative students—delineated a continuum of 42 creative and 33 uncreative attributes or traits that included imaginative, always questioning, quick in responding and active, through to conventional, timid, lacking in

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confidence, and conforming. This study interestingly drew comparisons between Chinese and U.S. cultural perspectives, asserting Chinese cultural norms regarding nonconformist or disobedient behavior as rebellious, expressive behavior as arrogant or attention seeking, and assertive behavior as self-centered or opinionated; these cultural perspectives, the study claims, were not well appreciated by Chinese teachers but were more desired by U.S. teachers.

Research across diverse age groups and curricula strongly evidence that, given some control over their learning, and supported to take risks with the right balance between freedom and structure, students' creativity is enhanced (Burgess & Addison, 2007; Cremin, Burnard, & Craft, 2006; Ewing, 2011; Gandini et al., 2005; Grainger, Goouch, & Lambirth, 2005; Hall et al., 2007; Halsey et al., 2006; Wood & Ashfield, 2008). Halsey et al. (2006) found creativity was best served by an equal balance between structured and unstructured work with disaffected young people. Grainger et al. (2005) found the presence of structure and clear expectations was significant to primary students engaging in a writers' festival, echoed by Ewing's (2011) studies of arts education in Australia.

A study of three primary teachers' approaches by Cremin et al. (2006) found the most effective practices were those that both framed challenges for pupils but also provided freedom in the ways in which they could choose to address challenges. Similarly, Gandini et al. (2005) found that creativity emerges from multiple experiences through well-supported development of personal skills and processes. Rather than explicitly planning for creativity, these researchers argue that the complexity of evolving creativity urges teachers away from lesson planning and toward organizing pedagogical systems that organize and prepare learners to think with a collaborative, creative mind-set.

Shin and Jang's (2017) study within two Korean elementary schools found major factors affecting creativity in the classroom centered around group dynamics (conflict and play), characteristics of the students (personality and motivation), and teachers' roles (training strategies, training style, and commitment). This study espoused further competency domains of teachers that could improve student creative outcomes encompassing self-management, creativity, leadership, interpersonal relationships, patience, cooperation, information processing, and communicative abilities in expressing their work to others.

A three-tiered study of demographic traits of Turkish teachers investigated the relationship between teachers' thinking styles and creativity fostering behaviors elicited in the classroom. Utilizing the Thinking Styles Inventory (TSI), developed by Sternberg (1997), and the Creativity Fostering Teacher Index Scale (CFTIS), developed by Soh (2000), across novice to expert teachers, the study asserted that "type 1" behaviors, promoting legislative, judicial, global, and liberal styles of behavior, rather than "type II" thinking styles that included executive, local, and conservative styles promoted creativity. While findings espoused that relationships between thinking styles and creativity fostering behaviors were significant, they were partially mediated by the specificity of teachers' subject domains. This study concurred with Baloğlu and Karadağ (2009) in that relationships between professional work experience and constructive thinking toward

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creativity and their results were higher in less experienced teachers, confounding earlier findings by Fan and Ye (2007), Sternberg and Grigorenko (1995), Zhang and Sternberg (2002), and Zhang (2001, 2002, 2008).

Pertaining to teacher qualities, research suggests creative teachers adopt a positive stance toward learner engagement, creativity, and creative learning, continually develop skills and professional knowledge to facilitate the development of students' creative responses, and take "long-term views" toward learners' creative potential (Cochrane, Cockett, & Cape, 2007; Davies, 2006; Grainger et al., 2005). A number of studies provide evidence suggesting that in order to develop creativity in classrooms, teachers need to develop an awareness of learners' needs—including those associated with multiple intelligences and different learning styles—and involve them in the planning of their own learning (Bancroft et al., 2008; Burnard et al., 2006; Jeffrey, 2006A; Sharp et al., 2008). Enhancing creativity is associated with teacher practice being "less prescriptive" in lesson planning (Braund & Campbell, 2010; Cochrane et al., 2007; Schacter et al., 2006; Sharp et al., 2008), despite this being made difficult by teacher performance pressures, time constraints, curriculum mandates, assessment, and the level of professional development undertaken (Harris, 2014, 2017, 2016; Braund & Campbell, 2010; Davies, 2006; Wyse & Spendlove, 2007).

An international study by Harris (2016) found diverse teacher attitudes toward creativity, the pedagogies utilized to develop creativity, and the assessment needs for measuring creative engagements or outcomes. Teachers consistently felt ill-equipped or uncomfortable in adopting appropriate pedagogies and strategies that can best enhance effective creative learning processes, which Harris has responded to with the Whole School Creativity Audit (Harris, 2017), through which schools and administrators can systematically address their creative capabilities across the school environment or "ecology." Wider evidence concurs that teachers hold a range of diverse preconceptions about what creativity is and feel ill-equipped enacting and developing appropriate pedagogies and strategies (Bolden et al., 2010; Cremin, 2006; Crow, 2008; Hong et al., 2009; Newton & Newton, 2009).

Karwowski et al. (2007) offer a Polish perspective on teaching creativity to preservice teachers, surveying a significant immersive psycho-pedagogical teacher training approach to creativity via a well-crafted five-year program that educates specialists in identifying and developing creative potential in students. This study suggested that such in-depth creativity training should translate into political and legal facilitations for creativity in learners, asserting that such strong educational grass roots movements that teach for creativity have the potential to translate into significant ongoing social and educational change.

Creative Relationships

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An important aspect of creativity studies pertaining to pedagogical and environmental levels of connectivity that foster creativity has been the investigation of learning relationships between students and teachers. A study by Soh (2017) investigating 117 Singaporean teachers found that teaching behaviors play a critical role in fostering student creativity, providing a CFTIS that serves both as an instructional and measurement tool of creativity fostering in the classroom context. A Nigerian study by Olawale et al. (2010) of lecturers in selected universities in the Ogun and Oyo States investigating creativity fostering behaviors utilized investigative scales examining independence, integration, motivation, flexibility, evaluation, questioning, and opportunities. The study found creativity fostering behavior that indicated levels of productivity and capacity building. A study by Gu, Zhang, and Liu (2014) revealed that Chinese university undergraduates can independently and interactively influence their creativity via peer, advisor, and expert "social capital." A review of 12 Canadian case studies of creative teaching by Reilly et al. (2011) found many shared characteristics between Canadian teachers and their U.K. counterparts: they were student-centered, promoted student inclusivity and student interests in the classroom, displayed well-developed interpersonal awareness and skills, were motivated by a value-based orientation in their creative teaching, and balanced risk with secure structures.

Burnard, Craft, and Cremin's (2006) study of three early years' environments observed the need for "enabling environments" to be fostered by teachers in their responses to children's creative activity. Menter (2010) emphasized the need for flexibility in the pedagogical relationship, which enabled teachers to modify their practice to accommodate pupil-inspired directions of activities. Responding to classroom manner and ethos, Burgess and Addison (2007) found that students prefer pedagogical relationships imbued with mutual respect. The work of Sawyer (2011, 2015) espouses the necessity for teachers to be well equipped to deal with the unexpected, employing a preparedness for risk-taking, and being adept improvisationally with curriculum content and pedagogies that unlock and elicit creative responses in students. Jeffrey (2006A) concurs with this aspect of teacher practice, suggesting the ability to act spontaneously and change plans is part of teachers' modeling of creative learning.

Studies have investigated the effect of dialogue as key to pedagogical instruction, as well as interpersonally enhancing motivation and self-efficacy in engaging in creative behavior. Expert practitioner and educator practices in learning and teaching musical improvisation students have been investigated by de Bruin (2016A,B). Gandini et al. (2005) found that regularly scheduled conversation between children and teachers served as a framework to support children's work. Linking and supporting a sustainable learning culture and community through ongoing interpersonal exchange, de Bruin (2018) investigated levels of modeling and scaffolding strategies that evolved to coaching, reflection, and fading of teacher dialogue and input, which evinced a cognitive apprenticeship of creative processes and products.

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Bramwell et al.'s (2011) examination of 15 case studies of creativity in Canadian teachers found teachers' creative processes emerged from the interaction between their personal characteristics, including personal intelligence, motivation, and values, and the communities in which they worked and lived. The findings of this study suggested that cooperation between teachers and administrators is essential for teachers to succeed in creating positive change within classrooms and the school environment.

As well as having supportive relationships with their teachers, strong evidence exists that students' creativity is closely related to their opportunities for working collaboratively with their peers (Burgess & Addison, 2007; Dillon et al., 2007; Halsey et al., 2006; Rutland & Barlex, 2008; Wood & Ashfield, 2008). The presence of collaborative activities in secondary art and design is a significant feature of a creative environment (Burgess & Addison, 2007), including teamwork (Rutland & Barlex, 2008).

Implications for Coordinated Structural Change

This overview of recent literature highlights characteristics of the conditions, environments, and practices needed for creative thriving in learning and workplace environments. Flexibility in pedagogical and physical environments allow learners to have control of their learning, ownership of activities, and engagement in varied and flexible encounters as they work at their own pace, all core conditions for fostering creativity. The significance of appropriate and flexible physical environments, adequate availability of resources and materials, pedagogical strategies of individual teachers, and collaboration and organizational synergy with other teachers and structural guidelines, as well as mindful use of environments beyond the school all contribute to a more holistic understanding of educationally based creativity.

Effective and informed pedagogical approaches by teachers generate positive environmental factors in the classroom, promoting creative climates. Evidence suggests that creativity is closely related to opportunities for working collaboratively (both with peers and teachers), that productively extends to peer and self-assessment and is conducive to creative endeavors, and that flexibility in pedagogical and physical environments allows learners to be more creative through productive risk-taking and experimentation. Effective creative environments, pedagogies, and relationships impact learners' academic achievement through developing increased confidence and resilience, enhanced engagement and motivation, improved social, emotional, and critical thinking skills, and more consistent and intense school attendance and involvement in learning.

The evidence also highlights the central role of overall school cultures in supporting or impeding creativity. This includes the need for teachers to reflect on their own conceptions of creativity, gain ongoing professional development, and maintain and model

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the importance of lifelong learning regarding creativity. Crucial to developing creativity in students are the ways in which creative cultures are institutionalized in schools and in policy. Administrators and teachers who dynamically organize ecologies of creative tools within their schools may succeed in establishing long-term depth of change toward creative competencies.

Creativity research suggests reform via formal restructuring and more complex systems of interconnection and organizational relationships between education, innovative communities, and industry. How learning institutions interact creatively with social, economic, cultural, and knowledge-based resources is perhaps at the core of what we term a “creative education future.” Amin and Roberts (2008) urge for communities of practice that consider broader organization, spatial dynamics, innovation outcomes, and knowledge processes that encapsulate “high creativity knowing in action.” Extending beyond Wenger’s (1998) communities of practice, Brown and Duguid (1991) have referred to “networks of practice” to describe creatively based relations among group members, and Lindkvist (2005) uses the term “collectivities of practice” that are concerned with new knowledge creation and exchange between groups who are brought together through creativity collectives that share a mutuality of understanding.

Focusing on both individual and collective creativity, the dynamics of innovation, and knowledge creation, de Bruin (2018, 2016A,B) urges the immersive applications expert practitioners and educators can utilize and apprentice for creativity and creative dispositions in students, connecting schools and institutions with workplaces, vitalizing existing creative communities while innovatively exploring possibilities that extend creative industry outputs. Hargreaves (2003) saliently probes how efficient, transformative, creative networks can be generated and sustained between education and industry, how this can provide the greatest potential to focus learners’ efforts to innovate, can create leverage for wider change, and how policy and governance systems can operate, adapt to, and evaluate innovation across distributed systems.

Actions From Creativity Research

To promote creativity in education, initial teacher education, policy, and in-service professional development must actively address the ways creativity is understood, nurtured, measured, celebrated, valued, and interconnected across the life span. Providing educators and teachers with significant research findings and evidence-based current research can enhance teacher, school leader, and parental confidence in making creative change. A secondary and ongoing area needing further development is the interdependency between higher education, vocational education, schools, and industry. Such educational connections can further promote innovation through distinctive

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symbiotic relationships between research and teaching and can deliver mutual and lasting benefit.

Assisting school administrators and teachers in supporting structural, pedagogical, and partnership innovation can allow schools to focus on the processes of creative skills development rather than institutional change. Schools are overburdened by external compliance, reporting, and accountability measures that can impede creative and innovative change. To encourage whole school approaches to creativity, school leaders and professional bodies could productively work more closely together to share the labor of sector-wide change.

Despite individual teachers inspiring creativity in their classrooms, superficial, short-term, and ad-hoc approaches continue to present missed opportunities in schools. A cornerstone to developing sustainable whole-school creative change necessarily demands partnership and preplanning. By taking a “creative ecologies” (Harris, 2016) approach, teachers will be equipped with skills and collaborative support that unites teachers *with* administration. This in turn can model and promote creative and critical thinking amid mutually beneficial creative partnerships that link schools with the world outside. Through creative ecological innovation, students can expand their own agency and self-direction. Rethinking school staff as creative teams and regular gatherings as forums for stimulating collaboration through formal creative models of practice and professional development can promote creative school renewal.

Implications for Future Research

This overview of recent creative education literature reflects the wide and diverse range of contemporary research in this area. Significant new findings on creative environments, policy, and pedagogies continue to inform considerations on how creative education research must be developed, not only in the classroom but in more intersectoral and interdisciplinary ways. Both qualitative and quantitative methods continue to bring different but equally valuable data sets concerning how to enhance creativity in the education sector. They also point to an urgent need for continued dissemination of exciting and perhaps unique aspects of creativity in educational systems, as well as larger and more generalizable data sets in this area of study.

Research on creativity in education remains dominated by European studies, and we recommend further development and expansion of this body of work worldwide, availing global contexts and research in various languages. The links between local contexts and creativity—in education and, more broadly, socioculturally—require site-specific and globally diverse data and epistemologies in order to fully understand the culturally responsive approaches to the development of creativity education. Education for creativity as well as overall stands only to gain by better understanding and incorporating

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diverse cultural, ethnic, religious, socioeconomic, and disciplinary approaches to creativity. International and intercultural collaborative projects and educational reform offer evidence-based new directions for advancing this work beyond borders.

Further research is needed which explores the impact of learning environments on students' creative engagement and success. This need also suggests the need for deeper longitudinal cross-disciplinary and birth-to-workplace investigations to better address short- and longer-term improvements in creativity across all learning and workplace environments. More work is also needed to identify links between (inter)curricular areas and creativity, identifying innovative ways of embedding creativity through multidisciplinary organization and practice, and through links with industry and other outside partners. Innovative, inclusive, and diverse learning through the aligning of learning through Science, Technology, Engineering, Arts, and Mathematics (STEAM) education can improve engaging and authentic cross-, inter-, and transdisciplinary contexts and practices that not only enhance creativity but respond to an urgent need for updating 21st-century ways of learning, collaborating, and producing.

Conclusion

This overview of research on creativity in education suggests trends in environmental, pedagogical, and organizational structures that facilitate and impede creativity. It reveals that the task of improving creativity in education is a complex one which challenges dominant educational approaches of the structural, policy, and pedagogical status quo. The education sector overall must find ways to make more room for creative risk, innovation, and imagination in teacher training and ongoing pedagogical practice, and validate teachers, school administrations, and connections between schools and wider community and industry innovation systems that can adequately prepare students for creative workplaces and society. Teacher education and the credentializing of the profession at large must consider how creative and cultural industrial aptitudes can be grown in both student and teacher populations.

A much-needed creative ecological approach to organizational and pedagogical change is now urgently necessary. The time of European industrial models of education is coming to a close with the rise of digital technology, flexible workforces, and glocal[5] perspectives. Schools and education systems in turn must change to meet these demands. Models like the Whole School Creativity Audit can offer holistic policies and practice reforms in schools, where creative ecology approaches can effectively promote networks between teachers, as well as across schools, with the incorporation of local and global industries. This article highlights creativity research as continuing to enhance significant impacts and interconnections and to inspire insights into creativity in education, providing authentic, profound, and impactful learning and teaching.

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Acknowledgment

This article was informed by an Australian Research Council-funded study (#DE140100421) entitled *The creative turn: An Australia-wide study of creativity and innovation in secondary schools* (2014–2016), Anne M. Harris, sole investigator.

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Notes:

(1.) Warwick Commission (2015), Arts Council Wales (2015), Claxton & Lucas (2015), Lucas, Claxton, and Spencer (2013), Burnard (2011, 2010), Thomson and Sefton-Green (2010), Thomson, Jones, and Hall (2009), Claxton, Edwards, and Scale-Constantinou (2006), Jeffrey (2006b), Jeffrey and Woods (2003), Craft (2003, 2005), Craft, Jeffrey, and Leibling (2001), Craft, Cremin, and Burnard (2008), Lucas (2001), NACCCE (1999). The Scottish government's curriculum agency, Learning and Teaching Scotland (Education Scotland, 2013), commissioned a review identifying the most effective creative learning environments and creative skills development conditions (LTS, 2011), as well as the Scottish *Journey to excellence* research summary, "Fostering Creativity" (Education Scotland, 2013), exploring the breadth of European interpretations and applications of creativity.

(2.) Tan (2014); Hui and Lau (2006; 2010); Cho et al. (2011).

(3.) Sefton-Green (2011), Leadbeater (2010); Araya and Peters (2010); Robinson (2009); Burnard and White (2008); Florida (2002); Lubienski (2009).

(4.) McWilliam and Haukka (2008); Harris (2014, 2016, 2017); Pink (2006).

(5.) Glocalization considers the complexity of 21st-century narratives of globalization, problematizing general understandings of a compressed "world view" and subsequent linking of locales as "global" connections (Robertson, 2012). Glocalization considers the idea of global culture in terms of increasing interconnectedness of many local cultures, both large and small (Hannerz, 1990), involving the construction of increasingly differentiated perspectives, practices, and evolutions that reflect that we live in a world of local assertions against globalizing trends, from which new knowledge, creativities, industry, and bipartisanship are found and negotiated.

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