Carol A. Mullen   *Editor*

Creativity Under Duress in Education?

Resistive Theories, Practices, and Actions

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Creativity Theory and Action in Education

Volume 3

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For my other half, Bill Kealy: My love and inspiration for all things creative.
Carol

Foreword

The goal of the book series *Creativity Theory and Action in Education* is to explore new frontiers in creative theory, research, and practice in educational settings. My series co-editor, Bharath Sriraman, and I thereby endeavor to provide an international forum for thinkers from various disciplinary and methodological perspectives to build on existing work in the field and offer new, alternative, and even speculative directions for creative theory, research, and practice in education.

In this way, the book series is a creative experiment of sorts. It is aimed at providing an opportunity for those engaged and interested in the broader project of understanding creativity in education to generate, develop, test out, and learn from new possibilities and multiple perspectives on all manner of creative phenomena in education. Such an experiment has potential implications for how we think about creativity in education and also for how we act on creative opportunities afforded by educational situations and settings.

Creativity Under Duress in Education? Resistive Theories, Practices, and Action, edited by Carol A. Mullen, is the third volume in the series. It offers readers a wide-ranging, thought-provoking exploration of the state of creativity in educational contexts. Mullen has curated an impressive collection of international perspectives from established experts and new voices in creativity studies, the arts, and education. The contributors to this volume offer an expansive exploration of the sociocultural, political, historical, and psychological factors that impinge on creative thought and action in education.

An explicit theme of Mullen's volume is the question of whether creativity is under duress in education. The exploration invites contributors to identify and voice concerns about the state of creativity in education. Inviting critiques about education systems and experiences always runs the risk of devolving into an alarmist exercise of panicked hand-wringing and finger-pointing, e.g., "Our [societal norms/schools/curricula/teachers] are killing creativity!"

Fortunately, under the editorship of Mullen, the contributors to this volume provide a balanced perspective. Going well beyond simply enumerating challenges, the authors offer new and different ways of thinking about the very nature of creative expression in educational settings. This includes providing ideas, suggestions, and

examples for how educators and researchers might anticipate as well as productively respond to current and future challenges.

Several of the contributors offer theoretical perspectives for reconceptualizing creative work in education, while others articulate insights based on empirical explorations, and still others highlight more practical applications and illustrations of creative educational endeavors. A common through line across the chapters in this volume is the always and ever-present creative potential that can be found in educational contexts.

As some authors highlight, the creative potential that inheres in educational situations is sometimes hidden or obscured by long-standing power inequities, external curricular control, and various other shared, unique, and pressing challenges faced by students and educators around the world. Even in light of these challenges, the volume's contributors illustrate how creative ideas and endeavors can resist suppression. These authors also offer concrete suggestions for how creative potential can be realized within the challenging constraints of educational settings.

In this way, this volume represents an invitation to scholars and educators to participate in the challenging and potentially rewarding work of understanding and supporting creative expression in educational contexts. There are of course no guarantees when it comes to engaging in creative endeavors. The path from creative potential to creative outcomes always involves some level of uncertainty. Still, such efforts—even those that fall short of hoped-for outcomes—can bring about unanticipated insights, understandings, and contributions that make the undertaking worthwhile.

Indeed, those engaged in the broader project of understanding creativity in education offer helpful guideposts along the way—many of which can be found in and across the chapters of Mullen's volume. I therefore encourage you to take your time with the ideas presented in this volume—reflecting on how they influence your own thinking and work—and put them to the test. Reflect on them in the context of your own professional and creative endeavors within education.

Ultimately, I hope you find your experience of reading this volume as engaging, thought-provoking, and insightful as I have.

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Acknowledgments

Introduction: Resisting Crisis Through Creative Education

With *Creativity Under Duress in Education? Resistive Theories, Practices, and Actions*, contributors to this volume explore the important question of whether creativity is under duress in education. Leading creativity and arts-based researchers, along with emerging scholars, join in a robust examination of this driving question. Spanning various nations and educational levels, the volume offers a host of cutting-edge ideas, methods, and tools to encourage creativity as a priority for global economies. Contributors name forces of authority, control, and constraint that impact creativity in education systems as well as the professions. Educators—and anyone invested in the future of education—are vital to rejuvenating creativity in and beyond schools.

Anchored in scholarly and practical analyses of creativity, contributors to this volume describe creativity frameworks of theory and action in education, research investigations into creativity and education, and applications of creativity theory in real-world practice. Dynamic, vocal, and visionary, the authors bridge draconian contexts of assessment and explosive creativity in diverse places. A key contribution is the validation and promotion of creativity, the arts, and the innovation for students, teachers, professors, leaders, employees, and policymakers, extending to public and private sectors.

In a snapshot, this edited book

- Provides contemporary perspectives on the topic of creativity in education
- Brings together a diverse cast of leading and emerging disciplinary scholars in creativity, the arts, and innovation
- Presents creativity as a multifaceted force that tempers authority, compliance, and restraint
- Bridges theory with practice by examining theories of creativity and innovation from local, national, and global perspectives
- Offers hope and possibility for creative education despite circumstances of duress around the world

Broader Aims of the Book

One goal of this book is to "push the envelope" on the status of creativity in education during these challenging times. Crafted as an open-ended question—creativity under duress in education—the title is an invitation for contributors and readers alike to take up this issue on their own terms. My challenge to authors was to express themselves relative to creativity and the arts without feeling "pressured" to adhere to a particular editorial position, such as creativity is definitively and absolutely under threat everywhere. A question mark signals space for reflection, debate, and controversy, allowing for cultural differences and contextual variations.

A second aim of this volume is to address forces and dynamics that shape creative processes within both educational settings and scholastic disciplines. Policies, conditions, circumstances, and socialization all influence the creativity of learners, teachers, leaders, and others. Also highly relevant to this aim are studies of creativity in a variety of domains, contexts, and levels (early childhood through higher education). Some authors describe fresh conceptions of theory and consider purposeful action. Others focus on real-world settings in which they or others have investigated creativity, applying particular models, strategies, or exercises. From the outset, then, through my call for chapters, contributors were invited to respond as they saw fit.

A third goal is to leverage creativity and arts-based paradigmatic in-betweenness by bringing these distinct scholarly traditions together. Typically, these academic cousins function separately, belonging to different associations (and subsets within large ones) and even publishing venues. As such, they primarily move in unrelated circles even though their pursuit of the creative imagination and intelligence within socio-educational contexts is complementary.

However, creativity, the arts, and inquiry intersect these two domains. At least one broad distinction I see is that creativity researchers focus on creative inquiry and problem-solving through empirical research, methods, and speculative possibilities, while arts-based scholars engage in artful inquiry using multiple modalities of expression (e.g., painting and performance). Both types of academics nonetheless theorize about and investigate learning, cognition, life, aesthetics, activism, and more, with a commitment to applied theory and practice. They are also wedded to some of the same constructs, such as "creativity," the "arts," and "aesthetics."

Preview of the Chapters

This volume is comprised of 21 chapters, written by 44 creativity and arts-based scholars, representing 9 countries. The chapters are organized in three parts:

- Creativity Frameworks of Theory and Action in Education (Part I)
- Research Investigations into Creativity and Education (Part II)
- Applications of Creativity Theory in Real-World Practice (Part III)

Chapters in Part I

In the first chapter, I (Carol Mullen) describe dynamic creativity with creative synthesis of Beghetto and Kaufman's 4C model of creativity and Csikszentmihalyi's systems model of creativity, which I graphically display. To further spark creative thinking, I introduce a fifth C—Hidden-c. It refers to creative self-beliefs and behaviors that trigger the personal power of creativity and capacity for engaging in dynamic creativity. This is demonstrated in a course I taught to preservice teachers within China's high-pressure, rote-based learning environment.

In Chap. 2, Ronald Beghetto contends that "think[ing] outside the box" is misleading. He deconstructs such slogans, which opens up possibilities for creative engagement despite impediments. Because schools endure constraints, including accountability mandates, a misconception is that schools kill creativity. Explaining that creativity always operates with barriers, he proposes how such obstacles can actually support creative thought and action—a message educators need to hear.

Charlotte Doyle (Chap. 3) provides a view of the creativity field by examining its collective conversation and, specifically, the 4P framework of person, process, product, and press. She attends to classroom creativity and the creative process of students and teachers alike, in addition to teacher as mentor of creativity. Support for classroom creativity is a political decision, she clarifies, which is tied to the goals of society and value for deep learning.

In Chap. 4, Vlad Petre Glăveanu, Ingunn Johanne Ness, Barbara Wasson, and Todd Lubart present a unitary, sociocultural framework of creative learning in which they advance notions of position and perspective. They address the role of perspective-taking in generating creative insights. Applications take the form of technology uses for mediating creative learning practices that enrich education in the classroom and elsewhere.

Morna McDermott McNulty (Chap. 5) reflects on conditions under which creativity can be understood in a bio-capitalist world. Global challenges of an ethical and political nature pose threats to life on our planet, notably rising global corporate power and the evolution of technological developments, which influences creative labor. She predicts what relationships among neoliberal ideology, capital, and creativity might look like in the age of Anthropocene.

In Chap. 6, Anne Harris and Leon de Bruin argue on behalf of schooling that embraces an interdisciplinary, whole-school, creative-ecology approach. They draw on an international study of creativity in secondary schools, sharing possibilities for creative ecologies in education. To make creativity fundamental to education, they assert, science, technology, arts, culture, and industry must be combined.

Chapters in Part II

John Baer (Chap. 7) reasons that creativity as a general concept is an abstraction, making it difficult to learn about the nature of creativity. He advocates for moving toward concrete instances of creativity in the research, along with discussion of the theory–practice connection and theories that actually guide practice.

In Chap. 8, Liane Gabora and Mike Unrau review creativity theories and their capacity to account for creativity in terms of hardship. They also review aspects of mindfulness, attending to potential therapeutic effects of creativity. In a practical mode, they outline what a creativity and mindfulness module might look like as part of an educational curriculum.

Jonali Baruak and Paul Paulus (Chap. 9) examine creativity research on collaborative creativity and application in education. They address the theory underlying collaborative creativity, different strategies for generating ideas in groups and selecting the best ones, and the role of culture and diversity in collaborative creativity. Also, they recommend ways to foster collaborative creativity and innovation in different settings.

In Chap. 10, Cyndi Burnett and Sara Smith offer advice to teachers for building creativity into their accountability-laden classrooms. Providing guidance on what educators need to know and do, and possibly how, they describe a five-point star model that offers a path for integrating creative thinking into the curriculum. The model itself is depicted graphically.

Celeste Snowber pursues creativity's deep connection to being a fully embodied human. In Chap. 11, she articulates how the body can inspire creativity, making connections between inhabiting the body and releasing creativity in multiple forms. She beacons for a more hospitable and imaginative relationship to the body as a place of generativity.

Kyung Hee Kim and Nancy Chae (Chap. 12) explore a research-based model for cultivating creative **C**limates, nurturing creative **A**ttitudes, and developing creative **T**hinking skills (CAT). Their framework is geared toward sparking students' creativity development and teachers' success. Many resources for encouraging experiential learning are described.

In Chap. 13, Michael Eason, Trevor Lam, Anna Hui, Raysen Cheung, and Elaine Liu-Au explore collaborative therapy and playback theater. Their discussion is based on findings from two original studies. Creative collaborative methods for examining insight in professional practice domains are detailed. Using the collaborative–dialogic model of insight, they propose that insight is a collaborative accomplishment that dialogue fosters.

Chapters in Part III

Shifting to Chap. 14, Niluphar Ahmadi, Laurine Peter, Todd Lubart, and Maud Besançon take up the problem of creativity research being at a disadvantage when it comes to implementation in education. They address the huge gulf between global and national expectations for creativity to be developed as a competency in schools and what actually happens in classrooms. The authors draw upon their own observations in hopes of stimulating creativity research involving teachers.

David Cropley and Timothy Patston explore general beliefs that challenge efforts to broaden and systematize creativity. In Chap. 15, they examine struggles with teaching both *for* and *with* creativity, and they offer advice to practicing teachers. They also address a significant gap for developmental models of creativity in the literature advancing creative education.

In Chap. 16, creativity is the centerpiece of a STEM-related professional development program for a large group of teachers. Akesha Horton, Danah Henriksen, Punya Mishra, Christopher Seals, Kyle Shack, and Candace Marcotte describe their work leading the STEM-related professional development program in Chicago, Illinois, USA, which cultivates the learning of K–12 urban teachers of math and science. In detail, they present these cohort fellows' preparation for engaging their own students in project-based and experiential learning.

Marilyn Narey (Chap. 17) addresses teachers' creative capacities and the need for these to play out in schools. Beyond this, she thinks about how to transform teacher education preparation using the tenets of social justice. In addition to finding intersections among several knowledge bases, she applies her analytical tool of 22 creative capacities to illuminate how these facilitate acts of social responsibility on behalf of change agents and the social field.

In Chap. 18, Kate Kauper and Mary M. Jacobs propose "slow curriculum" as a means for supporting creative expression in the classroom. Like the slow food movement, a slow curriculum contests an industrial system that privileges efficiency and markets over alternatives that encourage creativity and well-being. They describe three approaches for implementing creative pedagogies: curriculum mindedness, creative subversion, and improvisational teaching.

Mary Beth Cancienne (Chap. 19) describes the artful teaching of English methods to preservice teachers. Using Shakespeare's play *Macbeth* and a toolkit, she engages students in kinesthetic learning and other powerful forms, achieving results. Drawing upon students' responses, she narrates how drama-based pedagogy propels collaborative and creative activity.

In Chap. 20, Daniel Fasko and Mary Rizza address the role of creativity in educational systems and the change process, bringing forward creativity in students' daily lives despite testing and other accountability burdens. They advocate for systemic efforts relative to policy, practice, and research in generating learning environments within schools that support creativity.

Ending with Chap. 21, Mark Runco generates a sense of political urgency by examining macro (political and economic) influences on education and creativity.

He directs attention to political decisions and policies influencing micro-decisions that interfere with creativity in classrooms, unfortunately placing undue stress on creative teaching and learning.

Finally, my coda brings this volume full circle. Our hope is that you will get in touch to comment on the ideas and content we present. Contributors' contact information is included in this book. We are eager to widen our multidisciplinary community of creativity researchers and educational scholars, the momentum of which comes from our readers.

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Contents

Editor and Contributors

Editor

Carol A. Mullen, PhD, is professor of educational leadership at Virginia Tech, Blacksburg, Virginia, USA. She received two Fulbright scholarships, in China (Southwest University, Chongqing, 2015) and Canada (University of Toronto, Toronto, 2017), respectively. A multidisciplinary scholar who bridges leadership and international education, she researches with a social justice perspective. She has served as a department chair, school of education director, and associate dean and was the 67th president of the International Council of Professors of Educational Leadership (ICPEL). She is former, long-time editor of *Mentoring & Tutoring: Partnership in Learning* (Routledge/ICPEL, cosponsors). Her publications include 22 academic books, more than 230 refereed journal articles and book chapters, and 15 special issues of journals. Her books have won awards from professional associations. Articles on creativity in the arts, social sciences, and sciences appear in many journals, recently *Action in Teacher Education* (2018), *International Journal of Chinese Education* (2017), and *Kappa Delta Pi Record* (2018). Her award-winning books include *Creativity and Education in China* (2017, Routledge) and *Education Policy Perils: Tackling the Tough Issues* (2016, Routledge, coedited with C. H. Tienken). Research, teaching, and mentoring awards include the 2016 Jay D. Scribner Mentoring Award from the University

Council for Educational Administration, the 2016–2017 Excellence in Research and Creative Scholarship from Virginia Tech, and the 2017 Living Legend Award from the ICPEL. Almost $5 million in grants has been awarded for her research projects. Her doctorate is from the University of Toronto/Ontario Institute for Studies in Education, Canada. More information is at http://www.soe.vt.edu/carolmullen. Email: camullen@vt.edu

Contributors

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John Baer, PhD, is a professor at Rider University, New Jersey, USA, who researches the development of creativity. His research and teaching have won national awards, including the American Psychological Association's Berlyne Award and the National Conference on College Teaching and Learning's Award for Innovative Excellence. His (co)authored and (co)edited books include *Domain Specificity in Creativity*; *Being Creative Inside and Outside the Classroom*; *Creativity and Divergent Thinking*; *Creative Teachers, Creative Students*; *Creativity Across Domains*; *Creativity and Reason in Cognitive Development*; *Are We Free? Psychology and Free Will*; *Essentials of Creativity Assessment*; and *Teaching for Creativity in the Common Core Classroom*. He has been a teacher and program director in gifted education and regional director in the Odyssey of the Mind creative problem-solving program. A fellow of the American Psychological Association, he received research grants from the National Science Foundation, the Educational Testing Service, the National Center for Educational Statistics, the Carnegie Foundation, and Yale, Rutgers, and Rider Universities. He serves on the editorial boards of the *Journal of Creative Behavior*; *Psychology of Aesthetics, Creativity, and the Arts*; and the *International Journal of Creativity and Problem Solving*. Email: baer@rider.edu

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Ronald A. Beghetto, PhD, is professor of educational psychology and director of the Innovation House at the University of Connecticut in Storrs, Connecticut, USA. He serves as editor-in-chief for the *Journal of Creative Behavior* and series editor (with Bharath Sriraman) of *Creative Theory and Action in Education* (Springer). He is a fellow both of the American Psychological Association and the Society for the Psychology of Aesthetics, Creativity, and the Arts (Division 10, American Psychological Association). Researching creative expression in educational settings, he has published over 100 books, articles, and chapters. More information can be found at www.ronaldbeghetto.com.

Maud Besançon, PhD, is professor of psychology in Rennes University in cognition, comportment, and communication (Laboratoire de Psychologie). She received a PhD in psychology from Paris Descartes University, France, in 2006. Her research interests include creativity assessment and educational settings and the impact of cognitive (such as flexibility) and conative (such as motivation and well-being) on creative potential and giftedness. Her studies are based on a multivariate differential approach to children's creative potential, allowing analysis of both inter-variability (intellectual giftedness vs. creative giftedness, effect of pedagogies) and intra-individual variability (various domains, such as graphic or verbal). Her study results corroborate the distinction between intellectual and creative giftedness. To do this, she worked on the evaluation of creative potential (coauthoring the battery *Evaluation of Potential of Creativity* [EPoC] with Baptiste Barbot and Todd Lubart) and on factors affecting its expression. Results highlight the influence of cognitive, conative, and environmental factors and especially the school environment (Montessori and Freinet pedagogies) on the expression of creative potential. Email: maudbesancon.psy@gmail.com

Cyndi Burnett, EdD, is an associate professor at the International Center for Studies in Creativity at SUNY Buffalo State, USA. Her research interests include the use of creative models and techniques with children, creative thinking in higher education, and current trends in creativity. She is working with educators to bring creative thinking into the classroom. Other projects involve connecting communities of creative thinkers via social media and designing and managing a massive open online course on everyday creativity. She was featured in the *New York Times* in an article titled "Creativity Becomes an Academic Discipline." She is coeditor of the "Big Questions in Creativity" book series and coauthor of the books *Weaving Creativity into Every Strand of Your Curriculum* and *My Sandwich Is a Spaceship: Creative Thinking for Parents and Young Children*. She has a Master of Science in creativity and a Doctorate of Education in curriculum, teaching, and learning, which she uses to help ignite creativity.

Mary Beth Cancienne, PhD, is professor of English education at James Madison University in the Middle and Secondary Education Department in the College of Education. She teaches courses in high school English methods and accompanying high school practicum, Curriculum and Co-curriculum, Foundations of American Education, student teaching, and seminar. In 1999, she cofounded the Visual and Performing Arts in Education Special Interest Group with the American Education Research Association. She has also published in such academic journals as the *Virginia English Journal*, *Qualitative Inquiry*, *Theory Into Practice*, the *Journal of Curriculum and Teaching Dialogue*, and the *Journal of Curriculum Theorizing.* Her chapters appear in such books as the *Handbook of the Arts in Qualitative Research* (2007) and *Knowing Differently* (2008). Additionally, she coedited, with C. Bagley, a book and CD-ROM titled *Dancing the Data* (2002, Peter Lang). Email: cancieme@jmu.edu

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David H. Cropley, PhD, is professor of engineering innovation at the University of South Australia, Australia. He joined the School of Engineering at the South Australian Institute of Technology in 1990, after serving for 4 years in the United Kingdom's Royal Navy. His doctorate is in measurement systems engineering, and

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Leon de Bruin, PhD, is a postdoctoral research fellow at RMIT University. He is an educator, musician, and composer. As a researcher, he has authored over 20 peer-reviewed articles and book chapters on metacognition, creativity, performing arts/artistic practices, and creativity in education and the arts. His latest coedited book is *Creativities in Arts Education, Research and Practice: International Perspectives for the Future of Learning and Teaching* (2018, Sense, coedited with Pamela Burnard and Sue Davis). He is recipient of the 2016 Monash University Vice-Chancellor's Commendation for Thesis Excellence (2017), the 2016 Australian Society for Music Education Callaway Doctoral Award (for best doctoral thesis from an Australian university in music education), and the Monash University Postgraduate Publications Award (2016).

Charlotte L. Doyle, PhD, is professor of psychology at Sarah Lawrence College, USA. She earned her doctorate from the University of Michigan, USA. As a graduate student there, she coauthored *Psychology*, an introductory textbook, with Wilbert. J. McKeachie that underwent three editions and a Spanish translation. Later, she was sole author of *Explorations in Psychology*. At the turn of the millennium, she grappled with the problem of defining psychology for the field by writing the definition entry for the American Psychological Association's *Encyclopedia of Psychology*. She has written articles and book chapters on her research involving the creative process in children, fiction writers, actors, and teachers; theoretical articles have dealt with conceptualizing the creative domain, creative flow as a unique cognitive process, and reasons why people choose to listen to sad music. She also authored seven picture books for children including *Freddy's Spaghetti*, *Where's Bunny's Mommy*, and *The Bouncing, Dancing, Galloping ABC*. Teaching has always been a primary source of joy and challenge, and she has received teaching awards from the University of Michigan and Sarah Lawrence College.

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Daniel Fasko, Jr., PhD, is professor of educational psychology, Bowling Green State University in Ohio, USA. He teaches undergraduate and graduate courses in educational psychology and life-span development and an honors seminar on creativity. He has held leadership positions in the American Educational Research Association and the American Psychological Association and is a fellow of the Psychonomic Society. A frequent presenter at (inter)national conferences, he actively contributes in other roles. His research is on critical and creative thinking and application to teaching. He is former editor of *Inquiry: Critical Thinking across the Disciplines* and ad hoc reviewer for *Psychology of Aesthetics, Creativity, and the Arts*. He coauthored two books with Paul Wagner, Daphne Johnson, and Frank Fair: *Thinking beyond the Test: Strategies for Re-introducing Higher-Level Thinking Skills* and *Focus on Thinking: Engaging Students in Higher-Order Thinking* (both published in 2017, Rowman & Littlefield). He also coedited, with Wayne Willis, *Contemporary Philosophical and Psychological Perspectives on Moral Development and Education* (2008, Hampton Press) and edited *Critical Thinking and Reasoning: Current Theory, Research, and Practice* (2003, Hampton Press). In 2000, Morehead State University honored him with the title distinguished researcher. His doctorate is from Florida State University in Florida, USA. Email: dfasko@bgsu.edu

Liane Gabora, PhD, is a professor in the Psychology Department at the Okanagan Campus of the University of British Columbia, Canada. Her research focuses on the mechanisms underlying creativity and how creative ideas—and culture more generally—evolve, using both computational modeling and empirical studies with human participants. She has almost 200 articles published in scholarly books, journals, and conference proceedings; has procured over one million dollars in research funding; has supervised numerous graduate and undergraduate students; and has given talks worldwide on creativity and related topics. Her research on creativity is informed by her own experiences creating literature. She has a short story published in *Fiction*, another forthcoming in *Fiddlehead*, and a novel titled *Quilandria* underway that merges her scholarly and creative writing interests. Her paintings have been exhibited in Anastasia's Asylum Coffee House and Ten Women Gallery (Los Angeles) and Java Joe's Coffee House (Santa Fe), USA. Her animated short film titled "Self-Referential Face" was shown at the *Artificial Life VI Conference*, University of California, Los Angeles. Her electronic music composition *Stream Not Gone Dry* was performed at this university's Royce Hall (a piano version can be found at https://people.ok.ubc.ca/lgabora/artistic_files/Gabora-Liane-Stream.wav).

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Her public art installments include 60 4-foot dolls displayed in front of the US Department of Education (2012) and the cemetery for the "death of public education" for the first *Save Our Schools* (2012). Her documentary film *Voices of Baltimore: Life Under Segregation* (2018), coproduced with Gary Homana, was supported by Towson University (and it is available for free download). For her blog, go to www.educationalchemy.com. Email: mmcdermott@towson.edu

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List of Figures

List of Tables

Part I
Creativity Frameworks of Theory and Action in Education

Chapter 1
Creative Synthesis: Combining the 4C and Systems Models of Creativity

Carol A. Mullen

Abstract This chapter is a literature-informed conceptual essay that introduces dynamic creativity and bridges it with influential theory and generative possibility. The dynamic creativity construct grows out of the research on dynamics of creativity—both educational and cultural. Discussion moves to select influential creativity theories—Beghetto and Kaufman's 4C Model of Creativity and Csikszentmihalyi's systems model of creativity. A creative synthesis of these theories foregrounds their dynamic possibilities with graphical representation. A fifth C—Hidden-c—extends the theorizing about creativity with reference to Corazza's theory of dynamic creativity, which is demonstrated in a Chinese education classroom. Hidden-c refers to creative self-beliefs and behaviors that trigger the personal power of creativity and capacity for engaging in dynamic creativity. The role of adopter and shaper of creativity models informs the approach of this eclectic, layered work that is supported with original graphics. Implications for continuing the conversation about dynamic creativity conclude it.

1.1 Overview: Questions and Purposes

How might dynamic creativity apply to influential theory and generative possibility? This speculation—at the heart of this literature-informed conceptual essay—is itself a response to creativity researchers' call to advance notions of dynamic creativity. To quote Beghetto (2016), a proponent of this shift in the creativity paradigm, "As our understanding of the phenomenon of creativity continues to grow, it is becoming more and more evident that researchers need new ways of conceptualizing, identifying and studying creativity in the midst of social practices" (p. 270). Tan (2013) also calls for a new level of reflection by forward-thinking creativity researchers regarding "knowledge of creativity and cultivating creativity" (p. 27).

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Adding to this dialogue, I consider dynamic creativity in relationship to influential creativity theories.

In response, wanting to experience dynamic creativity that is educational and cultural in nature, I engage two highly recognized academic creativity theories: Kaufman and Beghetto's (2009) 4C Model of Creativity and Csikszentmihalyi's (1996, 1999) systems model. Into my theory-building I integrate the unique contribution of Corazza's (2016) theory of dynamic creativity for which my new idea of Hidden-c is being introduced (following my initial presentation of it to the teacher education field, Mullen, 2018).

1.2 Literature Review Methods

In this section, I present my creative methods. My methodological aims are to identify, discuss, and conceptualize select scholarship of contemporary influence in the area of creativity.

1.2.1 Identifying Creativity Scholarship as Primary Purpose

Scholars' creativity theories in psychology and education were sought in the published canon. Methodological support for theory-building predominantly came from Kaufman and Beghetto's (2009) and Csikszentmihalyi's (1996) creativity models. Herein I display a synthesis of these frameworks, with discussion of possible overlap and interplay.

Another step involved reviewing the academic literature on creativity in high-impact journals and books spanning 1996–2017. Cambridge University Press and Springer are among the sponsoring publishers. Online databases searched included the full text holdings of publishers and my home university's library. ERIC from WorldCat and Education Research Complete from EBSCOhost yielded relevant articles from academic journals and pertinent books. Also, documents were accessed via Google Scholar.

Discourse about creativity appeared in diverse sources: academic journals devoted to the topic of creativity (e.g., *Creativity Research Journal*), book series (e.g., Creativity Theory and Action in Education, published by Springer), and edited books (e.g., Kaufman & Sternberg, 2010). Influential theoretical and empirical sources were located using the search term *creativity* in association with *culture*, *education*, *educational psychology*, and *theory*.

In an earlier literature review of creativity frameworks (Mullen, 2017a), I found that educational psychology was particularly well represented among the academic disciplines as a prolific contributor to the creativity paradigm. Moreover, educational psychology is multidisciplinary and transdisciplinary (as opposed to insular

in its disciplinarity) in both the conception and treatment of creativity. Tan (2013) confirms academics' "efforts to explore new paradigms of creativity" (p. 27).

Pedagogically oriented research questions from my completed study (Mullen, 2017a, 2018) illustrate creativity in action. To paraphrase, what examples of Mini-c, Little-c, Pro-C, and Big-C might Chinese education students identify when prompted, challenged, and engaged? What might test-weary students in regimented academic programs experience when exposed to open-ended creativity concepts and activities?

As discussed later, I found the select creativity frameworks amenable to the creative development of Chinese preservice teachers. Moving past the disciplinary boundary as such into teacher education is not new for educational psychologists. (My disciplines are educational leadership and curriculum studies, with overlap in educational psychology). Border crossing has created forays into early childhood education (Craft, Cremin, Burnard, Dragovic, & Chappell, 2012; Craft, McConnon, & Matthews, 2012), cultural studies (e.g., Sternberg, 2006), systems thinking/science and sociology (Csikszentmihalyi, 1996, 1999), and more. Thus, I found *educational psychology* useful as a baseline descriptor for searching databases and taking my analysis into other disciplines.

Reviewing the creativity research, I settled on four criteria that arose from Kaufman and Beghetto's (2009) and Csikszentmihalyi's (1996) models.

1. Communities of creativity researchers worldwide cite and describe the recognized theory, using it as point of reference for advancing the conversation about creativity within the field (e.g., Neber & Neuhaus, 2013).
2. The recognized theory advances the author's knowledge-building about creativity, such as by using systems theory (e.g., Tan, 2013).
3. Application to pedagogical and learning contexts extends the well-known theory's influence and value in such areas as the nurturing of creativity within classrooms and schools subjected to high-stakes standardized testing (Collard & Looney, 2014).
4. The recognized theory is central to the ongoing debate around complexities involved in the individual creator's relationship to, and interplay with, impactful cultural and environmental forces (e.g., Glăveanu & Tanggaard, 2014).

To clarify, creativity researchers have described, analyzed, applied, or in some other way highlighted these select theories.

1.3   Definitions of Key Terms and Concepts

Creativity, culture, and systems all constitute complex, changing domains of knowledge in academia. An overwhelming number of definitions and multiple conceptualizations exist. As conceived for this writing, each is anchored to the dynamic creativity construct.

1.3.1   Creativity

Creativity generally refers to generating something new and valuable that is tangible (e.g., an invention or literary work) or intangible (e.g., an idea or theory) (Mumford, 2003). More specifically, it encompasses the collaborative process of seeking creative solutions to complex problems and performances known as "collaborative creativity" (Sawyer, 2012). In such group situations, the "collective social product" is not attributable to individuals (Sawyer, 2012, p. 67). Original work and transformation of ideas or things into something novel is a dynamic creative process, as is the re-creation or reinvention of that which already exists. Knowledge-building can also be creative (Tan, 2013), as can applying knowledge in pedagogic contexts (Beghetto, 2006) and thoughtfully appraising knowledge (Robinson, 2015). Open-ended questions invoke creativity and the unknown. Complex problem identification and problem-solving enhance processes of discovery.

1.3.2   Culture

Culture is the "act of developing the intellectual and moral faculties especially by education," as well as the "knowledge, belief, and behavior that [rely on] the capacity for learning and transmitting knowledge to succeeding generations" ("Culture," 2017). Besides educational value, the arts, creativity, and other self-expressions are regarded collectively as integral to culture.

While culture takes into account "a person's learned, accumulated experience" (Zimmermann, 2015), to have cultural impact, a creative idea must be admitted in a "cultural domain" (Csikszentmihalyi, 1996). Influential creative works can come from radically different cultures and worldviews (Kaufman & Beghetto, 2009) supporting the claim that dynamic creativity can occur anywhere and everywhere.

1.3.3   Systems

Systems thinking is a popular way of framing creativity that recognizes creative processes as emergent, self-organizing, and chaotic. Sawyer (2012) attributes to Csikszentmihalyi (1988), albeit not exclusively, the development of the systems model for which analysts of creativity seek to explain the micro (individual) and macro (social system) interrelationship. To Sawyer, navigating systems is a creative collaborative phenomenon involving social groups. Keller-Mathers and Murdock (1999) similarly reason that creators must navigate a system (e.g., organization) and its levels and domains to succeed. Expertise facilitates progress through these levels, coming to understand how to create novelty and perhaps even contribute to shared knowledge (Csikszentmihalyi, 1999).

Viewing creativity as a system, as Csikszentmihalyi (1996, 1998, 1999) does, draws attention to "interrelated forces operating at multiple levels" (Hennessey, 2013, p. viii). Even "an individual is regarded as a system," with psychological and other "subsystems" that have "to function well to regulate efficiently" (Tan, 2013, pp. 30–31).

1.3.4 Dynamic Creativity

To present a working definition of *dynamic creativity*, I borrow from key sources that resonate with my intended meanings: Corazza's (2016) notion of dynamic creativity as a phenomenon outliving "static creative achievement" (p. 261) and Glăveanu and Tanggaard's (2014) idea of creative identity as always changing, making identity protean and generative. Dynamic creativity is a complicated process and has "inconclusive outcomes" for creators, according to Corazza.

Dynamic connotes both power/ful and able ("Dynamic," 2017). Complex, dynamic interplays among individuals, systems, and cultures stimulate change or progress. Conceived dynamically, creativity involves constant activity, change, or progress and engages "subjectivity and the imagination," which, according to Corazza (2016, p. 262), can incite disagreement among experts where original outcomes question or violate norms.

In contrast, *stasis* blocks action and progress. Narrow definitions and pathways of creativity connote stasis, as in when outcomes of creative achievement shortchange the multitude of dynamics involved in generativity. Instead, dynamic processes of creativity involve the "search for original ideas" and "exploration of multiple alternatives" (Corazza, 2016, p. 261). From this perspective, complexities and unknowns are integral to active engagement and should thus be recognized as having creative value. As such, a richer definition of creativity incorporates the word "potential": "Creativity requires potential originality and effectiveness" (p. 262). Adding this lens arguably invokes another way of seeing, appreciating, and acknowledging—that is, creativity's dynamism depends upon deep exploration, which ignites uncertainty and indetermination in time-consuming, labor-intensive work.

However, it is not uncommon for complexities and unknowns of creativity to be reduced to several factors and components (in addition to outcomes) ("Stasis," 2017). It should not be overlooked that human dynamics can emerge from systems that themselves are stable yet paradoxically perpetuate the status quo ("Stasis," 2017). Of course, "Disequilibrium may spur [creativity]"—addressing weighty problems or coping with challenges to preconceived ideas can actually benefit the creative process (Collard & Looney, 2014, p. 350).

Either way, whether systems evidence equilibrium or disequilibrium, or a blend, dynamic creativity depends on an attitude of possibility. Craft (e.g., Craft, Cremin, et al., 2012) has long described creativity as possibility thinking, driven by "what-if" formulations. She even forwards possibility thinking as an evidence-based

concept driving creativity. With everyone being capable of questioning and imagining, this creative breakthrough may effect change within systems. From the life sciences, systems theorist Wheatley (1992) also asserts that a "what-if" mindset disrupts a "fix-it" mentality. To her, the possibility attitude promotes renewal of organizational systems and living entities. If possibility is conducive to change, as Ferdig and Ludema (2005) also contend, then generative possibility fuels the existence of dynamic creativity and a speculative future.

1.4 Select Creativity Theories in Psychology

My analysis of the literature and Internet results revealed a frequency of citations to Kaufman and Beghetto's (2009) 4C creativity model and Csikszentmihalyi's (1996, 1999) systems creativity model. Moreover, fellow scholars build on these Western theories, solidifying their value and influence. Recently, these models formed the basis of case studies of creative pedagogy in international settings (e.g., Mullen, 2017a, 2018). My empirical research of creative learning involved education and science students in China and the United States who endure the constraints of high-stakes testing. Openings for creative cultural discoveries evident in these exploratory studies could attract research interest in further globalizing the creativity models.

1.4.1 Kaufman and Beghetto's Creativity Theory

Kaufman and Beghetto's (2009) 4C model has four forms/levels/types of creativity: "Mini-c" is novel and personally meaningful experiences, "Little-c" is everyday problem-solving in work and life, "Pro-C" belongs to creative professionals (not famous), and "Big-C" is creativity of great magnitude reserved for famous works.

1.4.1.1 Mini-c

The most modest of the levels, Mini-c, feeds professional creativity and other types that would not otherwise come into being. As Eisner (2004) describes, meaning-making is itself an aesthetic process, neglected because it is elusive and challenging. Creative beings do not just *have* experiences—they make meaning of them. Communicating our (potential) discoveries, we enliven Mini-c's capacities by attributing meaning to our experiences of events, situations, and dynamics (Eisner, 1991). We creatively render these using images, schemas, and more.

1.4.1.2 Little-c

Humans constantly encounter problems to be (re)solved. Many simply react to problems rather than predicting them and tapping into a greater creative capacity. Many of us creatively use physical or digital objects and tools without much thought about our own artistry. In everyday problem-solving, creativity has endless possibilities—because the problems often encountered in life are ill-defined. More than this, we bring our dominant worldviews, mental models, expectations, and biases to a problem situation, making the concept of *problem* complicated and contextually driven, as well as open-ended and multifaceted (Stanton & Welsh, 2012). When we puzzle over something in daily practice, we are trying to solve a problem. And when we make inferences and decisions and arrive at a solution or judgment, we might very well be creatively problem-solving. A creative person might ask, What does *problem* mean in this context? Are there any alternatives to my socialized ways of seeing, knowing, and believing? (Schwab, 2004; Stanton & Welsh). What is the nature of this problem that I am *anticipating*? (Schwab).

1.4.1.3 Pro-C

Pro-C professional creativity recognizes highly accomplished creativity. Kaufman and Beghetto (2009) added it to their 2007 model, reintroducing it in 2009 as the Four Cs (or 4Cs) of Creativity. Such distinguished contributions move a discipline in a new direction or even completely change it. Pro-C contributions range from replication or improvement of pre-existing products to "reiniation," where creators try "to move the field to a new (as-yet-unreached) starting point and then progress from there" (Kaufman & Beghetto, 2009, p. 6).

   Likely, the most creative professionals who study unsystematic, difficult problems are ahead of others beholden to problems already identified. As such, complex problems demand "anticipatory consideration" (Schwab, 2004). Pro-C individuals are inspired "by possible fresh solutions to problems, new modes of attack, and [more]"; they do not miss the "novel features of new problems" (pp. 114–115). Attraction to novelty and originality helps explain that Little-c breakthroughs may lead to creative breakthroughs at recognized levels. Pro-C creators challenge the status quo by disrupting and remaking structures of knowledge, what Csikszentmihalyi (1996) describes as a field or domain's rules and procedures (symbolic knowledge).

1.4.1.4   Big-C

Big-C's famous works of human creative achievement transform societies, even the world. To Dewey (1934), when artwork becomes Big-C by "attain[ing] classic status it somehow becomes isolated from the human conditions under which it was brought into being." (p. 3). Everyday conditions and influences (e.g., activities) that imaginatively inform life should count as part of the cultural treasury. Such story lines are intrinsic to the aesthetics of art.

Creativity researchers building on the 4C creativity model acknowledge that while "extraordinary accomplishments" (in science, art, etc.) are eminent, Big-C's breakthroughs come from "myriads of Little-c creativity accomplishments" (Stoeger, 2003, p. 3). As we move from goal-setting to resolving obstacles, "numerous creative learning decisions" are involved (p. 3).

1.4.2   Csikszentmihalyi's Creativity Theory

Csikszentmihalyi (1996) illustrates his creativity framework using science (astrology) to depict conditions and influences for creative discovery as well as breakthrough. Pertinent across disciplines, his theory demystifies falsehoods associated with creators. This take on creativity conveys "interaction among domain, field, and person" (p. 29) as the source of creativity, not just an individual. He exposes the myth that creativity occurs "inside people's heads" as "some sort of mental activity" belonging to "special people" (p. 23).

Creativity advances as a systematic performance under a particular set of conditions. While someone may stake a claim in a creative act, it must be judged with reference to standards and a social process of evaluation belonging to a domain (academic or professional livelihood). A creative idea manifests, then, by "pass[ing] muster with the experts" before being admitted to a domain (Csikszentmihalyi, 1996, p. 27), where it can become known and make an impact. Creativity "observed only in the interrelations of a system" (p. 27) is a systems model situating the creator within a dynamic ethos of field and domain.

1.4.2.1   Systems Model of Creativity

Csikszentmihalyi's (1996) systems model of creativity encompasses three levels:

1. *Domain* (macro) "consists of a set of symbolic rules and procedures" that are "nested in … culture, or the symbolic knowledge shared by a particular society, or by humanity."
2. *Field* (next level of macro) includes "gatekeepers to the domain [whose] job is to decide whether a new idea or product should be included in the domain."

3. *Person* (micro) "has a new idea or sees a new pattern" that "use[s] the symbols of a given domain" (e.g., engineering), and "this novelty is selected … for inclusion." (pp. 27–28)

(For graphical depictions of Csikszentmihalyi's systems model, see Kahl and Hansen [2015]).

1.4.2.2   Systems Model Illustrations

From interviews with 91 exceptional contributors of knowledge to their domain, Csikszentmihalyi (1996) validates his suppositions, although the creativity field is no longer strictly associated with studies of "genius" or its implied values. Creativity research as a domain is "shift[ing] away from elite, culturally dominant activities to activities found in a range of cultural, ethnic, and social class groups" (Sawyer, 2017, p. 354). Increasingly, the "everyday creativity" of "the working classes or the uneducated" is being studied (Sawyer, p. 354). This trend encompasses teachers and learners' creative processes and interaction within a milieu (see Beghetto, 2016; Craft, Cremin, et al., 2012; Craft, McConnon, et al., 2012; Mullen, 2017a, 2017b, 2018).

An extended vignette enlivens Csikszentmihalyi's (1996) creativity interaction model: An astronomer made a Pro-C discovery that a galaxy's stars do not always rotate in the same direction. While this astronomer had shown herself to be creative, domain experts would have to decide whether to corroborate her creative accomplishment. After her creative discovery was validated, the work was funded and published, and her finding was admitted into astronomy's canon. At the macro level, a complicated, long-term interaction would have transpired, allowing the creator's work to become known and possibly have impact.

Of course, within a knowledge domain, external factors can significantly affect an outcome. Hurdles include an organization's cultural dynamics, a nation's politics, a domain's prohibitive structures, and an individual's circumstances. For example, domain experts may not appreciate a creator's discovery or see it as such, yet, despite barriers and (in)visible dynamics, a creation may still become known.

1.4.2.3   Select Theories' Generative Possibilities

Kaufman and Beghetto (2009) confirm Csikszentmihalyi's (1996) idea of creativity as an interaction among person, domain, and field, concurring that creativity's synergies extend well beyond a person's idea or work. Regardless, they assert the importance of "person" as creativity's primary source.

For Csikszentmihalyi (1996), because the creator is de-emphasized, shaping forces (i.e., field and domain) that impact one's creative capacities come to the fore. Hypothetically speaking, all of the synergies that influence success are exposed. Hence, the creative person is but one of multiple energetic forces at play within a
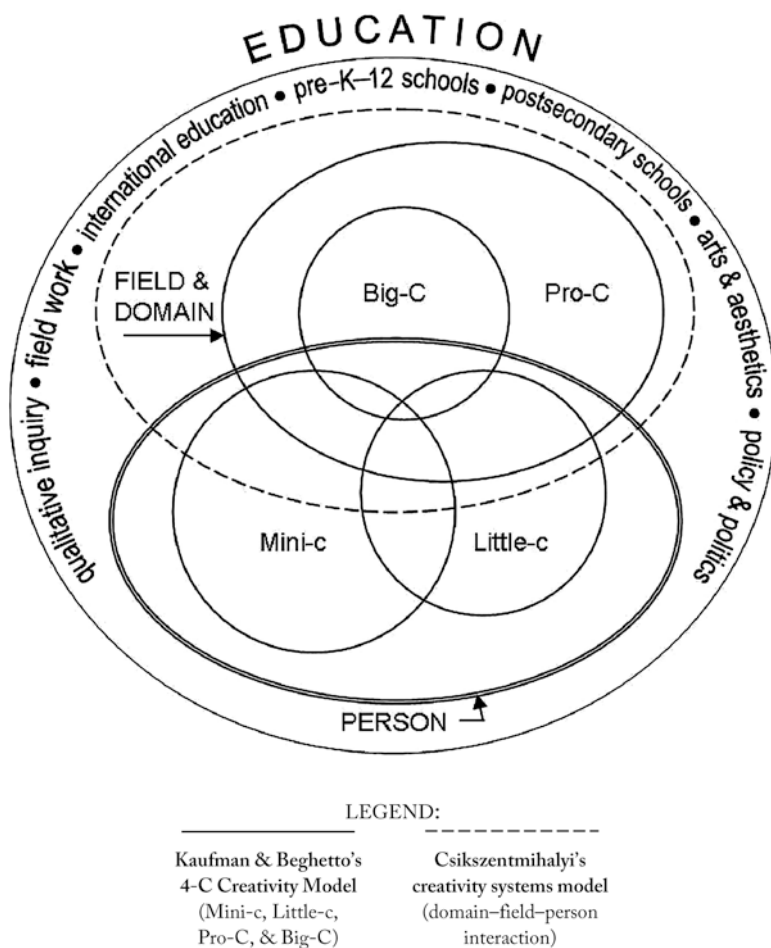
Fig. 1.1 Creative synthesis of 4C and systems models of creativity (Mullen, 2017a)

complex web. For Kaufman and Beghetto, like Csikszentmihalyi, creator and environment interactively influence creative processes and outcomes. What mainly differs in these frameworks is the perspective as to which force predominantly influences the creative sphere—creator (Kaufman and Beghetto) or milieu (Csikszentmihalyi). Context, as in ever-present social influences, is evident within these creativity paradigms, albeit to different degrees.

While these models are not polar opposites, as Fig. 1.1 may suggest, their emphases differ regarding human creativity and influences from the milieu. Evident in Kaufman and Beghetto's (2009) explanation, external forces are still highly influential within this worldview. However, due credit is given to the seeds of generativity (i.e., Mini-c and Little-c) for formulating ideas, making gains, and experiencing breakthroughs that are modest and may not be known to anyone. In my own theory-

building, the two psychology frames intersect not in perfect harmony but more as complementary perspectives on creativity.

However, societies have a bias toward "eminent creativity" (Kaufman & Beghetto, 2009), favoring cultural icons. The greatest inventions of all time have proven transformative for global societies (e.g., cars, compass, Internet, printing press, wheel, vaccination). Revolutionary theories are also numerous, with the most familiar among them including Heliocentrism, evolution by natural selection, quantum theory, relativity, and information theory. The lopsided view of creativity as eminence casts light on such truly groundbreaking creative achievements (inventions and innovations) in their scarce forms. With societal attention long geared as such, the "quality of creative products in schools" fails to attract much attention. Consequently, these lack "clear reference standards" and creativity goes without a common definition in education policy and curricula (Collard & Looney, 2014, pp. 3, 351).

Notably, efforts to raise awareness of creativity that is *not* about Big-C famous works but rather everyday life are also relevant (see Dewey, 1934). Of continuing interest, then, are the near invisible, barely detectable Mini-c and Little-c creative processes (e.g., Beghetto, 2006).

1.5 Systems Theory and Life Systems

An ecological take on creativity is that all societal sectors (e.g., schools) are life systems subject to adaptation, change, disruption, re-organization, and growth. Proactively responding to demographic and global trends is paramount if these sectors are to thrive, innovate, and lead (Wheatley, 2017). Creative thinking, critical thinking, and problem-solving are all capacities for success in innovative, globalized economies (Heyl, 2014). Rigid dispositions, customary patterns, and the status quo do not facilitate innovation and adaptation (Bandura, 1997), yet the struggle to survive is not without politics. In fact, "survival of the fittest" is how Li and Gerstl-Pepin (2014) describe the political rhetoric of economic innovation and revitalization dispossessed of creative vision.

In the creative economy, transforming nations and their subsystems (e.g., institutions) provoke a level of instability. Such creative behavior, intentional or not, disrupts the existing state of affairs, allowing for new and complex learning (Wheatley, 1992). Being innovative and creative as a growing, adapting system necessitates "self-organizing interaction" (Stacey, 1992) and a "transformative interactive" among peers (Ferdig & Ludema, 2005). This kind of work and relationship crosses organizational, disciplinary, and other borders. Team members creatively negotiate boundaries, interacting and combining elements from different contexts that generate the new and unfamiliar (Akkerman & Bakker, 2011; Mullen, 2017a; Sawyer, 2012).

In changing work environments, creativity is a condition of innovation and a crucial component of organizational excellence. In such life systems, transforma-

tion is not subjected readily to one person's vision (Stacey, 1992). No powerful entity is the sole proprietor of creative vision. Perhaps this is why Akkerman and Bakker (2011) identify innovation in teamwork and creativity of organizational collaborators as influencers of expert performance and organizational excellence. Importantly, in disequilibrium, the collective (e.g., activist communities) and influential sectors of society (e.g., tech-savvy youth) enact vision that may conjure exciting (or dangerous) possibilities for creativity.

Living systems—cells, organisms, groups, organizations, and societies—interact with the environment through a flow of ideas, energies, and data. These survive by forming, adapting, sustaining, and even reinventing themselves (Wheatley, 1992). Like other living things, the system (e.g., human being, organization) has a personality, values, and structures (Brown & Moffett, 1999). Micro moves, exchanges, and actions can execute a creative process in the direction of systems renewal.

Beyond human dialogue and action, renewal of a system depends on an attitude of possibility supporting speculation and change (Ferdig & Ludema, 2005; Wheatley, 1992). Human-centric conceptualizations can generate momentum for inquiry and change, no matter how uncertain. Life itself is dynamic, unlike an organizational chart's static representation of life systems (Wheatley & Kellner-Rogers, 1996). To Wheatley (1992), life forces are fluctuations; like those in the universe, these are the "primary source of creativity," producing disturbances and imbalances (p. 20): "Every organization is an identity in motion" (Wheatley & Kellner-Rogers, 1996, p. 58). Viewing the world as a living organism (rather than a machine) is a lesson from Wheatley's (2017) new life science model—systems as organisms are unstable, unpredictable, and uncertain, yet identifiable. Dynamic creativity feeds off such dynamics.

Systems flourish when regenerated and reinvented (Brown & Moffett, 1999). Within such institutions, structures, practices, programs, and policies are attuned culturally and globally (Mullen, Rodriguez, & Allen, 2017). With systems aging, vitality, flexibility, and fluidity diminish, as does the "capacity" for "meet[ing] challenges from unexpected directions" (Gardner, 1963, p. 3). Holding onto obsolete ways of thinking and behaving may be preferred and is an unfortunate habit, but, as Heyl (2014) explains, "a world of distributed learning" confronts "the short shelf life of knowledge" (p. 254).

In a dynamically creative world, power hierarchies give way to new patterns of interaction, collaboration, and interdisciplinary work. Cross-cultural teams and even interorganizational collaboratives draw together expertise from diverse members and fundamentally different organizations to tackle perennial questions of education. One such question is how to revitalize outdated organizations to meet the twenty-first-century demands of rapidly increasing diversity in urban school populations (Mullen et al., 2017). Mature civilizations and their sectors and organizations retool in fundamental ways through such means as an action-oriented vision of diversity, collaborative learning, and strategic alliances. Growth is thriving, functions are team supported, and vibrancy is perceptible.

1.6 Culture Frame

Creativity within high-stakes testing cultures is thought by many educators to produce or perpetuate stymied life systems (e.g., Zhao, 2014). Creative expression and innovation in such schooling contexts, spanning the West and the East, are a struggle to cultivate. As Collard and Looney (2014) explain, a pedagogic problem is the tendency of some teachers to avoid interfering with their students' creative self-expression so as not to dishearten them. In this scenario, learners receive "little guidance" and feedback for improving their work. Consequently, empirical understandings of high-quality creative work need much development.

Consider China's testing milieu. Teachers are expected to help students achieve high test scores and unquestioningly respect authority (Lee & Pang, 2011). Low scores on entrance exams limit future possibilities for Chinese citizens, with severe consequences including poor quality of life and even suicide (Zhao, 2014). China's competitive mindset dominates, undermining such collective strengths as a strong sense of social belonging (Staats, 2011).

Paradoxically, while China's labor markets control education systems and hinder creativity, explains Staats (2011), China is seen as accrediting the collective with being creative (Sternberg, 2006). The collectivist tradition should make it amenable to collaborative expressions of creativity and cooperative groupings, but another constraint is that classes are typically large and teacher centered (Starr, 2010).

In mainstream China, classroom pedagogies must align with rote testing goals even though the World Economic Forum (2013) identifies creativity and entrepreneurship as proficiencies needed for global literacy. However, generative possibilities exist within this test-centric environment where Chinese students—presumed to lack creativity (Li & Gerstl-Pepin, 2014)—have opportunities to experience interventions of creativity. In Mullen's (2017a) study mentioned earlier, 34 Chinese education undergraduates produced dynamic cultural frames of creativity in response to Kaufman and Beghetto's (2009) 4C creativity model. Cooperative work groups and a collectivist orientation supported the creative learning.

Chinese students' reduced creativity likely reflects their culture, learning environment, and teachers' mindset. Niu and Sternberg (2001) had evaluators rate the creativity of Chinese and American college students, finding the American artwork more creative and aesthetic. Negative influences they identify in China are environmental task constraints and the absence of teacher directives to be creative. Similarly, Niu, Zhang, and Yang (2007) attribute the differences in performance of college students in the United States and Hong Kong to cultural influences. (Americans proved stronger in creative thinking on creative writing and problem-solving tasks involving insight).

China's government believes its citizens lack creativity and are incapable of flexible and divergent thinking, critical thinking, and higher order thinking. Students take their directions from teachers who are carriers of the regime. Given its millions of followers, Confucianism has likely reinforced such allegiance to the government.

Chinese students have had to become very good at tested subjects, sacrificing development in open-ended problem-solving. However, despite the generalization that this population is creativity-poor and math-smart, creativity is evident in China's entrepreneurial sector (e.g., Woetzel & Towson, 2013) and has also been witnessed in the educational sector (e.g., Mullen, 2017a, 2017b, 2018).

1.7 Introducing Hidden-c

Interacting with select creativity models from educational psychology, I identify a fifth C—Hidden-c. *Hidden-c* refers to creative self-beliefs and behaviors that trigger the personal power of creativity and capacity for engaging in dynamic creativity (Mullen, 2018). Making a dynamic creative achievement by shifting and changing over time and overcoming challenges encountered quite possibly mobilizes the capacity for influencing environments and being influenced by them. Putting personal creativity center stage as a creator or instructor is strategic—it speaks to our capability to become immersed in the exploratory experience of originality and effectiveness. Altering conditions and situations that affect generative work is a possible outcome.

This creativity construct aligns well with conceptions of dynamic creativity (Corazza, 2016) and complements Kaufman and Beghetto's (2009) 4C creativity model. Using theory-informed application to ground Hidden-c, I envision it as having generative possibilities for which theoretical perspectives and Chinese learning contexts serve as touchstones. To further contextualize Hidden-c in the literature, when creative potential is realized, it manifests as creative achievement (Corazza, 2016) in one of the 4Cs, typically Little-c's sphere of problem-solving or above. (However, a case could also be made for Mini-c's meaning-making domain). Conversely, when the potential for creativity is not fulfilled (for internal or external reasons), then one remains in a state of what Corazza describes as creative *inconclusiveness*, that is, the Hidden-c condition. In this view, educating for creativity becomes an effort aimed at promoting higher and higher levels of potential for originality and effectiveness, as well as the conditions that transform Hidden-c into some form of creative achievement (Ronald Beghetto and Giovanni Corazza, personal communication, February 18, 2018).

1.7.1 Creative Self-Belief

Importantly, for decades, educators have asserted that teacher beliefs (such as all students are naturally creative) are more powerful than teacher knowledge. Xu (2012) sees teachers as "highly influenced by their beliefs" (p. 1397). Based on Xu's review of the literature, we know that teacher belief affects how educators define problems, make decisions, and even act. Because creative self-beliefs form at a

young age, these tend to stay the same, she contends. However, they *can* change when individuals are exposed to enriching opportunities for expressing creative behaviors, a conception that deserves more development and testing.

Quite possibly, before human beings can creatively and dynamically generate meaning, problem-seek, and problem-solve—let alone contribute to professions or the world—they must believe in their potential for creativity. Self-belief, also creative self-belief, is rooted in the long-established concept of *creative self-efficacy* (the "perceived confidence to creatively perform a particular task") (Beghetto & Karwowski, 2017, p. 3). Creative self-belief can be explained as the "self-judgment about one's confidence to creatively perform an impending task at a particular level (e.g., 'I am confident that I can creatively solve three of these five problems')," which is "triggered [in] a performance situation" (Beghetto & Karwowski, 2017, p. 7). These creativity researchers also classify creative self-efficacy as a type of creative self-belief.

Beyond theorizing, there is empirical validation of the hypothesis that self-belief is fundamental to creative processes and probably the very capacity to be creative. For example, Beghetto's (2006) US-based survey study of 1322 middle and secondary students' judgments of their creative abilities advances the fundamental premise that "although creative ability is necessary for creative expression, it is not sufficient. Creative expression … seems to be influenced by self-judgments of one's ability to generate novel and useful outcomes" (p. 447). A possible interpretation of *self-judgment*, as Beghetto puts it—or Hidden-c from my perspective—is that it is both a catalyst for all creative endeavors—a form/level/type of creativity unto itself—and a shaping force that underlies the 4Cs. At all levels of creativity and across types, creators who persist with the doubts, uncertainties, and unknowns typical of long-term, complicated creative work may learn something valuable from failure. A Pro-C or even Big-C creative achievement signals success, but educative insight comes from firsthand knowledge of intricacies and dynamics.

1.7.2   *Chinese Preservice Teacher Demonstration*

Given this framework and study finding of creative self-belief, one might find it mysterious that the Chinese preservice sophomores I taught did prove to be creative (Mullen, 2017a, 2018). Despite feeling long suppressed (and overly regulated by test-centric curricula) to the point of believing they were uncreative, these education majors rose to the occasion. Within cooperative groups in a Chinese university's ministry-set general curriculum devoid of the liberal arts, students read, interpreted, and performed the basic 4C classification (Kaufman & Beghetto, 2009). In teams and alone, they produced writing and graphics signifying the four categories of creativity, in addition to unifying images of their homeland for which they felt proud (e.g., Confucius, a beloved teacher–philosopher). These undergraduates also creatively and collaboratively performed their achievements on our classroom's stage,
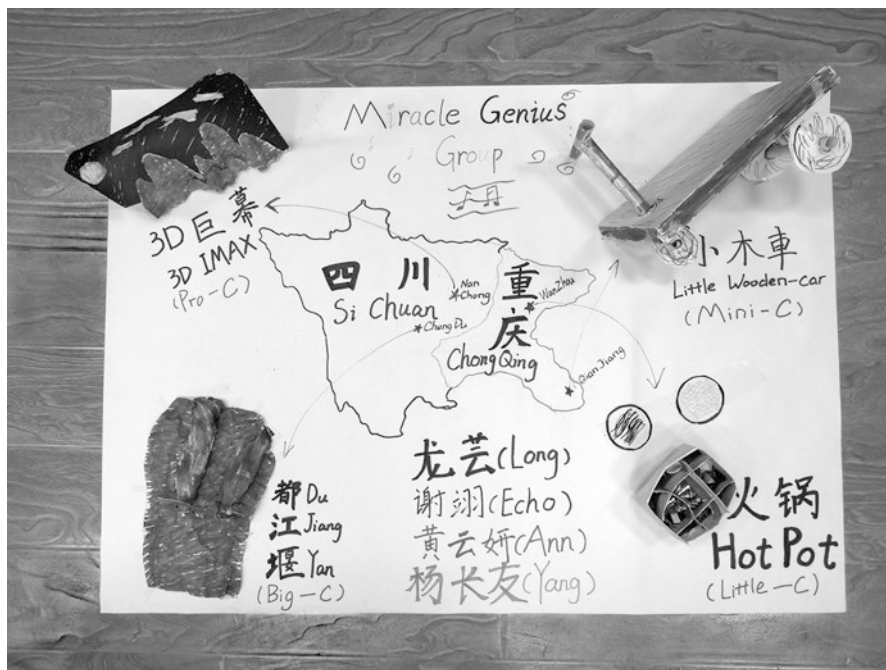
Fig. 1.2 A Chinese team's 3D paper poster rendering of the 4Cs (Mullen, 2017a)

complete with a microphone and homemade 4C props, and later for a live audience of leaders.

To demystify why creativity occurred in these paradoxical and impossible circumstances, I had conceptualized an original study and designed a learning environment that was a direct response to Niu and Sternberg's (2001) and Niu et al.'s (2007) research findings. Translating their two major takeaways at the level of practice, I endeavored to remove as many task constraints as possible within the Chinese classroom in favor of establishing a creative workspace and communicating directives to be creative. My expectations were articulated explicitly in the course titled Creativity and Accountability in Education. These carried through in my training of a bilingual teaching assistant and our English–Mandarin instructions accompanying all exercises and performance feedback.

In this Chinese course, students' creative products suggested dynamic creativity by way of Mini-c and Little-c collective immersion. The original products built upon the personal essays of creativity in the form of joint productions—3D paper posters representing each of the 4Cs, complete with an integrative image of all 4Cs (e.g., points of a compass, members' birthplaces) and an accompanying script (scroll) documenting decisions made (see Fig. 1.2).

Table 1.1 is an elucidation of this exhibit; the 4Cs are aligned with this group's associations with, and signifiers of, each of them. Adding to the 4Cs by integrating them is a request I made of my Chinese students. Building on the 4C model from

Table 1.1 Associations with the 4Cs in the Chinese team's 3D paper poster

4Cs	Signifiers of the 4Cs and integration
Mini-c	A three-wheel cart (with moveable wheels and handlebar) signifies an invention from childhood (upper right-hand corner)
Little-c	"Hot-pot," a culinary invention, solved the historic problem of seafarers feeling chilled (lower right-hand quadrant)
Pro-C	3D IMAX films, only discovered in 2008 in China, are mesmerizing young generations who may make their classrooms more creative (upper-left quadrant)
Big-C	A hydraulic engineering project of the Qin dynasty is a working irrigation infrastructure on China's world heritage list (lower left-hand corner)
Integration	Drawing a map of their birthplaces, students linked the 4Cs by way of their personal and cultural affinity with the cart, Hot-pot, films, and irrigation system

the standpoint of putting together parts or elements (e.g., 4Cs) and combining them into a whole facilitates the creative potential for higher-order thinking. An "ah-ha" moment for those immersed in creative work more readily results (see Table 1.1 under "Integration" and Fig. 1.2 for the mapping of birthplaces). With the support of these graphics, I am presenting integration as a new metacognitive idea relative to the 4C theory. I am also treating it as a pedagogic strategy for encouraging students' dynamic creativity and sense-making about this process.

In this preservice classroom, students' (inter)subjectivities and imaginations were stimulated cognitively and artistically, a process that Corazza (2016) identifies as intrinsically dynamic. Negotiating conceptions and representations, all cooperative groups moved from the intrapersonal (Mini-c and Little-c) to the professional/cultural (Pro-C), to the societal/global (Big-C), articulating examples of Pro-C and Big-C creativity rooted in Chinese culture.

Paradoxically, half of the students' essays on personal creativity expressed *not* being creative, echoing the stereotype (Mullen, 2017a, 2018). Some of these participants could not recall ever having had a creative experience. If they had, an adult or another external force had disrupted it. Brainstorming beyond their personal essays, teams generated novel creations connoting practical value. Self-reported was 4C curiosity, task engagement, and peer enjoyment, all outcomes associated with creativity (Kaufman & Beghetto, 2009). Students strongly preferred the group projects, not acknowledging that the self-reflective groundwork in creativity had originated with their individual essays. The teams had no avenue available for imitating or replicating the 4C model (e.g., consulting the Internet or samples), solidifying my conclusion that the class had evidenced high group creativity.

This course's rapid pace and brevity further suggested some level of self-confidence or perhaps shared confidence in creative risk-taking. Like the marginalized learners (e.g., girls, English language learners) in Beghetto's (2006) study, being at a disadvantage can challenge one's beliefs about the capacity for creativity. Because feedback from peers and teachers about one's ability influences creative self-efficacy, encouraging this can boost the most vulnerable student's learning. Influential authority figures and peers factor into creative learning experiences, as do perceptions. Contextual dynamics (e.g., teacher acceptance) can bring about

feelings of belonging (Beghetto, 2006), which in the Chinese classroom was evidenced as a feeling of communal bonding and friendship arising from a safe space for taking creative risks and expressing oneself individually and as a group.

Focusing on "domain" and "field," Csikszentmihalyi's (1996) model serves as a reminder that influential forces, visible and invisible alike, constantly exert influence. Within classrooms, the teacher is a gatekeeping force upon which seen and unseen forces wield power. On the scale of a field or domain, gatekeeping by expert peers who evaluate the quality of products (e.g., manuscripts) is a deciding factor in what counts as a creative contribution. Such real-life dynamics can affect anyone's creative self-efficacy, motivation, doubt, and even desire to persist.

Situations in which creativity is blocked do not necessarily negate being creative and in fact can strengthen one's resolve and thus capacity to be creative (Beghetto, 2006). Some creators do persist with creative challenges, even changing their circumstances and courageously modeling what is possible. While socialization or circumstances might inhibit the development of positive creative self-beliefs, individuals might find they can perform creative tasks where energized and modeled or imposed and scaffolded (Mullen, 2017a, 2018). A teacher's explicit instruction to be creative or innovative is one such opportunity.

It follows that creative self-belief and new learning indicate both paradox and possibility in restrictive environments. Within this Chinese preservice teacher classroom, Hidden-c surfaced as a creative force in students' learning performances. Undergraduates were placed in a novel situation—their classroom was a small theater organized into a work studio with round tables. The curriculum, developed and taught by myself, an American professor, was organized around project-based learning within cooperative groups and steeped in a collectivist orientation (Mullen, 2018). However, I did not known at the time if the piloted curriculum, experiential conditions, and new activities for fostering creativity would in fact stimulate creative thinking and yield creative products or overall success.

1.8   Takeaways, Implications, and Possibilities

Future directions for theory, research, and practice emerge from this layered treatment of creativity ideas. Dynamic creativity was my focus, with creative self-belief brought into the mix and extended to Hidden-c. A vignette of Chinese creative learning and collaboration was featured to demonstrate the 4Cs. I added the concept and practice of integration to the 4C model.

1.8.1 Dynamic Creativity in Hindsight

Dynamic creativity—the central construct herein—was introduced as a new concept (besides Hidden-c), which I illustrated with examples. This key sense-making device allowed for the exploration of select influential theory and generative possibility. A speculation was that dynamic creativity involves generative possibility on many different levels, from adaptive and flexible learning to the changing self-beliefs of individuals and nations.

Hopefully, something intriguing has been conveyed about complex, dynamic interplays of creativity among individuals, systems, and cultures. Certain understandings underlying this writing are that creativity can be operationalized in experiential terms through "creative activity and creative products" and that creativity relies on "the judgment process" and "who the judges are" (Corazza, 2016, p. 259). Vital to this picture are attitudes of possibility in expressing and manifesting creativity, as the various life systems' examples and cases suggest.

1.8.2 Hidden-c's Creative Potential

Also presented was the emergent idea of Hidden-c, with grounding in the creativity theories of Kaufman and Beghetto (2009), Csikszentmihalyi (1996), and Corazza (2016). While perhaps an extension of the 4Cs theory, the generative possibility of Hidden-c was more a demonstration of dynamic creativity along the lines of Corazza's thinking. The life systems interpretation of Csikszentmihalyi's (1996) creativity framework also served to advance dynamic opportunities for thinking about different kinds of systems in which creative learning is essential for adaptation and growth. Notably, the creative synthesis of Kaufman and Beghetto's and Csikszentmihalyi's models may provide creative openings for readers to rework or even apply the idea.

What does Hidden-c suggest? Based on viewpoints ventured, Hidden-c may facilitate creative thought and action for which the belief in oneself as a creative being is a generative force. Dewey (1934) teaches that the human condition through which creativity manifests must not be lost—everyday creativity borne out of circumstance and conflict should be part of any cultural story. For Eisner (2004) too, creativity is the soul of the human condition. Creative schools catapult creative teaching and learning, potentially adding capital to creative societies. Leaders of school systems with a creative trajectory need frameworks to serve their purposes. Kaufman and Beghetto's, Csikszentmihalyi's, and Corazza's theories can be utilized for systems and cultural change.

1.8.3   Creative Self-Belief Emergence

While not focused on teacher and learner beliefs, this writing has implications for study of this area. As explained, a finding of Niu's breakthrough studies is that Chinese students' reduced creativity likely reflects their culture, environment, or context rather than any natural ability to be creative (Niu & Sternberg, 2001; Niu, Zhang, & Yang, 2007). Significant interferences with the creative process from youth can condition preservice teachers and other adults to believe they have a deficiency in creativity. Consider the scale of this problem for students wanting to teach who will in turn influence the young. Not only is this self-belief a serious hindrance for the preservice teacher but also for societies struggling to adapt and excel in the creativity economy.

   Theory-building about dynamic creativity could enrich the self-belief construct with study of how nations understand their capacity to be creative and reflective. Entire nations as living systems possess dynamic creativity, including generative regimes. Imagine such ideas in the worldwide community of creativity scholars capable of addressing creative self-belief on the scale of nations and their influence on personal, professional, and eminent creativity! In effect, new insights into creativity could emerge on an entirely new level that, specific to Hidden-c, affect people's belief in their capacity to contribute creatively something larger than themselves.

1.8.4   Chinese Creativity Case

Another takeaway is that creativity is *not* limited to a particular application. A universal application, creativity, like good teaching, is integral to all learners. Seeds for creative learning, growth, and transformation were contained in the Chinese case, with China's particular ways of relating to the world's high-stakes testing ethos and opportunities for creative innovation. In fact, the rich illustration of China's collective strengths evidenced in classroom creativity sheds light on the larger narrative of dynamic creativity. Dynamic creativity makes possibility palpable—breathing life into education—no matter the circumstances and beliefs.

1.8.5   A Final Word

Readers may choose to adapt any of these ideas to inform their own theories, studies, and pedagogies. My hope is that this discussion about dynamic creativity, with application to influential theory and generative possibility, offers something of value. Hidden-c's creative potential may be worth developing and mining in new contexts that spur dynamic creativity.

1.8.6   Author's Notes

This chapter is a condensed, updated version of an original publication, cited as follows:

Mullen, C. A. (in press). Dynamic creativity: Influential theory, public discourse, and generative possibility. In R. A. Beghetto & G. E. Corazza (Eds.), *Dynamic perspectives on creativity: New directions for theory, research, and practice in education*. New York, NY: Springer.

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Chapter 2
Structured Uncertainty: How Creativity Thrives Under Constraints and Uncertainty

Ronald A. Beghetto

Abstract Creativity is often associated with slogans like "think outside the box," which imply that creativity dwells outside of constraints. Given that schools and classrooms are filled with constraints, including increased pressures from accountability mandates, it makes sense that people may come to believe that creativity is under duress, in a state of crisis, or that "schools kill creativity." In this chapter, I offer an alternative perspective. More specifically, I discuss how creativity always operates in constraints and that creative expression emerges from structured experiences with uncertainty. Rather than viewing constraints as stifling creativity, I argue that they actually serve as a supportive structure for creative thought and action in educational settings.

2.1   Introduction

Is creativity in a state of crisis in K-12 schools and classrooms? Do schools kill creativity? Do curricular and assessment mandates put too much pressure on teachers and students, making it impossible for them to engage in creative thought and action? The simple answer is no. The more nuanced answer is it depends.

   The purpose of this chapter is to demonstrate how creativity can and does thrive under pressure, constraints, and other forms of uncertainty. More specifically, I open by outlining some operating assumptions about creativity, and then introduce the concept of "structured uncertainty," illustrating how uncertainties and constraints serve as a basis or catalyst for creativity. I close with a brief discussion of how educators can use this concept to design curricular experiences and activities to support both creative thought and action in and outside of the classroom.

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2.2 Operating Assumptions

In order to understand how creative thought and action can and does thrive in educational contexts, it may be helpful to first outline a few working assumptions about how educators and researchers might think about creativity. In what follows, I highlight my operating assumptions about creativity in educational settings.

2.2.1 Creativity as a Distinction

The first step in understanding the role that creativity plays in educational contexts is to recognize that creativity is a way of describing phenomena and not an entity itself. This is an often overlooked, but important assumption. When people (including creativity researchers) talk about creativity, it is often unclear whether they view creativity as an entity or an attribute.

An entity view portrays creativity as a thing that has its own distinct existence. Such a view serves as the basis for descriptions of creativity as something that particular individuals possess and something that can be given or taken away. Claims such as "schools kill creativity" or "she is a creative teacher and he is not" have a basis in this conceptualization of creativity. When this logic is followed to its conclusion, creativity devolves into a parasitic homunculus that dwells within people and reproduces itself through creative experiences, thoughts, actions and artifacts (Beghetto, in press).

The assumption that serves as the basis of this chapter is that creativity is not a thing, but a distinction we bestow on particular experiences, ideas, actions, and artifacts. Given this assumption, the important question becomes, *on what basis do we make this distinction?*

2.2.2 Criteria for Making Creative Distinctions

Although creativity researchers vary in how they specifically define creativity (see Corazza, 2016; Simonton, 2017; Smith & Smith, 2017) most tend to agree that creativity involves contextually defined originality and meeting task constraints (Amabile, 1996; Glăveanu, 2013; Plucker, Beghetto, & Dow, 2004; Runco & Jaeger, 2012; Stein, 1953; Stokes, 2006). Creativity, therefore, involves balancing originality and task constraints for a given classroom situation or learning assignment.

This definition underscores the idea that both originality and meeting task constraints are necessary for something to be described as creative. If a student shares a unique example during a discussion about the rise and fall of civilizations, but it is not relevant to the discussion then it is only original, not creative. Similarly, a student who uses taught procedure for solving a puzzle, would be meeting the task

constraints, but following a known procedure is not creative. Rather, students need to find a way to balance their own unique ideas with expectations and guidelines of the learning task.

This definition of creativity should not imply that determinations of what is and is not creative require equal proportions of originality and meeting task constraints. Rather, depending on the situation (e.g., an elementary classroom), even a small amount of originality might still be considered creative (e.g., a first grade student comes up with a novel way to resolve a disagreement between peers).

Recognizing that creativity represents some combination of originality and meeting task constraints can be quite helpful in understanding how creativity can be infused in even the most rigid of guidelines and learning criteria. This recognition is particularly helpful in schools and classrooms, because the task constraints are often predetermined. In such cases, students and teachers typically only need to find ways to add a bit of originality in meeting the task constraints in order for something to be considered creative.

2.2.3   Levels of Creative Magnitude

Equipped with an understanding that creativity is a distinction that is made based on the dual criteria of original expression within contextually defined task constraints, it is then helpful to recognize that determinations of creative expression can be made at various levels of creative magnitude. Importantly, the criteria for making these judgments remain the same, but the context and magnitude of creative expression change.

The Four-C model of creativity (Kaufman & Beghetto, 2009) provides a framework for understanding how creativity can manifest and develop across different levels of creative magnitude. Figure 2.1 provides a visual overview of the model, illustrating the development from creative inspiration to creative impact (adapted from Beghetto & Kaufman, 2014).

In what follows, I briefly highlight these four levels of creative magnitude, including their distinguishing features and transition points. I provide a bit more discussion of the transition from mini-c to little-c as this is often the most relevant for schools and classrooms.

2.2.3.1   Mini-c Creativity

As illustrated in Fig. 2.1, the smallest level of creative magnitude is mini-c creativity. Mini-c creativity refers to an internal judgment of new and meaningful (i.e., creative) insight, idea, or interpretation of experiences. It is a subjective judgment of the person and need not be recognized as creative by others (Runco, 1996; Stein, 1953). Any time a student learns something new and meaningful or a teacher has a novel
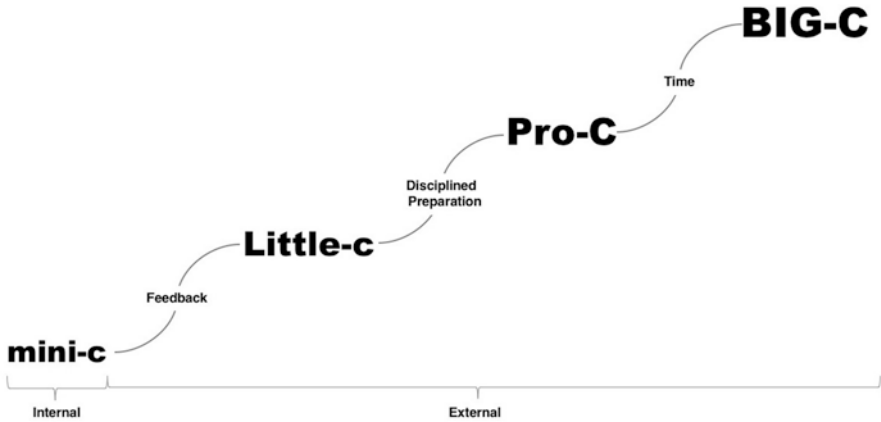
Fig. 2.1 Four C Model of Creativity

and relevant idea for how to teach a lesson, it can be said that they are having a mini-c experience.

In this way, mini-c creativity can be a self-contained experience that has the potential to rise to a higher level of creative contribution. Indeed, a key assertion of the Four C model is that all later forms of creativity start out as mini-c insights (Kaufman & Beghetto, 2009). In this way, creative expression that is recognized by the self and others has its basis in an intra-personal insight, experience, or interpretation.

2.2.3.2 Little-c Creativity

Once people share their mini-c insights with others, mini-c creativity has the opportunity to be recognized as little-c (Beghetto, 2007). Judgments of little-c creativity occur in the context of everyday settings (e.g., the classroom, the home, amongst a group of friends, and so forth). In this way, a sixth grade student's unique way of interpreting an historical event can be considered novel and meaningful (i.e., creative) in that particular classroom, even if it would not be recognized as creative within the context of a high school or college classroom.

As I have discussed elsewhere (Beghetto, 2016), when students share their mini-c perspectives, it is possible that their teachers and peers will recognize these as novel and meaningful (i.e., creative at the little-c level). It is also possible that teachers and peers may view the ideas as novel, but not recognize the relevance. In such cases, teachers (and peers) will need to work with the idea (e.g., "We are not seeing how this interpretation fits with the historical event we are discussing, can you help us make sense of it?"). In some cases, this may lead to a recognition of the novelty and meaningfulness of the idea. In other cases, the student may realize that his or her unique perspective really doesn't fit.

It is also possible that a student may have a mini-c idea, but fearing ridicule decide to share a conventional idea instead. Given this possibility, teachers interested in supporting creative expression will likely need to encourage students to share their own unique mini-c perspectives (e.g., "Can you come up with your own idea for how to solve this problem?). In both cases, feedback (giving and receiving) typically serves as a key transition point from mini-c to little-c creativity (Beghetto, 2007; Beghetto & Kaufman, 2007). Indeed, feedback is critical not only for creativity but also learning (Black & Wiliam, 1998).

Even with supportive feedback, it is important to recognize that attempting to move from mini-c to larger-c levels of creative expression always requires some risk. Although the benefits may outweigh the costs (e.g., making a contribution to the learning of others, being recognized as sharing a new way of thinking about something, helping to solve a problem), the costs are still present (e.g., being dismissed, laughed at, ostracized, and feeling embarrassment).

In some cases, the negative costs can have lasting consequences. For example, the student may give up on creative aspiration or endeavor (see Beghetto & Dilley, 2016). In this way, creative potential remains latent or hidden. Mullen (in press) describes this unfulfilled state as *hidden-c.* Teachers can play a key role in helping to uncover hidden-c's latent potential in their students (and themselves) by providing opportunities for students to express their own unique ideas and perspectives (Mullen, in press).

Of course, some mini-c insights and ideas never rise to the level of externally recognized creative expression. Indeed, in the daily occurrences of life, there is often not a need to share out every unique and personally meaningful insight. In the classroom, however, teachers have a professional responsibility to support academic learning. Consequently, teaching for creativity often has the dual aim of helping students develop their creative and academic competence. An example would be inviting students to apply their understanding of a scientific concept in a creative way (e.g., coming up with novel examples, designing their own experiment, and so on).

2.2.3.3 Pro-c Creativity

Pro-c creativity refers to the professional levels of creative accomplishment that are recognized by relevant members of a professional community of practice (Kaufman & Beghetto, 2009). Publishing a paper in a peer-reviewed journal is an example of a Pro-c level contribution. A teacher who develops a smartphone app that educators download and use because it offers a new, timesaving approach for evaluating student work is another example.

Although it is possible for novices to make Pro-c contributions, consistent professional level creative contributions require deep domain expertise and relevant access to the domain to make such contributions (Beghetto & Kaufman, 2014). This key requirement in the transition from little-c to Pro-c is denoted in Fig. 2.1 as disciplined preparation. This signals that Pro-c creators have invested a great deal of time, sustained effort, and deliberate practice developing the expertise necessary to

make contributions recognized by other professional creators. In this way, Pro-c creativity not only requires expertise but access to professional audiences and venues for creative endeavors to be shared and acknowledged by relevant professionals in a discipline, domain, or practice. Indeed, a breakthrough idea requires an audience to acknowledge how that idea has made a creative impact (Glăveanu, 2013).

In classrooms, Pro-c creativity can serve as an inspiration for young people and illustrate how professionals make creative contributions in and across various domains and practices. It can also help students start to realize how much time and effort goes into becoming a professional creator. In this way, inviting professionals into the classroom can be a powerful way to inspire students to make a connection between their own learning and interests and possible future trajectories they might pursue.

2.2.3.4 Big-C Creativity

Big-C creativity represents legendary accomplishments that stand the test of time and have transformed the way people think or act in particular domains and, in some cases, across cultures (Kaufman & Beghetto, 2009). Big-C distinctions typically are made by historians, critics, and connoisseurs. In this way, Big-C creativity is out of the hands of creators and represents the most dramatic example of a retrospective judgment that continues across socio-cultural and historical contexts.

Much like Pro-c, Big-C examples can be aspirational to young people. When teachers include the historical narratives of Big-C accomplishments in and across subject areas, students will be exposed to the heights of human creativity and the who, what, when, where, and why of such accomplishments (Root-Bernstein & Root-Bernstein, 2017). This includes the role that others have played in such accomplishments and how people have worked through setbacks and struggles, risks taken, and opportunities recognized. It also helps students recognize that creativity follows a trajectory and how mini-c inspirations (much like they are experiencing in their own learning and lives) can lead to larger-c contributions.

Taken together, the Four-C model can serve as an important framework for understanding how creativity can manifest at different levels of magnitude. This ranges from personal experiences and subjective interpretations (mini-c) to externally recognized contributions at the everyday (little-c), professional (Pro-c), and historical (Big-C) level.

2.2.4 Uncertainty as a Catalyst

Given that creativity is a distinction bestowed on phenomena and encompasses subjective (mini-c) insights to more profound (larger-c) contributions, a key question that remains is: Under what conditions might we expect creative thought and action to manifest? Creative expression is not needed at all times and in all places (Kaufman

& Beghetto, 2013). During a fire drill we do not want every student coming up with their own unique path out of the building. There are, of course, exceptions. If, during an actual emergency, the planned path is obstructed, then it would be critical for students and teachers to have the confidence and courage to find a new way out.

Along these lines, creative thought and action can be thought of as a way to make sense of uncertainty. Making sense of uncertainty typically requires us to challenge our old assumptions and try new things. Uncertainty, therefore, serves as an opportunity for creative expression. Figure 2.2 provides an illustration of how uncertainty provides an opening for creative action.

As illustrated in Fig. 2.2, whenever we run into an impasse in our planned experience, we have an opportunity to generate new and potentially creative outcomes. A classroom example might help illustrate. Consider a teacher who plans a lesson to quickly review and check students' understanding of a previously taught concept. The teacher has some predetermined expectations of how this lesson will unfold, including what is being expected.

No matter how well planned the lesson, unexpected moments often emerge (Aoki, 2004). During a routine check of sixth grade students' understanding of a concept (e.g., "Prior to moving on to our next writing activity, let's refresh our memory of what we discussed yesterday: Who can define foreshadowing for us?"), a student might share an unexpected idea or comment (e.g., "A main character hiding in the shadows"). In such situations, it is unclear whether the student is confused or whether the unexpected comment has potential relevance. When such unexpected ruptures occur, the teacher is confronted with at least two options on how to resolve this surprising response (Beghetto, 2016).

One option would be to simply move forward with the lesson by trying to redirect the class to what was planned (e.g., "That's not what I'm looking for….can someone help explain what foreshadowing means?"). The other option would involve taking class-time to attempt to understand what the student means and thereby take the lesson in a to-be-determined direction (e.g., "Ok … that's not what I was expected, but can you explain how this might be an example of foreshadowing …")?
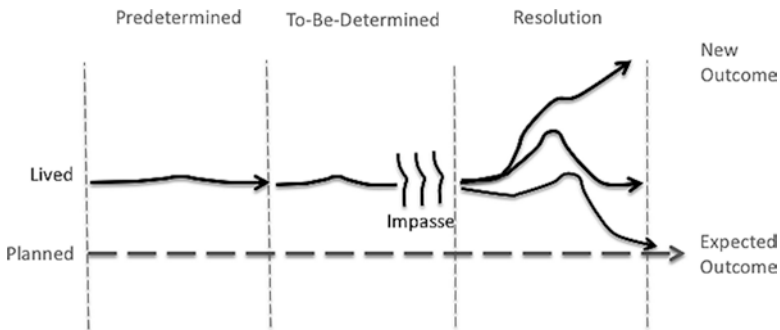
Fig. 2.2 Uncertainty as a catalyst for new thought and action

   Both options have costs and benefits. The first option has the benefit of quickly resolving uncertainty by continuing with the planned direction of the lesson. Although this is an understandable response, it can come at the cost of silencing a potentially creative idea. This can short-circuit that student's (and other students') willingness to share his or her mini-c ideas.

   The second option has the potential cost of wasting curricular time and confusing other students. Exploring a surprising mini-c perspective, however, has the potential benefit of uncovering insights that might contribute to the learning and understanding of peers and even the teacher. The student who shared the unexpected response when asked to define a foreshadowing may actually have a clear and compelling example: "I recently wrote a short story that opens with the main character hiding in the shadows, which is something that the main character will have to do throughout the entire story because he is constantly chased and harassed by bullies."

   Exploring unexpected ideas requires the teacher's (and peers') willingness to step into the surprising response and work with students in an effort to understand what the student is saying. Doing so can result in little-c contributions that go beyond what the teacher initially planned. Although such moments do, on occasion, emerge in the context of lessons and activities, they are not consistent or systematic.

   Fortunately, there is a way for teachers to design learning activities that provide students with opportunities to engage with uncertainty. In what follows, I introduce the concept of structured uncertainty and describe how it can be used as a design principle for creative lessons.

2.3   Structured Uncertainty

Structured uncertainty refers to presenting students with opportunities to work through uncertainty in a well-planned learning environment. The concept of structured uncertainty builds on the commonly agreed upon criteria necessary for judging something as creative. It also illustrates how slogans like "think outside the box" and similar conceptions that portray creativity as a form of unstructured originality are problematic.

   Supporting creative expression in classrooms is, therefore, not about trying to remove all constraints, which is not possible. Rather, it is about establishing openings for original expression, which also fulfill the necessary constraints of academic learning. Indeed, if we recognize that uncertainty can be used as a way to promote creative expression, then we can design learning experiences that provide opportunities to engage with uncertainty while still providing students with helpful guidelines and instructional support.

   In what follows, I highlight three interrelated ways that teachers can apply the concept of structured uncertainty to work more creatively within the constraints of their existing curriculum and instructional responsibilities.

2.3.1   Working Differently Inside the Box

Using the concept of structured uncertainty, educators can more systematically design learning experiences that provide young people with opportunities for creative expression. The good news is teachers need not start from scratch, but rather can work with existing lessons and activities to establish openings. Typically, learning activities assigned to students represent a routine task (Pólya, 1966). This is to say, the problem, in addition to the process for solving the problem, the outcome, and the criteria for success are all defined in advance to assigning it to students (Beghetto, 2018).

As I have described elsewhere (Beghetto, 2018), most learning activities can be thought of as having four elements: *problem, process, product, and criteria*. The problem refers to the task students are asked to complete. Problems include math story problems, writing tasks, science experiments, historical inquiry, conversational simulations in a different language, literary analysis, and just about any learning activity that teachers have designed.

The process refers to a procedure or strategy that can be used to solve the assigned problem. Processes can include mathematical procedures, writing strategies, methodological approaches, principles of practice, or any series of thinking techniques and actions aimed at systematically solving assigned problems. Teachers often teach students how to employ at least one standard process when confronted with a particular type of problem or task.

The product is the outcome of employing a process to solve a problem. Typically, the product is already known in advance by the teacher and used as one indicator for judging whether students have completed the task or resolved the problem. The criteria are the specific guidelines used to guide efforts and determine whether students have successfully completed the activity. The criteria often include nonnegotiable elements, such as amount of time allotted, expectations for how work will be completed, how help can be obtained when needed, academic standards and conventions, and other guideliens and indicators of success.

As discussed, the four elements (problem, process, product, and criteria) of the prototypical activities that students are asked to complete tend to be fully determined by the teacher in advance. Once teachers teach a new concept or strategy, they usually assign routine exercises for students to complete. The components of such exercises are fully predetermined and much, if not all, of the uncertainty has been removed by the teacher (Beghetto, 2018; Roberson, 2017).

Indeed, in the context of routine tasks where predetermined outcomes and procedures for obtaining those outcomes are expected, students who provide an unexpected response—even if those responses accurately solve the problems—likely will be marked wrong. They will have not provided what was expected and how it was expected. Again, this is not necessarily a problematic situation if the goal is to check students' ability to reproduce a previously taught procedure in the context of a particular type of exercise (Cazden, 2001; Lee & Anderson, 2013).

Having students work through routine tasks makes sense pedagogically, as they provide opportunities to rehearse and reinforce understanding of concepts, procedures, and skills. Such tasks provide a basis for developing understanding (Beghetto, 2018).

Routine tasks become problematic if there are little to no opportunities for students to engage productively with uncertainty. Indeed, a teacher interested in helping students learn how to productively respond to uncertainty needs to find a way to provide systematic and structured opportunities so they can identify their own problems to solve, develop their unique way of solving those problems, and produce novel outcomes and products (Beghetto, 2018).

Indeed, supporting students' creative expression requires challenging students to put their understanding to creative use. This still involves maintaining a solid ground level of academic support, but pushing out the boundaries of what teachers expect from their students and how students meet those expectations. One way of doing so is for teachers (and students) to engage in what is called lesson unplanning (Beghetto, 2018).

2.3.2   Lesson Unplanning

Lesson unplanning refers to the process of providing openings for uncertainty into what otherwise might be a closed and predetermined lesson (Beghetto, 2018). One way to think of lesson unplanning is that it is a design technique used to help students put their learning to creative use. Lesson unplanning introduces uncertainty into activities by removing one or more of the four components (i.e., problem, process, product, criteria) from a previously planned lesson or activity. The removal of a predetermined component becomes an aspect that students will determine.

A teacher asking students to come up as many ways as they can for solving a particular type of math story problem is a simple (and fairly common) example of lesson unplanning (see Niu & Zhou, 2017). This small pedagogical move can substantively expand the walls of possibility and thereby remove the ceiling on what students might generate. Consequently, students have an opportunity to generate possibilities that even their teachers may not be aware of in advance. This is a clear sign that genuine uncertainty has been introduced into the activity, making room not only for students' own learning, but the possibility for making creative contributions to the learning of their peers and teacher (Beghetto, 2016).

There are at least two considerations to keep in mind when engaging in lesson unplanning. First, when it comes to using lesson unplanning in the context of academic assignments, students likely need ground-level knowledge or at least a working understanding of the concepts, skills, and procedures to be used. Returning to the math example, if students do not understand even one way of completing a math exercise, asking them to come up with multiple ways or showing them 14 different ways their peers have generated solutions to the problem may only further confuse or frustrate them (Lee & Anderson, 2013).

Consequently, teachers may have more success using lesson unplanning after they have taught students using a fully determined version of the activity (i.e., pre-determined product, process, product, criteria) and then follow up with some exercises and tasks that have been unplanned, such as having students identify the problem, procedure, and product.

Some students may be ready to move from a ground level activity to more complex challenges that have two or more elements removed. Others may need to step back and continue to practice on a few more fully planned exercises. Still others may be ready to engage in lesson unplanning themselves.

Second, teachers still have the primary responsibility for specifying the criteria for learning tasks. As will be discussed, while it can be helpful to invite students to assist with defining the criteria (e.g., when they are designing projects that have emergent outcomes), teachers ultimately have the professional responsibility to establish the criteria (i.e., amount of time to be allotted, academic concepts to be included, how students can obtain assistance when needed, and so on).

Without clearly defined criteria, students will not know what is expected of them. Consequently, students may quickly become confused and frustrated. Establishing clear criteria helps to establish an effective learning environment (Reeve, 2006). As has been discussed, creative expression in the classroom is not about unconstrained originality, but rather is more about resolving uncertainty in an otherwise structured and supportive learning environment.

Just like any learning activity, teachers will want to ensure that students understand what is expected of them prior to asking them to engage with creative learning tasks (Lee & Anderson, 2013). Establishing and clearly communicating the criteria at the outset of a creative learning activity can support students in taking the risks necessary for generating new and meaningful ways of thinking and acting.

In this way, lesson unplanning conforms to the definition of creativity. Specifically, the criteria that teachers define for creative learning activities represent the task constraints of the definition and students' unique responses to uncertainty reflect the originality of the definition: *Creative Learning Activity = Unique Student Responses x Meeting Teacher-Defined Criteria.*

Finally, lesson unplanning can be thought of as ranging on a continuum (Beghetto, 2018) from slight curricular changes (e.g., having students write their own ending to a story) to beyond classroom endeavors (e.g., having students identify and attempt to solve a complex challenge facing their school or community). These more ambitious endeavors, called "legacy challenges" (Beghetto, 2018), involve students identifying problems in and beyond the walls of the classroom that matter to them. Importantly, these often are problems that adults may not recognize (e.g., finding a way to make sure that students, who are too embarrassed to eat their lunches in front of other students, can still get a chance to eat).

Legacy challenges are designed by students. Students, working under the guidance of the teacher and relevant external partners and experts, develop a project to address the problem they identified. As such, they endeavor to make a lasting contribution that extends beyond the life of the project (Beghetto, 2018). Even in cases

where such projects fail, if provided with an opportunity to document, reflect, and receive feedback on their efforts, students can still learn from their setbacks.

Providing students with a full range of structured experiences with uncertainty is one way to help them learn how and when to engage in creative thought and action. In some cases, teachers may already use some version of these experiences. In other cases, these can be easily incorporated into the existing curriculum by using assigned tasks differently (i.e., substituting a few unplanned lessons with preplanned ones). In still other cases, teachers may need to think about how to use their time differently to incorporate more ambitious efforts into the school day (e.g., using homeroom time and electives differently) or by designing before and after school clubs.

2.4   Concluding Thoughts

Given the increasing pressures placed on teachers to meet externally mandated standards and assessments, it may seem justified to conclude that creative expression is under duress in classrooms. If teachers feel forced to focus too narrowly on meeting task constraints, they may over-plan students' learning experiences and undermine opportunities for creative expression. As has been discussed, even in such situations, small openings do emerge on occasion. These openings offer opportunities for students and teachers to think and act in new and meaningful ways. Moreover, teachers can make slight adjustments to establish openings in their planned lessons, thereby more systematically supporting creative expression.

The central idea I have attempted to describe in this chapter is: The potential for creative expression is always and already present in schools and classrooms. Although this potential can never fully be eradicated, it can be suppressed. The key is deciding when and where opportunities for creative expression might be more systematically included in the curriculum. If teachers are interested in establishing such openings, they can use the concepts of structured uncertainty and lesson unplanning to guide them in finding ways to replace over-planned learning experiences with a range of opportunities to support creative expression in their students (and themselves).

Doing so requires a shift in how creativity and learning are sometimes conceptualized. Rather than viewing these goals as being in competition with each other, the ideas presented in this chapter have focused on how supporting creative expression and academic learning can be realized as compatible goals. Indeed, there is empirical evidence that supports the link between creative expression and academic learning.

A recent meta-analysis (Gadja, Karwowski, & Beghetto, 2016) has, for example, demonstrated a modest, yet robust positive link between indicators of creative potential and academic achievement. Follow-up work exploring the conditions of creative learning in classrooms (Gadja, Beghetto, & Karwowski, 2017) has indicated that classrooms with the strongest links between creative potential and academic achievement tend to have teachers who demonstrate a more supportive,

exploratory approach when working with students' ideas. Moreover, findings from a recent set of studies (Karwowski & Beghetto, 2018) has indicated that the movement from creative potential to creative expression seems to be mediated by creative confidence beliefs and moderated by the valuing of creativity.

At this point, additional work is needed to examine whether and how specific pedagogical efforts aimed at blending opportunities to put learning to creative use (such as lesson unplanning) influence student learning, creative confidence, and ability to creatively solve complex challenges and ill-defined problems. This level of work will require researchers working in collaboration with teachers to carefully document examples of creative learning (see Mullen, 2017, for an extended international example).

In addition to more formal studies, teachers can run small scale pedagogical tests of these ideas in their own classroom. If the aim is to provide students with more opportunities to productively respond to uncertainty in the context of a structured and supportive learning environment, then teachers can start by making small adjustments to their existing activities and evaluate the results.

Documenting, curating, and exhibiting such efforts, including failed attempts and setbacks, can go a long way in clarifying how and under what conditions creative expression does (and does not) thrive. Doing so will also help us develop a more nuanced understanding of when, for whom, and in what contexts it might be justified to raise concerns about the potentially stifling influence of external mandates and curricular pressures on creative expression in classrooms. Engaging in this work likely will also provide more occasions to recognize and celebrate the everyday efforts and creative achievements of students and teachers.

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Chapter 3
Speaking of Creativity: Frameworks, Models, and Meanings

Charlotte L. Doyle

Abstract Psychologists have had a long-running collective conversation on how to conceptualize creativity. This chapter presents the evolution of current views and their implications for education, including specific suggestions for facilitating students' creativity. The 4P framework originated in a definition of creativity as encompassing four interconnected strands—taking place when a Person goes through a Process to produce a novel Product in the context of environmental Press. Each strand became the subject of further research-based theorizing and led to renewed understanding that the strands are in continual dynamic interaction. The 4P framework has been augmented by emphasizing that creativity involves action in interaction with material culture. Contemporary conceptualizations recognize that, though levels vary, creativity is a universal human possibility, that the socio-cultural-material environment is crucial for providing opportunities and constraints, and that the creative process has phases, each engaging different cognitive modes. The modern view explains how classroom creativity fosters students' deep learning, their appreciation for how knowledge is created, and insights into themselves as learners. Teaching, too, has been explored as a creative process; creative teachers provide opportunities for student creativity, an example of mentoring creativity. Whether to support classroom creativity is a political decision dependent on how societies envision their educational goals and on their willingness to provide resources for deep learning across the educational spectrum.

3.1   Introduction

Creativity is under duress in education partly because of misunderstandings—about the nature of learning, the work of the teacher, the nature of creativity, and the interrelationships among the three. Psychologists' models of learning, teaching, and

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creativity have been products of collaborative conversations, making sense through theorizing, research, and re-theorizing.

The earliest laboratory studies explored learning by rote association (Ebbinghaus, 1913). In many educational systems for many years, rote learning of disconnected facts, assessed by tests, has been and continues to be a major aim of education, a pedagogy Sawyer (2013) called *instructionism*. In instructionism, the teacher's function is to convey information and the student's task is to remember it.

Yet psychologists have been rejecting rote association as the most effective mode of learning. Memory researchers found that the more active the learner when first encountering material and the more meaningful the material to the learners, the more items they recall (Craik, 2002). Similarly, Piaget (1964) asserted that learning is actively assimilating, accommodating, and reorganizing cognitive structures. Vygotsky (1978) reminded psychologists that learning typically takes place in a social context and educators applied his insight by scaffolding learning as a meaningful construction (e.g., Berk & Winsler, 1995). Sawyer (2013) called the active, constructive mode of learning, facilitated by teachers, *deep learning* and saw deep learning itself as creative.

The deep learning concept provides a backdrop for looking at frameworks and models of creativity and their educational implications. A major framework can be traced back to a definition that emerged from a collection of prior attempts to define creativity. Rhodes (1961) assembled over 40 of them and noticed that they overlapped and intertwined, each naming one or another important strand. Braiding the strands together, he defined creativity as taking place when a *person*, through a mental *process*, makes a communicable *product* that is new, all taking place in the context of environmental pressures, which he shortened to *press*. Those four strands have become known as the 4Ps; they have organized much of the thinking and research in the creative domain. They also provided a framework upon which to build.

Glaveanu (2013), to emphasize that creativity is embedded in a socio-cultural context, suggested substituting the 4Ps with the 5As: *actor, action, artifact, audience, and affordances*. Both Rhodes and Glaveanu emphasized that these aspects are not isolated strands. It is difficult to explore any one without considering the others and their interpenetration.

This chapter presents highlights from psychology's collective conversation about the 4Ps. Each of the next four sections will focus on psychology's conversation about one of the Ps; the discussion will include material on that P's interrelation with other strands, on Glaveanu's alternative, and on the implications for facilitating student creativity. Teaching has also been seen as a creative process (e.g., Hansen, 2005; Reilly, Lilly, Bramwell, & Kronish, 2011); a section on creative teaching, both how it can be conceptualized in terms of present-day frameworks and its relation to student creativity, will follow the discussion of the 4Ps.

3.2 Speaking of the Creative Product

Psychology's conversation about defining the creative product has converged on adding a second criterion to its being new (novelty), because of the recognition that everything new is not necessarily creative. To be called creative, the outcome of the creative process also had to be useful in the sense of being meaningful, effective, fit, or appropriate (Richards, 2010; Runco & Jaeger, 2012). Glaveanu (2013) preferred the term *artifact* to product to emphasize that creative outcomes arise from cultural participation and impact the socio-cultural environment as well.

Adding usefulness to novelty in the definition of the creative product raised a new question: For whom should a given product be new and useful? Csikszentmihalyi (1996) proposed that a creative product is one that is recognized by experts as new and useful in changing a cultural domain such as Darwin's (1859) *On the origin of species* in the domain of biology or Picasso's *Guernica* (see Arnheim, 1973) in the domain of visual art. Though Csikszentmihalyi (1996) acknowledged that fresh perceptions, insightful judgments, and discoveries known only to the person making them exist, he felt such products were not appropriate for empirical creativity research. He advocated studying creativity that leaves a trace in the cultural matrix, a kind of creative work which has come to be known as *eminent*, *legendary,* or *Big-C creativity* (see, e.g., Beghetto & Kaufman, 2007).

Richards (2007) pointed out that Csikszentmihalyi's definition leaves out the creativity of everyday life. Every day, people are carrying out their tasks in a creative way. Though not changing a domain, the products are new and meaningful to one or more persons other than the creator. Examples of everyday creative products include a homemade holiday card meaningful to those who receive it, the use chewing gum as a temporary fix for a gas line leak for a stranded traveler, a delicious family meal made from mixing ingredients in a novel way, an innovative method for inspiring inner city students. Creative works that are new and meaningful to at least one person in addition to the creator have been named *everyday creativity* (Richards, 2007) and *little-c creativity* (Beghetto & Kaufman, 2007).

Kaufman and Beghetto (2009) went a step further and proposed a four C model. A child discovers how to solve a problem. A classic example is the feat of the girl who figured out that she could transform a parallelogram into rectangle by cutting off the protruding triangle and using it to cover the missing triangle on the other end (Wertheimer, 1959). The solution was not new or useful to the domain or the teacher, but was to the child. Kaufman and Beghetto (2009) called this kind of transformative learning *mini-c,* and defined it as "the novel and personally meaningful interpretation of experiences, actions, and events" (p. 3). They continued, "Central to the definition (of mini-c) … is the dynamic, interpretive process of constructing personal knowledge and understanding" (p. 3), that is, active discovery of something new and useful to the creator alone. Kaufman and Beghetto also added *pro-C*, a product showing expertise in any creative field, not domain changing, but adding to

the domain within its current structures. An experiment that clarifies aspects of someone else's breakthrough scientific finding would be an example. Reilly et al. (2011) added one more category, *local-c*, a creative product recognized by a local institution, such as a worker's innovative suggestion, one that wins an award.

As the Cs multiplied, it seemed as though their characteristics could best be captured by a model in which each of the 5 Cs were points or ranges on two product dimensions: magnitude of recognition and the degree to which a structure has been transformed (Doyle, 2011). Mini-c is the lowest point on the magnitude of recognition dimension. The creator and no one else recognizes it as new and meaningful. Big-C products are recognized by an entire field of expertise—the highest points on the recognition dimension. Little-c (recognized by one or more people other than the creator), local-c (recognized by an institution of a particular size), and pro-C (recognized as a small or larger contribution by a profession) can be seen as ranges in-between. For example, a poem may be recognized by only one friend as new and meaningful—one person recognizing a creative product; a beautiful holiday card sent to 25 people is recognized by all of them as new and meaningful and so earns a higher place on the recognition dimension. The degree-to-which-a-structure-has-been-transformed dimension begins with the changed structures in the minds of people who, by their own discoveries, learn something new only to them (mini-c). Local-c may transform institutions in small or larger ways and represent a range on the transformation dimension. The highest points on the transformation dimension are the domain changing creative products such as those of Darwin or Picasso (Big-C). And, the model allows for borderline cases.

Mini-c discovery by a student, which transforms his or her understanding, is an example of creativity in the classroom. The fact that the discovery is the result of active, meaningful construction speaks to deep learning. The resulting product for children who discover by their own actions is new knowledge content, but there are four other outcomes as well. Students also learn that knowledge can come not only from a teacher's authority, but also from their own perceptions and actions, their own constructions. They gain new understanding about the evidence knowledge is based on and about the pleasure discovery learning brings. In addition, self-concepts change as students come to see themselves as learners capable of constructing knowledge, bringing them enhanced creative self-efficacy and creative personal identity (Karwowski, 2016).

3.3   Speaking of Press

Theorists, in defining the creative product, could not do so without also considering the environment in which it is being recognized. Csikszentmihalyi (1996) made this explicit with his systems model. Asking "Where is creativity?" his answer was, in the relation among a person, a domain, which is a culturally recognized sphere of human accomplishment, and a field, all the people and institutions who affect the domain. This includes gatekeepers such as scientific journal editors, gallery owners,

and publishers who decide which works will become part of the domain, but also institutions such as schools that facilitate entry to working in the domain.

Csikszentmihalyi noted that domains vary in the extent to which they are structured; it is more difficult for a field's gatekeepers to determine whether a product is new or original in less structured domains. Mathematics is highly structured making it is easy for the gatekeepers to the mathematical domain to determine whether a product is new and useful; domains like morality and child-rearing are not. The fields for these domains, too, are less organized, another reason why determining whether an outcome is new and useful is more difficult. Education is a loosely structured domain; a teachers' creative work may not be recognized outside the classroom.

Glaveanu (2013) took an expanded look at the environmental impact on creativity. Csikszentmihalyi's (1996) field became *audience,* all the people who support, collaborate on, oppose, deny, or accept a creative outcome. Audiences can include family, friends, collaborators, and teachers for products in the little-c range as well as Big-C gatekeepers and opportunity makers. *Affordances* are opportunities and constraints provided by material culture such as the available technology. We can add that fields provide social affordances through its institutions; in education both students and teachers are afforded constraints and opportunities through practices such as required curricula and district-wide tests.

Richards (2010) gave an example of the material and social environment affording an opportunity for collaborative mini-c. Pairs of fourth grade children were given a battery, wires, and a bulb. Their task was to make the bulb light up. When one pair, then another and another succeeded, there were "screams of delight and joy" (p.207), a meaningful entrée into further mini-c discovery through an engaged discussion of currents, energy, batteries, and wires. Again, we see the creative process in the classroom resulting in academic knowledge, giving the experience of pleasure in discovery, and perhaps contributing to creative self-efficacy.

3.4   Speaking of the Creative Person

Psychologists' first talk of people who make exceptional contributions to a culture did not use the word creativity. Instead, coming from an assessment framework, psychologists equated genius with intelligence, and the criteria for selecting "genius" children were intelligence tests, assuming the tests were measures of a single quality (Terman, 1925). Though some questioned whether intelligence was a single entity (Thurstone, 1945), it was Guilford's (1959) model of intellect, which was constructed explicitly to include creativity, that changed the conversation. His model organized 120 different abilities as a three dimensional cube made of cells that distinguished different kinds of contents, operations, and levels along each axis. Intelligence tests contained items that tested the operations of memory, comprehension, evaluation, and convergent thinking, all of which had single correct answers. To include creativity, he added a new operation—divergent thinking, coming up

with many possible answers to items such as "Think of different uses for a brick." Though some considered divergent thinking tests alone as measures of creativity, Guilford proposed that creativity involves all the operations.

Guilford himself distinguished three kinds of contents, knowing more should be added, which modern psychologists have done. Kaufman, Cole, and Baer (2009) listed seven general thematic areas specific to creativity: artistic-verbal, artistic-visual, entrepreneur, interpersonal, math/science, performance, and problem-solving. Gardner (2004) distinguished seven kinds of content abilities: linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, and intra-personal. Baer and Kaufman (2005) pointed out that there are microdomains within domains such as journalism and poetry in the verbal domain; each cultural domain and microdomain draws on one or more of the abilities; for example, fiction-writing draws on both linguistic and interpersonal intelligences.

Theorists pointed out that it is impossible to speak of abilities independent of the environment. Glaveanu (2013) called creative persons *actors* to emphasize both that creative work involves action and that actors are agents shaped by a sociocultural context and who act within it. Children have to learn the contents and skills necessary in order for them to create in a given domain. Every culture honors some domains more than others and afford extended training in the most valued domains (Csikszentmihalyi, 1996). Modern technological societies give prominence to the sciences and provide material affordances (such as computers) and social affordances (such as curricula) to develop mathematical ability. According to Csikszentmihalyi (1996), one feature of a big-C creative person is that they have internalized both the domain—knowledge, symbol systems, rules, and skills—and the field, understanding how cultural institutions facilitate, judge, and reward creative accomplishment. He sees understanding how to communicate a creative outcome to the field as an essential aspect of big-C creativity, picking up and extending Rhodes' (1961) definition that to be creative a product should be communicable.

Just as psychologists argued about whether intelligence is a single entity or cluster of abilities, now creativity theorists are discussing whether creativity was a general trait. Because creativity demands domain knowledge, a person who did creative work in one domain was likely to have some traits different from someone creative in another. The conversation led to new models that included both general and domain-specific traits. Both Sternberg and Lubart's (1991) and Amabile's (1983) models identified persistence in the face of obstacles, willingness to take risks, tolerance for ambiguity, and low need for social approval. Amabile's (1983) model also included flexibility, self-discipline, and the ability to delay gratification; Sternberg and Lubart's (1996) model proposed preferences for thinking in novel ways of one's own choosing, for doing things in new ways, and openness to experience (see also, Silvia, Nusbaum, Berg, & O'Connor, 2009). Sternberg (2018) expanded the idea of low need for social approval by noting the creative people may defy the crowd, the *Zeitgeist*, their own prior approaches or some combination of the three. Several psychologists have pointed to creative self-efficacy, and creative personal identity as general traits of the creative person (e. g., Karwowski, 2016).

One attribute generally agreed on by psychologists is the importance of motivation. The behaviorist framework emphasized extrinsic motivation, rewards and punishments from the environment. Amabile (2001) theorized and provided evidence that people are most creative when intrinsically motivated, citing research showing that extrinsic motivation can undermine intrinsic. But, she also acknowledged that some extrinsic incentives—those which support competence development and deep engagement—can add to intrinsic motivation. For her, intrinsic motivation remained central, so much so it could compensate for lack of ability. For example, John Irving, a celebrated novelist, was dyslexic but his passion for storytelling was so strong that he worked persistently over a long period to develop mastery of his medium.

A hidden assumption often made is that these traits are immutable, a person has them to a certain degree or does not. Again, that is underestimating the role of the environment. The risky option of venturing into the unfamiliar, of exploring the ambiguous and unknown, begins with feeling safe and confident rather than fearful. The same toddler who runs to mother when frightened, after a few hugs may confront the very object that seemed so frightening. Persistence is related to motivation. When something really matters, people will work harder. Creative self-efficacy and creative personal identity come from graded experiences in the environment and the confidence of significant others (Bandura, 1989). An educational environment can encourage intrinsic motivation or make irrelevant extrinsic rewards stand out (Amabile, 2001).

The importance of the environment in facilitating or inhibiting creativity led theorists to assert that creativity is open to everyone, an aspect of being human that allows adaptation to our changing environments. From the creativity inherent in discovery learning to the many improvisations necessitated by daily life, people everywhere are creative and become increasingly so given the opportunity. For education, what is important is that the proposed general traits are developed in experience and that the educational environment can foster or inhibit them. Children will be more willing to take risks if they feel safe, if errors are accepted as part of the learning process, if self-efficacy is encouraged.

Theorists have also become increasingly interested in the traits of small group members that facilitate collaborative creativity. There are indications that the expertise and creativity of individual members may not be the most important factors. Rather, the groups tend to be more creative and productive if the members represent a diversity of perspectives (Page, 2007) and show high trust in one another (Klimoski & Karol, 1976).

3.5 Speaking of the Creative Process

Discussions of the creative process have often been intermingled with the study of problem solving. An early controversy was whether solving new problems involved blind trial and error shaped by reward (Thorndike, 1898) or could occur through sudden (creative) insight (Kohler, 1925). Duncker (1945) added to the conversation

by speaking of something in between: Seeing the process of coming to a solution as a beginning in an initial problem representation and continuing with a series of steps, which that draw on heuristics, rules of thumb, which often lead in the direction of solutions, but not always.

Meanwhile in another part of the conceptual landscape, Freud (2010), from a psychoanalytic framework, was writing about two modes of thought in creating literature, primary and secondary process. He saw primary process as based on association and infused with emotional concerns whereas his vision of secondary process was logical and realistic. Several contemporary psychologists have also put forward dual process models. Their models have a common thread—the idea of first generating responses, then selecting one and elaborating it (See, for example, Ward, 2001). And, the dual process models often involve two different cognitive modes of thought as Freud's did; association was often seen as the process underlying the generation of diverse responses, but without the Freud's controversial motivational assumptions. Elaboration was often seen as often involving rule-based, convergent thinking (Goldschmidt, 2016).

The most influential model came from Wallas (1926) who distinguished four stages: preparation, incubation, illumination (his word for insight), and verification. Wallas was also concerned with cognitive modes; he emphasized that two phases, preparation and verification were under conscious voluntary control, whereas the other two happened in the mind of the creator without voluntary effort. Since then, theorists have added other stages to those of Wallas, stages that together constitute a contemporary composite model of the creative process. The composite model encompasses the ideas of generation, selection, elaboration, and cognitive modes provided by other theorists. Theorists have also noted that the progression of stages is not inevitable, so perhaps the term *phases* may be more appropriate (Doyle 2016). Phases may overlap, be omitted or occur in a different order as well as differ in different domains (Glăveanu et al., 2013) and typically recur (Csikszentmihalyi, 1996).

Glaveanu (2013) preferred the term *action* to *process* to emphasize that thinking in the creative process is typically embodied. The actor is physically doing something—writing, sketching, puttering in the laboratory, consulting colleagues and mentors, or doing library research—action in interaction with the social and material environment.

The educational context from pre-K to graduate school may provide opportunities for the creative process to take place: not only in art projects but also in subjects across the curriculum—small scale in the early grades, a dissertation for doctoral students. In the following sections, we will look at many of the phases theorists have described and the actions involved. Educational implications and examples will suggest how teachers can facilitate each of the phases.

3.6 Before Preparation: Problem Finding

3.6.1 Presented Versus Discovered Problems

When Wallas (1926) pictured what he called "the birth of an idea," he assumed that the thinker already was puzzled by something specific, knew the goal that the creative work was to achieve. And, there are many educational contexts in which a problem is given. Richards' (2010) observation of children using given materials to light a bulb turn is an example. Here the goal of the creative process was clear, though the means of reaching it were not. Problems with a known goal have been called presented problems (Csikszentmihalyi, 1996).

However, sometimes, the beginning is simply the intention to create, for example, the PhD student searching for a dissertation topic. Then the problem the creative process is to solve is more elusive; it too needs to be discovered. Thus, psychologists have added general intention and problem-finding as possible early phases of the creative process and have looked at factors that facilitate problem discovery. Here are some strategies that psychologists and educators have identified as helpful for finding a promising creative problem.

3.6.2 Imposing Constraints

Though it may sound as if constraints would limit creativity, Stokes (2001) made the case that in fact it can facilitate the problem finding. Typically, there is some general idea of the problem domain at this early beginning as well as some specific constraints. For an artist, the medium chosen—sculpture versus painting sets material affordances: opportunities and constraints. Stokes (2001) theorized that conceptual constraints, if they move possibilities in a new direction from the dominant form of the domain, could facilitate more work that is creative. For example, the move from social realism to abstract expressionism in American art involved explicit intentions to constrain artwork with new rules such as precluding realistic representation and promoting expressivity (Stokes & Fisher, 2005).

In classrooms, teachers often provide constraints for assignments, such as choose a book from the library and write a report on it or write an essay about something you did over the summer. A constraint can also be suggested rather than imposed, priming more creative work. Gwathmey and Mott (2000) applied this principle with a nudge rather than an imposed constraint. They noticed that their 7- and 8-year-old children, when afforded the opportunity to paint without constraint, often produced somewhat the same scenes over and over again. The class had been studying a local river, so the teachers began the art session by asking them to share some of their

experiences with water. Just priming them to think about water changed the direction of their problem finding and many painted water scenes, a subject that had been not chosen before.

3.6.3   Clarifying Requirements

Mumford, Reiter-Palmon, and Redmond (1994) proposed that being explicit about the requirements for a creative project could assist problem finding. Even simply restating the general intention and the constraints can help. I have found this with my own college students in their choice of essay topics. Just asking them to reread the possible choices (with one option to design their own topic) and thinking about what each would involve resulted choosing topics that they then developed in more substantive and imaginative papers.

3.6.4   Divergent Thinking

The idea of generating many possibilities before selecting one is the basis of Simonton's (2001) Blind Variation and Selective Retention Theory; the blind variation typically involves divergent thinking. A teacher of a combined kindergarten-first grade class, as part of teaching early reading and writing, used a group divergent thinking heuristic. One letter of the alphabet was the constraint each day. The children were to choose four words containing the letter of the day, then write and illustrate them for a page in a self-created alphabet book. At the daily meeting before the project, children were invited to call out all the words they could think of containing the letter, broadening the possibilities for the group, giving each child more words to find interesting enough to illustrate (Shupak, Nov, 2011, personal communication).

3.6.5   Conceptual Combination

Ward (2001) suggested that putting together ideas that do not seem to go together would facilitate creativity. He noted research demonstrating that unusual conceptual combinations such as a Harvard educated carpenter led to more creative stories than either of the elements separately. A poetry exercise in college class applied this technique for problem finding. From random words on cards in a bowl; each student took out two and the charge was to use them as the starting point for a poem. Public school teachers have used conceptual combination to come up with interesting material for students. A special education teacher who taught the same children

reading and social studies read newspapers every morning, looking for articles about contemporary events that echoed an aspect of world history.

3.6.6 Interdomain Images

Bonnardel and Moscardini (2012) theorized and then demonstrated that interdomain images facilitate problem finding. They studied the domain of product design and found that a visual image not representing the kind of product designers were charged with designing evoked more possible ideas. Teachers, too, can help students find inspiration with interdomain images: writing poetry to music or visual scenes; visiting an art museum to view the many different art styles prior to designing a set for a play.

3.6.7 Exploring Possible Elements and Problem Representations

Getzels and Csikszentmihalyi (1976) studied problem finding by making the constraint for an art project that students had to choose objects from a given set and create a still life. They found that the more the art students explored the objects themselves and the longer they kept open the possible direction of their work, the more creative their products tended to become. Similarly, Reiter-Palmon, Mumford, O'Connor Boes, and Runco (1997) suggested that in solving social problems, those who consider different ways of construing the core of the problem as a first step are more likely to find creative solutions. I tell my students before they sit down to write a paper based on library research, take time to explore the readings carefully and consider different ways to organize them before deciding on the theme of the paper.

3.6.8 Collecting Observations

Writers often keep notebooks in which they jot down events that feel pregnant with meaning. Similarly, artists sketch; actors note unusual gestures and habits of speech; an inventor used to roam the aisles of drug stores, noting objects he found annoying—all collecting observations that could become useful in finding subsequent creative tasks. The same principle can be applied to creativity in the classroom. Caulkins (1991) described asking children keeping journals to use them as a source of ideas for later, more structured writing. In my child development class, all the students do field work in our Early Childhood Center, a school for children between the ages of 2 and 7. The college students are charged with writing detailed

observations of incidents they found intriguing as a prelude to choosing a topic for an independent project involving both library research and their own observations.

3.6.9   Evaluation and Selection

How do people select a problem to work on when problem finding has led to several possibilities? Ward (2001) suggested that people would select one that is most novel and surprising. Runco and Chand (1994) proposed that knowledge and strategies are engaged; for example, reviewing the requirements of the general task and testing the possibilities against them. According to James (1934) and Zuo (1998), the intuitive sense that a possibility will lead in a meaningful direction may also guide selection.

When children are uncertain of which possibility to select, teachers can scaffold selection by sensitive questioning. For example, Caulkins (1991) told how teachers helped grade school children choose from among their journal entries by asking them to pick out the ones that were most meaningful. One child chose an entry about having to give up his pet hamster. Asked whether there were any related entries, the boy remembered his grandmother's death. That combination became the basis of his essay.

3.7   Preparation

3.7.1   Problem Representation

Newell and Simon's (1972) general theory of problem solving picked up Duncker's (1945) idea: The first step of preparation is the creation of problem representation, an explicit or implicit mental picture of the problem. This includes the conception of the starting points, what the person sees as the parts such as: relevant knowledge, procedures such as algorithms and heuristics, and conceptions of the goal or outcomes (see also Reiter-Palmon, 2017).

Often the difficulty in solving problems is a limited problem representation. For example, a study compared the problem representations of skilled and failing physics students. The skilled students began with a diagram, and then filled in what was known before going to formulas. The failing students went immediately to formulas without deepening their understanding of the problem (Simon & Simon, 1978). The famous 9-dot problem, in which a 3 × 3 matrix of dots have to be connected with just four straight lines is often implicitly represented with the constraint that the lines stay within the matrix, though the solution requires going outside it.

Teachers can help students develop their problem representations. A special education teacher assigned two students to work together on a history project centered

on world religions. Though the students' first representation of the task was to use their textbook, he helped them see that library research could yield much more detailed and interesting information. The students ended up including religions not even mentioned in the textbook (Doyle, 2017b).

Teachers can help students represent the problem of writing a book report. Do students put the kinds of questions a book report could potentially answer into their problem representations?

3.7.2   Elaboration

Ward (2001) named the phase following problem representation *elaboration*. This phase involves moving from the initial representation through algorithms, heuristics, reasoning, and improvisation. He pointed to Stephen Donaldson who, in writing a fantasy novel, constructed a problem representation with the goal of writing about a leper who entered a fantasy world in which he was healed. Donaldson elaborated the idea by reasoning about the conflict between a leper's need to stay vigilant and the pull of fantasy, using the heuristic of listing possible characters, and improvising, allowing scenes to come to mind with subsequent ones spontaneously building on the ones before.

Sawyer and DeZutter (2009) made elaboration through improvisation visible in a study of young people in conjunction with putting forward the concept of *distributed creativity*—creations emerging from collaboration. They recorded teen theater groups whose task was to develop a play by improvising on a given story. The researchers found support for a theoretical model that enumerated four characteristics of the distributed creativity process: unpredictable outcome, moment-to-moment contingency (each person's action depending on the one before), subsequent action having the possibility of changing the meaning of what came before, and each contributor's equal participation. Implicit in the contingency feature is the requirement that the participants listen closely to one another.

A single student's middle school history project on the Salem witch trials had similar features. It illustrates how elaboration may result in changes in goal representation. She first did library research: reading about the structure of leadership in Salem, the local weather and its effect on farm crops, the Puritans' religious practices and actual trial transcripts. The transcripts were so striking, her representation of her goal changed. With the teacher's permission, instead of writing an academic report, she wrote a play about one of the accused witches. To do so, she drew on her knowledge to select characters and situations, used the heuristic of writing down the features of each character, and then improvised dialogue as she imagined the characters interacting with one another (Martens, January 1980, personal communication).

3.8 Creative Frustration and Reflection

At times elaboration moves smoothly to the completion of the creative task; other times nothing seems to work. Sapp (1992) named the time when the work comes to a standstill *the point of creative frustration* and added it as a possible phase of the creative process. Frustration brings reflection and there are two kinds. Sometimes, the reflection is on the work, trying to figure out what can be changed about the direction of problem solving. A writer spoke of reflecting on her choice of a first person for a story. Finding it too farcical, ~~so~~ she modified her problem representation by choosing a third person viewpoint (Doyle, 1998). The frustration can also lead to reflecting on self, wondering about one's capacity to do this kind of work, a type of reflection that has come to be known as the *inner critic*. Even skilled writers can fall victim to the inner critic. For example, John Steinbeck, amid working on a novel wrote in his notebook, "My many weaknesses beginning to show their heads . . . I am not a writer" (Steinbeck & DeMott, 1989, p. 36).

If children in the classroom fall victim to the inner critic, teachers can help in several ways. They can boost self-efficacy by both expressing confidence and asking children to tell about earlier successes. Teachers can also turn the students' reflections back to the work by asking them where the project is now and to put the current problem into words. In a preschool class, a child was frustrated because his drawing of a person had gotten so big there was no room for the person's legs. The teacher turned his reflections back to his task, asking, "What could fix that?" The boy himself thought of the solution. "Get another piece of paper?" he asked, and he did (Doyle, 2001).

3.9 Incubation and Insight

Sapp also suggested another way to deal with the frustration—stop reflecting on the problem and do something else—incubation, Wallas's second phase. For Wallas (1926), incubation and his third phase, insight, were linked. Leaving work on a problem and allowing the mind to wander elsewhere may bring insight—the sudden realization of how to solve a creative problem. He cited a lecture by the great neurophysiologist, Helmhotz, in which he spoke of happy thoughts coming to him suddenly as he strolled through wooded hills. More recently, Topolinski and Reber (2010) delineated the phenomenological features of insight: an idea comes suddenly and unexpectedly, bringing pleasure, excitement, and confidence in its rightness.

Sio and Ormerod (2009) gathered laboratory evidence showing that incubation can be helpful and listed several possible explanations: recovery from fatigue, easing of fixation on inadequate problem representations, opportunistic assimilation (a new environment providing just the right clue), and global access (mind-wandering providing an unexpected clue). Ward, Smith, and Finke (1995) provided a model

that underlies all these explanations. Though conscious thought is elsewhere, the search for a solution remains active below the level of consciousness; when the insightful idea appears, it is recognized immediately as a solution.

The implication for education is to allow students to turn away from projects, once they have thoroughly prepared. Activities such as recess, listening to music, neighborhood walks, or playing games, though they appear to take time away from "serious work," can contribute to insightful ideas coming to mind.

3.10 Creative Flow

Scientists, mathematicians, and inventors often report insights coming to them as parts of their creative process, so do those working in the arts. However, another phase has emerged from artists' descriptions—a period of total yet effortless engagement with their work; though the creator is active at the computer, the easel, or the keyboard, it feels as though the work is making itself. These are examples in the artistic domains of a phenomenon that Csikszentmihalyi (1999) termed *flow*. Csikszentmihalyi (1999) enumerated the characteristics of flow in many domains such as rock climbing, sports, and religious experiences. Theorists have suggested that flow as part of the creative process shares most features with flow in other domains, but has some unique features as well (Cseh, 2016; Doyle, 2017a). Among the shared features are effortless attention, action and awareness merged, balance between skill and challenge, time distortion, spontaneity, non-distractibility, no self-consciousness or fear of failure, and the sense of having stepped out of everyday reality.

Though most flow experiences involve clear goals, unambiguous feedback, and a sense of control, these are not typically part of the creative flow experience (Cseh, 2016). Creative flow also involves meaning-making coming in a rush with the possibility of the emerging meaning surprising the creator (Doyle, 2017a). Collaborative creativity brings opportunity for group flow, which happens when all the participants are committed to the task, listen closely to each other, and respond sensitively to one another (Sawyer, 2013).

Children doing creative projects—whether writing about the Salem witch trials, creating a children's book for the first-graders, or playing in an orchestra—have the possibility of experiencing flow. Like insight, flow cannot be commanded, but it can be made more likely. Children need projects that are challenging, but that they have the skills to accomplish. A long period of preparation can be helpful as can incubation. Csikszentmihalyi (1999) proposed that a condition which facilitates flow is being in a place devoted to a particular activity: a church for religious flow, a studio for an artist. Caulkins (1991) suggested that teachers set aside a quiet place, away from the rest of the classroom, where children can go and work on their projects when they feel ready.

3.11   Reflection, Verification, and Evaluation

Insight and flow bring joy and a sense of fulfillment but an important phase follows. The creators need to consider whether the results meet requirements, to see whether parts need elaboration, to reject what flowed out but does not fit. Professional writers, artists, composers, and scientists often turn to others to help with this phase, and then go back to work given the comments. Writers often say the key to writing is rewriting.

Teachers can be a double role here, both to support students in what they have already produced and to point the way to improvement. Caulkins (1991) gave the example of a boy, who, in a free writing exercise, wrote a list of rules for asking to go to the bathroom. She recognized his originality and love of humor and then made a suggestion: Pick out the three funniest items and to try to make the others just as funny. He did that and was pleased with the result.

3.12   The Composite Creative Process Model and Creative Teaching

We have seen that throughout the presentation of the composite model that teachers can take an active role: scaffolding phases of the students' creative process: helping students to find meaningful creative tasks, using sensitive questions to lead them to fuller problem representations, supporting them through creative frustration, guiding them as individuals or as a group to make mini-c discoveries. Theorists have suggested that teaching, too, can be a creative process (Hansen, 2005) and studies have suggested that creative teachers facilitate the creative process in students (Reilly et al., 2011). The composite model can be a guide to interpreting studies of the creative process of teachers as well.

In an interview study (Doyle, 2017b), dedicated teachers for students of various educational levels were asked to tell when they had experienced teaching as a creative process. The expectation was that teachers would tell about specific incidents that occurred on particular days. Instead, each teacher told of a creative problem representation that encompassed an entire semester or year with overall educational goals; a number of subprojects were designed to reach the overall goals. The subprojects consisted of both presented problems mandated by curricula and discovered problems on both a large and small scale. For example, one second grade teacher discovered that a book she read to her children caught their imagination and so set herself the task of using its contents to structure academic content throughout the year.

The teachers told of many other features that fit the composite model. A high school special education teacher used the heuristic of reading the newspaper every day not only to discover material relevant to the history curriculum but also articles

that he thought would interest reluctant readers to meet two of his overall goals. The teachers noted the importance of preparation for each day's class, but, once in the classroom, listening closely to students and improvising responses. Even a college lecturer "listened" by allowing questions and by noting the attentiveness of students by their facial expressions and body postures—both allowing him to adapt to what he saw. Thus for these dedicated teachers, students were co-creators, more active participants in smaller classrooms, but even in the lecture hall.

The teachers evaluated the outcomes of their creative plans and sometimes experienced creative frustration when their plans failed, but as is necessary in creative work, they persisted and set about renewed problem solving. Sometimes the solution came as an insight—either amid interaction in the classroom or when they were at home, doing other things—incubation leading to insight. They spoke of moments of deep engagement, moments that met the criteria of flow.

The dedicated teachers were also clear on the nature of their creative product, the outcome of their creative process. One teacher could have been speaking for all of them as she said, "The outcome is transformation … sometimes in relation to the content of the material, experiences of transforming the understanding of the project material, ownership. … When it goes deeper, it often follows from that. They realize that it has changed their relation to learning in their own lives … they've been transformed as learners" (Doyle, 2017b, pp. 14–15). With that as a double goal—both students' deep learning of content and students learning about themselves as learners, the teachers knew the importance of constructing opportunities for students to have opportunities for creative work.

The creative product for teaching falls under the interpersonal domain and points to adding an important interpersonal microdomain we can call *mentoring creativity*. It includes the creative work of teachers, coaches, academic advisors, counselors, psychotherapists, occupational and physical therapists, etc. In each case, the creative goal is to advance the development of someone else and the creative outcome is transformation in that person. Thus the features of mentoring creativity given the current composite creative process model are an overall project with subgoals, presented and discovered problems, preparation, listening, improvisation, incubation, insights, evaluation, and the possibility of flow. Mentoring creativity is by its nature collaborative, with the students or clients necessary partners—cocreators—in the creative transformation.

Creativity models present intrinsic motivation as a decisive factor in creativity. For creative and dedicated teachers, there were at least two sources of intrinsic motivation: a passion for what they were teaching—such as the second grade teacher who fell in love with the book that structured her year with her second-graders (Doyle, 2017b)—and a passion for contributing to the growth of students (Woods & Jeffrey, 1996). The second grade teacher told of her satisfaction with the tremendous intellectual, social, and emotional growth of her pupils (Doyle, 2017b). Teachers also spoke of a strong moral purpose and of wanting to make a difference (Woods and Jeffrey, 1996). Teaching for creative teachers is a deeply meaningful activity (Hansen, 2005).

3.13   Classroom Creativity: Challenge to Traditional Education

This journey through current conceptions of the creativity reveals that allowing students the opportunity to learn through the creative process challenges some of the assumptions of traditional education. First, the creative process takes time and this moves against the aim of cramming as much information as possible into a semester. It suggests that rests and non-demanding activities may facilitate the process at strategic points through incubation. Rather than making students the passive receivers of information for which the teacher is the ultimate authority, the teacher becomes a guide, a coach that allows students not only to learn, but also to learn how knowledge is created and applied.

Classroom creativity gives students agency and self-efficacy, living proof that they can learn, construct, and create by their own actions. Learning, then, is not an obstacle course that requires gritting ones teeth to study disconnected, meaningless facts. Rather, though a challenging and perhaps at times frustrating process, learning becomes an adventure and a pleasure. With collaborative creativity, cooperation rather than competition is emphasized. Furthermore, though mini-c learning is often the same for all the students in the class, as students take on projects that are especially meaningful to them as individuals, different students will be learning somewhat different contents, which goes against the idea of standardized curricula.

Creative projects for students require creative teachers, teachers who are problem finders and problem solvers, who prepare carefully, yet improvise in the classroom, teachers who listen closely to students, who value and support student construction, teachers who are intrinsically motivated to make a difference in the lives of their students. This means giving teachers agency and respect as professionals rather than mandating exactly what and how they should teach. The teachers' passion for what they are teaching provides a model of engagement with academic material. For students who learn through the creative process, the learning becomes deep, meaningful, and fulfilling. The same is true for teaching. Teachers whose work is creative find teaching an important aspect of their identity, a deeply satisfying, meaningful way to live.

Today, computer-based education is seen often as a solution to the economic challenges of education. Yet, it is important to remember that creativity in the classroom requires the sensitive support and guidance of a living human being, a teacher committed to the intellectual and socio-emotional development of students. A pedagogy that includes opportunities for creativity in the classroom is expensive, labor-intensive education, but a precious path to deep learning of content and to the student's sense of self as a learner, thinker, and creator.

In a sense, whether to educate and support teachers to afford opportunities for classroom creativity is a political decision. It depends on how central a domain education is to a society, on how it represents the goals of education, and on the available resources to implement them. If the desire is for citizens who obey authority without questioning, who do not see themselves as able to explore, construct,

reflect, evaluate and create independently, then traditional education will serve. If, on the other hand, citizenship is to embrace active participation, pleasure in life-long learning, thinking about problems in imaginative ways, and contributing to society through creative projects, then educational opportunities for students to discover, construct, and create will prepare them well.

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Chapter 4
Sociocultural Perspectives on Creativity, Learning, and Technology

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Abstract In this chapter we focus on the links between creativity, learning, and technology in education. More specifically, we propose and exemplify a unitary, sociocultural framework of creative learning based on the notions of position and perspective. We start by specifying some general principles of sociocultural theory, in particular the interdependence between person and context and the way in which psychological processes "extend" into the world through the means of action, inter-action, and communication. Following this, we outline the perspectival model of creativity and learning, focused on how re-positioning and perspective-taking lead to new, creative insights, and relate it to various uses of technology in education, including technology mediated creative learning practices and immersive technology. In the end, we reflect on the consequences of these uses for how we understand, theorise, and cultivate creative learning in and beyond the classroom.

4.1   Introduction

What would education be like for students if, during class, teachers were to show more of what they are talking about? For example, when discussing the lives of people in ancient Rome, students could experience what it was like to walk the streets of Rome at the time. Or, in geography class, they would see what the view from the top of Mount Everest looks like or find themselves in the middle of a herd of dinosaurs when covering paleontology. Of course, these experiences are all possible in the classroom, to varying degrees. Teachers have long been using all sorts

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of tools—from images and models to written texts—as resources for igniting students' imagination and opening new possibilities for learning and creativity. Nowadays it is more common to use videos in the classroom in order re-position students within other spheres of experience (Zittoun & Gillespie, 2016). The reliance on multiple cultural tools in education is something Vygotsky (1978), a founding father of sociocultural theory, advocated almost a century ago. The technological advances that revolutionise so many segments of our lives are slow to be adopted by educators for a number of reasons, though, from fearing their disruptive potential and not mastering them sufficiently, to a lack of support and financial resources. Yet, the virtual world and its technological underpinnings are gradually entering not only students' lives but also their school lives and, in the process, create a new context for education that needs to be examined further.

An important question is how these new technologies shape creativity and learning, and why. We focus on links among creativity, learning, and technology in this chapter because they are at the heart of a sociocultural approach to education. This approach starts from the premise that creativity, or the process leading to the emergence of meaningful novelties, is in fact a distributed phenomenon, one taking place "in between" rather than "inside" the mind (Glăveanu, 2014). "To create" involves, fundamentally, collaborating with others either in an implicit or explicit manner. One can collaborate with others directly by working in groups or exchanging with teachers and peers. But, at a deeper level, students (and teachers as well) collaborate with the ideas or points of view of others who in many cases are no longer living but have left their mark on culture or society. There is, in this sense, a strong connection between learning and creativity because, in order to create, the person needs to acquire new experiences of the world and to learn from them.

Creative learning is, from a sociocultural standpoint, a rather tautological expression. We create based on what we know and thus have learnt. At the same time, we learn by appropriating and transforming content, recreating it to various extents so as to understand and use it, rather than simply replicate it inside our head. Moreover, culture and its symbolic and material tools mediate both these processes, standing as the two faces of the same coin. Technology, from simple pen and paper to the virtual reality sets of today, is a key mediator of creative learning given its capacity to expand our experience beyond the "here and now" and towards the absent and the possible.

In this chapter, we discuss and illustrate these links within a unitary, sociocultural framework of creativity and learning based on the notions of position and perspective. We start by outlining some general principles of sociocultural theory. In particular, our focus is on the interdependence between person and context and on the way in which psychological processes "extend" into the world through the means of action, interaction, and communication. Then we outline a perspectival model of creativity and learning, relating it to various uses of technology in education, including technology mediated creative learning practices and immersive technology. In the end, we reflect on the consequences of these uses for how we understand, theorize, and cultivate creative learning in and beyond the classroom.

4.2 Sociocultural Approaches to Creativity and Learning

In past decades, creativity and learning became two highly popular concepts in science and in public debates about society and education, as well as business. Creativity and learning are assumed to underlie knowledge-based economies and learning societies (Hargreaves, 2000), and are part and parcel of what became known as twenty-first century skills (see Trilling & Fadel, 2009). Despite this surge in popularity, however, most scientific theories of creativity and learning still reflect the behaviourist and cognitivist legacy of the twentieth century. In particular, they start from the all too often implicit assumption that both these phenomena are "located" within the mind or, in more recent research streams, the brain of the person who learns or creates. For as much as it aids the development of psychometric instruments, this radical individualisation is incongruous with today's practices of both learning and creativity.

Connectivity and collaboration are at the core of how children and adults learn and express their creativity. This is supported by the use of technology and other similar tools to communicate, share, and transform cultural content. The distributed nature of creativity and learning in the age of the Internet (Literat & Glăveanu, 2016) calls for new conceptual frameworks, forms of measurement, and intervention. Most of all, it requires us to think and study these phenomena in a systemic, relational, and developmental manner, being much more sensitive to context and process instead of simply focusing on person and product.

A conceptual framework apt for studying these phenomena is the sociocultural approach most commonly connected to the work of Lev Vygotsky. He made important contributions to both psychology and education and is often seen as one of the founding fathers of sociocultural theory. Following a Vygotskian approach, creative processes are inherently social, as ideas develop through a combined and relational process of co-construction of meaning and knowledge enhancement through dialogue. This theoretical positioning is grounded in the three main premises of the sociocultural approach, as identified by Wertsch (1991):

1. individual development originates in social sources, whether cultural or historical,
2. human action, at once individual and social, is mediated through tools or signs,
3. these processes span time and space.

In this chapter, in particular, we pay attention to the Vygotskian view that cultural resources (tools and signs), acquitted and employed in interaction with others, mediate our action and contribute to our development. Such a sociocultural perspective on creativity and learning (Glăveanu, Gillespie, & Valsiner, 2015; Lave & Wenger, 1991) offers a cutting edge scientific perspective that is critical of theories that "place" both these phenomena inside the mind of isolated individuals and treat them as static. It postulates a dynamic, distributed, and participative view in which creativity and learning develop within relationships and are mediated by the use of cultural tools, including technology.

Vygotsky saw semiotic mechanisms as mediating social and individual functioning, and connecting the external and the internal, the social and the individual (Wertsch & Stone, 1985). He stated that human action, at both an individual and social level, is mediated by tools and signs. Such tools, often referred to as "psychological tools" (Wertsch, 1991, p. 28), include language, systems of counting, mnemonic techniques, algebraic symbol systems, works of art, writing, schemes, diagrams, maps and mechanical drawings, conventional signs, and so on. According to Wertsch (2007), our contact with the social and physical world is not direct and unmediated but rather indirect or mediated. In our contact with our surroundings, we are making use of semiotic and psychological tools in particular. All mediated activities involve the use of psychological tools, which first existed outside the person and gradually became internalised or appropriated, regulating individual thought, emotion, and behaviour (John-Steiner & Mahn, 1996; Vygotsky, 1986).

According to this sociocultural view, semiotic mediation is important for all the processes involved in creativity and learning activities. Thus, creativity and learning are two psychological processes that could benefit greatly from a sociocultural approach. This is because both of them are shaped by interactions. These interactions can take place with other people as well as between people and their material environment, which includes both appropriated and transformed cultural resources. Although treated separately in most cases, there are many links between creating and learning, as explained above.

These links prompt researchers today to talk more about "creative learning," which we will define shortly. In fact, from a sociocultural perspective, acts of creativity always involve an element of learning—either about oneself, about others, or about the world—whereas learning is in itself a creative process, leading to the generation of new perspectives and knowledge for the learner. Here, we elaborate a unitary theoretical framework for creativity and learning, one that is grounded in the notions of difference, positions, perspectives, and reflexivity and considers the social and material conditions necessary for creative learning to occur.

All sociocultural research starts from the premise of the interdependence between mind and context and proposes the cultural (symbolic and material, including technological) mediation of human action (Shweder, 1991). From this perspective, *creativity and learning are both situated cultural activities that lead to the generation of new and meaningful perspectives in relation to particular contexts or problems*. In fact, from this standpoint, there is little difference between learning and creativity. The reason is that both phenomena build on the creator/learner's experience of the world in ways that produce new knowledge, tools, or practices for the person, the group, and sometimes for society. The view that creativity and learning feed into each other has been recently supported (see Beghetto, 2016). Creative learning stands at the core of what defines human beings as active agents, rather than passive recipients, of existing cultural content.

Beghetto (2016) states that when students are engaged in learning, they construct their understanding of what is being taught by combining what they already know with the new experience. The combinatorial process is a creative process in which the whole has new properties compared to the parts. In the case of learning, the

process of integrating prior knowledge with new experience results in a change in personal knowledge. In this way, change serves as a common link between learning and creativity. *Creative learning* can be defined as "a combination of intra-psychological and inter-psychological processes that result in new and personally meaningful understandings for oneself and others" (Beghetto, 2016, p. 4), a working definition we also adopt in this chapter.

Creative learning is, in other words, mediated human action and a psychological process. This mediated action involves what Vygotsky (1978) refers to as Zone of Proximal Development (ZPD), which is a means of explaining how social and participatory learning take place (John-Steiner & Mahn, 1996). ZPD has been defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Given these processes, human beings are not passive recipients of knowledge; in fact, the ZDP is grounded in activity and interaction. According to Newman and Holzman's (1999) explanation,

> For Vygotsky, human development was revolutionary activity—development (more properly developing) is inseparable from creating environments for development. The social-cultural-historical process of creating what he called ZPDs is the revolutionary activity of people jointly (collectively, socially) transforming totalities. ZPDs are not instrumental means-ends tools for results, but simultaneously prerequisite and product, tool and result. (p. 100)

A constant negotiation between the learner and the more advanced partner takes place in the ZPD. Its outcomes are never a given, deriving from a form of scaffolding that is prefabricated (see Daniels, 2008; Newman, Griffin, & Cole, 1989). Creative learning has this kind of active negotiation and shifting of perspectives at its core. When we follow this line of thought, we see how technology, in a proximate development zone, represents an essential factor by enabling learners to explore a variety of positions and perspectives available within their environment. Technological tools thus mediate both creativity and learning in the relationship among people, groups, and organisations. A question is, why and how is this the case?

4.3 A Perspectival Model of Creativity and Learning

As described in the previous section, the sociocultural approach is based on a set of assumptions that help connect creativity and learning. First, sociocultural theory assumes that people participate in culture as active agents, not simply acquiring and reproducing, but appropriating and transforming cultural elements (Vygotsky, 1980). This dynamic can be conceptualised in terms of learning and it is a *bi-directional process* in which individual and context shape each other (Valsiner, 2014).

Second, this is a socially mediated process that builds on explicit or implicit interactions with other people, from teachers to colleagues, competitors and critics.

It is by being able to take the perspective of others (i.e., to see ourselves and the world as another does) and learn to share and coordinate perspectives or points of view that we develop a human self (see Mead, 1934). By so doing, we become capable of acting flexibly and creatively in the world (Glăveanu, 2015).

Third, every situation or problem, especially in education, can be approached from a variety of positions and their resulting perspectives. This makes being aware of multiple perspectives—including perspectives coming from different disciplines, historical times, or theoretical models—highly important for learning and creatively transforming educational content, from the arts to mathematics.

The perspectival model we propose to conceptualise learning and creativity within a unitary framework of creative learning is based largely on sociocultural and pragmatist theory. Specifically, we are referring to the social psychology and philosophy of George Herbert Mead (1934) and to neo-Meadean scholarship (Gillespie, 2005; Martin, 2005). Their basic premise is the following: there are always multiple positions and therefore perspectives from which to understand and engage with reality. Positions are defined in social and material terms as the vantage point from which perspectives are formed.

From early childhood onwards, children are introduced to different positions within play and games (e.g., hide and seek, doctor and patient, thief and police, and so on). Importantly, episodes of play, the first cultural manifestations of both learning and creativity, allow children to "move", physically and then mainly imaginatively, between different positions. This is what Gillespie and Martin (2014) call "position exchange." In doing so, they develop different perspectives on the situation, defined as action orientations (Gillespie, 2005). Indeed, a perspective is not simply an idea or a cognitive construction; it designates the intentional, psychological orientation of the person within a specific context. For instance, taking hide and seek as an example, there are two basic positions involved: the seeker and the one who hides. This game, like all others, relies on perspective taking and orchestration. The child is successful as a seeker if he or she is capable of understanding and imaginatively adopting the perspective of someone who is hiding. How else would the child know where to look? This simple dynamic involving the exchange of positions and perspectives has profound implications for creativity and learning.

The perspectival model (for more details see Glăveanu, 2015) postulates that creative learning emerges out of two interrelated processes: (1) *learning new perspectives by re-positioning oneself in relation to the situation or problem at hand*, and (2) *creating new meanings by placing multiple perspectives in dialogue with each other*. Thus, the perspectival model proposes a close and dynamic relationship between learning and creativity in which the two support one other. We learn new perspectives by interacting with others, with the help of cultural tools (such as language and technology), and by being exposed to a variety of experiences as part of the educational process. We start being creative when these perspectives are put in relation, when we reflect on what our initial perspective reveals about the others, and when we use this insight to integrate or multiply the perspectives we are learning. In this way, the creative "moment" of the process (or, rather, its creative

dimension because creativity and learning are seen here as deeply interconnected) opens up new learning opportunities in a continuous cycle.

A key element in this whole dynamic is the possibility of de-centering or taking distance from single and conventional perspectives, and exploring alternatives and contradictions. As schools are traditionally places in which children are socialised to acquire the dominant or conventional views of their community and society, reducing the act of learning to this acquiring singular perspectives on the world would sacrifice its creative potential. Creativity emerges out of difference (Glăveanu & Gillespie, 2015) and, as such, successful forms of education try to equip children with more than one perspective on things. This helps them reflect about differences in perspective and use these differences to generate new (potentially creative) ideas. For teachers, for example, this means finding multiple ways to present a topic, helping students think about it from different perspectives, as well as inviting them to reflect on these differences and the new ideas that might emerge from considering them.

This dynamic is, in many ways, the work of imagination (Ness, 2016; Zittoun & Gillespie, 2016)—the psychological function underpinning acts of perspective taking and perspective orchestration (see also Ness & Glăveanu, in press). Imagination, alimented by our social and cultural experience of occupying various positions in the world (Vygotsky, 2004), helps us both actualise and transform perspectives acquired in the past. A direct consequence is that learning and creativity are fueled by the social and cultural experiences we accumulate and their variety. The more experiences we can draw on in a certain situation, the more material we have to learn from and with which to create. However, this is not a linear relationship. Having the resources to take various perspectives does not guarantee the person will actually engage in perspective-taking. What is required is an understanding of the value of different perspectives (Glăveanu & Beghetto, 2017) and a facilitating environment that invites the person to take and orchestrate perspectives (Ness, 2017; Ness & Riese, 2015). All these elements—mobilising personal experience, valuing differences in perspective, and facilitating orchestration—are essential for educational environments. Unfortunately, education is, as this book makes explicit, under duress in many ways. It suffers from a shortage of staff and resources and, more broadly, from a troubled socio-political climate when it comes to appreciating otherness and the knowledge of others, at a global level. Yet, if creative learning is to take place, we need to ensure that classrooms are places where multiple perspectives exist and thrive.

The perspectival model suggests a series of hypotheses about perspective-taking, learning, and creativity, some of which have been already tested empirically. For example, perspective-taking was found to foster learning (Burant & Rios, 2010; Lozano, Martin Hard, & Tversky, 2006) and to enhance creative expression (Grant & Berry, 2011; Hoever, Van Knippenberg, Van Ginkel, & Barkema, 2012). This is because, for us, perspective-taking captures both sides of the coin—creativity and learning—as referred to in this chapter.

In essence, perspective-taking refers to the act of learning or acquiring a different perspective than one's own based on dialogues with others and use of material tools.

Also, the perspective being constructed connects necessarily to existing knowledge or, continuing our terminology here, existing perspectives. The degree of the difference between our current perspectives and those being taken holds the potential for creative, new ideas to emerge as part of the process. As we know, when confronted with radical differences in perspective, we tend sometimes to ignore or outright refuse the perspective of the other. This blockage of creative learning should be tackled in education, just as it is in design and the creative industries using perspective-taking tools (e.g., the Personas method, which cultivates innovation by thinking from the perspective of users; Miaskiewicz & Kozar, 2011).

Computer mediated activities and, in particular, virtual reality platforms offer a unique venue for testing our assumptions about learning and creativity (for a similar argument, see Gillespie, Corti, Evans, & Heasman, 2017; Lindgren, 2012; Wasson, Ludvigsen, & Hoppe, 2003). This advantage is underpinned by the fact that virtual world settings afford manipulating the participant's position and his or her perceptual environment. Such manipulation is most effective when it helps reposition the person and thus foster perspective-taking. The possibility of avatars (i.e., images representing a person online) to foster creative expression (see Buisine, Guegan, Barré, Segonds, & Aoussat, 2016; Guegan, Buisine, Mantelet, Maranzana, & Segonds, 2016), for instance, has been recently documented in research. Moreover, today's virtual reality headsets and similar technologies afford a much greater immersion into the situation.

The enhanced potential to facilitate perspective-taking and position-exchange should be exploited in educational research and practice. What is particularly interesting in relation to virtual reality is the fact that the individual's potential for distantiation (i.e., taking distance so as to be able to "see" things from a new perspective in Second Life environments) is matched by immersion, especially through using recent VR headsets, which are widely accessible on the market. This mix between immersion and detachment in virtual environments creates interesting opportunities for educational psychologists, educators and learning scientists to examine and foster creativity and learning in the classroom, as we go on to explore, starting from the general use of technology in education.

4.4   Technological Mediation of Human Activity in Education

Following the sociocultural approach, learning is an emergent property of active involvement in social practices (Säljö, 1999, 2009). It is bound to a context and requires participation in cultural practices (Cole 1996; Lave & Wenger, 1991). The sociocultural approach to technology enhanced learning (TEL, an umbrella term used in Europe to refer to information and communication technologies [ICT] used to enhance or support learning) offers a view of learning that is situated in human social practice and mediated by technological tools. We think that a technology-enhanced-creativity (TEC) notion can be envisioned, one grounded in technology's

potential to offer learners/users access to a variety of new positions and perspectives from which to approach, conceptualise, and act on the world around them.

In an educational setting, the integration of technological tools into a pedagogical culture has a learning function. This integration can be seen as "a mediator that enables students' and teachers' collaboration and creative work within and across different curriculum subjects and cross-curricular projects" (Kumpulainen, Mikkola, & Jaatinen 2014, p. 55). While the digitalisation of society is moving at a rapid pace, schools have not kept up with integrating the technologies used by students and teachers in their everyday lives (Laurillard, Oliver, Wasson, & Hoppe, 2009).

This raises questions about if and how students find relevance in their schoolwork (Kumpulainen et al., 2014). For example, while there is an increasing view of learning as a participative activity in the learning community (Kollar & Fischer, 2009), schools and institutions have been slow to react to the emergence of this new participatory culture (Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006). As the articles in the Hillman and Säljö's (2016) special issue show, learners as participants and creators "challenge simple notions of learning as a reproduction of what exists, and they simultaneously pave the way for conceptions of learning that emphasize tool-mediated collaboration, innovation and a performative understanding of what it means to know" (p. 308). This dichotomy between school life and everyday life challenges researchers to ask how these two worlds can be brought closer together (Collins & Halverson, 2009; Kumpulainen et al., 2014). The same situation can be found in vocational education and higher education.

The technological mediation of human activity in education is not new and, indeed, has taken many forms. Historically, the use of ICT in education spans from the first operational instructional program developed in 1963 at Stanford University to teach elementary mathematical logic (Suppes, 1971), through artificial intelligence applications that provide adaptive learning and feedback, to current day learning apps. These are accessed on a device (e.g., smartphone, tablet) and emerging production environments enable learners to utilize such devices in order to participate more fully in creative learning processes and immersive technologies that provide virtual worlds to be explored.

In recent years, researchers have been arguing that education has to embrace technology as a tool for intellectual expression and production. The recent emergence of production and authoring tools mediates a shift where learners are not only consumers of digital materials but also creative producers (Buckingham, 2003; Buckingham & Sefton-Green, 1994; Laurillard et al., 2009; Peppler & Kafai, 2007) who participate in technology mediated learning environments that change how they learn and know (Hillman & Säljö, 2016). Laurillard et al. (2009) argue that "the use of digital technologies to enhance intellectual expressiveness and creativity" actually help "students in their appropriation of the world with a special emphasis on their intellectual development; [thus] it is essential for the education system to incorporate new digital media as tools for intellectual expression and production" (p. 289).

The use of technology for participation in creative learning processes challenges both how we understand learning and how it can be assessed. For instance, Hillman and Säljö (2016) argue that digital technologies play a significant role in learning

and knowing: "Digitization is a change of a magnitude that makes it necessary to partially reconsider what we construe as learning, [it] exerts a strong pressure on established instructional processes, and … on how the outcomes of such processes should be evaluated" (p. 308). They add that it is important to analyse, in this context, "how young people learn to participate in technology mediated environments, and how they exploit such resources for learning that is relevant across institutional boundaries" (p. 307).

As pointed out earlier, creativity and learning are part of the demand for twenty-first century skills (Trilling & Fadel, 2009), as is collaboration. Studies of computer support for collaborative learning (CSCL; Dillenbourg, Baker, Blaye, & O'Malley, 1995; Wasson & Ludvigsen, 2003) focus on understanding productive collaboration processes in various learning contexts. In CSCL, technology mediates interactions between learners, who are co-located in front of a shared screen or distributed over physical locations, and between learners and teachers or even avatars as learning companions, and so on, and can facilitate students as participators and designers (e.g., Wasson & Vold, 2012). Reflecting on these studies from the standpoint of the perspectival model already outlined, we would consider each learner as occupying, at the same time, multiple positions in relation to others (physical and virtual). They would be accessing multiple perspectives on the problem or situation at hand and, important for creative learning, trying through collaboration to articulate and move between or among the different positions and perspectives that CSCL affords.

Wake, Guribye, and Wasson (in press) present one example of this dynamic by exploring the potential of the creative design of location-based games for history learning. This example shows the potential of using authoring tools to have students engage creatively with subject matter as a focal point of creative learning activity. A scenario that engages history and media high school students in collaborative game creation, game playing, and media product development was studied both for how a group of students coordinate their collaborative work, and how the creative work of designing a location-based history game involves a series of perspectives and design decisions. The scenario was designed in close collaboration with a history teacher (who also provided digital technology help to other teachers at the school) who chose Bergen history during the World War II (WWII) and who took into account the (then) 16 locations around the city related to themes and events during WWII. Groups (of 3–4 students) collaboratively created games for their peers and, in this way, were accountable for a useful learning experience. These student designers had to rely on their creativity in writing an engaging, coherent storyline. The authoring tool SILO was used to mediate the game design process by providing an easy-to-use interface where they identified locations and entered clues to help the game players find the location. In this way, the designers not only had to construct new experiences for their peers but had to rely on their capacity to adopt their users' perspective when creating the problem to solve.

It turned out that their teacher was very satisfied with the scenario and, in particular, the importance of the collaborative creativity that was involved in creating the game and having another group play the game. Wake et al. (in press) make a key observation: "The students in this learning scenario engage creatively with the learning

materials and the resources available to them" (p. x). The teacher reported: "the participation in the scenario made them see the history in the city in a new way, and attach new meanings and associations to places already familiar to them" (p. x). This study is important in that it shows the relevance of constructionism and how students organise their creative work and interaction in game design and how they learn through such collaboration.

Academic learning, however, is not just taking place in schools or universities. In their special issue on learning, knowing and opportunities for participation, Hillman and Säljö (2016) point out that that academic learning is no longer restricted to formal settings, but rather also takes place in alternative settings "where digital technology plays a significant role and where it co-constitutes the activities of learners in significant manners" (p. 306). Kumpulainen et al. (2014) take this argument further and show that formal learning in the twenty-first century occurs across various chronotopes (i.e., patterns of organization of and across activities in space and time) and in formal and informal settings.

Kumpulainen et al. (2014) show how twenty-first century pedagogies focused on creativity and learning potentially "resonate with learners' lives and extend their opportunities for engaging in meaningful and creative learning across time and space" (p. 70). They studied the social practices of 21 Finnish elementary schools where a total of 240 students were involved in a school communal music project, the Magic Forest Musical. Over one year, students and teachers worked collaboratively, "produc[ing]… poems, short movies, audiovisual effects, animations, stories, and a composition of the musical melody using various technological tools and devices" (pp. 57–58). The study's focus was on the technology mediated creative learning practices that were embedded in the sociocultural context of the school community. Findings illuminated the nature of created chronotypes, those "novel time and space configurations" in the students' creative learning processes. As such, the learning flowed out of the traditional educational space-time configuration bound by the definition of school setting (formal) and into their out of school lives (informal). Importantly, Kumpulainen et al.'s study both illustrates what is possible when "students' learning lives' [are] fostered by the pedagogical culture of the school" (p. 68) and challenges current schooling to "create educational ecologies for such creative collaborative practices [of] learners who are to build the future" (p. 70).

In the next section, before concluding, we take a closer look at human computer interactions. In particular, our discussion considers technologies that enable an exploration of virtual worlds and augmented reality, with a view towards how they support creativity and learning.

4.5   Human: Computer Interaction and Virtual Worlds

As previously noted, computers are part of the sociocultural tissue in which we live. It is worthwhile to reflect, in this context, on the ways that these technological agents interact with people and can contribute to or hinder human learning and

creativity (Burkhardt & Lubart, 2010). Based on a special issue of human-computer interaction, Lubart (2005) proposed four social roles of computers: computer as nanny, computer as pen-pal, computer as coach, and computer as colleague. We review these here with a focus on how they each potentially impact creative learning.

4.5.1 Computer as Nanny

Generative thinking encompasses learning and creativity. People sometimes have difficulty engaging in novel thinking, breaking away from everyday life, routine thinking, and habits. To the extent that computer technology provides a supportive setting, which "cuddles" people and facilitates access to creative learning mindsets, the computer acts as a nanny. One aspect of support concerns keeping learners on track with their projects and their goals in mind (and perhaps nudges them to respect such things as the time schedule for a task). Computers can monitor the work process and thereby provide such levels of support. As such, learners can set personal goals and deadlines and receive automatic reminders, or they can use an application to monitor their daily schedule and detect problems (e.g., interruptions). Having no breaks can pose a problem; computers could improve users' quality of life and perhaps foster learning or creative incubation by proposing breaks.

Moreover, the nanny role encompasses the provision of an environment that affords engagement in learning and creative work. This computer work environment (or desktop), much like a cabin in the woods, a beach, or a café may offer some special conditions that put a person in the creative mindset. In a similar way, environments that foster a discovery mindset, inviting the learner to travel in a novel "knowledge escape," may facilitate learning. In terms of the perspectival model, in this kind of relationship computers propose a certain number of predetermined perspectives to users who accept (or reject) the "invitation" to follow them.

4.5.2 Computer as Pen-Pal

Thinking is typically, at one point or another, communicated to social others for feedback, and ultimately idea adoption. Thus, there are naturally moments when a creator or a learner may use computer technology to communicate. The affordances offered by technology have greatly expanded through cell phones, skype, chat, e-mail, video conferencing, and social media. Thus, communication technology has enriched the possibility to connect to remote others, which may contribute positively to creative work as an enriched context or negatively as a source of social pressure.

However, the development of collaborative creative projects or learning activities in team contexts is another major trend, which benefits from communication

technology. In addition to the aforementioned technological tools, there are co-working platforms that allow distance collaboration on a shared object, such as a text under simultaneous revision by multiple authors and a virtualized sketch or object (such as an architectural model) that can be examined and modified at distance by co-creators. Such evolving computer representations have been found to facilitate the exchange of ideas between and among diverse actors in complex problems such as urban planning. Electronic mail and teleconferencing software allow collaborations across time and space. Thus, the potential for more diversified, collaborative projects involving heterogeneous teams is possible and can enhance creativity and learning. In this vein, the development of brainstorming software that allows individuals to exchange ideas electronically, yielding a common pool of ideas that itself is submitted to group discussion, illustrates well the computer as a networker or facilitator. In terms of our framework, the computer as pen-pal enables learners to share perspectives and thus, can potentially lead to creative insights.

4.5.3 Computer as Coach

Given that a large number of cognitive processes (e.g., divergent thinking, metaphorical thinking, free association) are involved in learning and creative thinking, it is almost certain that an individual does not master all of them. He or she may not even be aware that certain kinds of thinking may be useful in a task. Thus, the computer as an expert system, programmed to be knowledgeable in learning strategies and creativity-relevant techniques, can help the user to go as far as possible. Computers that provide information in different ways enable learners to come up with new or breakthrough ideas, which can serve to jump-start the creative learning process. If a learner is interested in trying to use a certain cognitive process, the computer can provide tutorials and exercises for advancing relevant techniques. Opportunities for learning about new perspectives and how they come about can be fostered in such a computer-assisted creative learning environment.

4.5.4 Computer as Colleague

The most ambitious vision of human–computer interaction for creativity involves a real partnership, in which humans and computers work hand in hand. The idea here draws on work in artificial intelligence in which computers can themselves contribute new ideas in a dialogue with humans. The growing field of machine learning and computational creativity indicates that computers can learn complex tasks (e.g., playing chess), generate visual art (e.g., images, multimedia), musical compositions (e.g., improvisation), stories e.g., (text generation), and scientific ideas (e.g., data mining).

We can imagine a creative team composed of a human–computer duo. As such, the user proposes an initial idea which the computer modifies in a random or heuristic way and that the human modifies in turn. This cycle continues until the user or outside judge(s) decides that the production is satisfactory. One tactic in creative thinking is to rely on random or semi-random search mechanisms to generate novel, unconventional ideas. This is especially useful when one is stuck, continuing to revisit a less suitable idea. Computers can probably better implement random searches than humans can, but human beings are needed to select the best ideas and perhaps to fine-tune these, turning them into viable creative productions. Thus, it is possible to conceive of computers as real partners in creative and learning processes intervening at different points in order to generate, evaluate, or refine ideas. With this last metaphor, computers not only enable positions and perspectives, but also propose a challenge, position, and perspective with which learners are "confronted" and need to work with, accommodate, and/or resolve.

Designing systems to foster learning and/or creativity involves specifying the nature of the computer's contribution. Following this is a determination of how systems fit with the nature of the generative thinking task and to what extent the system interacts with the user to support learning and/or creativity. In this vein, the fourth author and his team have been exploring virtual reality environments since 2013 (see Lubart et al., 2018). In these systems, multiple users represented by avatars engage in individual or collective creative thinking tasks in virtual workspaces. The studies that we have conducted have employed Second Life as a readily available platform (see www.secondlife.com).

This research undertaken by Lubart et al. (2018) primarily examined the impact of the virtual workspace on creative output. In one study, we had students engage in the search for creative ideas to solve transportation issues in a big city (Paris, France). Participants worked in one of the following conditions: (a) a real meeting room that was the normal control condition, (b) a virtual version of the meeting room, (c) a virtual enhanced room resembling an artists' studio, or (d) a virtual dark and uninviting "prison-like" storage room. Findings indicate that students assigned to the virtual artist's studio tended to produce more ideas that were original than those in the other three conditions. In addition, there was no notable difference between working in the virtual and real meeting rooms. The artist studio was not a random choice as a creativity-inductive environment. In fact, we had conducted an initial study to determine the attributes of a creative work environment for the students and then we configured a virtual space to reflect their ideas (Guegan, Nelson, & Lubart, 2017). Thus, we were using here virtual reality in *nanny* mode to provide a propitious environment that supported individuals' creative thinking by repositioning participants in contexts that enable (or inhibit) the development of new perspectives.

The effect of a virtual environment on creativity is not limited, however, to the "physical" features. We examined in another line of work the influence of avatars used to represent people in the virtual world (Buisine et al., 2016; Guegan et al., 2016). In previous research, a "proteus" effect has been observed, such that assigning people an avatar with specific characteristics leads them to play these out in their

avatars' behaviour. For example, providing a sexy avatar is associated with more socializing by the user with that avatar when in a virtual bar scene and upon leaving virtual reality and returning to "first" life (i.e., participants then socialize more in real life.)

In a study with engineering students, some participants solved creative thinking tasks using a normal avatar, whereas others had a creative-looking avatar (looking like a crazy engineer) (Guegan et al., 2016). The students who solved the problem in the creative avatar's shoes produced more ideas than those in the regular avatar's shoes. Then, in a second part of the study, there was still greater performance for those who had previously received a creative avatar compared to those previously using a regular avatar (Guegan et al., 2016; Guegan, Collange, & Lubart, in press). Once again, we can observe the facilitating effect of virtual technology, again in *nanny* mode, but this time actively influencing the generation of new perspectives by giving participants a new position (physical aspect and social role) within the situation.

Finally, we examined the use of multiple user virtual environments (MUVE) for creativity in small groups, with three avatars in a neutral virtual meeting room working on a creative problem-solving task (Lubart et al., 2018). The focus was on the interaction among participants in this small group setting. Students in the avatar work group that communicated with chat text exchanges expressed nearly the same feeling of co-presence as students in the regular meeting room, with verbal exchanges. The avatar condition allowed these learners to remain anonymous (compared to a real-life room with people talking with each other). This feature can be beneficial for creativity or learning as some people in regular meetings restrain from expressing wild ideas or unexpected questions due to such concerns social image and negative feedback. This risk is reduced, however, when participants are hidden behind anonymous avatars. Overall, this type of effect entails the role of computer as *pen-pal*. Virtual reality allows new interactive modes that are difficult to envision in regular group meetings and influences the way in which perspectives are exchanged in the situation.

The empirical research briefly reviewed here explores how technology can impact creativity. Specifically, what has been addressed is the positioning of learners in a new physical context (the first study), inviting perspective taking related to a specific social role (second study), and enabling the exchange of perspectives under conditions of anonymity (third study). Most of all, the work presented on virtual reality—the first series of empirical studies to examine systematically its potential for creativity and learning—points to some facilitative effects. Of course, technology can have mixed effects and, in some cases, it can hinder creativity and learning. One pervasive example is the tendency to use Internet search engines, such as Google and Yahoo, to find information on a topic. These are the most commonly chosen sites containing information that is widely shared, including information that is even false at times.

Thus, the typical behaviour for choosing the top "hits" in an Internet search contributes to little learning and diversity in information gathering and practically no generative thinking. Internautes may well consult the same popular website, leading

to little room for idiosyncratic knowledge, a form of collective techno-driven conformity. In terms of the perspectival model, these uses of computers mainly as *coaches* can end up reinforcing dominant perspectives without displaying enough initiatives or inviting participants to look for them. Thus, as most tools, technology can help but it can also hurt when used uncritically.

4.6 Concluding Thoughts

In this chapter, we adopted a sociocultural approach to creativity and learning in education. This approach is based on the idea of socio-cultural and material mediation of activity and, in this case, not only other people but also technology itself can "act" as a scaffolding device for creative learning. Of course, as we briefly mentioned, this view does not imply that all uses of technology will lead to more creativity and opportunities for learning. We are not advocating a "romantic" view of technologically-enabled education. Our belief is that all creative learning there is a technological component (even when it is as simple as pen and paper) and that modern-day technologies that offer virtual and augmented realities can have a significant impact (positive or negative) on how and what we learn and create. This impact is premised on the fact that creativity and learning are intrinsically perspectival phenomena. This means that they thrive on the possibility of the user re-positioning him or herself and adopting a new perspective on the situation at hand. Technology can greatly facilitate such acts of re-positioning and learning new perspectives. At the same time, by using the same means in the same manner, learners can be "blocked" into developing and practicing only a limited number of positions or perspectives. It becomes important, in the end, to consider how technology can be used in education in ways that are more fruitful.

Taking the example of virtual reality and Second Life types of environments, it is worthwhile to reflect on the settings being constructed for learners, the roles played in them, and the relationships established. First, introducing users to more than one type of environment and role is bound to diversify their range of immediate experiences, mobilize more distant experiences from the "first", offline lives, and offer resources to build on when imagining and creating (Vygotsky, 2004). Allowing students to choose their avatars and the worlds they would want to be in can spark their curiosity and encourage them to explore. At this stage, it is important to invite learners to change avatars or environments from time to time, in order to avoid being "trapped" into what might end up being stereotypical ways of relating to their new, virtual surroundings. Then, reflection needs to go into the way participants are allowed to interact in virtual worlds. Using the chat function, as indicated, can enhance their participation because they can express their ideas at any time, without the risk of interrupting others who do the same (thus diminishing production blocking, a phenomenon well documented in real-life brainstorming situations; see Nijstad, Stroebe, & Lodewijkx, 2003).

An open question remains as to how much teachers should direct the interactions among participants or generate a common set of rules for them. When constraints are too numerous or specific, these can reduce rather than increase participation in creative work. In light of the perspectival framework proposed in this chapter, creating opportunities for perspective-taking might be a highly useful way of using these new environments. For example, learners can be asked to change avatars periodically with others to "experience" the situation they are in from a new position. Creating dyads that operate in this manner might increase mutual understanding and the feeling of agency (something argued by the proponents of Position Exchange Theory; Gillespie & Martin, 2014).

In the end, the sociocultural view on creativity, learning and technology is not meant to offer (only) practical advice but should be used by teachers as an epistemological set of guidelines for (re)thinking creativity and learning within education. The notion of interdependence between person and context, as we explained at the beginning, is fundamental here. If technology is used primarily with a focus on the individual learner and his or her experience and knowledge disconnected from others, then the framework in question might be cognitive but not sociocultural. The distinctive mark of the sociocultural is that it considers learners as creative actors (see Glăveanu, 2013) whose experience of the world is mediated by interactions with others and the use of signs and tools, including technology. This involves a deep consideration of the multiple positions in the world, both physical and virtual, that learners get to experience, and the perspectives associated with them. An accompanying concern is for how these perspectives can be diversified, exchanged, and enriched as users collaborate within learning environments that are effectively supported by technology.

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Chapter 5
Creativity and Bio-capitalism in the Age of the Anthropocene

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Abstract Creativity is an abstract and universal concept. Yet, it is one also subject to the form and function of the socio-historical and economic conditions during which it is being defined. This chapter is a reflection on conditions under which creativity might be understood and applied in our future eco-political landscape. Furthermore, creative "labor" (input and output) will be influenced by the rise in global corporate power and evolution of technological developments. The author reviews a recent history of the intersections among neoliberal ideology, capital, and creativity, and predicting what those relationships might look like in an emerging bio-capitalist world. This chapter concludes with hypotheses about the relationships between power and people, and creative solutions to the problems we will face in the age of the Anthropocene, a larger global sphere.

5.1 Introduction

> Capitalism is in crisis, a crisis of imagination. (Max Haiven, critical theorist, 2014)

Imagine that the data subscription on the microscopic chip in the left hemisphere of your brain is due to expire in a week. You have received the reminders from IBM that you need to re-up your before the week is over. If you do not, the electromagnetic flow, which has fueled the promotion you have been promised at work, might fall through. That extra creative boost the chip has given your brain impressed your CEO. But without it you could lose your collaborative rights, because your "cloud-zone" ideas will no longer sync with those of your planning team.

The brain-to-cloud-data that the chip now immediately streams from your unconscious imagination and, through blockchain technology, verifies these are in fact your original ideas. Your creative data is necessary to complete the big project before the boss gets wind you all have fallen behind. Not that the originality of your creative conscious matters much once it's been uploaded by the chip. In the

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blockchain, the creative ideas become the property of IBM, who has paid for your creative consciousness upgrades. You needed these to get an edge on your job application. Without the thoughts, without the updated registration, IMB cannot pay you your weekly "gig" salary via the latest crypto-currency. No creative thoughts, no team, no pay, no job. Welcome to the possible future of creativity.

The purpose of this chapter is to examine how creativity, as well as the ways in which we understand it and apply it, will likely be transformed by the epochal shifts in technology, economic policy, and socio-political theories of the next several decades. With this writing, I acknowledge the over-romanticization of creativity in Western society and the "I-paradigm" (see Glăveanu, 2016). To romanticize creativity is to idealize a stereotype and ignore or silence patterns of power that shape identity through Enlightenment-era artistic expression. Westernized perceptions of creativity celebrate freedom of the spirit, but also privileging the traits of dominant culture over creative/cultural values of marginalized people; to believe as if the creative "diamond" exists in a vacuum of sorts. Systemic patterns of racism and classism are prevalent across history, patterns often reproduced by mis-appropriations of creativity. Existing issues of power, marginalization, and control will follow us into the twenty-first century and beyond. As technology advances in tandem with the ways in which our global society embraces or rejects creative practices, I wonder: What might the world of the imagination look like in the future? And, how will new conceptions of creativity influence the worlds we make?

5.1.1   Creativity Past and Present

Centuries of scholarship document the human's ode to the creative spirit, understood in its many manifestations (oppressive, revolutionary, and everything in-between). Because the future of creativity may choose to repeat the past, it is important to reflect on how the history of dominant narratives of race, culture, class and gender have co-opted or controlled creativity as a fundamental source of power. Scholarly critical examinations of the uses of creativity toward colonial domination and the capitalist free market agenda are not new (Gatzambide-Fernandez, 2012). The commodification of creativity as a source of profit(s) and other market-driven interests can be traced back for centuries.

Creative achievements of White-dominant Eurocentric nations have been used to promulgate racial and cultural superiority in the form of the "Canon" of the Classics. The neoliberally-entrenched idea of the eccentric "genius" alone in his (usually male) workshop being "creative" is not only a cultural myth, it has its roots in the laissez fair economic liberalism that emphasizes individualism as a matter of competition, choice, and freedom. Creativity becomes, therefore, synonymous with the unique expression of the individual, and therefore erases non-Western and communal notions of creativity, efforts, which might disrupt a capitalist worldview.

Therefore, anti-capitalist critiques, by extension, are relegated to associations with conformity or "group think" (the antithesis of creativity). This narrative leads to the conclusion that in order to be creative, one must embrace neoliberalism. The argument follows that there can be no creativity outside of a free-market ideology. As such, creativity is detached from acts of collective resistance; creativity (synonymous with "good") makes associations with liberalism as a "naturalized" given, and therefore capitalism itself must also be inherently "good." This is because creativity is such a likeable winnable concept, "in which politicians align creativity with personal autonomy and cautioned against government interference in the operation of the free market" (Ward, 2013, p. 15).

It was during World War II, fueled by anti-Fascist and anti-Communist sentiments, that a "discourse of creativity was appropriated by neoliberals and incorporated into their account of the relationship between freedom and prosperity" (Ward, 2013, p. 12). As the mid-century progressed toward the 1980s, capitalism became increasingly associated with a type of creative destruction, a theory rooted in the thinking of economist Joseph Shumpeter (1942). Creative destruction is a process by which the free market entrepreneur disrupts the "status quo" by destroying an existing system in order to create something new. This cycle frees-up resources and opportunities that would have, according to the entrepreneurial mind set, been stifled by previous arrangements. Another way of conceiving of "creative destruction" is as "disaster capitalism" (Klein, 2008), a system which relies on a crisis (real or manufactured) in order to generate an opportunity for new markets and profits. Think of how Hurricane Katrina destroyed communities in New Orleans, but became a boon for the charter school industry in New Orleans.

However, creativity has also served as a necessary tool for counter-narrative social movements (McDermott, 2018), and the capacity for resistance in its many forms. For every form of cultural oppression, there has been an equal and opposite counter-culture, often utilizing revolutionary approaches toward creativity to spur the movement of the moment. Poet David Amran of the Beat movement defined creativity through improvisations and spontaneity; processes in search of alternative methods for making meaning. He stated that the whole Beat movement of the 1950s and 1960s:

> Was not just for the sake of non-conformity... it had more to do with exploring human relatedness particularly through emotions and feelings which tend to be down played as the basis of rational decision making process in the corporate liberal world. (in McDermott, 2000, p. 72)

Similarly, the Surrealist artists, who intersect with the Black Radical Imagination (BRI) movement, developed creativity as a means for confronting systems of colonialism and oppression. In Kelley's (2002) discussion of the BRI movement, he included artists and art theorists such as bell hooks, Jean-Michel Basquiat, James Baldwin, and Ralph Ellison, who re-imagined "the possibilities of relational, transitive, and creative solidarity as a strategy for recasting not only human relations but also the very notion of what it means to be human" (p. 42). A movement of

solidarity which locates its power in creativity is a process "crucial for decolonization" (Gatzambide-Fernandez, 2012, p. 34).

But even these existing intersections among domination, capital, and creativity are shifting beneath our feet. Our global society is at a turning point not unlike previous epochal shifts wrought by the advent of other technologies: agriculture, the printing press, and the industrial age. Newer technology (such as, but not limited to, the Internet) places us in a historical moment in which creativity is not merely continuing to be marketed, bought, sold, and managed by economic and culturally dominant forces. What is new in the twenty-first century, and what follows, is discussion of the landscape within which such relationships are now being constructed. With new technologies we will begin to experience levels of authoritarian control and surveillance capabilities that will have to be matched or superseded by a different capacity for creativity to manifest a resistance.

5.2   Corporatization of Creativity

The relationships between creativity and capitalism have exploded exponentially in recent decades. Technology-focused global corporations such as IBM and Google, which have formed indelible fingerprints on the handiwork of global education policy since the 1980s (McDermott, 2014a), dictate what sorts of creativity can, or will, have value (and to whom) as a form of capital. For example, Lou Gerstner (CEO of IBM and chief supporter of Common Core state standards) stated in a 2002 UNESCO report (cited in McDermott, 2014b), "Education is increasingly becoming a market, and a global one at that …," adding that with increase usages of bandwidth, "Education projects may profit from this market-driven growth" (para. 4).

The market economy appropriates educational concepts and turns them into specific copyrighted products. Notions of personalized learning and individualized instruction have become synonymous with online production of curriculum and assessment, where companies like Knewton (a privately-owned education technology company) replace the interpersonal face-to-face relationship between student and teacher, instead using "smart technologies" to track student progress and provide "individualized" materials (at a price, of course). Their argument is that "traditional" schooling (aka factory model) has stifled creativity in students for decades, and the only solution is to advance the role of technology in the classroom—to "unleash" creative potential in each individual.

All collaborative and social interactions are now mediated through the interface with screens and data-mining mechanisms, otherwise known as "hubs," where students "meet" through online social media platforms, and are secured through blockchain technology. Social behaviors are increasingly monitored and modified through biometric means such as collecting a pulse rate or eye-tracking rate. Since the qualities of a creative person often involve biometric inputs (i.e. personality traits, paying attention, dialogue with others, movement of body in space, and

motivation) the ways we determine if or how someone is creative will also be tracked and monitored.

In a 2014 report published by the U.S. Department of Education, Office of Technology, the authors explain how of affective computing methods are growing including data mining techniques as well as "physiological response data from a biofeedback apparatus that measures blood volume, pulse, and galvanic skin response to examine student frustration in an online learning environment …" (p. 44). In a world of biometrically measured creativity, a company can in real-time know not only "who's in the room at the time" (Lightwave CEO, quoted in Nudd, 2015, para. 3), but they can also collect data that tells them "what music people danced the hardest to" in order to dynamically update the playlist or assess how "the lighting in the room is affected by your mood" (para. 3).

As we move away from Fordist industrial modes of production toward a data-driven techno-capitalist saturated economy, "policy makers and economists" recognize that "knowledge and creativity have become primary drivers of economic value within the global economy" (Means, 2013, p. 47). Haiven (2014) argues that "Capitalism has enclosed and commodified notions of creativity and imagination and transformed them into highly individualized things" (p. 12). And, because of this push toward unfettered neoliberalism, "we are told that we must leverage our creativity and imagination, use them to compete with others for some of the few decent jobs that still allegedly exist" (p. 12).

Not unlike food fads in which a certain healthy ingredient suddenly becomes infused with every factory-made product (i.e. oats, whole grain, fat-free, pomegranate, green tea, to name a few), the term creativity is wildly positive and so can be, "deployed under an umbrella of neologisms -'creative economy,' 'creative class,' 'creative age,' 'creative citizenship,' 'creative industries,' and 'creative cities'" (Means, 2013, p. 48). Selling this as a positive transition, free- market proponents argue that creativity is the most significant factor "for addressing the overlapping economic, technical, social and environmental challenges of the twenty-first century" (p. 48). A more critical approach would counter that creativity has, as Haiven (2012) suggests, become big business; big data, real-time algorithms and faster decisions mean companies need rapid-fire new creative ideas to remain ahead of the competitive curve of their rivals.

Beyond simply increasing the market of new ideas to design and sell, our global society is at a precipice where technologies are also increasingly interwoven with our internal drives, motivation, behaviors, and psyche, such as Positive Behavior Interventions and Supports (PBIS) data tracking materials, thus affecting our capacity to be creative with a sense of agency, free of corporate interference. These new interfaces with technology are a central part of the age of bio-capitalism (to be explored in the following pages); an evolutionary phase that will directly impact how we negotiate and engage as creative beings.

A 2014 UNESCO Report declared the need for tools in the neurosciences to measure non-cognitive (i.e. grit, mindfulness, creativity, and resilience) and "21st century skills" in order to assess young peoples' readiness to enter the workforce. As described by EdSurge (2011), here is one possible scenario:

Pearson will tag its content at what Knewton calls an "atomic" level of information (and) … his or her progress will be reported back to Knewton. As it amasses data on how hundreds of thousands of students work through the content, Knewton will blend that data with psychometrics on student populations … to help students successfully navigate a course. (para. 4)

Psychometrics involves the gathering of data on a person's attitudes, personality, and other affective or psychological traits.

Given the scope, history, and trajectory of the blurring between technology and neoliberalism with human creativity, the question posed in this chapter is reflected in the message offered by Occupy Wall Street (Haiven, 2014): How can we re-empower our creative capacities to "envision and actualize resilient and powerful alternatives?" (para. 5) Imagining alternatives will demand imagining creative forms of participatory democracy and the use of public spaces and collective engagement to resist "the new corporate enthusiasm for the 'sharing economy' that seeks to use the commons to sustain capitalism" (para. 5).

The new corporate-sponsored knowledge-economy is fluid and reliant upon open deregulated borders of all kinds: Geographical, financial, political or psychological. It is non-linear, intangible, and porous. Unlike the era of industrialization that relied on efficiency and standardization, the emerging states of "creative" capitalism (as coined by Bill Gates). It requires creative capital (otherwise known as the knowledge-based economy) as "a key resource for the invention of new markets, products, and patterns of work and institutional management" (Means, 2013, p. 42).

Beneath the biotech revolution lies a "control revolution" (Schenk, 1997, para. 2), which creates a massive transfer of unregulated data from individuals into the hands of bureaucracies and corporations. The unregulated un-bordered flow of information always moves from the bottom (people) to the top (global markets) and requires that "even such social intangibles as privacy become commodified" (para 4). As Race to the Top and No Child Left Behind are replaced with Every Students Succeeds Act (ESSA), "innovative assessments" will be the vehicle by which corporations can build a new bio-capital world for all of us (Pace, 2015). In a bio-capital reality, data becomes surveillance becomes total control.

5.3   Bio-capitalism and the Fight for Creative Agency

Growing technological advances are slowly forming new relationships between human creativity and capital. The forces of the bio-capital market are less externally imposed, and are becoming more internalized. For example, rather than requiring a phone call or a chart to monitor a patient's medication routine, we now have digital pills that inform the medical provider that the pill has, or has not been, ingested (see Belluck, 2017). In the promise to increase security and stability of our daily lives, we undergo a transformation of bodily regulation. As *in Gravities Rainbow* (1973) a piece of speculative fiction, author Pynchon explains (in the voice of the major

character) that "It's control. All these things arise from one difficulty: control. For the first time it was inside, do you see. The control is put inside. No more need to suffer passively under 'outside forces'" (p. 31). The observations of this fictionalized character are not wildly far off from what we are beginning to see in our everyday lives. It is the advent of bio-capitalism.

The education policies underway, invited in through the gates of ESSA and other tactics such as social impact bonds, are the way for bio-capitalism to successfully engender us unto it. Bio-capitalism moves the ideas of capital and labor (as external physical resources) to a capitalist system that utilizes more abstract forms of labor that are internal and intangible. According to Pierce (2013), bio-capitalism "is a model of political economy that has further opened earth's biology through techno scientific advances to the dynamics of a rapidly expanding free market capitalism" (p. 165). Artificial intelligence is not only the process and product, but also a self-looping system that can reproduce itself, "which is the fundamental activity of a living organism" (Fumagalli & Morini, 2013, p. 106). Creativity will no longer be a core quality of sentient beings, alone. Sentient being themselves (and their creativity capacities) will be systemically enmeshed with the Internet, the blockchain, or AI systems.

5.3.1 Curriculum of Corporate Control

In 1993, Neil Postman documented how schools were the "first technocracies" (p. 63), and thus began the building of the information ecology that legitimized the flow of data that governs the existing power structures. Think of how standardized testing data flows from children to policy makers (Tienken, 2016) who use the test scores to hire/fire teachers and close schools. From here, as the mechanism for data collection become more immediate, pervasive, and invasive, so does the surveillance.

Similarly, because schools mirror society, Jagodzinski and Wallin (2013) argue that "personalized" learning promulgated by new technologies of the "self" as the center, directly influence the design and processes of curriculum and instruction, because students are both consumer and product in this arrangement. They are also the next generation of global workers for the new market. Where efficiency and physical labor were key in the nineteenth to twentieth century factory models, current technology needs creative (knowledge) capital and data.

Collecting student data in the name of knowledge production has always been a facet of public education (such as IQ scores, immigrant status, or behavioral records.), However, the advent of new technologies now broaden the scope of what can be known (or better yet, mined) out of students' minds and bodies as potential resources for the control and financial benefit of those mining the data. According to Pierce (2013), schools have become "associated with neoliberal strategies of governance for optimizing the population in a flat world economic arrangement" (p. 3). As curriculum and assessment, as well as psychometric data, are now increasingly on-line and owned by third-party private entities, companies such as

Knewton and Google have tapped into the "internal ordering of individuals by enlisting individuals into practices and habits that work through bodily techniques of control imbued with moral and ethical pedagogies of the self" (Pierce, 2013, p. 5).

Think of the catch phrase "habits of mind." Clever phrases like that one, or social-emotional and affective learning, have spurred new mindfulness strategies (like meditation), many of which might be good if they were not becoming (1) copyrighted and marketing as for-profit fads sold to schools, and (2) were not used as sources of data mining and surveillance on children for the purposes of predictive analytics. Using psychological testing and biometric measures, predictive analytics is being touted as a way to "predict" which students may be "at risk" for certain socially or personally negative behaviors.

Because creativity intersects with deeper personality traits (such as risk taking or collaboration), creativity in the twenty-first century will be enmeshed with the social emotional learning component of surveillance, embraced by the "extractive schooling" model in which "educational vitality has become a mineable good" (Pierce, 2013, p. 3). In other words, as I proposed in my opening scenario, under this economic model the education system will need to produce individuals who are creative, not for other purposes except to provide "private capital" (Ward, 2013) to global marketers driven by competition with other markets. And further, the outsourcing will have fewer steps between the interior landscape of the mind and ownership of those ideas by another. But it is not only data management. Also influenced will be the kinds of creative thinking even deemed possible to imagine in the first place.

Bio-capitalism can use technology to tap into the inner resources, the motivation, the psyche, the "soul" of our internal lives. Such a process turns inspiration into biometric data, and forge highways between external response mechanisms and internal decision making thus managing our internal lives more greatly than ever before. In other words, to paraphrase Thomas Pynchon (1973), its presence is so large, nobody can see it. Creativity, wedded to artificial intelligence and sources of surveillance of the mind, become the part of the hyperobject itself, an intangible immaterial source of labor that eventually subsumes all space and time on a global scale.

How are such data able to be collected and processed? Through emerging blockchain technology. Sold to those in the creative economy as a way to buy and sell their art work without the messy cash transaction or middle-man such as a bank, blockchain technology offers peer-to-peer exchanges that are verified by multiple transparent sources. A report from the World Economic Forum (n.d.) concedes that the creative economy is a "main artery" for the flow of new information technologies, "and thus most susceptible to disruptive forces from technologies such as virtual reality (VR), augmented reality (AR), artificial intelligence (AI), and the blockchain" (para. 1). While promoted as a great democratizer by making financial exchanges more decentralized, blockchain also requires extended levels of biometric data to secure these new monetary exchanges.

In a bio-capitalist world, artificial intelligence (not human creativity) is evolution. Corporate policy-makers require schools to adopt educational theories in which survival-of-the-fittest-by-gaming reflects the use of play infused with Darwinian principles for automated problem solving. For example, meet Biological Experiments in Adaptation, Genetics, Learning and Evolution (aka BEAGLE), the Simulated Evolution project's software "specifically designed for learning evolution in both school and non-school settings" (n.d., para. 1). Consisting of a suite of NetLogo models it also has supporting materials designed to "facilitate inquiry, teaching and learning of concepts and phenomena related to evolution, adaptation, and natural and artificial selection" (para. 2). The BEAGLE model adjusts itself according to what it learns about, or predicts about, the participant's behavior. (Also see Center for Connected Learning and Computer-Based Modeling, n.d.).

BEAGLE is just one example of how humanism becomes transhumanism, the blending of organic human and artificial machine for a new more "advanced" being. Creativity via "play" is a predicable resource subject to a machines manipulation. In a bio-capitalist world, I assume a continuation of a narrative which might look something like this: If technology is what is required to "catch up" to the concept of trans-humanism, and trans-humanism is an extant of the ongoing human evolution, and evolution is inextricably interwoven with creativity as a biological necessity, then in a posthuman world, creativity and technology too, will be directly interwoven.

What might the infusion of artificial intelligence with human behavior and evolutionary theories mean? It could mean the use of emotional data used to manipulate behavior. A well-known OCEANS personality test, which uses a five factors (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism), is linked to the psychological operations of Cambridge Analytica who used personality data culled from Facebook and Google to sway the outcome of the 2016 U.S. elections (McDermott, 2017). There is a growing emphasis on creating databases that collect and monitor the "affective" learning of students using that same OCEANS model. According to the ETS website, "The broader domains in these models are tied to those areas of the big five personality theory" (Markle & O'Banion, 2014). If personality traits like "grit" determine creative output, one can see how there is also overlap between personality measurements such as OCEANS and "measurements" of creativity.

It could also mean dominion of Beyondists such as Raymond Catell, "forefather" of "creative Eugenics" who formulated the same previously mentioned five-factors OCEANS personality test. Beyondists are eugenicists who adopt methods of collected big data in order to discern a twenty-first century version of "survival of the fittest." Beyondists embrace scientifically legitimized associations between measurements of "grit" (Duckworth, Peterson, Matthews, & Kelly, 2007) and predictions of creative behaviors in children as measures of predicted "achievement" or success (Rojas, Usher, & Tolland, 2012). This belief further entrenches racist and classist surveillance techniques for a bio-capitalist society. At this moment, we are ensnared by two outcomes: (1) Beyondists spawned by totalitarian and Fascist ideologies, promulgating bio-capitalism (McDermott, 2015), and (2) a radical new humanism like "post humanism" (Haraway, 1991), which urges for a new human-

ism that embraces technology that liberates us all from false hierarchies of domination.

5.4   Creativity and the Anthropocene

To the extent that more than its capitalist predecessors, bio-capitalism is more global, systemic, and subsuming of the organic into the artificial, or real into the hyper real, I would argue that it is a phenomena of "hyper-objectivity." Martinson (2015), citing Tim Morton (who coined the phrase) says that hyper-objects (in this case, being bio-capitalism) are most notable for their trait of inaccessibility—by way of their "massive dispersal through space and time" (p. 7). Martinson adds that "hyper-objects are contradictory beasts" that "confound the social and psychic instruments we use to measure them" (p. 7). With bio-capitalism as the next means for merging of body and capital so large one might consider it a hyper-object, I now also consider how this new phase will occur in a larger global sphere called the Anthropocene.

In the previous pages of this chapter I reviewed how in more recent centuries, creativity has been linked with specific economic and political networks of colonialism via capitalism. What I have tried to exemplify in this chapter are the two ways that the controlling-creativity-as-capital are emerging: (1) Through blockchain technology, which tracks every online transaction including creative ideas/works and creates a pattern of surveillance, and, (2) Biometric collection of human emotional and behavioral data output. In a bio-capitalist landscape set upon the Anthropocene, these two methods of creativity management intersect with one another. The blockchain technology will increasingly rely upon biometric data to "secure" online transactions, and biometric data will be disbursed (mined, outsourced) to corporate ownership via the blockchain.

Looking toward the Anthropocene, human are facing mass migration from climate ravaged regions, continuing decimation of farm land, water, and resources, our creative capacities will no longer focus on clever marketing and products for profit, but may turn again as they did once long ago, toward creating opportunities for continuation of our species itself. How will we create new landscapes for food, shelter, and clean air and water? Creativity is a core facet of human survival; a way of problem-solving that enables us to feed ourselves and create languages. However, "If the Anthropocene calls us to imagine humanity written into the rock of the Earth itself" (p. 7), Davis and Turpin (2015) warn that, "Capitalism is the instrument of this brutal inscription." In the future, the ecological disasters of Monsanto, Exxon, and Dupont will further exacerbate stratification between humans and the earth.

While we currently engage in some of these efforts within the framework of bio-capitalism itself (think of GMO's created by Monsanto), I wish to imagine another counter-creativity, one which resists the persistence of bio-capitalism as the system-supreme in the Anthropocene. Such possibilities begin with artistic imaginings. For example, the Land Art Generator Initiative (n.d.) creates works of public art blended

with engineering, architecture, and science to generate energy and resource sustainable structures. According to their website, "the time is now for artists to go further and take an active role in solving the problem through their own work: solution-based art practice" (para. 4).

5.4.1 Privatization of Creativity Versus a Creative Commons

How can we maintain agency in a future-world where creativity is a commodity, where through technology the process itself is capitalized upon and controlled/ manipulated? Biotechnologies make now possible what before could only be theorized, and as the modes technology has caught up with the bio-capitalist ideology, we can see how biometric data that measures (and anticipates) personality factors such as OCEANS (McDermott, 2017), could be extended to the intersections where such AI driven personality factors influence creative capacities and social functions. In a historical moment that could have powerful creative revolutionary potential, we are distracted by the promise that creative solutions to our "comfort" problems with privately owned creative "capital." Creativity, by itself promises nothing inherently liberatory. As Haiven (2012) points out:

> The call to embrace creativity does not typically include a call for equality, decent and meaningful work, social care and compassion, and social justice. Without also calling for these things, calls for creativity ring hollow: it is creativity for the few, not for the many. (para. 6)

Those with a seat at the power and policy table say little about the power of creativity as a form of collective solidarity and sustainable change. While those relationships are manifest in and with marginalized communities or other radical factions, largely the national framework (through policy and white papers) for education markets creativity as a tool for personal success and toward the service of private sector technologies. A bio-capitalist world system manufactures pathways for creativity only for economic gain "at the expense of other conceptions of creativity" which might create the seeds of resistance. Schools, as a facet of society, promote creativity sole "associated with neoliberal economics and entrepreneurial innovation" (Kalin, 2016, p. 10).

We are at a precipice. While bio-capitalists harness and manipulate human creativity as a commodity for a new biodynamic surveillance society to "manage" the future of ecological instability of the Anthropocene, the alternative is to resist (refuse) that narrative, and to instead harness human creativity to affect our relationships with the natural world. While disagreement, tensions, and dissent are important for creating visionary spaces, exploitation and oppression of one another are not. Our challenge going forward is to find our way, as a shared journey, through two possible outcomes:

> Either a future of broadly shared prosperity and sustainability, made possible through social democratic cooperation and creativity, or one marked by continued sociopolitical marginalization, insecurity and crisis for the majority. (Means, 2013, p. 56)

To chart the future differently, we have to reclaim our creative capacities from the funnels into which our external bodies and interior spaces are being harnessed. In this space, the value of what is "public" and how define "common good" might yet be reclaimed for the necessity they possess. It is possible that "human creativity, community spirit and conscious thought can lead to changes that might make our species look back at current behavior as sheer ecological barbarism" (Schwägerl, 2014, p. xii). One possible response to these dilemmas may emerge from notions of the "adjacent possible" (Johnson, 2010, para. 5), which can be described as "a kind of shadow future, hovering on the edges of the present state of things," which, "captures both the limits and the creative potential of change and innovation" (para. 7). Additionally, we first have to be able to conceive that other realities are possible. "There must be," according to bell hooks (1995), "a revolution in the way we see, the way we look" (p. 4). Some even argue that the Anthropocene itself is an "aesthetic event" (Davis & Turpin, 2015). We can radically re imagine the aesthetics of the Anthropocene by building movements that dismantle bio-capitalism and see, "themselves not as sites of struggle only, but also as catalysts for the imagination," that "must fearlessly advance and defend visions of very different worlds" (Haiven & Khasnabish, 2014, para. 5).

Conception-into-action is a process of collective consciousness, one that, per Johnson's theory of adjacent possible, develops over time—slowly, across a multiplicity of spheres, people and places. One first step is to critically understand the use of language and perception. Power has a way of reproducing itself by identifying the concerns and desires of the populace (i.e., equity, choice, or freedom). Then, the language of those fears and desires are used to hijack a movement, the movement which is attempting to wrest such desires from the hands of the powerful.

If creativity is central to a popular resistance against a system of corporate surveillance and control, that movement cannot be co-opted by a privately managed set of "solutions" sold to us by those same corporations. The elite "market" so-called solutions to those problems back to the populace (McDowell, 2017). One need think only of how the far-right conservatives marketed charter schools to the same low income communities of color, under the guise of equity and choice, only to further exacerbate the conditions of inadequate schools and segregated conditions (and make profits from the process) to see how this works.

In effect, the same powerful corporations that create the conditions of oppression or inequality hijack the narrative of resistance by marketing and selling solutions to those same problems it created—solutions which, in fact simply exacerbate the problems, re-entrenching existing inequalities. As Levi Strauss (1999) reminds us, "Mass culture has proven to be capable of absorbing practically any critical resistance that is thrown at it, and then selling it back to the perpetrators at a profit" (p. 122). A creative movement dedicated to resistance must exist, and remain outside of, the existing structures of power, in order to dismantle them.

Audre Lorde (1979) reminds us the Master's tools will not take down the Master's house, and so we cannot revolutionize the power of creative change if we are standing inside of that house. The corporate elite may invite us in, but then we will never leave. Micah White (n.d.) argues, "The creative, local and artistic forces of culture have been forced into subservience by a global megacapitalism, which holds all the purse strings" (para. 3), but he also conveys a message of hope that, "Just because we are forced to sell our creativity does not mean that it constitutes the master's tools" (para. 3). In other words, *it is up to us.* Rather than defining creative resistance as an individual act of spontaneity (though resistance may manifest itself as such under certain conditions), we might take some advice from Kelley (2013), that resistance to oppression told through works of creative actions open "new possibilities in unlikely places" (p. 189).

Artist/activist/writer Franco "Bifo" Berardi (2011) suggests that in order to dismantle the totalizing discourse of bio-capitalism as our proscribed future, we need creativity to "reconnect and re-feminize our culture, reconnect to our physical substratum, our bodies, the embodied life" (p. 183). De-colonizing our creative capacities is not a luxury but a necessity, because challenging this system of bio-capitalism, being the hyper object that it is, will take more than just economic and political policies or movements, "we also need to transform culture and the imagination" (Haiven, 2014, p. 51).

Collective emancipation starts with decentering bio-capitalism's colonization of our social and personal imagination. According to Tipu's Tiger (2015), in order to create that future we must "attack a system that has evolved to contain social movements through elite representations" (p. 61) and focus instead on "revolutions within revolutions" (p. 61). Our challenge is to re-engage collective and critical—creative capacities to forge empowered public spaces that will build the worlds we wish to see. "Our responsibility now is to decide what comes next," in the words of Biradi (2011, p. 185).

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Chapter 6
Creative Ecologies and Education Futures

Anne M. Harris and Leon de Bruin

Abstract The challenge to foster greater creativity in education systems represents a range of diverse and complex affordances and constraints. Creativity research in education spans policy, teaching, learning and assessment, as well as environments within and beyond the school that promote creative encounters. Worldwide, creativity, critical thinking, and problem-solving skills are marked as essential for effective learners and future employees. Creativity is closely linked with the development of flexible thinking and lateral problem-solving. Yet a shift is occurring from interest in creative individuals to creative ecologies in sociocultural formations of digitally networked cultures and collaborative methods of thinking. The value of attending to increasing creative sociality within and between diverse cultures and contexts is growing. Drawing on an international study of creativity in secondary schools across Australia, Canada, Singapore, and the United States, the authors argue that because creativity in education is central to lifelong learning and work satisfaction, schools must radically shift toward a more interdisciplinary whole-school creative ecology approach, and away from siloed disciplinary and individualist learning. The chapter draws on aspects of creative ecologies in education that combine science, technology, arts, culture, and industry, showing creativity as a fundamental aspect of education across all domains.

6.1   Introduction

Leading debates in creative educational change over the coming generation have now been firmly established. The way creativity is defined, fostered, assessed, and linked with/driven by industry, and how educational contexts interpret and prepare learners for futures shaped by creative and innovative challenges, are central to these debates. Creativity scholars have sought to define and diversify

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understandings of creativity's influence on core education in the twenty-first century and in contemporary workplaces (e.g., Harris, 2016; Jeffrey, 2006).

Globally, research is increasingly questioning what productive, implementable, and sustainable creativity across the education and employment lifespan might mean. In particular, there is interest in looking beyond a collection of rubrics, curricular skills, or general capability schemas. At the same time, creative economic discourses, such as design thinking and creative (and cultural) industries, trickle down through tertiary, and increasingly secondary, education practices, disconnecting education and workplace cultures. Standardised testing and more static/traditional pedagogies stand in stark contrast to workplace flexibility and adaptability skills. Creativity education researchers recognise the need to build upon instrumental concerns with definitions, assessment and 'top 10 lists,' thereby demanding a more nuanced 'mindset shift' approach (Araya & Peters, 2010; Harris, 2017; Sawyer, 2011). Creativity research specific to education argues the development of flexible and iterative practices that can both innovate and reinterpret current pedagogies through shared construction of new knowledge between learning domains, and teachers and students (Griffin & Care, 2015; Runco, 2014).

Whilst most studies of creativity in education emphasise critical thinking and problem-solving amongst learners, other approaches including design thinking and metacognitive studies point to convergent and divergent planning. Metacognition (i.e., thinking about thinking) in/as creative learning are well-documented constructs for developing both individual and collective creativity (de Bruin, 2016; Hesse, Care, Buder, Sassenberg, & Griffin, 2015; Zimmerman & Schunk, 2011).

A persistent yet false binary between arts and Science, Technology, Engineering and Maths (STEM) exists in the "creativity debate." This binary undermines the valuable task of increasing contemporary inter- and transdisciplinary approaches rather than more narrow and siloed disciplinary knowledge. Indeed, creativity research highlights the need to foster the flexible, collaborative, and improvisational skills of creative thinking and doing. Not all older research is outdated though. For example, Runco's (1984) early research on personality traits common to creative students is still widely used today, with relevance to research on networked creative workspaces and work practices.

Globally, a range of studies has contributed to the body of work in this area. Studies in Hong Kong (i.e., Chan & Chan, 1999; Chan & Yuen, 2014) combined a focus on teacher and student motivation, with attention to environmental factors affecting creative development. In the Turkish context, Baloğlu and Karadağ's (2009) investigation of the relationships between teachers' thinking styles and creative environment enhancement has continued importance. Their study, which used both the Fostering Teacher Index Scale (CFTIS) (Soh, 2000) and a Thinking Styles Inventory (TSI), importantly incorporates a contextual or environmental focus.

While individual creative skills and capacities remain important, multinational employers and global markets are moving toward an ecological approach, with hiring practices shifting toward those with good leadership and group skills and those attending to improving the environment and work/collaboration practices. Similarly, an increasingly important part of classroom environment change is attention on

collaboration and group dynamics. Shin and Jang's (2017) study within Korean elementary schools found that specific creative dynamics in the classroom were central to fostering effective creative environments: interpersonal (ecological) factors of conflict and play, students' personalities and motivation, and teaching and learning styles.

Creativity education and policy in many countries grapples with the role that business (especially the technology sector) is (or will be) playing in curriculum, pedagogy, and industry partnerships. Creativity in education has become synonymous with critical thinking and "innovation" (Florida, 2014; Garnham, 2005). Changes in creative workplace cultures have encouraged schools to move toward greater interdisciplinarity as a means to creative innovation, by highlighting the value of creative leadership, multiliteracies, lateral connectivity, and design thinking approaches. While still resisting a move away from siloed subject areas, secondary school creativity is increasingly ecological in promoting learning interactions that foster flexibility and processes-orientation with product outcomes (Harris, 2014; Plucker, Beghetto & Dow, 2004). Design research highlights how innovative thinking employs both abstract and concrete, as well as analytic and synthetic, processing (Beckman & Berry, 2007), yet assessment still dominates education research into creativity (Tanggaard & Elmholdt, 2008).

Teachers engage in a wide variety of evaluative practices in an effort to quantify how students create. Assessing for creative learning as a processual "event" can be difficult using existing assessment standards which remain focused on outcomes rather than processes (e.g., Craft, 2011; Harris, 2017; Lin & Cho, 2011; Lucas, Claxton, & Spencer, 2013; Taddei, 2009).

6.2 Fostering Creative Ecologies

The 3-year international study entitled *The Creative Turn: Creativity and Innovation in Secondary Schools* (Harris, 2016) recognised the need for user-friendly tools resulting in the first Australian education-focused *Creativity Index* and *Whole School Creativity Audit*. At the same time, this study emphasises that a one-size-fits-all approach does little more than quell anxiety in the education sector. These self-assessment checklists allow schools to gauge their own whole-school creative ecology and monitor improvement over time.

The ecological approach used in these tools facilitates a coordinated systems approach. Included in such an approach are leadership, teaching and learning strategies, administrative support, professional development procedures, school structures and organisation including timetabling, and more. Attending to school environments as networked worksites allows a shift from skills, capacities and aptitudes of previous creativity enhancement to an environmental approach. This shift allows for consideration of creative schools as workplaces, communities, and ecosystems (or ecologies), which is more in line with creative industries and design thinking approaches (Gollmitzer & Murray, 2008; Harris 2017; Hearn, Roodhouse,

& Blakey, 2007; Howkins, 2011; Kacerauskas & Zavadskas, 2015; Leadbeater, 2010; Stankevičienė, Levickaitė, Braškutė, & Noreikaitė, 2011).

School systems and school environments themselves are beginning to be understood as creative ecosystems, dynamic collaborative environments that could more productively support and incentivise transdisciplinary STEAM (Science, Technology, Engineering, Arts, Mathematics) educational achievement goals, as well as core creativity skills such as productive risk-taking group brainstorming, and critical thinking (Tan, 2014).

Creativity scholars agree that cognitive flexibility and creative improvisation is also central to engaging critically and creatively in a global creative economy (Kaufman & Sternberg, 2010; Runco, 2014; Taddei, 2009; Ward, 2004). A creative ecologies approach in which whole school environments are developed as an interdependent ecosystem—rather than discreet and atomised teacher or student practices and aptitudes—provides a missing macro-oriented perspective on teaching and learning practices and whole-school environments.

6.3   Networked and Collective Creativities

While metacognition scholarship has long argued for the need to develop students' critical reflexivity about their own thinking and learning processes (e.g., Lawson, 2006; Nosich, 2012; Schwartz, 2009), research on twenty-first century networked culture points toward collective approaches to understanding creative collaboration and co-design. Digital media scholars concur that curatorial and critical thinking are additional core skills of increasingly digital, networked and global creative learners and workers (Harris, 2014; Sefton-Green, 2011). The change in pedagogical development of twenty-first century global workers requires learners to see beyond themselves as individuals, and toward a vision of self as collaborative co-designer within an ecology of creative others (McPherson & Renwick, 2011).

Critical and creative thinking education has expanded from individual, extrinsically-motivated and -monitored work to learning within groups in experiential, multisensory environments where experimentation is intrinsically motivated (Harris, 2017; Järvelä et al., 2015). Educators increasingly see the value of collaborative participation in interactive learning events that foster interpersonal negotiation, group-devised contribution to knowledge, and creative outputs.

Greater attention to creative ecosystems (over individual traits) can help education service providers develop creative cultures rather than creative individuals per se, and expand their creative networks outside of schools (Glaveanu, 2014). Networked and distributed approaches to creativity (rather than individualist ones) can offer multiple opportunities for rehearsing creative processes and relationships (Chan & Yuen, 2014; Harris, 2016), offering empirical evidence for both metacognitive and co-design approaches (de Bruin 2016; Harris, 2017; Zimmerman, 2000).

6.4   Self-Regulation Theory and Collaborative Creativity

While creative ecologies do challenge metacognitive and other individualist (including giftedness) approaches to the study of creativity, here we include aspects of self-regulation theory that encompass three phases of activity pertinent to ecosystems approaches: pre-action, in-action and after-action. While Zimmerman (2000) asserts that learners prompt and adjust their activity through a feedback loop that monitors actual outcomes against goal orientations, metacognition theory advances the notion of individual decision-making (Hadwin & Oshige, 2011) informing co-regulation (CoRL) and socially shared regulation (SSRL) in successful collaborative and interactive learning (Zimmerman & Schunk, 2011).

Whilst CoRL involves the regulation of activity between student and peer or teacher, SSRL refers to processes collaborators use to regulate their collective activity. SSRL for groups involves interdependence and collectivity in shared regulatory processes, beliefs, and knowledge (Hadwin, Järvelä, & Miller, 2011) whereby learners engage with, collaborate, and activate self-regulated, co-regulated and SSRL with peers and teachers (de Bruin, 2016, 2018). Best-practice creative ecosystem activities therefore encourage students to adapt to situated contextual demands and preference learning that involves all three processes occurring simultaneously (Hadwin et al., 2011). Training in skills like empathy (step one in Design Thinking, and a core component, for example, of drama education) can help teachers develop comfort and confidence with their students' and their own creative risk-taking, iteration approaches, and productive failure.

6.5   Harris' Creative Ecologies Secondary School Study (2014–2016)

Creativity is consistently identified one of the three most significant curricular skills from early childhood to tertiary or vocational training (Curriculum Development Council, 2000). A desire for greater creativity within secondary education, as well as more consistent and sustainable creative education across the education lifespan informed Harris' 3-year study of secondary teaching and learning practices across Australia, Canada, Singapore, and the United States (2014–2016). This study also recognised the need for more comprehensive and forward-looking policy change regarding creative teaching and learning, as well as a creativity framework for teacher education reform. Research shows that the two major barriers to implementing creative practices in classrooms are lack of sufficient time and teachers' discomfort or unfamiliarity with creative approaches and skills (Flew, 2012; Harris, 2016).

Harris' (2016, 2017) mixed method study reported widespread desire from both teachers and school leaders for more individualised training, professional development and whole-school training for fostering creativity across their schools. The study drew on 681 student surveys and 30 student focus groups within Australia, in

addition to over 70 one-on-one interviews with teachers and school leaders from all four countries. The study focused on creative events, environments, values, and restrictions experienced in secondary schools. Both principals and teachers saw educational value in developing creative teaching and learning at both the micro and macro levels, yet were concerned with standardised testing procedures that reduce time and severely curtail the development of slower and deeper teaching methods that engage students (and themselves) in creative activities and achievements.

While teachers consistently identified rigid organisational and assessment constraints, the most significant impediment to ongoing and sustained fostering of creative learning in students was a lack of time. This problem was tied to standardised testing, especially in the senior secondary years, across all four countries. For most teachers, "teaching to the test" imperatives created time-poor ecologies in which teachers, students, and school leaders were unwilling to try creative approaches to learning at any level. Conversely, positive and trusting learning relationships between teachers and students stimulated creative mindsets, as well as teachers collaborating with each other transdisciplinarily. The study identified four main creative areas for improvement: *creative facilitators, creative environments*, *school leadership,* and *policy change* (Harris, 2017), each of which we next expand upon.

6.5.1 Creative Facilitators

Effective dynamic interpersonal connections between teacher and student were found to nurture problem-solving and divergent thinking, and promote flexible, imaginative possibility thinking (Craft, 2005). Creative education requires space in which facilitators (teachers) can explore the curriculum, expand the class, and enjoy productive risk-taking once trust is established. Teacher respondents articulated differences and similarities in the way they understood creativity, and the way it appeared in their classrooms. Teachers described fostering creativity through learning events in which identifiable transferable skills like problem-solving, imagination, critical thinking, and improvisation can be encouraged for more creative involvement with learning tasks.

Engaging class activities that engaged and developed curiosity/independence, empathy, analytical skills, resilience, complexity, and communication were conducive to such creative 'events'. Teachers recognised the need to be creatively engaging regardless of subject area, understanding that as facilitators of creativity they must take a lead role in modelling critical thinking and creative experimentation. Through effective modelling, teachers could encourage and value personal development of creativity, even when their school environment or education system overall devalued it. Teachers expressed the need to explore, take risks, and recalibrate not only their thinking but also of the students' in promoting a safe and trusting relationship between teacher and student within an environment that facilitates learning at one's own pace and where multiple possibilities to solutions can be worked out to their inevitable success or failure. Student respondents referred to influential

teachers across diverse subject areas who modelled creativity, who introduced and scaffolded learning through creative processes, and who had been transformative for the students' conception of creativity, collaboration and design thinking.

A social or ecological view of creativity is that manifestations of creativity are usually the result of complex collaborations across social groups (Harris, 2016).The teacher, school leader and student data in this study supported that view. Teachers noted that specific collaborative practices facilitated students' development of, and confidence in, their creativity and creative relationships, and that had a direct increase in achievement and lateral application in other subjects.

6.5.2 *Creative Environments*

Research has shown that both physical and social environments impact creative capacity (e.g., Hunter, Bedell, & Mumford, 2007) and that characteristics of this social environment affect whether and how creativity emerges (Csikszentmihalyi, 1996; Gardner, 1993). Teacher participants (in Harris, 2017) described the learning environment they tried to create, depicting classes as a dynamic "incubation bed," with teachers as "trainers" who mentored students and acted as role models. Organisation of classrooms that promote ideation, prototyping, and reflection/re-evaluation of work individually as well as through collaborative interplay stimulate metacognition and increase students' positive involvement in creative learning and critical thinking.

Student participants (Harris, 2017) felt that environments in which they were allowed to trust their curiosity, intuition and creative "daydreams" offered an empowering creative landscape. Patience and understanding was a cornerstone of the learning relationship, with one teacher expressing, "We go as fast as we can but as slow as we must." A strengths-based approach was seen as crucial to establishing creative environments through trusting relationships, reflected in physical environment features such as more "private" space to ideate, wander, and engage in unstructured creative activity or just have some down time.

Research indicates that both students and teachers (as well as employees and managers) are more creative in environments in which personal control can be exercised over activities and the environment (Amabile, 1995; Araya & Peters, 2010; Ryan & Deci, 2000), but in which there is also room for play. Creativity in classrooms was perceived as not a static, procedural expectation, but rather as having emerged from interactive events or "creative moments." Good teachers were those who developed strategies for enabling creative environments for self-guided student experimentation, for validating productive risk-taking, and for celebrating the irregular appearance of "aha" moments rather than seek to engineer rote pedagogical and behavioural practices.

Creative thought, effort, and collaboration were deemed possible within and across domains via interdisciplinary connectivity. Sites of creativity were perceived as being not exclusive to creative arts subjects but instead as connected

interdisciplinarily. Creative environments were those making space for intermingling mathematics and music, English and drama, and graphic design and science. Student responses reflected a growing body of research on the transferability of creative and arts skills to enhance learning in other areas of endeavour. These moments of transferability provided opportunities for peered and tiered (Harris, 2013) learning between students and multi-directionally between students and with teachers, affording a thinking-together approach that was unquestionably welcome.

School environments were desired that provide time to brainstorm, collaborate, develop, and plan programs, exchange ideas, and enact deep(er) critical and creative activities, yet these were the scarcest of creative resources reported. Coupled with a crowded curriculum, student and teacher participants lamented the limited opportunities for "what if moments" and "possibility thinking" (Jeffrey & Craft, 2006).

Student, teacher, and school leader participants were all critical of school cultures and practices that reduced creative opportunities, insufficient engagement with digital media, retention of outdated and overly narrow definitions of success, and lack of flexibility and openness to student input into their own learning. Such inhibitors to building truly creative ecologies within schools rather than isolated practices by gifted or creative individuals require coordinated change at the environmental practice and policy level, drawing on greater links with creative and design literature and empirical success evident in changes in workplace mindsets.

6.5.3   School Leadership

Principals who adopt approaches that encourage staff to build capacity, resilience, and confidence in applying creative approaches in class foster creative school environments. School leaders (Harris, 2017) described this crucial creativity-enabling work as "building capacity," "celebrating capacity," and "giving permission to develop the capacity of themselves and others through risk-taking and reinvention."

The principals in this study established the creative environment of their schools through encouraging productive risk-taking (a core component of creativity) and positively assuaging their teachers' and students' fear of failure. Administrators play a crucial role in modelling and valuing creative skills and capacities, thereby enabling their whole-school community to flourish as a creative environment, specifically a networked ecology of creative practices, spaces, and relationships. Even schools where teachers felt confident in their own creative abilities, the school community's environmental creativity was enhanced or diminished depending on the affects of school policy and leadership.

Some principals noted that in developing and fostering individual as well as collaborative creativities in their schools, there was a greater—but still insufficient—need to address assessment of students' conceptual and practical understanding of their creative works. Cowdroy and de Graaff (2005) describe the need for a double paradigm shift in teacher pedagogy and assessment, "from teacher-

derived criteria for examination of work to student-derived criteria of assessment of the student's understanding of his or her own concept in terms of the philosophical and theoretical frameworks of the relevant field of creativity" (p. 515). Similarly, Lucas and Claxton (2009) argue for assessment that focuses on the learner: "our experience suggests that finding ways of tracking and articulating progression in wider skills may well best be done in collaboration with the learners themselves" (p. 31). In most schools, a culture of accumulation in standardised testing is well entrenched. Similarly, assessment by traditional measures remains a preoccupation of the creativity debate regarding how to implement creative skills and capacities, and measure their demonstration, in schools.

Principals and other school leaders expressed a commitment to fostering creativity in their school environments, but were challenged by both teachers and parents who voiced anxiety about its value and the perceived risk to students' preparation for future goals (e.g., university entrance, good jobs). Principals struggled to support teachers who consistently felt they lacked the skills and preparedness to teach in a way that elicits creative responses and thinking. Within subject areas, younger teachers felt it was often difficult to get older, more experienced staff to experiment and diverge from tried and tested class methods and management styles. Some conflicting narratives emerged among teachers who felt hesitant to invest in developing new classroom styles when their perception is that leadership and the cultural ecology of the school remains generally resistant to valuing creativity, despite its ubiquity in curriculum (and increasingly school-based) policy documents.

6.5.4 Policy Change

Professional teacher training can bring macro-level change to the education sector through better skills development in improvisation, ideation, and trans- and interdisciplinary collaboration (Sawyer, 2015; Tan, 2014). Yet many teachers and school leaders feel that creativity is just one more thing added to an already full curriculum and school timetable. Creativity education policy is central to helping "arm" teachers, school leaders, and all those interested in changing standardised curricula and school ecologies toward more open, creative innovative places against those who fear or criticise such moves.

The Australian government (like other governments worldwide) has identified a need to improve teacher capacities in creativity including across STEM subjects (Arts Council Wales, 2015; Commonwealth of Australia, 2017) in policy and vision documents. An example is the Australian government's *Inquiry into Innovation and Creativity* (AP, 2016) policy document and *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). Still, even well-meaning government policies have failed to effectively implement these creativity imperatives in compulsory teacher training or

professional development of inservice teachers or school ecologies (Harris & de Bruin, 2017a, 2017b; NESTA, 2012; The Warwick Commission, 2015).

Still missing is attention to the need for creating better creative environments and cultures (ecologies) in schools. This would require that students have the time and space to practice their creative, practical, and leadership skills in environments resembling the professional settings in which they will be employed. Harris (2016, 2017) and other creativity research (e.g., Craft, 2003; Kim et al., 2012; Partnership for 21st Century Skills, 2009; Roberts, 2006; Robinson, 2011; Sefton-Green, 2011; Yakman & Lee, 2012) argues that individualist approaches to learning and teaching are insufficient. They agree that what is needed are systematic and sustainable whole-school approaches that cultivate creative ecologies within schools in order to make effective and long-lasting change.

Whilst a discourse of greater creativity and innovation is now widespread in education policy (e.g., Cho et al., 2011; Craft, 2005; Flew, 2012; Leong & Leung, 2013), cultural and political resistance still shackle educators to outdated, individualist, and subject-specific ways of thinking about workplace creativity and innovation. While computer coding in early years education may be the most ubiquitous example of creativity permeating mathematics and other STEM subjects, in practice there remains a long way to go beyond a narrow digital technological understanding of creativity education or creative industries more generally (Garnham, 2005).

6.6   International Policy Approaches

Policy analysts continue to argue the need for better development of creative and cultural industry preparation since the UK's report titled *All Our Futures* (National Advisory Committee on Creative and Cultural Education, 1999), which appeared two decades ago (Claxton & Lucas, 2015; Craft, 2005; Craft, Chappell, & Twining, 2008; Creative Partnerships UK, 2012; Jeffrey, 2006; Lucas et al., 2013; Thomson & Sefton-Green, 2010; Warwick Report, 2015). Examples since then from national policy perspectives include Scotland's national creative education policy and vision documents *Fostering Creativity* (Creative Scotland, 2013; Education Scotland, n.d.), *Korean Secondary Education Research* (Cho et al., 2011), Hong Kong's creativity curriculum restructure (Curriculum Development Council, 2000), and the European Commission's survey of creativity in schools in Europe *Fostering Creative Learning and Supporting Innovative Teaching* (Ferrari, Cachia, & Punie, 2009), to name a few.

In addition, national economic indexes (see particularly Beijing [2012] and Hong Kong [2012]) are on the rise, positioning creativity education as part of a greater creative economies ecology. More recently, reports like the internationally-comparative *Global Creativity Index* (Florida et al., 2015), rank nations worldwide based on their gross domestic product and other creative economic measures. Such measures allow them to plot their "advanced economic growth and sustainable prosperity based on the performance of its creative class" (Florida, 2015, n.p.), thus ensuring creativity's primary position in national economic forecasts for at least the

next generation. Yet education-based Creative Indexes (such as Harris, 2017) that value creative skills alongside more traditional benchmarks like literacy and numeracy scores are only beginning to emerge as necessary education companions to the PISA (Programme for International Student Assessment) and other international ranking tests tied to national economic health.

Across Asia, educational change remains firmly attentive to a move away from rote teaching and learning practices but is slow to move toward more collaborative and experiential education styles. Singaporean education has improved student outcomes through curricular change and teaching that enhances critical thinking, inquiry, and investigation (Darling-Hammond, 2012) by developing independent and collaborative learning skills, and by "creating an inquiry culture among teachers" (p. 328).

Cheng (2004) notes the emergence of a Chinese model of creativity education, within an educational region that remains largely dominated by standardised learning, teaching, and testing. Yet most creativity education scholarship remains focused around individualist notions of creativity, or individual skills and capacities, rather than ecological or environmental approaches for effecting whole-school change. Increasingly though, creativity scholars are seeking to tie metacognitive and individual measures of creativity to environmental enhancement, recognising the networked nature of creativity development (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Csikszentmihalyi, 2014; Harris, 2017; Seelig, 2012).

6.7   Creative Turn in Teacher Practice

The challenge of fostering greater creativity in education involves a range of complex affordances and constraints, united primarily by the school-based ecologies. Such efforts must span teaching, learning and assessment, as well as the environments within and beyond the school that promote creative encounters. Worldwide, creativity, critical thinking, and problem-solving skills have been marked as essential for effective learners and future employees and employers. Yet, despite ample empirical evidence, teacher education and in-service teaching seems slow to adopt design thinking or other systems-based approaches. Increased attention on trans- and interdisciplinary practices in both creative education research and teacher training and practice offer new opportunities for threading diverse disciplinary (subject) practices to work toward common goals (Holley, 2009), breaking down disciplinary boundaries (Moran, 2002, 2009).

The social and distributed nature of creativity through practices of designing, reflecting, and collaborating is increasingly required of teachers as well as students (Glăveanu, 2014). Collaboration is key to developing shared understandings, practices, and goals among team members, regardless of whether the creative ecology consists of teachers and students, co-workers, or creative industry collaborators (Sawyer, 2011; Wells & Arauz, 2006). Successful collaboration between students can evoke positive interdependency by team members—an ideal collaborative envi-

ronment in which groups create in ways that exceed the abilities of any one individual (Vass & Littleton, 2009). Whilst there are similarities between successful collaborative knowledge construction and creative collaboration concepts, creativity and learning are not simply one and the same thing in all contexts (Craft, 2008; Sawyer, 2015; Sawyer & DeZutter, 2009).

6.8   Future Visions

Florida (2015, 2014) has argued for an environmental (or ecological) engineering strategy of creative economies in which urban environments are creatively engineered rather than allowing or hoping for creativity to organically emerge. Although his research has been widely criticised over the past decade, Florida's overall argument for an environmental approach to fostering creativity in cultural and collective settings still holds sway. In a Floridian commodified creative economy, broader principles of creativity reflect a dominant Western meta-narrative of 'progress' wherein learners must progress from school to industry with *just the right amount* of creativity to meet current demands. Yet, digital technology over the past decade has accelerated at a rate not even Florida predicted. Emaciated contemporary understandings of 'creative industries'—envisioned by Claxton and Lucas (2015) as a multifaceted and interconnected performance of creativity across all sectors—has been reduced to a dangerously narrow tech-sector economic driver (O'Connor & Wynne, 2017).

   A narrowing creative industries discourse over the past 25 years has increasingly decoupled creativity from arts and culture, and tethered creativity to more economic catch-words like *innovation, design* and *critical thinking* (Harris, 2014). The value of creative practices in compulsory and tertiary schooling has moved from a use-value of wellbeing and whole-child development to national investment in global transnational economic measures such as the increasingly popular *creativity indexes*. Improving transnational creative collaboration between countries promotes more holistic creative mindsets as well as global trade (Robinson, 2012; Sprague, 2012).

   Acknowledging creativity as an essential universal trait with meaning, value, and currency within global education today positions creativity education far above reductive notions of innovation. Effective creative education involves moving beyond instrumental, skills-based approaches to individual creativity, toward more networked distribution and design-oriented creative engagement within and across groups and environments. To foster truly creative ecosystems (whether national, corporate, or educational), education systems must shift to a 'macro' approach in thinking about creative practices, environments, and outputs, including assessment. Perhaps most challenging, teachers must embrace creative uncertainty, relinquishing 'expert' roles and reimagining themselves as curators, consultants, and mentors. When critical thinking becomes a mode of collaboration rather than a criterion for expertness (Ambrose, 2005; Shalley & Gilson, 2004), educators will be free from positivist notions of 'right and wrong' ways of learning. Many students now have

the tools to source information in independent and unprecedented ways. What is needed for growing robust knowledge economies are resilient, creative, and flexible ideators. Sadly, the education sector is dangerously lacking in preparing students for creative futures across a range of industries in our new knowledge economies.

The status of creativity in education highlights significant differences between the approaches of policymakers and practitioners resulting from factors such as differing incentives, goals, language, demands and timeframes (Harris, 2017; Tseng & Nutley, 2014). Large-scale creative education research must continue to determine how creativity is most effectively taught and fostered, both locally and globally. Increasingly transnational contexts, values and flows coalesce, vitiate, or enhance the dynamics of localised creative ecologies. We acknowledge that the practicalities of improving creative and critical thinking across secondary and higher education contexts as well as in workplace environments (virtual and physical) is complex, yet the increasingly networked, distributed, and transnational nature of our digitised workforces demands a more robust and achievable response.

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Part II
Research Investigations into Creativity and Education

Chapter 7
Theory in Creativity Research:
The Pernicious Impact of Domain Generality

John Baer

Abstract This chapter considers how misguided theoretical assumptions influence both creativity research and teaching. There are many kinds of theories, ranging from unconscious and vague beliefs to explicit and clearly articulated principles, but no matter their nature or how they are acquired theories guide research and teaching practice. A key question about the nature of creativity—how domain-specific are the skills and traits that underlie creativity?—is explored in detail both as an example of how theory impacts practice and as a key determinant of the kinds of creativity research and creativity training that are possible. Domain specificity argues that (a) creativity as a general concept is an abstraction, (b) we can learn little about the nature of creativity as long as we focus on that abstraction rather than concrete instances of creativity, and (c) both creativity research and teaching for creativity must be done domain by domain, just as teaching content knowledge and teaching many skills must be done. This chapter concludes not with a call for more teaching of theory, but with a discussion of the theory-practice connection and the importance of an awareness of the theories that actually guide one's practice.

7.1 Introduction

Theory has a bad reputation in teacher education, at least among teacher education critics. The complaint that schools of education value theory at the expense of practice is an especially common one, even among many who teach in those schools. In a chapter of *Educating School Teachers* ominously titled "The Pursuit of Irrelevance," Arthur Levine (2006), who was just then stepping down from a 12-year stint as President of Teachers College, Columbia University, USA, summarized what many believed to be true about the over-emphasis of theory in teacher education:

> In their effort to obtain acceptance, teacher education programs attenuated their ties with P-12 schools and the people who work in them. They attempted to remake themselves in the

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image of arts and sciences colleges, emphasizing theory over practice and the education of academicians over practitioners. (p. 23)

It is not the goal of this chapter either to challenge or to refute this indictment. My interest is in the impact that theories have on creativity research and educational practice, not in the theory-practice balance in teacher education. I will show how theories about the nature of creativity shape, and sometimes misshape, the work of both creativity researchers and teachers.

But, first we must consider what it is to be a theory, and why theories matter. I am using the term *theory* in a very broad sense to include many things, including principles, ideas, concepts, opinions, views, assumptions, and beliefs. A theory (as I am defining it) can be any set of principles upon which a behavior, decision, or activity might be based. It can also be any idea or system of ideas used to explain something. A theory can be explicit or implicit, and it may have been intentionally taught and adopted or passed on and acquired unknowingly.

Teachers and researchers do things for reasons. Those reasons may be ones they can clearly articulate, or they may be entirely subliminal (or some combination of the two). A teacher may have a single reason for an action, or her choices may be determined through a complex combination of reasons. Generally, those reasons can be thought of as theories: theories about teaching and learning, beliefs about child development, hunches about what "works" in different contexts. These may not be theories we have studied or can name, and they may not have the same kind of status as the theories that might appear in a textbook. But, the beliefs and assumptions that undergird our decisions as teachers and researchers amount to theories that direct our practice.

We can, of course, hold beliefs that do not influence what we do, either because they do not relate to the decisions we must make or because we are acting hypocritically (which, given the complexity of personal beliefs, it is almost impossible not to do sometimes). And what we claim to believe may sometimes not match what our actions suggest we actually believe. It is the beliefs, principles, and opinions—the theories, broadly defined—that actually guide our actions, explanations, and decisions that are my concern here.

Theories range in extent from what Kuhn (1962/1970) termed paradigms at the most comprehensive level to notions, biases, and hunches at a much more pedestrian level. All shape what we do, what we look for, and even what we are able to see. An uncountable array of theories guide the actions of teachers, including a large subset that relate to nurturing students' creativity. It is one such theory—a theory about creativity long shared by most creativity researchers and teachers—that is this chapter's focus: domain generality (defined below). I have chosen the theory of domain generality for two reasons:

1. It is an excellent example of a theory that can influence research and teaching both as an explicitly held theory and (perhaps more commonly) as an implicit, and often largely unconscious, belief about creativity.
2. It is probably the most important and powerful theory of creativity because it influences everything else one might think (or theorize) about creativity.

7.2   What Is Domain Generality of Creativity?

To understand the question of domain generality of creativity it will be helpful first to think about domain generality in other areas. Consider expertise. The question "Are you an expert?" is not one easily answered without some specification of the domain in question: "An expert in what?" Expertise doesn't transcend domains. One may have expertise in many or few domains, but being an expert in one domain tells us nothing about one's expertise in unrelated domains. I may be an expert archer and an expert calligrapher, an expert in one but not the other, or an expert in neither, but knowing about my expertise in these domains provides no information whatsoever about my expertise in astronomy, French wines, or calculus. Expertise is very domain-specific, which is the opposite of domain-general (Baer, 2016; Willingham 2007, 2008).

Skill is similarly domain-specific. As a teacher, I don't assume that because my students have learned how to dribble a basketball they will also be able to diagram sentences, nor do I assume that teaching them one of these skills have any impact on their skill performing the other.

Intelligence is a more troublesome example. Standard theories of intelligence theory acknowledge domain-specific factors but emphasize the correlation among abilities, such as linguistic, logical, and spatial abilities, and typically focus on the domain-general aspect of intelligence. But MacArthur Prize-winner Howard Gardner and others have argued for a fully modular and domain-specific theory of intelligence, under which there is no *g*, or general intelligence. From this perspective, a student's logical-mathematical intelligence tells us nothing about her linguistic, spatial, interpersonal, or other intelligences. The consensus in psychology is that intelligence is a roughly equal combination of domain-general and domain-specific components. This means that a person's intelligence in any area is somewhat predictive of that person's intelligence in other areas, but only to a limited degree (Neisser et al., 1996; see also Cosmides & Tooby 2002, for an interesting theory of how general intelligence may have evolved from domain-specific abilities).

It was Gardner's theory that first introduced me to the idea that creativity might be domain-specific. Although his book, *Frames of Mind: The Theory of Multiple Intelligences,* was about intelligence, Gardner (1983) hinted that this idea would also apply to creativity. I was a creativity trainer when I first read it and although I taught a particular model of creative problem solving, I hadn't thought a great deal about creativity theory. I was interested in practice, not theory. But Gardner's book led me to understand that I *was* (unknowingly) basing my practice on a theory (domain generality). The fact that I didn't know I was doing this—that I was unaware that my practice was based on a theory that I had neither recognized or acknowledged—didn't make theory irrelevant. It meant that I might be inadvertently, but nonetheless significantly, deceiving myself (and my students). If Gardner was right, then it would be no more possible to do what I claimed to be doing—teaching generic, domain-transcending creative-thinking skills—than it would be to teach students generic, domain-transcending content knowledge and skills (expertise) that they could apply equally well in everything they did, regardless of domain.

Like every creativity trainer or teacher I knew, I assumed I was teaching my students how to be creative, full stop. Creative in whatever they did, or at least creative in any endeavor in which they chose to apply the heuristics I was teaching them. If what Gardner was arguing was true, which would mean that what I thought I was doing was in fact impossible, then knowingly teaching what I was coming to realize was a domain-general method of creative problem solving would make me a fraud, a charlatan. Now that I knew of this theory, something I had never before encountered, I either needed to change how I taught or find a way to honestly dismiss the theory. So I set out to prove Gardner wrong.

A primary way that Gardner's critics showed that intelligence was domain-general—only partially but nonetheless domain-general to a significant degree, which would be enough if I could do the same for creativity—was to show that abilities in diverse domains were inter-correlated (For a summary see Neisser et al., 1996.[1]) Assessments of people's abilities in diverse domains such as those Gardner had proposed showed evidence of a fairly strong shared core. The fact that "intelligence" in one domain predicted "intelligence" in other domains meant that there was a substantial domain-general component to intelligence.

I wanted to show the same was true of creativity, that it included a substantial domain-general component If, as I assumed, there were significant inter-correlations among creativity-relevant behaviors in different domains, that would presumably demonstrate domain generality. As Ivcevic (2007) summarized the issue decades later, "Domain generality would be supported by high intercorrelations among different creative behaviors . . . while domain specificity would be supported by relatively low correlations among different behaviors" (p. 272). If creativity was, as I believed, domain-general, finding positive and significant positive correlations among creativity measures in different domains would prove it.

As I saw it, I simply needed to assess research participants' creativity in a variety of domains and show that there were significant correlations among those measures. This would prove that creativity was, to some degree, domain-general, and that I could return in good conscience to the kinds of creativity training I had been doing. (Of course there would also be skills that would promote creativity only in one or a few domains. No one doubted that there would also be domain-specific components. But it was the domain-general creative-thinking skills that I claimed to be teaching.)

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[1] Readers may wish to contest Neisser et al.'s conclusion, and one needn't agree with that conclusion for the rest of this chapter to make sense. The Neisser et al. paper represented the shared conclusions of a large panel appointed by the American Psychological Association to determine the consensus of the field regarding the domain generality of intelligence. (From the introduction on p. 77: "*The Board of Scientific Affairs (BSA) of the American Psychological Association (APA) concluded that there was urgent need for an authoritative report on these issues—one that all sides could use as a basis for discussion. Acting by unanimous vote, BSA established a Task Force charged with preparing such a report.*") The concern of this chapter is creativity, not intelligence, however, and the question of the domain generality of intelligence is of interest here only because it illustrates a standard approach to determining empirically whether a skill is domain-general or domain-specific.

To accomplish this I needed tests of creativity in multiple domains, which was a problem. Most creativity assessment techniques *assumed* domain generality, which made them useless in testing for domain generality. To make matters worse, the validity of almost all available methods of creativity assessment had been severely challenged. And, the most common creativity tests, which were measures of divergent thinking, not only had questionable predictive validity. Different versions of divergent-thinking tests, even ones by the same test maker, were essentially uncorrelated with one another, so they seemed to be testing entirely different things, even though all claimed to be measuring the same thing (general creativity). Imagine two IQ tests that had a correlation of .06 with one another, which was the reported correlation of the two most widely used divergent-thinking tests (Cramond, Matthews-Morgan, Bandalos, & Zuo, 2005). No one would even consider using such IQ tests, so trusting divergent-thinking tests, which had that very problem, seemed ill-advised.

The second most common approach to creativity assessment was based on self-report scales, which had very different kinds of validity problems. For example, the self-report scales were generally very transparent and thus easy to fake. In addition there was evidence that even when responding honestly, people tended to be very poor judges of their own creativity. There is a substantial body of work that documents the limitations of self-report creativity assessments and their general lack of validity; see, for example, Amabile (1983, 1996), Anastasi (1982), Baer (1993, 2016), Barron and Harrington (1981), Crockenberg (1972), Kogan (1983), Sawyer (2012), and Weisberg (1999).

There was a new technique, however, that had been first validated in 1982 (Amabile, 1982) and would later be dubbed the "gold standard" of creativity assessment (Carson, 2006). The Consensual Assessment Technique (CAT; Amabile, 1983, 1996) was not only the most valid creativity assessment technique. It was also agnostic about the domain generality/specificity question, which meant it didn't prejudge the outcome of the studies I hoped to conduct. The CAT assessed creativity in particular domains, but the inventor of the method had herself used CAT scores as domain-general indicators of creativity, so the CAT didn't assume domain specificity.

The CAT assesses creativity the same way creativity is assessed in the real world: through the combined opinion of experts. When Nobel Prize committees make their judgments, they don't ask psychologists to design rubrics or give nominees tests of some sort. They ask experts in the field to judge the creativity of the nominees' work. The CAT works the same way in judging lower levels of creativity, the everyday, garden-variety creativity expected among participants in creativity research studies. If one were assessing the creativity of poems, the judges might be poets and poetry critics; if judging the creativity of collages, the judges could be artists or art critics. Working independently, the judges rate the creativity of a group of artifacts. With a modest number of judges (typically 5–15), the inter-rater reliabilities tend to be quite high, generally .80 and up (see, e.g., Amabile, 1982, 1983, 1996; Baer 1993, 1994a, 1994b; Baer, Kaufman, & Gentile 2004; Baer & McKool 2009, 2014;

Hennessey, 1994; Kaufman, Baer, & Cole 2009a, 2009b; Kaufman, Baer, Cole, & Sexton, 2008; Kaufman et al., 2013 for studies confirming the high inter-rater reliability of the CAT).

So, I did my first series of studies, first with middle school students and soon after with elementary, high school, and adult participants from three mid-Atlantic states. Participants created artifacts in multiple domains (such as poems, stories, collages, and math word problems) and experts in the respective domains rated them for creativity. I then computed correlations in ratings across domains.

The results were a disaster. In study after study, the correlations between creativity ratings in different domains hovered around zero (and were statistically insignificant, no better than chance[2]). Other researchers tried and got the same results (for a review of this work, see Baer 2016). One large study by Conti, Coon, and Amabile (1996) was designed expressly to prove that my early studies (Baer 1991, 1993, 1994a) were faulty. They used seven tasks from the domains of writing and art, which allowed them to make 20 cross-domain (i.e., writing-art) comparisons (including comparisons of overall-writing and overall-art creativity scores, a procedure that increased the reliability of the measures even further). Of the 20 cross-domain correlations, *not one* was statistically significant. (Even chance would predict that one of 20 would reach the .05 level, but none did.[3])

It is important to note that the *within*-domain correlations in this same study— correlations between products in the same domain, which both theories (generality and specificity) predict will be positive—were not only positive; they were substantial and statistically significant (mostly at $p < .001$). This means that the measures seemed to be working fine and the outcome could not be blamed on bad measures. The within-domain correlations were just as predicted (by both theories), but when it came to the *cross*-domain correlations that would show domain generality, the researchers came up totally empty handed. No evidence whatsoever was found for domain generality in this rather large study, which included 20 cross-domain comparisons and was designed by proponents of domain generality (as I had once been) to prove the existence of a domain-general component to creativity. They failed, just as I had.

I eventually had to give up on domain generality. I even tried a training study (Baer 1996) in which I taught participants key creative-thinking techniques, the same ones I had long used in my creativity training seminars, but this time in all the exercises I used content from a single domain (poetry-writing). When these participants later wrote poems, experts rated those poems significantly more creative than those written by control group participants. But the trained participants were no more creative in other domains: even the short stories they wrote were no more creative than those written by the control group!

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[2]This was true even after correction for attenuation.

[3]The authors noted that a handful of the 20 correlations *approached* statistical significance ($p < .10$), but when computing 20 correlation coefficients, even totally random results will, on average, produce a few such marginally significant (but obviously false) outcomes. If one accounts for multiple comparisons in these 20 correlation coefficients, even those results that appear to be marginally significant would disappear.

This points to another consistent finding of this research: the domains that matter in creativity are much more narrow than domains as typically conceived. Poetry and fiction are from the same larger domain, but creativity training in one did not boost creativity in the other. If one wants to increase students' creativity, the more closely one matches the training to the task of interest the more effective it will be, and there is little if any transfer of creative-thinking skills across domains. As a result, creativity researchers are now examining creativity in specific areas more closely (see, e.g., the edited volumes Kaufman & Baer, 2005; Kaufman, Glaveanu, & Baer, in press, in both of which creativity researchers look at how creativity works in very specific domains).

The domain generality/specificity issue is central to creativity research because almost any study needs (either explicitly or implicitly) to endorse (or at least assume) one of the two theories. Domain specificity claims that one cannot really say anything much about creativity in general, only about creativity in domains, whereas domain generality claims that creativity is a domain-transcending factor (an ability, trait, or approach). Because of the importance of the question, the *Creativity Research Journal* published its first (and thus far only) point-counterpoint debate about whether creativity is domain-general or domain-specific (Baer, 1998; Plucker 1998). Even the debater arguing for domain specificity acknowledged that the "conclusions of researchers using the CAT are almost always that creativity is predominantly task or content specific" (Plucker 1998, p. 181). He went on to argue that "[P]erformance assessments produce evidence of task specificity, and creativity checklists and other traditional assessments suggest that creativity is content general" (p. 180).

But in fact even the most traditional of all creativity assessments—the Torrance Tests of Creative Thinking (TTCT)—have provided strong evidence for domain specificity. Plucker (1999) himself offered some of that evidence in validation studies he did later. Other evidence of domain specificity came from Torrance, the creator of the most widely used paper-and-pencil creativity tests, in which he found that his two tests (TTCT-Verbal and TTCT-figural) that use tasks from different domains were uncorrelated with each other (Cramond et al., 2005).[4]

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[4] I believe my presentation of evidence regarding theories of domain specificity and domain generality in this chapter, although necessarily brief, is as even-handed as possible. (For a more detail analysis, see Baer 2016.) But as Kuhn (1962/1970, 1979) warned us, there is often no neutral ground from which competing theories can be judged or even described:

[Successive theories are] incommensurable . . . in the sense that the referents of some of the terms which occur in both are a function of the theory within which those terms appear. There is no neutral language into which both the theories and the relevant data may be translated for purposes of comparison (Kuhn 1979, p. 540).

I don't believe the theories of domain specificity and domain generality are *that* difficult to compare to one another, however (and not at all like the differences between, say, the Copernican and Ptolemaic world views). Such deep revolutions as the Copernican, which may well have been unintelligible from a Ptolemaic world view, are actually quite rare in science. As McMullin (1998) argued, most scientific revolutions are "shallow" (p. 122) and require only small modifications of the "disciplinary matrix" (Kuhn 1962/1970, p. 182) that hold together a field of study. The differences between domain specificity and domain generality are therefore not incommensurable, but

7.3 The Impact of Domain Specificity Theory on Creativity Research

The issue of domain specificity is, in one sense, simply about an error in creativity theory. But it goes much deeper than this, because whether creativity is domain-specific or domain-general has implications for *every* creativity theory (and these theories, as I had learned, impact how one teaches for creativity). The generality-specificity question reflects a belief about the fundamental nature of creativity or whether creativity even has a "fundamental nature." If creativity is entirely domain-specific, then there is no such thing as general "creativity," in the same way there is no such thing as general, domain-transcending "skill" or "expertise." Skill, expertise, and creativity can be conceptualized as domain-general abstractions, but the components of any actual instance of skill, expertise, or creativity will depend on the domain and vary accordingly. If one thinks of each kind of creativity as a circle in a Venn diagram, there is no place that all the circles, or even most of the circles, overlap.

The implications of domain specificity for most creativity research are therefore almost paradigm-shifting in their potential impact. If creativity, whether understood as a set of skills, personality traits, or ways to approach problems, were something that transcended domains, then it wouldn't much matter the domain one chose to conduct a study. For example, consider the relationship between creative genius and mental illness. Much ink has been spilled about this connection (or lack of connection), and different studies have come to starkly different conclusions. But that's because different researchers have looked at possible connections in different domains, and the relationship is a very domain-specific one. For some domains there is a connection, whereas in others there is no connection. As Simonton (2010) explained, "geniuses in the natural sciences tend to be more mentally healthy than in the social sciences; geniuses in the social sciences, more so than those in the humanities; and geniuses in the humanities, more so than those in the arts" (pp. 226–228).

The same is true in other areas of research. Consider a less fraught issue, conscientious, which (unlike creativity) appears to be a fairly general trait. This means that people who are conscientious doing activities in one domain tend to be conscientious doing other, unrelated activities in other domains. The impact of conscientious on creativity is a different matter, however, because although conscientiousness is domain-general, creativity is domain-specific. Conscientiousness has a significant positive impact on creativity in some scientific fields, but a significant *negative* impact in some artistic fields. Conscientious scientists tend to be more creative,

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they are nonetheless very real and important; the viewpoints, meanings, and assumptions of domain-general and domain-specific theories can be quite pronounced, and as Kuhn showed us, defenders of competing theories often fail to understand each other's arguments as a result. What counts as evidence under the theories of domain specificity and domain generality are not so different, however, which provides room for discussion and comparison—and for the field to continue to move, albeit slowly, toward embracing domain specificity ever more fully.)

whereas conscientious artists tend to be less creative. The effect varies not just in size, but also in direction (positive or negative) depending on the domain (Feist, 1998, 1999). Many domain-general traits (like conscientiousness) can, despite their domain generality, be domain-specific in their impact on creativity.

McKay, Karwowski, and Kaufman (2017) measured a number of abilities, beliefs, and personality attributes commonly believed to be predictors of creativity, searching for associations between these and creativity in five domains. For example, they predicted that domain-general traits like openness to experience, creative self-efficacy, and creative personal identity would be related to creativity in all five domains. Their evidence, however, forced them to reject this hypothesis. Some of the abilities, beliefs, and personality attributes were indeed related to creativity in some of the five domains, but none was linked to creativity in all five domains. None, that is, was truly domain-general.

Consider what such an outcome says about creativity research in general. The overall creativity index that most so-called creativity tests provide—and that are the criterion measures used in hundreds if not thousands of past research studies —are typically sums of scores on a variety of subtests. Had McKay et al. (2017) assumed domain generality and simply summed the creativity ratings in the five domains into a single measure of creativity, they would have found positive associations between this generic estimate of creativity and some of the abilities, beliefs, and personality attributes they had measured. In doing so they would have totally missed the fact there is no such association for many domains. Or had they assumed, as domain-generality theory would suggest, that domains don't matter and had simply sampled a single domain and used it as a overall general creativity measure (also a common practice in past research), their results would have been quite different, depending on the domain they happened to choose. Had they chosen one domain they might have found one thing, but had they chosen a different domain the result could have been entirely different. As domain specificity predicts.

Is it any wonder that creativity research has been so plagued with contradictory research results? As long as one can simply choose a different test and get different results, which the lack of correlation among different creativity measures ensures, creativity research is doomed to being buried in inconsistent and conflicting findings. Consider the two most widely used tests of creativity, Torrance's TTCT-Verbal and TTCT-Figural. The choice of which of these two tests to use is simply a matter of convenience or suitability to the sample in that both are offered as domain-general tests (Plucker 1998). But they are clearly measuring two different things because they correlated only .06 with each other, according to Torrance's own research:

> Reponses to the verbal and figural forms of the TTCT are not only expressed in two different modalities . . . but they are also measures of different cognitive abilities. In fact, Torrance (1990) found very little correlation (r = .06) between performance on the verbal and figural tests. (Cramond et al., 2005, pp. 283-284)

When Plucker (1999) did a re-validation of these two tests, both of which measure divergent thinking (DT), he found that one of the two was associated with his measures of creative performance whereas the other was not. He explained this outcome as the result of domain specificity:

The importance of verbal DT relative to figural DT may be due to a linguistic bias in the adult creative achievement checklists. For example, if a majority of the creative achievements required a high degree of linguistic talent, as opposed to spatial talent or problem solving talents, the verbal DT tests would be expected to have a significantly higher correlation to these types of achievement than other forms of DT. (Plucker 1999, p. 110)

This failure of the TTCT to predict creativity across domains was a key issue in the first-ever debate sponsored by the American Psychological Association's Division (APA) 10, which focuses on creativity. The title of the debate was "Are the Torrance Tests Still Relevant in the 21st Century?" Note that the debate title was not "How Valid Are the Torrance Tests?" but instead asks if they are still even *relevant.* (For the debate itself, see Baer 2009; and Kim 2009; or see Baer 2011a, 2011b; and Kim, 2011a, 2011b for a follow-up written version of the same debate that was solicited by the APA journal *Psychology of Aesthetics, Creativity, and the Arts.*)

Thus, if one conducted creativity research using one of the two Torrance tests, one should expect that the results would be different had the other test been chosen, even though they are both supposedly measuring the same thing, domain-general creativity. The same would be true if instead of divergent-thinking tests one used performance measures, which researchers have often in the past interpreted as general measures of creativity (Amabile 1983) even though they have now been shown to be valid only for the specific domain of the performance task. So whether one uses performance-based measures of creativity or paper-and-pencil creativity tests, the results of any test of creativity that assumes domain generality can be expected to vary considerably depending on which test(s) one uses. (Want a different result? Just use a different test. As an example, in 2008 Baer and Kaufman published a review of research about gender differences in creativity. They found 47 studies that compared divergent-thinking test scores of boys and girls. Some results favored girls; some favored boys; some had mixed results because they used more than one test and girls scored higher on one and boys on the other; and some showed no difference.[5])

I don't mean to suggest that creativity researchers are unethical in their choices of tests or that they are fishing for specific results by trying different tests and then reporting only the ones that fit their hypotheses. But whether such choices of tests are made by chance or by design, the results obtained in any given study will depend

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[5] Divergent-thinking tests are the most common form of creativity measures, but Baer and Kaufman (2008) found the same kind of conflicting results when other kinds of measures were used to compare gender differences in creativity. The only area in which consistent gender differences were found was in creative productivity, and those differences were attributable not to gender differences in ability but to differences in the environments in which males and females live, work, and produce creative things and ideas:

There continue to be large gender differences in creative productivity, and these differences represent the most significant unanswered questions about gender and creativity. It is clear that a large part of those differences is environmental, including differences in adult expectations of girls and boys, differences in opportunities available to male and female children and adults, and differences in the kinds of experiences women and men are likely to have. There are also differences in how different kinds of creative works—including those more typically produced by women and men—are valued by society. (p. 28)

on the choice of creativity measure (and the domains it includes), so that if a researcher had happened to use a different test a positive result might have instead been negative (or vice versa). This is no way to get valid answers to important questions about creativity.

The only way to assess creativity validly is domain by domain. That makes creativity research hard, much harder than it would be if creativity were domain-general. This difficulty perhaps explains the reluctance of some researchers to give up domain-general research programs.[6]

As Feist (2004) suggested:

> [It is] a very appealing, and ultimately firmly American, notion that a creative person could be creative in any domain he or she chose. All the person would have to do would be to decide where to apply her or his talents and efforts, practice or train a lot, and *voilà*, you have creative achievement. On this view, talent trumps domain and it really is somewhat arbitrary in which domain the creative achievement is expressed."

Although the idea is, indeed, appealing—it was part of my attraction to the kinds of creativity training I used to do believing this would give participants the kinds of skills for doing creative things in any field—Feist concluded, "this is a rather naïve and ultimately false position and that creative talent is in fact domain specific . . . creativity and talent are usually not among the domain general skills" (p. 57).

It would make creativity research not only easier, but also grander, if creativity were domain-general. But as Silvia (2014) argued:

> The history of psychology shows that "big theories" inevitably fail to fulfill their promise. Instead, as George Kelly argued long ago, complex problems with many facets are better served by a mix of big and small theories. Likewise, the diversity of creativity research is a sign of healthy pluralism. (p. 233)

Grand theories are enticing (Do creativity researchers and theorists have physics envy?), but they inevitably distort, distract, and disappoint:

> It is the attempt to build grand, domain-transcending, all-encompassing theories that has crippled creativity research and led to a field in which it is the norm for research results to contradict each other (Baer 2011c, p. 200).

There are many other areas where creativity research has been plagued by conflicting research results. One such area of special interest to teachers is intrinsic motivation (which generally leads to higher levels of creative performance) and the impact of rewards (extrinsic motivators) on creativity (which often, but not always, lower creative performance). Teachers have many reasons to value intrinsic motivation, only one of which is its associated with greater creativity. But teachers also use rewards and other extrinsic motivators (like evaluations) that have been shown to depress creativity. The use of such extrinsic motivators is sometimes elective, but at

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[6] Kuhn suggested (quoting Planck) that new paradigms only get widely accepted as those who held earlier views leave the field: "Max Planck, surveying his own career in his *Scientific Autobiography*, sadly remarked that 'a new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it'"(Kuhn 1962/1970, p. 151).

times it is simply unavoidable. It's hard, for example, to give feedback in a way that does not impact extrinsic motivation. Feedback is necessarily evaluative, so if students anticipate feedback on their writing, then they are expecting that their work will be evaluated.

Research on the impact of extrinsic motivators like rewards on creativity has led to conflicting findings (Amabile 1996; Baer, 1997a, 1997b, 2016; Eisenberger & Cameron, 1996). Some studies show that rewards depress creativity, while others show that rewards can increase creativity and still others suggest that it depends on the age and gender of the participants in the study! The key idea is that intrinsic motivation is linked to creativity and extrinsic motivation tends to drive out intrinsic motivation. It is impossible to know (yet) if one factor in these confusing findings might be the domain specificity of creativity because the needed research has not yet been conducted.

But, whatever those studies might show, it is important to note that there is at least one crucial kind of domain specificity involved in the connections between intrinsic motivation and creativity: intrinsic motivation varies greatly within individuals from domain to domain. A person may be interested in math, art, science, cooking, basketball, woodworking, poetry, theater, dance, and history; interested in any possible combination of these diverse areas of interest; or interested in none of them. A person's intrinsic interest in different activities isn't a general personality trait. It depends, almost entirely, on the kind of activity, so we shouldn't be surprised if creativity-motivation links vary as well.

As teachers, we can't promote intrinsic motivation *in general* or assume that if we nurture students' intrinsic motivation in one domain, such as poetry, it will naturally increase their intrinsic motivation in other areas, such as math, science, or art. The same is true of teaching for creativity. Teaching art-related creative-thinking skills will not in most cases have any impact on creativity in math, science, or writing.

7.4   Impact of Domain Specificity Theory on Teaching for Creativity

What does the domain specificity of creativity mean for the teaching of creativity? The answer is simple:

> It means we simply can't do it:
>> We can't teach creativity.
>> It's impossible.

"Creativity" doesn't exist if we think of it as a *general* skill, approach, trait, or strategy in the same way that "expertise" doesn't exist (except as an abstraction) apart from domains. I can't teach you "expertise." But I *can* teach you how to become an expert in X, Y, & Z, just not all at the same time. Teaching content knowledge can be done only one domain at a time. Ditto for creativity.

It's kind of like teaching "skill." I can't teach "skill"—just as I can't teach "appreciation" or "expertise." They're too abstract, and each kind of skill, appreciation, and expertise is different. Each kind of skill, appreciation, expertise, and creativity is different. We *can* teach them, just not all at the same time.

Many of the skills like divergent thinking that researchers think might be related to creativity *can* be taught. But only domain by domain, like in the study of teaching poetry-relevant divergent-thinking skills, which increased poetry-writing creativity but not story-writing creativity.

Just as it would be nice if we could do domain-general creativity research that would tell us about creativity of all kinds, in all domains, it would be nice to be able to teach creativity once and have it transfer to all domains. That kind of creativity research is impossible, however, and that way of teaching creativity is equally impossible. We need to teach and to research creativity domain by domain.

Teaching creativity domain by domain might sound like a daunting task, but teaching domain by domain isn't really that unusual, is it? When we teach U.S. history we don't expect that it will lead to students knowing more physics. In fact, when we teach U.S. history, we don't even expect it will result in students knowing more ancient Japanese history, even though both are from the same domain and taught in the same department. Expertise is *very* content-specific, and so must be our teaching for content knowledge.

This is true even when teaching critical thinking skills. Analyzing a poem, applied behavioral analysis, analyzing a theorem, psycho-analysis, tree-ring analysis, and factor analysis are all types of analysis, but learning how to do one doesn't mean I can now do all (or any) of the others any better. Like creativity, we need to teach analysis domain by domain. (Teaching would be a lot easier if we could just teach analysis once and be done, wouldn't it?)

I once used as a field placement for my educational psychology classes a school that had what they called a H.O.T.S. Lab, with H.O.T.S. standing for Higher-Order Thinking Skills. Students would come there to be taught how to apply, analyze, synthesize, and evaluate, based on the very powerful ideas of Bloom's Taxonomy (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). But it didn't (and it cannot) work that way. Knowing when a math problem calls for multiplication and doing it correctly is application. Knowing how the grid system works and using it to find the latitude and longitude of a city is also application. But there's no way to teach both application skills at the same time (and all the other application skills in other domains as well). That's why programs to teach critical thinking have such a poor record and why, when they do succeed, it's when the outcome measures are similar to the activities used in training, that is, when success is measured in the same domain as the training (Willingham 2007, 2008).

Having a taxonomy of higher-order thinking skills (à la Bloom) is a useful framework to remind of us the kinds of thinking we want to encourage, just as it's helpful to be reminded that we want to encourage creativity. Because either we can't teach the skills that Bloom labeled or creativity *in the abstract,* we need to teach thinking domain by domain and we need to teach for creativity domain by domain. And we can do that. It's just a little harder, maybe a lot harder, than it would be if creativity were domain general. (Did anyone ever promise that teaching would be easy?)

Although I no longer run creativity training workshops, those are still possible, despite domain specificity. But one needs either to focus on a single domain (like the poetry-training study discussed earlier) or choose one's exercises from a broad range of domains and aim for modest improvements in multiple domains. Domain specificity forces us as both creativity researchers and creativity trainers to be more humble. It also makes creativity training even more important because it's something we need to do in every subject, every class, every domain.

What does the impact of theory on creativity research and theory tell us about the role of theory more generally in teacher education? I started this chapter by noting that theory has a bad reputation in teacher education. By exploring how a false theory of creativity has distorted creativity research and the teaching of creativity, however, I have shown how creativity theory—even, and perhaps especially, a theory that has been long held implicitly, and has therefore often gone unexamined and unacknowledged—has had a profound impact. Does that make theory bad? Certainly bad theory (like domain generality) is bad, and can have very harmful effects. But does the impact of theory on practice mean we need more theory, or less theory, in teacher education? Or just better theories?

I also wrote in the opening that it was not my goal either to defend or to condemn the teaching of educational theory. Although I have argued that a false theory has crippled creativity research and led to poor practices in the teaching of creativity, that is not intended to be a call for more teaching of theory at the expense of practice. It is only a call for the recognition of the impact of theory on practice. As teachers and teacher educators, we need an awareness of the theories that guide us. We cannot simply banish theory, because whether acknowledged or not, our theories (in the form of assumptions, principles, ideas, concepts, opinions, views, or beliefs) direct our work.

We need to be aware of the theories that guide us in our practice. Having such an awareness can be prevent us from unwittingly being guided by theories that may lead us astray. An awareness of the theories that guide our practice can also make it more likely that our practice will be *successful* practice, practice that leads to meeting our goals in teaching.

Theories based on wishful thinking, like the theory that drove the school I discussed to establish a H.O.T.S. Lab, can sometimes suggest that teaching is easy. And teaching *can* be easy, as long as it is only teaching, and not learning, that one cares about. If learning matters, however, we need teaching to be rooted in theories that work, theories that actually describe reality—theories like domain specificity.

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Chapter 8
The Role of Engagement, Honing, and Mindfulness in Creativity

Liane Gabora and Mike Unrau

Abstract As both our external world and inner worlds become more complex, we are faced with more novel challenges, hardships, and duress. Creative thinking is needed to provide fresh perspectives and solve new problems. Because creativity can be conducive to accessing and reliving traumatic memories, emotional scars may be exacerbated by creative practices before these are transformed and released. Therefore, in preparing our youth to thrive in an increasingly unpredictable world, it could be helpful to cultivate in them an understanding of the creative process and its relationship to hardship, as well as tools and techniques for fostering not just creativity but self-awareness and mindfulness. This chapter is a review of theories of creativity through the lens of their capacity to account for the relationship between creativity and hardship, as well as the therapeutic effects of creativity. We also review theories and research on aspects of mindfulness attending to potential therapeutic effects of creativity. Drawing upon the creativity and mindfulness literatures, we sketch out what an introductory 'creativity and mindfulness' module might look like as part of an educational curriculum designed to address the unique challenges of the twenty-first century.

8.1   Introduction

With intelligence increasing across generations (a phenomenon referred to as the Flynn Effect), our networks of thoughts and ideas are taking on more diverse, complex structures. As a consequence, our minds travel down less-trodden, newer paths. Some thought-paths lead to revolutionary innovations, heart-wrenching tunes, and riveting movies. Other thought-paths lead to ruminations about the past, and fears about the future, which may play a role in anxiety or depression. Still others lead to ever-subtler ways of manipulating each other, probing and bringing to light repressed and offensive parts of ourselves.

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Thus, as both our external world and inner worlds become more complex, we are faced with novel challenges, hardships, and duress. Creative thinking is needed to provide fresh perspectives and solve new problems, but since creativity can be conducive to accessing and reliving traumatic memories, emotional scars may be exacerbated by creative practices before they are transformed and released. This suggests that in order to prepare our youth to thrive in an increasingly unpredictable world, it could be helpful to cultivate in them an understanding of the creative process and its relationship to hardship, as well as tools and approaches for fostering, not just creativity, but self-awareness and mindfulness. *Mindfulness* is the awareness of what is happening presently, by paying attention to our experience and the novel distinctions of it we actively draw upon, without judgement (Kabat-Zinn, 2003; Haller, Bosma, Kapur, Zafonte, & Langer, 2016). Mindfulness is essentially creative, in that as we experience life mindfully, what we notice is new to us as a fresh perspective (Langer & Moldoveanu, 2000).

This chapter begins with a brief overview of a few theories of creativity. Our focus is on how, and to what extent, they address the relationship between creativity and hardship, as well as the well-documented therapeutic impact of creative engagement. Next, we investigate some theoretical aspects of mindfulness, again attending to its relationship to hardship and well-being. Finally, we sketch out the basics of what a 'creativity and mindfulness' educational module might look like.

8.2   Hardship and the Therapeutic Effects of Creativity

It is widely believed that creativity is fostered by a warm, supportive, nurturing, and trustworthy environment conducive to self-actualization (Maslow, 1971; Rogers, 1959). However, there is a negative correlation between creativity and parental warmth (Siegelman, 1973) and a high incidence of early parental loss in eminent creators (Eisenstadt, 1978). More generally, childhood adversity is believed to be a developmental antecedent of eminent creativity (MacKinnon, 1962; Rhue & Lynn, 1987; Simonton, 1994), perhaps in part because of a relationship between adversity and diversifying experiences (Damian & Simonton, 2015). The relationship between creativity and hardship is not restricted to childhood adversity; for example, stories written by adults in response to mildly threatening stimuli were rated as more creative than stories responding to non-threatening stimuli (Riley & Gabora, 2012).

Nevertheless, creativity can be therapeutic (Barron, 1963; Forgeard, 2013) and intrinsically rewarding (Gruber, 1995; Kounios & Beeman, 2014; Martindale, 1984). Although the creative process can at times be frustrating and draining and involve working through negative material, there is evidence that high levels of creativity are correlated with positive affect (Hennessey & Amabile, 2010) and the ability to manage intense feelings (Moon, 1999). Clinical practitioners of art therapy note that imagery and creative engagement can deepen communication between client and therapist (Moon, 2009). Art therapy can also enhance self-understanding,

and facilitate the process of finding healthier ways of handling situations and interacting with others (Dunn-Snow & Joy-Smellie, 2000; Riley, 1999). By providing access to issues that are difficult to verbalize, art therapy can bring these to the surface in a nonverbal form or provide a springboard for discussion (Malchiodi, 2007). There is also evidence that creativity can enhance one's sense of self (Garailordobil & Berrueco, 2007; MacKinnon, 1962).

Therapeutic effects of creativity may also stem from the capacity of therapy to enhance feelings of connection to, and appreciation by, others. In the verification of a creative work, the creator generates an internal context for the idea that encompasses a typical individual who will encounter the work. For an inventor the verification phase might involve developing a working prototype. For an artist it might involve arranging artworks for show at a gallery. By finding a form for the idea that is palatable (e.g., comprehensible or intriguing) to others, one's worldview merges with and expands those of others. To the extent that a creative product responds to universal features of worldviews, it may have a healing effect on others. Creative products are felt to be a highly personal form of self-disclosure; self-disclosure has therapeutic value (Pennebaker, 1997) and even beneficial effects on the immune system (Pennebaker, Kiecolt-Glaser, & Glaser, 1998). Since creative people often feel disconnected from others because they defy convention (Sternberg & Lubart, 1995; Sulloway, 1996), the benefits of creative self-disclosure may be mediated by an enhanced sense of belonging.

8.3   Theories of Creativity

To what extent do theories of creativity incorporate and account for (1) the relationship between creativity and hardship, and (2) the transformative and sometimes therapeutic effects of creativity? In this section, we address these questions.

A starting point for much research into creativity is Wallas' (1926) classification of the creative process into a series of stages. The first stage is preparation, which involves obtaining background knowledge relevant to the problem, and its history, such as any past attempts, or preconceptions regarding how to solve it. It also involves conscious, focused work on the problem. The second stage is incubation—unconscious processing of the problem that continues while one is engaged in other tasks. The first and second stages may be interleaved. Wallas proposed that after sufficient preparation and incubation, the creative process is often marked by a sudden moment of illumination or insight during which the creator glimpses a way of going about the task, which may require substantial work to bring to completion. The final phase, alluded to in the previous section, is the verificationphase. It involves fine-tuning the work and making certain it works not just in theory but in in practice, as well as putting it in a form that can be understood and appreciated by others.

While early research supported Wallas' classic four-stage theory of creativity, subsequent studies, in particular those examining the need for incubation, did not

support Wallas' theory (Eindhoven & Vinacke, 1952). Another problem with Wallas' theory is that it is merely descriptive; it does not explain how or why the stages occur. More importantly with respect to our purposes, it does not address the relationship between creativity and hardship or the therapeutic impact of creativity. Despite these shortcomings, variants of Wallas' theory have continued to serve as a platform for theoretical and empirical research on creativity.

8.4   Heuristic Search

Inspired by the metaphor of the mind as a computer (or computer program), early research on creativity focused on the notion of heuristic search. In heuristic search, rules of thumb guide the inspection of different states within a particular state space (i.e., a set of possible solutions) until a satisfactory solution is found (Eysenck, 1993; Newell, Shaw, & Simon, 1957; Newell & Simon, 1972). In heuristic search, the relevant variables are defined up front; thus, the state space is generally fixed. Examples of heuristics include breaking a complex problem into sub-problems, hill climbing (reiteratively modifying the current state to look more like the goal state), and working backward from the goal state to the initial state. Heuristic search may include the *restructuring* of mental representations. This restructuring may be accomplished, for example, by (1) re-encoding the problem such that new elements are perceived to be relevant, or (2) relaxing goal constraints (Weisberg, 1995).

The idea that creativity could be construed as a heuristically guided search gave hope to those who sought a scientific understanding of creativity, since search is formally tractable. However, in many creative tasks, and particularly artistic forms of creativity, the goal state is unspecified, and some elements of the eventual solution may not be present when the problem presents itself. It has been suggested that creativity involves heuristics that guide the search for a new state space itself, not just a possibility within a given state space (Boden, 1990; Kaplan & Simon, 1990; Ohlsson, 1992). However, search based approaches to creativity start with pre-existing state spaces and do not address how a new state space comes into existence. Furthermore, like Wallas' four-stage theory, the heuristic search approach to creativity neither addresses the relationship between creativity and hardship nor the therapeutic impact of creativity.

8.5   Dual Process Theories

It is widely believed that there are two forms of cognitive processing, one that is fast, automatic, and unconscious and one that is slow, deliberative, and conscious. These *dual process theories*, as they are called, come from largely disconnected literatures in cognitive and social psychology (Evans, 2008; Sowden, Pringle, & Gabora, 2014), and accordingly they are diverse; while some distinguish between

parallel competing processes involving explicit and implicit knowledge systems (Gyurak, Gross, & Etkin, 2011), others are concerned with the contextualizing and shaping of deliberative reasoning and decision-making processes by preconscious processes (Evans, 2008).

Dual process theories are also prominent in the creativity literature. Dating back to Freud's (1949) distinction between primary process and secondary process thinking, most creativity researchers espouse some variant of a dual process theory (e.g., Barron, 1963; Eysenck, 1995; Feist, 1999; Finke, Ward, & Smith, 1992; Fodor, 1998; Gabora, 2003; Martindale, 1995; Richards, Kinney, Lunde, Benet, & Merzel, 1988; Russ, 1993; Simonton, 1999). Psychological theories of creativity typically involve (1) a divergent stage that predominates during idea generation, and (2) a convergent stage that predominates during the refinement, implementation, and testing of an idea (for a review see Runco, 2010). Divergent thought is characterized as intuitive and reflective; also, it involves the generation of multiple discrete, often unconventional possibilities. Divergent thinking ability is sometimes measured in terms of fluency: the number of ideas generated. Convergent thought, characterized as critical and evaluative, involves the selection or tweaking of the most promising possibilities. Neural models of the mechanisms underlying these two modes of thought have been proposed (Gabora, 2000, 2010, 2018; Gabora & Ranjan, 2013).

One well-known dual process theory of creativity is the *Geneplore model* (Finke et al., 1992). This theory posits that the creative process consists of two stages: generate and explore. (Indeed the name 'Geneplore' is a condensation of "generate" and "explore.") The generation stage involves coming up with crudely formed ideas referred to as pre-inventive structures that contain the kernel of an idea as opposed to an idea in its entirety. The exploration stage involves fleshing out these pre-inventive structures through elaboration and testing.

Use of the term *exploration* to refer to the second phase of the creative process can be misleading. *Explore* is often used to refer to surveying the space of possibilities as generally occurs during the first phase of the creative process, as opposed to refining a single possibility as generally occurs during the second phase. However, the notion of a pre-inventive structure does capture the intuition that early on in the creative process one is working with cognitive structures that are different in kind from those being worked with later in the creative process. The Geneplore model does not attempt to formalize how a pre-inventive structure differs from a full-fledged idea or what differentiates a promising pre-inventive structure from a mundane one.

Another theory of creativity that could be considered a dual process theory emphasizes ideation-evaluation cycles (Basadur, 1995). Creative thinking is said to involve three major stages—problem finding, problem solving, and solution implementation. Each of these involves alternating cycles ideation and evaluation to varying degrees, depending on the domain. Domains that emphasize problem finding have a higher ratio of ideation to evaluation, whereas domains that emphasize implementation have the opposite.

A dual process theory of analogy is structure mapping (Gentner, 1983). In brief, analogy generation occurs in two steps: first, searching memory in a "structurally

blind" manner (Gentner, 2010, p. 753) for an appropriate source and aligning it with the target. Second, mapping the correct one-to-one correspondences between the source and the target.

Yet another well-known dual process theory of creativity is the Darwinian theory of creativity (Campbell 1960; Simonton, 2011). Like biological species, creative ideas exhibit the kind of cumulative complexity and adaptation over time as an evolutionary process, not just when they are expressed to others but in the mind of the idea's creator (Gabora, 1996; Terrell, Hunt, & Gosden, 1997; Thagard, 1980; Tomasello 1996). Thus, it has been proposed that in creativity, as in natural selection, there is a phase conducive to generating variety and another conducive to pruning out inferior variants. According to the Darwinian theory, we generate new ideas through essentially a trial-and-error process involving *blind* generation of ideational *variants* followed by *selective retention* of the fittest variants for development into a finished product. Thus, the Darwinian theory is sometimes referred to as Blind Variation Selective Retention (BVSR). The variants are said to be 'blind' in the sense that the creator has no subjective certainty about whether they are a step in the direction of the final creative product.

In addition to serious theoretical flaws with BVSR (e.g., Gabora, 2007), although the relationship among creativity, hardship, and wellbeing is at times mentioned in BVSR and other dual process accounts, it does not play a central role in these theories. If we were to find out suddenly that we were wrong about the research relating creativity to hardship and the therapeutic benefits of creativity, these theories would not require substantial revision as a result.

8.6   Honing Theory

This relationship among creativity, hardship, and well-being plays a fundamental role in another theory of creativity known as *honing theory* (HT) (Gabora, 2017). While the central aim of the above-mentioned theories of creativity is to account for the existence of creative products—i.e., products that are new and useful to society—the central aim of the HT of creativity is to account for the cumulative nature of cultural evolution. The focus is not on creative outputs but on the minds that generate them. Thus, HT focuses not just on restructuring as it pertains to the conception of the task, but also as it pertains to the global structure of the mind, what we call the *worldview*. A worldview is a mind experienced subjectively, from the inside. It is a way of *seeing* and *being in* the world that emerges as a result of the structure of one's web of understandings, beliefs, and attitudes. A worldview reveals itself through behavioural regularities in how it is expressed and responds to situations (Gabora, 2017). The creative process reflects the natural tendency of a worldview to self-organize to achieve a state of dynamical equilibrium through interactions amongst its components, whether they be ideas, attitudes, or bits of knowledge. Most people are familiar with the experience of "catching themselves" in internal dialogue. Internal dialogue is evidence of the self-organization of one's worldview in action.

HT developed from the premise that creativity is the novelty-generating component in cultural evolution. We refer to culture as *evolutionary* because it exhibits cumulative, open-ended, adaptive change over time. However, HT is not a Darwinian or *selectionist* evolutionary theory (Gabora, 2011). A Darwinian process is particularly reliable means of achieving cumulative, open-ended, adaptive change, i.e., evolution, but it is also possible through self-organization and communal exchange (Gabora, 2006, 2013; Kauffman, 1993; Vetsigian, Woese, & Goldenfeld, 2006). Although *selection* as the term is used in the layperson sense may play a role in creativity (i.e., people may be selective about which aspects of their worldviews they express or which paintings they show at a gallery), the creative process does not involve selection in its technical sense (change over generations due to the effect of differential selection on the distribution of heritable variation across a population.) As in any kind of evolutionary process, in cultural evolution, novelty *generation* must be balanced by novelty *preservation*. In biological evolution, novelty is generated through genetic mutation and recombination, and the novelty is preserved through the survival and reproduction of "fit" variants. In cultural evolution, novelty's generation is through creativity, and novelty preservation is through imitation and other forms of social learning.

HT posits that the creative process begins with being alert to *psychological entropy*, arenas of one's worldview that, on the spectrum from orderly to chaotic, are relatively chaotic and in need of creative restructuring (Gabora, 2017; Hirsh, Mar, & Peterson, 2012). The process can be "jogged along" by stimuli that capture attention or pique interest; creativity often involves a *seed incident* that gets the creative juices flowing (Doyle, 1998).

Honing an idea involves looking at it from the different angles proffered by one's particular worldview: "putting one's own spin on it," making sense of it in one's own terms, and expressing it outwardly (Gabora, 2017). HT posits that creativity involves viewing the task from a new context, which may restructure the internal conception of it. This restructuring may be amenable to external expression. Thus, honing enables the creator's understanding of the problem or task to shift, and in so doing a form may be found that fits better with the worldview as a whole. In this way, not only does the task get completed (or worked on and put aside) but also the worldview transforms, becoming more robust as it evolves.

The transformative impact of immersion in the creative process extends far beyond the "problem domain." It can bring about sweeping changes to that second (psychological) level of complex, adaptive structure that alters one's self-concept and view of the world. Creative acts and products render such cognitive transformation culturally transmissible. This is why HT posits that what evolves through culture are not creative contributions but worldviews. Cultural contributions give hints about the worldviews that generate them. When faced with a creatively demanding task, not only does one's worldview offers perspectives that alter the conception of the task, but, likewise, immersion in the task subtly or profoundly alters the creator's worldview. The above-mentioned finding that childhood adversity is a developmental antecedent of creativity is consistent with viewing creativity as the honing and expressing of a unique worldview, since adversity and isolation generate the need

and mental space to figure things out for oneself. It is through the creative honing of networks of understandings that worldviews self-organize, and it through the communal expression of honed ideas that culture evolves.

Midway through the creative process, one may have made associations between the current task and previous experiences, but not disambiguated which aspects of those previous experiences are relevant to the current task. At this point, the idea may feel "half-baked." It can be said to be in a *potentiality state* because how it will actualize depends on the particular perspectives from which it is considered. These perspectives may be internally generated (imagining what would happen if …) or externally generated (e.g., building a prototype and trying it out). Thus, the recursive process described in which an external change suggests a new context from which to think about the creative task, and so forth recursively until the task is complete, can be referred to as *context-driven actualization of potential*. Each time the idea is looked at from a new context it undergoes a change-of-state such that some of its potential becomes more readily actualized. When the task is complete, the conception of it is said to be in an *eigenstate*, because one's worldview is no longer spontaneously generating new contexts from which to consider it. The creator may express this state as a creative product, which can cause someone else's worldview to be in a potentiality state. This is when it is someone else's turn to adapt it to their own needs or tastes. Through this process culture evolves in new directions.

A worldview not only self-organizes in response to perturbations but it is imperfectly reconstituted and passed down through culture. This is because it is not just self-organizing but *self-regenerating*: people share experiences, ideas, and attitudes, thereby influencing the process by which others' worldviews form and transform. Children expose elements of what was originally an adult's worldview to different experiences and bodily constraints, and thereby forge unique internal models of the relationship between self and world. Thus, worldviews evolve through (1) internal interactions amongst their parts, and (2) external interactions with others. Through these interleaved processes, novelty accumulates and culture evolves. Elements of culture create niches for one another. One creative ideas begets another and modifications build on each other, a phenomenon sometimes referred to as the *ratchet effect*.

8.7   Theory and Research on Mindfulness

At the beginning of the chapter, we defined mindfulness as the awareness of what is happening presently, by paying attention to experience without judgement. Mindfulness involves "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145) as well as "simultaneously drawing novel distinctions in the present moment" (Haller, et al., 2016, p. 894). We posit that mindfulness has three components (Shapiro & Carlson, 2009; Young, 2016):

1. *Awareness* of what is happening presently, from both a subjective (self-referential) and objective (non-self-referential) point of view (Vázquez Campos & Liz Gutiérrez, 2015).
2. *Attention*, to novel distinctions. Mindfulness can encourage one to wonder, "what is new in what I'm observing?" Attention includes both "focused attention" on a particular object (like the breath) and "open attention", which defocuses from a particular object or, rather, is a distributed attentional focus where one is attentive to experience and the interpretation of it.
3. *Equanimity*, including the non-judgmental acceptance of what is being experienced and attended to.

Like creativity, the practice of mindfulness appears to reduce dissonance, enhance feelings of connection, and facilitate the movement of repressed emotion. Mindfulness has been correlated with indicators of wellbeing (reduction of stress, anxiety, and depression) and it has also been related to satisfaction of life, vitality, a sense of flourishing, and self-actualization (Beitel, Ferrer. & Cecero, 2004; Brown & Cordon, 2016; Brown & Ryan, 2003; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008; Carlson & Brown, 2005; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007; Lawlor, Schonert-Reichl, Gadermann, & Zumbo, 2013; Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006).

Is there a relationship between creativity and mindfulness? One might speculate that being mindful could allow one to feel less gripped by internally aroused or externally provoked stress, and therefore more open to creative possibilities, and potentially even more able to influence social networks towards a creative shift? Perhaps a feedback loop of creativity > mindfulness > creativity might even alter self-concept and thus move the individual towards self-actualization.

There is evidence that mindfulness practise (specifically focused attention meditation and open monitoring meditation) is related to divergent and convergent creative thinking (Baas, Nevicka, Ten Velden, 2014; Greenberg, Reiner & Meiran, 2012; Ostafin & Kassman, 2012; Ren et al., 2011). There is also a positive correlation between mindfulness meditation and insight problem solving, cognitive flexibility, fluency, and originality (Baas et al., 2014; Capurso, Fabbro, Crescentini, 2014; Chambers, Gullone, & Allen, 2009; Colzato, Ozturk, & Hommel, 2012; Greenberg, et al., 2012). Mindfulness meditation is also correlated with attentional focus (Davidson & Lutz, 2008; Valentine & Sweet, 1999) and the reduction of automatic or habitual responses (Schmertz, Anderson, & Robins, 2009). This suggests that mindfulness might lead to creativity.

Another question is: can creativity lead to mindfulness? We can refer to creativity that is enhanced or due to mindfulness as *mindful creativity* (Haller, 2015). We refer to mindfulness that is enhanced as a result of creative engagement as *creative mindfulness.* In brief, someone who is being more mindful may become more creative, and someone who is being more creative may become more mindful.

Mindfulness can result in observation, non-evaluative description, acceptance (Baas et al., 2014), as well as a "greater sensitivity to one's environment, more

openness to new information, the creation of new categories for structuring perception, and enhanced awareness of multiple perspectives in problem solving" (Langer & Moldoveanu, 2000). This suggests that mindfulness can indeed enhance creativity.

There are different modes of mindfulness, from four perspectives: *subjective* (thoughts, emotions, perceptions and sensations); *objective* (a time/space material observation of body and externalities); *inter-subjective* (values, relationships, and meaning amongst social connections), and *inter-objective* (systems, networks, and environments) (Forbes, 2016). *Integral mindfulness practices* are those that generate a mindfulness experience that is not only internal (subjective) and external (objective) awareness, but also collective (inter-subjective) and systemic (inter-objective). Mindfulness programs have been used to stimulate social action in the Occupy movement, and in initiatives in schools and communities related to racism, climate change, and social justice (Forbes, 2016; Magee, 2015; Rowe, 2015a, 2015b). Thus, mindfulness can play a role in bringing about social inclusivity, equitable citizenry, communal well-being (eudemonia), and a "shared meaning of the common good" (Forbes, 2016, p. 1267; also, Giroux, 2014; Healey, 2015a, 2015b).

Although mindfulness has distinct components such as attention, observation, and equanimity, it has been shown that the "ability to carefully observe, notice, or attend to a variety of internal and external phenomena consistently predict[s]enhanced creativity" (Baas et al., 2014, p. 1103). Observation is believed to be a strong indicator of creativity; it is associated with being open to experience and assisting in adaptive responses to uncertain or complex situations (Siegel & Siegel, 2014).

If creativity does indeed enhance mindfulness, this creative mindfulness, could be "contagious" from a personal to social experience, thereby playing a role in fostering community engagement, enhanced trust and social capital (Ponder, 2012). Bridging outward social action with inner transformation in a collective way could potentially facilitate social and self-actualization. As Mouchiroud and Bernoussi (2008) conclude: "It may be that only socially creative individuals will be able to act efficiently on these global issues and invent viable social solutions" (p. 379).

8.8 Duress and Wellbeing in Theory on Mindfulness and Creativity

Self-agency, emotional regulation, and higher self-esteem are correlated with mindfulness (Siegel, Siegel, & Parker, 2016), which may help to facilitate our ability to meet our basic needs for autonomy, competence, and relatedness (Brown & Ryan, 2003). It has been shown that two mindfulness interventions, 1. the Mindfulness-Based Stress Reduction (MBSR) program and 2. the Eight Point Program (EPP), a concentration-based meditation program, enhance wellbeing for those with medical and psychiatric conditions (Shapiro, Oman, Thoresen, Plante, & Flinders, 2008). Mindfulness was measured by the Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003; Easwaran, 1991). In this study, mindfulness was defined in

terms of the non-judgemental awareness of moment-to-moment experiences. Wellbeing was defined in terms of improved effects in perceived stress, rumination, and forgiveness. Another study showed that when wellbeing was measured for self-esteem, neuroticism, positive or negative affect, self-actualization, autonomy, competence, and physical health, MAAS-measured mindfulness was positively correlated with enhanced wellbeing (Brown & Ryan, 2003). There is evidence that daily creative activity in everyday environments has a positive impact on emotional experience (Conner, DeYoung & Silvia, 2018). This supports the view that everyday creativity can cultivate positive psychological functioning and thus a sense of flourishing and wellbeing (Richards, 2010).

Well-being has been shown to be correlated with *social and emotional competence* (SEC; Jennings, 2016), which refers to the ability to manage stress, emotional reactivity, and related cognition and behaviour to optimize effectiveness in daily activity such as the classroom. SEC's five competencies are relationship skills, social awareness, responsible decision-making, self-awareness, and self-regulation. Interpersonal connections, trust, compassion, internal kind-heartedness, and self-awareness can all be enhanced through mindfulness (Siegel et al., 2016).

When both a contemplative capacity (such as mindfulness) and social competence are both relatively high, the individual is more likely to be creative (Zajonc, 2016). The type of creativity that instigates or results from social awareness is sometimes referred to as *social creativity* (Watson, 2007) (although this term is used differently elsewhere). *Social mindfulness* has been described as a "benevolent focus on the needs and interests of others" (van Doesum, van Lange & van Lange, 2013). Social creativity is correlated with meaning-making (Serotkin, 2010), a result that was intepreted in terms of Maslow's (1971) concept of self-actualization. Social creativity has been used in social awareness and social justice programs, anti-oppression pedagogy, democratic reform, and social advocacy (Beyerbach & Ramalho, 2011; Boal, 2000, 2005; Dewhurst, 2014; Hick & Furlotte, 2009; Lampert, 2013) and it is at the heart of social innovation programs in that such programs offer novel approaches to social problems (Mumford & Moertl, 2003). We suggest that these findings may be due to the impact of both social mindfulness and social creativity on the individual's awareness of the needs of others, as well as his/her connections within groups and communities, which deepen a sense of meaning and increase personal and social well-being while augmenting social change.

8.9 Educational Applications of Creativity and Mindfulness Research

The pace of cultural change is accelerating more quickly than ever. In biological systems, environmental change often induces a sudden increase in the mutation rate. This makes adaptive sense; although most mutations are detrimental, others are beneficial, and enhance the chance of survival in changing environments. Similarly, in times of accelerated *cultural* change it is adaptive to increase creativity so as to

generate innovative solutions to any unforeseen problems. This is particularly relevant right now, for in our quickly evolving, high-stimulation environment, children spend so much time processing new stimuli that there is less time to deeply process stimuli they have encountered. They do not have much time to think about ideas and situations from different perspectives such that their ideas become more interconnected and their mental models of understanding more integrated. It is this kind of thorough processing of stimuli, thoughts, and ideas that make the crucial connections leading to important advances and innovations.

How can creativity and mindfulness be cultivated in the classroom? Starting with creativity, one way is by focusing less on the reproduction of information, and more on problem solving and critical thinking. Another way of cultivating creativity is by posing questions and challenges, followed by experiencing opportunities for solitude and reflection or group discussion in an effort to foster the honing of new approaches and ideas.

We suggest that classroom curricula might include a regular Creativity and Mindfulness Module that incorporates activities and approaches inspired by the creativity and mindfulness literatures. Creativity-enhancing activities can be, for example, assignments that transcend traditional disciplinary boundaries. Examples include painting murals that depict historical events, acting out plays about animals that share a biological ecosystem, and writing poetry about black holes. After all, the world does not come carved up into different subject areas. It is only through enculturation that we come to believe these disciplinary boundaries are real and as a result our thinking becomes trapped in them.

There are also ways in which mindfulness can be cultivated in the classroom both on a day-to-day basis and as part of a possible Creativity and Mindfulness Module. If formal mindfulness programs are not practical, a more informal *creative mindfulness* approach could be cultivated. This could be accomplished by encouraging creative improvisation and present-moment awareness, and by providing the physical and psychological space for engagement in creative acts (in art, writing, science, physical education, etc.). For example, a teacher could guide students into focusing their attention on the details of what a student is doing by paying attention to not just their task but also their process and their environment, and not judging themselves or others' experience or outcome. By helping students "get lost" in their creative experience, to the point of them being engrossed with the very act of creating itself, teachers may find their students become more involved as whole beings, more able to pay attention with greater awareness, and overall more mindful as a result.

We suggest that creative mindfulness, when directed toward a creative group process, could potentially enhance social awareness. As William James (1923), acclaimed father of psychology, stated, the "faculty of voluntarily bringing back a wandering attention, over and over again, is the very root of judgment, character, and will. … An education which should improve this faculty would be *the* education *par excellence*" (p. 424, italics in original). Bringing back a wandering attention is fundamental to creative mindfulness. We believe that introducing mindfulness into the lives of young people could impact not just judgement and character as James suggests, but also nurture personal and social well-being.

8.10   Conclusions

Creativity is much-needed in today's fast-paced, ever-changing world. In the long term, it can be transformative, therapeutic, and even self-actualizing. In the short term, however, creativity can re-open painful memories, causing duress. Yet, there is reason to believe that—paired with the potentially life-affirming effects of mindfulness towards well-being—it may be possible to delve into painful experiences and tendentious material but nevertheless feel held and accepted by one's higher self throughout the process. With this type of self-regulation, creativity may help one improve a generalized sense of self-awareness and even social mindfulness, as the needs of others and connections to community, meaning-making, and social wellbeing develop. Such changes could add to a possible collective shift in social-actualization and a potential change in worldview. Drawing upon the psychology of creativity and mindfulness literatures, we have loosely sketched out a creativity and mindfulness module that introduces a *creative mindfulness* approach, for prospective application in a classroom setting. This is just an initial outline that requires development and refinement. Nevertheless, we suggest that a move in this direction could play a part in an educational curriculum designed to address unique challenges of the twenty-first century.

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Chapter 9
Collaborative Creativity and Innovation in Education

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Abstract As organizations are becoming increasingly dependent on collaborative teamwork there has been a major shift in focus from individual to team based innovation. Value is increasing in promoting team level creative competence in students. Hence, this chapter examines research on creativity with a special focus on collaborative creativity and its application in the context of education. We discuss the theoretical basis for collaborative creativity, different techniques for generating ideas in groups, the process of selecting the best ideas, and the role of culture and diversity in collaborative creativity. We then review the literature on collaborative creativity in various education disciplines. Finally, we make research-based recommendations on ways to promote as well as enhance collaborative creativity and innovation in educational settings.

9.1 Introduction

Corporations must be creative in order to survive. Creativity is required in every aspect of business from designing a product or service to advertising and marketing and to making final implementations. Hence, there has been an increasing emphasis on the development of creative competence in educational institutions as a common curricular goal to help prepare students for an uncertain future (Beghetto, 2010).

Collaborative teamwork and team-based creativity now dominate most US companies in public as well as private sectors to help accomplish organizational goals and activities (Anderson, Potočnik, & Zhou, 2014; Sawyer, 2017). In response, the goal of this chapter is to examine research on creativity with special focus on

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collaborative creativity and its application in the context of education. We begin with theoretical underpinnings and some key issues in the area of creativity and innovation. We then discuss various methods and processes of creativity, as well as social and cognitive factors that play roles in this process with a special focus on educational context. After that, we examine the literature on creative education in different disciplines. Finally, we conclude with recommendations and implications for both educators and researchers.

Creativity and innovation are often used to represent different aspects of the innovation process. The essence of innovation is the generation of ideas (creativity), selection of ideas that involve thorough evaluation, and application or implementation of the final idea or product. Thus, creativity is often considered the first stage of the innovation process.

9.1.1 Idea Generation

Brainstorming is a most widely used and potentially useful technique for generating creative ideas (Osborn, 1963). Since it is simple to use and is the most researched approach to collaborative creativity sessions, we examine it in detail. Much of the literature on brainstorming research reveals a suboptimal performance at group level compared to individual level brainstorming (e.g., Diehl & Stroebe, 1987). This shows that groups generate fewer ideas than the same number of individuals working in isolation (nominal groups). Factors associated with this outcome are discussed after we briefly discuss theoretical underpinnings.

9.1.2 Theoretical Underpinnings

Theoretically speaking, a team should perform better than the same number of individuals performing in isolation. The diverse skills and expertise brought in by team members can complement each other in attaining specific goals (Saavedra, Earley, & Van Dyne, 1993). For example, developing a software application may require a team of interdependent individuals with varied expertise. Here is one such scenario: a software programmer focusing on developing the software, a business analyst gathering requirements of the product, a quality control analyst checking the effectiveness of the product, and a user interface designer designing the look and feel of a product. In addition, the interaction process among different team members can generate cognitive stimulation, allowing groups to develop creative solutions that would not otherwise occur (Baruah & Paulus, 2009).

Several models of group creativity (i.e., Nijstad & Stroebe, 2006; Paulus & Brown, 2007) propose that sharing and building on each others' ideas in a group setting should produce cognitive stimulation. Paulus and Brown's (2007) cognitive-social-motivational model of group creativity suggests that group creativity

combines cognitive processing in which members actively engage in search of ideas and social exchange. Group members build on each other's ideas to generate more and better ideas. Thus, one can expect a superior performance in a group through a high level of cognitive processing along with a successful exchange in collaborative environments after controlling for factors inhibiting performance within a group context. Similarly, the Search for Ideas in Associative Memory (SIAM) model by Nijstad and Stroebe (2006) posits the importance of spreading activation of ideas through search cues. Cues in human memory strongly associated with the search cue are the ones that will be activated. In a group setting, the ideas of others that are attended to result in stimulation of further ideas. However, SIAM also adds that in a group setting where members wait for their turns to speak or respond, delays occur between the generation and articulation of ideas. This delay may result in forgetting. However, as groups show greater persistence in generating ideas than individuals, teams can compensate for the productivity loss if members are given additional time (Nijstad, Stroebe, & Lodewijkx, 2003).

9.2 How to Generate More and Better Ideas

The level of performance in the context of collaborative exchange is often evaluated in conjunction with the modality of brainstorming used. Although the traditional method of collaborative exchange in groups is verbal brainstorming, several other methods have been developed. We next discuss the impact of various methods of brainstorming to optimal performance and key issues associated with each one.

9.2.1 Verbal Brainstorming

Hindu teachers in India used verbal or face-to-face brainstorming for over 400 years to solve problems or share ideas with their pupils (Osborn, 1963). During such a session of *Prai* (meaning, being outside yourself)—*Barshana* (pouring) no discussion or criticism took place. Osborn was the first proponent of using group brainstorming as a way to increase the creativity of organizations. The original concept was to assemble a group and allow them come up with ideas using four rules: do not criticize, quantity is wanted, combine and improve suggested ideas, and express all ideas that come to mind, no matter how wild. Researchers often use these rules expecting that the cognitive stimulation from hearing others' ideas will trigger new ideas and that the "piggybacking" of ideas will lead to more and better quality ideas. If one person's ideas should stimulate ideas for another, then a larger pool of ideas can be generated by increasing group size. However, contrary to this expectation, studies of verbal brainstorming groups have found that such groups experience a production loss relative to nominal groups as group size increases (Bouchard & Hare, 1970).

A number of key factors appear to be responsible for the productivity loss in verbal brainstorming groups. One such factor is production blocking or collaborative inhibition, that is, the inability to express ideas as they come to mind (Diehl & Stroebe, 1987; Nijstad & Stroebe, 2006). Other factors that can play a role in productivity loss are evaluation apprehension (individuals' concern about others' perception of their ideas) (Diehl & Stroebe), in addition to social loafing (letting others do the work in groups) and downward comparison (converging toward the performance level of low performers in a group) (Paulus & Dzindolet, 1993).

Since the face-to-face modality is not particularly conducive to the idea exchange process in terms of generating many novel ideas, researchers have examined other methods. These include exchanging ideas on slips of paper (brainwriting) and via computers (electronic brainstorming). We elaborate in the next section.

9.2.2   Brainwriting and Its Variations

While the data on verbal brainstorming technique are extensive, far less data are available on these techniques where communication occurs as written words or sketches. In the classic brainwriting technique, face-to-face group participants silently write down their ideas on paper and place the slips in the center of the table. Each member is free to pull out one or more of these ideas to stimulate new ideas. Some field studies (e.g., VanGundy, 1995) and experimental ones (e.g., Paulus & Yang, 2000) have found that brainwriting groups produce more ideas than verbal brainstorming groups. Heslin (2009) has identified some of the potential boundary conditions under which brainwriting can be an effective alternative to other well-known brainstorming paradigms: when time is available, when one is looking for high quality ideas, and when group members have unique expertise.

Several studies in the field of design and engineering have demonstrated the use of brainwriting, sketching, and 6-3-5 as methods in the idea generation process. Linsey and Becker (2011) had participants begin by silently sketching their ideas on large sheets of paper, including brief annotations (brainsketching). This technique allows for a visual means of expression and so it is considered suited for design engineers. The researchers reported that the use of words and sketches together resulted in a higher quantity of ideas among face-to-face groups compared with nominal groups. Earlier, Van der Lugt (2002) found the brainsketching approach to be a better technique for building on previously generated ideas than did brainstorming among a group of product development students. More recently, Leahy and Mannix-McNamara (2016) subjected a group of Irish high school students to brainstorming on a given problem in small groups of four to seven in phase 1 (control) and brainsketching in phase 2 (experimental). Their data analysis indicated that brainsketching increased the students' intrinsic motivation in the design-based problem solving activity. This finding suggests that use of a strategic brainsketching approach for creative design based activities in education is likely conducive to creative idea generation.

A few other variations of this method are 6-3-5 (Shah, Vargas-Hernandez, Summers, & Kulkarni, 2001) and C-sketch (Shah, 1998). For 6-3-5, a group of six participants is seated around a table and each silently describes three ideas on a large sheet of paper. The ideas are passed to another participant. This exchange goes on for five rounds. For the original 6-3-5 method, ideas are described using only words. In contrast, the C-Sketch method permits only sketches. Researchers have found that the C-Sketch has an advantage over 6-3-5 in that sketches are typically ambiguous and can lead to misinterpretation of others' sketch. These misinterpretations give rise to unlikely ideas, which can be tied to the existing problem to subsequently create novel ideas (Shah et al., 2001).

Vidal, Mulet, and Gómez-Senent (2004) compared verbal brainstorming with brainsketching and the objectual (showing rudimentary objects) technique. In the brainsketching paradigm, participants silently drew sketches of their ideas on pieces of paper whereas in objectual paradigm, participants silently presented objects, not sketches, to their teammates. The researchers found that the verbal brainstorming resulted in the maximum number of ideas generated, but that the participants had not gone into the depth of the issue in this paradigm, hence the ideas are not highly developed. However, both the brainsketching and objectual method helped with exploring deeper into the solutions.

Although brainwriting has been found to be effective, it has a disadvantage. In a brainwriting, paradigm individuals need to make an effort to pick up and read ideas written by others. Hence, there is a likelihood of paying more attention to one's own ideas. Michinov (2012) indirectly suggested that due to a lack of attention to shared ideas more irrelevant ideas are generated in brainwriting than electronic brainstorming (EBS). However, contrary to Michinov's findings, Litcanua, Prosteana, Orosa and Mnerieb (2015) reported that brainwriting minimizes the effects of digression from a focal topic, status differentials and pressure to conform to group norms.

In sum, it appears that brainwriting is superior to traditional verbal brainstorming and that it is an effective approach to minimizing production loss and maximizing performance in some disciplines. Design engineering is one such discipline where engineers rely heavily on objects and sketches. However, more research is needed on the different variations of brainwriting and brainsketching to determine their relative effectiveness for different types of creative activities.

9.2.3 Electronic Brainstorming (EBS)

With EBS, participants interact using computers. Rather than speaking their ideas or writing them on paper, they type them into special computer software (e.g., a group decision support system) that collects the ideas and shares them with the group. There is also an option for keeping the brainstormers anonymous. If anonymity is maintained, production loss due to evaluation apprehension is minimized (Dennis & Valacich, 1993), but social loafing may worsen (Karau & Williams, 1993).

In terms of process gains, such groups have shown increased creativity over time (Baruah & Paulus, 2016) and increased stimulation due to the production of large pool of ideas (Paulus, Kohn, Arditti, & Korde, 2013). Several studies (cf., De Rosa, Smith, & Hantula, 2007) have found that the performance of EBS rises when the group size reaches 9 or higher. However, Paulus et al. (2013) reported that with this group size the average increase in productivity only ranged from 1 to 2.5 ideas per person. One reason for this limited benefit could be that electronic brainstormers pay more attention to non-task related communications and thus generate many irrelevant ideas (Ziegler, Diehl, & Zijlstra, 2000). Hence, an additional instruction to pay attention to the task and build on members' ideas after participants have generated a significant number of ideas may be helpful in the EBS paradigm (Paulus et al., 2013).

9.2.4   Asynchronous Brainstorming

In response to the changing style of communications from written to virtual in organizations and from face-to-face to online modalities in teaching and learning, new areas of research have evolved. The asynchronous brainstorming paradigm refers to the communications where group members engage in discussions or share messages through digital media and do not face traditional time constraints as they can post messages when convenient. All ideas, submitted individually to a common forum, are available to all group members. This modality has the possibility of reducing cognitive interference since group members' ongoing train of thought is not disrupted by others' ideas.

In a workplace setting, an asynchronous brainwriting paradigm resulted in higher productivity compared to a group brainwriting paradigm (Paulus, Korde, Dickson, Carmeli, & Cohen-Meitar, 2015). In an educational setting, Abrams (2003) found that the asynchronous paradigm resulted in the expression of fewer ideas and words, less lexical richness and diversity in language used compared to the synchronous paradigm. However, there was a reduction in motivation in that members had to wait for others' responses and for extended periods (i.e., several days). In another study, Abrams (2005) found that asynchronous group discussion among graduate students resulted in enhanced critical thinking. They were able to provide well-thought-out responses to their peers not evident in face-to-face paradigm of group discussion.

9.2.5   Hybrid Brainstorming

Although much focus has been on comparing the performance of groups with nominal groups, in reality most creativity involves both individual and group activity. Combining individual and group brainstorming in a single paradigm, or hybrid brainstorming, may be an effective approach (Korde & Paulus, 2017). Findings related to the sequence of individual and group creativity are mixed. In one study,

the performance of verbal brainstorming was elevated when participants engaged in a solitary session followed by group brainstorming (Baruah & Paulus, 2008). This sequence makes sense. At the beginning of a brainstorming session, one may not need stimulation from group members to come up with ideas that are readily accessible in memory (Paulus & Brown, 2007). Once someone finds it more difficult to think of additional ideas alone, exposure to ideas in a group setting provides cues for tapping additional knowledge or memory stores. Furthermore, the alone-to-group brainstorming sequence may also be beneficial since the rapid pace of ideation in alone condition may be carried over to the group condition (Baruah & Paulus, 2008).

Other studies have identified a benefit of the group-to-alone sequence (e.g., Korde & Paulus, 2017; Paulus, & Yang, 2000). Korde and Paulus (2017) found that group brainwriting followed by an individual brainwriting session resulted in enhanced performance compared to a group only or individual only session. The enhanced performance was observed in the alone sessions after the group sessions, consistent with Paulus and Yang's (2000) findings and the cognitive model of brainstorming (Paulus & Brown, 2007). Consistent with these outcomes, Girotra, Terwiesch, and Ulrich (2010) reported that participants using the hybrid process generated three times more ideas than those in the face-to-face groups only. Thus, considerable evidence suggests that a mixture of individual and group brainstorming may be optimal.

9.3   Recommendations for Brainstorming

We have focused our review thus far on the brainstorming literature as this is the most extensive research literature on collaborative creativity and it has a strong theoretical base. Most of the studies were completed with college populations in short-term settings. We have found no systematic studies on brainstorming in younger populations or as a means of enhancing the educational process. This is in large part due to the fact of limitations on research on younger populations and the fact that the focus in education is mostly on learning not creativity, let alone collaborative creativity. We return to this larger issue in the conclusion section. However we will briefly summarize some of the basic findings and practical suggestions that would be relevant to the application of brainstorming in an educational environment for student groups, groups of educators, administrators, and policymakers.

1. The method of sharing ideas has a strong impact on groups' creative output. Sharing ideas by sharing ideas in writing or electronically increases the quantity of ideas and the extent to which all group members can contribute.
2. Verbal brainstorming is probably the most popular method brainstorming in real-world settings and participants tend to enjoy it more than the other versions of brainstorming such as electronic brainstorming. However, unless participants also write down their ideas or record these for transcription, many shared ideas may be lost.

3. Short training sessions incorporating aspects of accountability, enhanced application of diverse ideas and detailed feedback can increase the effectiveness of group brainstorming (Baruah & Paulus, 2008).
4. Alternating individual and group brainstorming seems to be most optimal process for generating the most ideas in a group context (Korde & Paulus, 2017).
5. For verbal interaction, it is best to keep groups small. Pairs can be optimal for a broad scope problem if a diversity of perspectives is not needed. Otherwise, a group no larger than the diverse perspectives required is recommended.
6. Although electronic idea exchange processes could be used for school settings, these present a challenge in terms of coordination and collecting the ideas. Brainwriting in groups may be a useful alternative to ensure equal participation, effective exchange of ideas, and easy accumulation of the shared ideas for later evaluation. More research is needed on the utility of different forms of brainwriting or brainsketching for a variety of creativity tasks (e.g., design, arts, openended idea sessions).

9.4   Idea Selection

Although much of the creativity literature has focused on the idea generation phase of innovation, innovation is incomplete unless suitable ideas are designated for implementation. The selection of ideas is a critical part of innovation but this area has received relatively little research attention (see Rietzschel, Nijstad, & Stroebe, in press). A few experimental studies in this area reveal that the generation of good ideas in a brainstorming phase does not guarantee selection of equally good or better ideas in an idea selection phase (Rietzschel, Nijstad, & Stroebe, 2006). Additionally, it has been found that the average quality of selected ideas was not superior to the average quality of generated ideas (Rietzschel et al., 2006). Neither solitary nor group brainstormers select the best ideas, although solitary brainstormers generate more original ideas than groups (Putman & Paulus, 2009).

In practice, there is often a strong tendency for people to underestimate the originality of truly novel ideas (Licuanan, Dailey, & Mumford, 2007) and instead to default to selecting feasible or practical ideas (Putman & Paulus, 2009; Rietzschel, Nijstad, & Stroebe 2010) over the original or creative ones. Consequently, novel ideas may not be incorporated into a final product or innovation. People can fail to identify original or truly novel ideas because they have difficulty evaluating atypical or inaccessible ideas (Licuanan et al., 2007) or because they are by nature risk-averse. Since the selection of a radical idea carries uncertainties, brainstormers are often reluctant to choose these options over feasible ideas (Baer, 2012).

9.5   How to Select the Best Ideas

9.5.1   *Facilitation*

Facilitation at the stage of idea selection can be helpful in the selection of the best ideas. Rietzschel et al. (2010) reported that the participant's tendency to rely on feasibility as a dominant selection criterion could be minimized by giving specific creativity instructions during the idea selection phase. They also reported that participants found it difficult to take both originality and feasibility into account because they perceived the two to be incompatible. Hence providing specific instruction geared towards focusing on a specific criterion of creativity may be beneficial. Alternatively, a process in which the participants first select the creative ideas and then refine them to make them better might also improve the overall quality of ideas.

9.5.2   *Refinement of Selected Ideas*

Few studies in creativity literature have examined idea refinement. This involves strong attentional demands and controlled processing as brainstormers go through deeper processing and evaluation of their ideas to make them more suitable for meeting requirements. Since it is difficult for a group's best ideas to survive from the idea generation into a final implementation stage, allowing a separate stage of refinement will help the brainstormers to create better solutions to the problem. Frederiksen and Knudsen (2017) emphasized the importance of idea revision before the final implementation to minimize the likelihood of premature rejection of ideas. Similarly, Rietzschel et al. (in press) argued that revision of ideas to make them suitable for final implementation could reduce the tension between the feasibility and originality of ideas. Thus, by giving specific instructions to direct participants' attention to refine each of the selected ideas during a separate idea refinement stage, the participants should be able to generate ideas that are more creative. Additionally, as the process of refinement involves deeper processing, it might lead to greater elaboration of each idea. Research shows that greater elaboration is associated with enhanced originality of ideas (e.g., Rietzschel et al.).

9.6   Recommendations for Idea Section

Although generating many novel ideas is often a desirable goal, in most contexts such as education only a few ideas can be implemented, requiring a selection process. The research we have discussed suggests that selection of the "best" ideas

can be a challenge for both individuals and groups. Combined with our experience, the literature leads us to make these suggestions:

1. To enhance the selection of novel ideas in groups, groups should be instructed to select ideas with novelty in mind.
2. Although solitary brainstorming is often the most effective strategy for generating a host of ideas, individuals' ideas still need to be evaluated by some collective to determine their novelty and potential utility.
3. To date, there have been no studies on training groups to become more effective in selecting the best ideas from a pool of generated ideas. It would seem that enhanced experience and efficacy (ability to produce the desired result) with the collaborative creative process might be associated with increased effectiveness in the selection process. In particular, it is important to overcome the initial bias to feasibility.
4. Evaluation of ideas is probably best done in small groups after a brainstorming session. With verbal brainstorming, it may be a difficult process since members have to rely on their memory for the shared ideas. In brainwriting, members can pass around the ideas and mark those they think are worth further discussion. Regarding electronic exchanges, a printout of the shared ideas could be provided for evaluation purposes.
5. If brainstorming sessions are fairly long, having periodic evaluation sessions in between brainstorming sessions may be optimal for avoiding an overload of ideas. This way, groups end up with subsets of favored ideas to evaluate at the end.
6. Once a subset of ideas is selected, these may require further refinement and development. For example, highly novel ideas will need to be modified to make them more feasible or applicable.

9.7   Diversity and Collaborative Creativity

A major benefit of group interaction in problem solving situations is exposure to different perspectives on a given problem. Groups that have members with different experiences and expertise relevant to a problem should be able to think of more creative and useful ideas in part because of their diverse knowledge and mutual stimulation of ideas (Paulus & van der Zee, 2015). Alternatively, variation in expertise or background may result in conceptual or intellectual gaps, which may hinder group performance or creativity (Cronin & Weingart, 2007). Diversity in groups can be based on variations in expertise (functional or informational diversity) or personal characteristics such as gender, race, culture, and personality (demographic diversity).

Although groups should benefit from intellectual or experiential diversity, thus far the literature has been mixed in terms of the support expressed for this expectation. Research shows that functional informational diversity in terms of heterogeneity

in knowledge, expertise, or experiences in teams can enhance creative performance (Hülsheger, Anderson, & Salgado, 2009; Jackson, May, & Whitney, 1995). However, when multiple perspectives are at odds, high diversity may make it harder to resolve differences among perspectives (Olson, Walker, & Ruekert, 1995). Thus, it is not surprising that some researchers have found no effect of functional diversity on innovation (e.g., Sethi, Smith, & Park, 2001).

Science and engineering teams are becoming multidisciplinary. As a result, such teams are encouraged to collaborate and thereby increase the likelihood of generating breakthrough solutions to the problems (Dunbar, 1997). Jackson et al. (1995) reported that task-oriented diversity attributes, such as education, function, and tenure are associated with higher elaboration (deeper processing) of ideas through exchange of information among group members. Bell, Villado, Lukasik, Belau, and Briggs (2011) found that educational background diversity was strongly correlated with creativity and that it was most beneficial for design and product development teams.

Benefits of demographic diversity (e.g., gender, age, ethnicity, and race) in creativity have been more limited. Possibly, some initial potential discomfort in groups that are demographically diverse may restrict members' creative potential. However, once familiarity develops with each other and interpersonal trust develops, benefits can occur. For example, Watson, Kumar, and Michealson (1993) compared culturally diverse groups with homogenous groups, and reported that in the beginning the homogeneous groups exhibited enhanced creative performance. However, over time, the diverse groups scored higher in problem identification, quality of solutions, and overall performance. Moreover, if group members have a positive attitude to diversity in the group they are more likely to demonstrate a creative benefit such as increase quality of ideas from interacting in a diverse group (Paulus & van der Zee, 2015).

The literature on diversity and group creativity is relevant to schools. These are becoming increasingly diverse along racial, ethnic, and cultural dimensions. The potential benefit of diversity may not be realized without intensive interaction in structured settings. Collaborative creativity sessions can provide just such an opportunity. However, people from different cultures may approach creativity in different ways, which may help or hinder creativity. For example, children from collective cultures may be more effective in collaborative settings than those from individualistic cultures and thus may demonstrate higher levels of collaborative creativity (cf., Rogoff et al., 2017).

9.7.1   Culture and Creativity

Values of collectivism such as interdependence, conformity, and high power distance result in lower levels of creativity in idea generation phase of innovation (Goncalo & Staw, 2006). Individualistic cultural values are more beneficial when creativity is the goal since these emphasize independence and uniqueness as opposed

to harmony and conformity (Goncalo & Staw, 2006). Because critical thinking and deviant responses tend to be suppressed in collectivistic cultures, this should negatively impact the originality of ideas generated. However, one can also argue that the creative outcome in such cultures is possibly geared towards refinement of existing ideas to make them more suitable for implementation. Kaplan, Brooks-Shesler, King, and Zaccaro (2009) reported that team conformity that is associated with greater coordination, information sharing, and a lower level of conflict are beneficial in the implementation stage of innovation. Paulus, van der Zee, and Kenworthy (2016) argued that cultural diversity would only enhance team performance in the context of task-related diversity. Team members from different cultures may generate dissimilar culturally relevant ideas on the same task, which can contribute towards a diverse pool of ideas.

Given cultural differences in approaches to creativity, differences among group members in the preference for uniqueness versus elaboration (or refinement) and collectivism versus individualism may complicate the collaborative creative process. Conflicts could rise and difficulty in developing consensus could develop. However, conflict may be more problematic in short-term groups, as members in longer term groups may learn to use their different orientations to enhance the group's outcomes (Watson et al., 1993). Studies have also reported that diversity faultlines, which are cases in which group members differ on several correlated dimensions of diversity such as gender and race, can negatively impact collaborative creativity (Ellis, Mai, & Christian, 2013), mostly due to conflicts (Homan, van Knippenberg, Van Kleef, & De Dreu, 2007). However, if the salience of faultlines is minimized or removed, the creative potential of groups can be enhanced (Jehn & Bezrukova, 2010).

In the past three decades, cross-cultural researchers primarily focused on comparing eastern and western cultures based on self-reports. With the terrain of culture being much wider today (Kitayama & Salvador, 2017), the definition of *culture* is now extended to one's values, experiences, background, and neurobiological level. Each of these dimensions may be independently relevant to an individual's creativity. If individuals in a certain culture are bilingual, they can have more creative potential in terms of sharing unique ideas by activating unique concepts through each language (Blot, Zarate, & Paulus, 2003).

9.8 Recommendations for Diversity and Collaborative Creativity

With the increasing diversity of backgrounds and cultures among student population in schools, sensitizing students and teachers to the benefits of diversity has become an important issue in education. Although inevitable challenges exist due to increased diversity, the research on collaborative creativity suggests that diversity can be a positive factor for group outcomes. We present some practical interventions that can help in making the best use of diversity in the current education settings with diverse populations.

1. On tasks that tap underlying cognitive differences related to diversity, increased diversity of ideas of group members can enhance collaborative creativity.
2. Positive outcomes of collaborations with diverse members should enhance the positive attitudes to diversity and the feelings of collective creative efficacy (Tasa, Taggar, & Seijts, 2007). This collective efficacy can then carry over to other school contexts.
3. Faultlines in educational settings may enhance problems related to diversity. For example, if a minority group is primarily female, this may make it harder for groups to have interactions in with both males and females of this group. In group contexts, attempts should be made to compose groups in ways to minimize such faultlines.
4. Taking advantage of diversity is critical to success. Organizations and educational institutions are becoming more culturally diverse and students from different cultures may have different orientations to creative tasks. Such differences can add to potential group conflicts. Hence, it is important to sensitize students to the potential benefits of collaborative creativity through various positive group experiences.

9.9   Research and Practices in Classroom

In the corporate world, managers are under constant pressure to create unique products catering to the needs and requirements of consumers. For example, IDEO Corporation, a design firm, focuses on unstructured group brainstorming to create new products. However, "educational researchers have paid very little scholarly attention to the recent shift to an innovation economy, although it has substantial implications" (Sawyer, 2006, p. 41). Sawyer (2003) underscored the value of team-based creativity in educational settings, suggesting that since it is initially difficult for some students to engage in collaborative work, they need to be taught and scaffolded to participate in groups.

A major gap in the creativity literature is research on collaborative creative processes among school children. Some literature that promotes a focus on creativity in individuals indicates that the role of education has often been blamed for "killing" creative potential (e.g., Kaila, 2005). Beghetto (2010) reported that creativity researchers have primarily worked to enhance creativity among gifted and talented children. Consequently, very small numbers of students from the mainstream academic curriculum have the opportunity to develop their creative potential in classrooms. Teachers of mainstream curriculum may not be working to foster and nurture student creativity if they see this as outside of their responsibility. Beghetto (2010) speculated that this could be the reason why policies fail to include the development of creativity in American school curricula (e.g., No Child Left Behind).

According to O'Donnell and Micklethwaite (1999), publicly funded primary and secondary schools in several Canadian provinces (e.g., Alberta and Ontario) began emphasizing the inclusion of problem solving, creativity, and critical thinking in

preparing for work and lifelong learning and citizenship. Their report also reveals that a desirable learning outcome in England's school curriculum is the development of children's imagination and the ability to communicate ideas in creative ways. Some other countries that these researchers indicate have been emphasizing creativity in the form of dance, drama, music, visual arts, and critical thinking in their school curriculum are Singapore, the Netherlands, Spain, New Zealand, and the United States.

In China, the creative processes in past few decades had been based primarily on beliefs more than knowledge base (Mullen, 2018). However, there has been a rising interest in enhancing creativity among Chinese students (Mullen, 2017). Mullen (2018) reported that explicit instructions provided to foster creativity in a collaborative setting were highly valued by Chinese students. Hu et al. (2011) emphasized the importance of the Learn to Think curriculum for primary school children in China. They experience the combined approach of skills training in basic thinking, problem solving, and creative thinking. Academic achievements had reportedly improved for the children. Hu et al. (2013) later compared this model (experimental condition) with a regular curriculum (control condition) among secondary school children. After 2 years of intervention, the experimental groups developed significantly higher scientific creativity than the control groups. Thus, the above findings imply the emerging awareness of the importance and promotion of creative thinking among young adolescents in the educational settings of China.

A popular approach to team-based learning and creativity in Italian provinces is the Reggio Emilia approach of early childhood education (see Hong, Shaffer, & Han, 2017; McNally & Slutsky, 2017). This fosters collaboration for problem solving through critical thinking and idea sharing (brainstorming) among group members. Teachers facilitate children's thinking and create an environment that lends itself to research, problem solving, and group interaction. As opposed to promoting independence and individualism, the goal of this approach is to transform personal learning experience into a shared context where children develop a sense of self in group contexts (McNally & Slutsky, 2017).

A common trend in the above studies and in the field of education in general is that most scholars believe that creativity is an important individual trait that can be enhanced through training or facilitation. However, to the best of our knowledge, education in collaborative creativity remains surprisingly understudied along with a deeper exploration of factors affecting such creativity among school children. Yi, Hu, Plucker, and McWilliams (2013) reported that divergent thinking scores of middle school children were significantly lower than elementary children in China. They attributed this decline in creativity to the social pressures on Chinese children from the middle school level to prepare for competitive college entrance exams. Hence, these researchers noted that the creative organizational climate of school environments needs to support the fostering of children's creativity. We now turn to the application of creativity in various disciplines of education at the university level.

9.10 Creative Learning in Engineering

In the engineering education field, emphasis is on serving global learners of engineering through creative assignments that engage solving problems by using materials from other courses and disciplines (Felder & Silverman, 1988). Several researchers (Hernandez, Schmidt, & Okudan, 2013; Ilevbare, Probert, & Phaal, 2013) noted the importance of the theory of inventive problem solving (TRIZ), a method whereby one converts a specific problem to a general one bringing in a very large pool of ideas from various patents and other sources and fields (a generic perspective). Finally, one maps out the specific solutions (a specific perspective) from the generic framework. Hernandez et al. (2013) reported a significant positive effect of the TRIZ method in generating ideas of high novelty and variety (but not quantity) compared to the traditional brainstorming method among engineering students. The effectiveness of TRIZ also depends on the type of task and problem at hand. This method should be more effective when trying to come up with a breakthrough product or solution, which differs from a situation where the focus is on refining an existing product or concept to make it more effective or useful. Ilevbare et al. (2013) reported that TRIZ is primarily applicable to technical problem solving and innovation.

Dym et al. (2005) emphasized the value of divergent and convergent thinking in design engineering. They argue that divergent thinking is most applicable in contexts where concepts or answers do not have truth-value or verifiable answers. Although there is no systematic literature on collaborative creativity in engineering, most high tech companies depend on a great deal of collaboration in the engineering process. Thus, it is important to incorporate experiences in collaborative creativity in both the divergent and convergent phases in engineering education.

9.11 Creativity in Medical Sciences

The literature on collaborative creativity is very limited in the medical education field. Despite major advances in medical technology, efforts to promote new interactive techniques of teaching have been slow (Geuna & Giacobini-Robecchi, 2002). Some researchers note that medical education lacks integrative and collaborative learning brought in by students from diverse backgrounds in a collaborative environment (e.g., Irby, Cooke, & O'Brien, 2010) and that investments in health care are necessary for research and innovation (Asch & Weinstein, 2014).

We turn to some common practices used in medical education. One of these is problem-based learning, used as a pedagogical approach in medical science for several decades. *Problem-based learning* can be defined as a collaborative method of learning in which students learn through "actively solving problems rather than passively absorbing information" (Nandi, Chan, Chan, Chan, & Chan, 2000, p. 302).

Although this type of learning has received considerable attention as an effective pedagogy in medical education, some researchers have found no difference between problem-based learning and traditional learning in this field (Nandi et al., 2000). Hmelo-Silver, Duncan, and Chinn (2007) have concluded that the extensive "scaffolding" used in problem-based learning in educational settings effectively reduces cognigerdtive load and thus enhances learning.

Handfield-Jones, Nasmith, Steinert, and Lawn (1993) emphasize the importance of experiential learning, role play and "medi-dramas" as effective pedagogical practices in medical sciences. Others have used brainstorming in teaching human anatomy to nursing students, finding that more than 50% of these participants perceived brainstorming as very effective (Geuna & Giacobini-Robecchi, 2002). Another group of researchers (Goswami, Jain, & Koner, 2017) used brainstorming with postgraduate medical students, citing its effectiveness in enhancing understanding of biochemical concepts. While some researchers found that the use of storytelling in problem-based learning is a benefit to students' reflective learning in dentistry (e.g., Kieser, Livingstone, & Meldrum, 2008), others point to the effectiveness of concept mapping that has been incorporated in problem-based learning in medical education (Daley & Torre, 2010). Thus, apart from some efforts in using creative ways of teaching, the evidence regarding efforts in collaborative creativity in medical education is very limited.

9.12   Creativity and Music Education

Great symphony orchestra performances require creativity not only from the composer and the conductor but also from every musician (Salonen, 2008). The importance of collaborative creativity in music performance is evident in MacDonald and Miell's (2000) study in which they created dyads of children consisting of friends or non-friends, having them generate a piece of music. Teachers rated the dyads' compositions by friends of significantly higher quality than of those in non-friendship pairs. These researchers suggested that social relationships play a crucial role in collaborative creativity involving music among children because of the importance young people place on music.

MacDonald, Davies, and O'Donnell (1999) subjected participants with special needs to an 18-month music workshop. Workshop participants exhibited higher performance motivation and expressed ideas of greater value than those not exposed to a music workshop. Sawyer (2015) promoted the importance of teaching music in collaborative contexts as opposed to solitary contexts for enhancing musical performance among children. He reports that three characteristics play key roles in group creativity: improvisation, collaboration, and emergence. Improvisation is valued when a group member commits an error and the other performers make up for the mistake. In such a context of "group flow," group members inspire each other, playing a crucial role in overall performance.

Several music toys have been created to promote enhanced learning of music among children in schools. For example, Sawyer (2006) reported that Beatbug is one such toy designed for playing with a group of eight participants. Use of such toys has enhanced interaction and communications among players. Through the practice of scaffolding and guided participation, teachers can enhance students' musical performance in such group-learning contexts.

9.13 Summary of Research in Educational Settings

We have reviewed the literature on collaborative creativity in general and on creativity in education. Although considerable literature on group creativity exists and some on creativity in educational settings, research on collaborative creativity in educational settings is very limited. The educational environment has lacked a strong focus on creativity. Concern with maintaining order in schools and meeting various achievement goals also restrict the attention on creativity. Creativity and critical thinking are difficult to teach and few have the ability or confidence to teach, encourage, or facilitate collaborative creativity. We provide some insights from our review and suggestions for enhancing the practice of creativity in educational settings.

1. Creativity in education seems to be valued in many countries. Research demonstrates broad benefits of programs for enhancing creativity in children. However, thus far we know of no research on collaborative creativity involving children. This is unfortunate since they may especially enjoy such activities, which in turn can help build their social, collaborative, and intellectual skills.
2. Project-based learning is emphasized in engineering pedagogy. Such team-based education should help build collaborative skills needed for working in creative groups. However, we know of no research that demonstrates such a link.
3. Many engineering problems require diverse collaborative inputs. Thus, experiences in collaborative creativity in engineering education would seem to be quite important.
4. Teaching pedagogy in medicine commonly follows traditional, problem-based, and group based learning approaches. Even though some medical practices involve teamwork and collaborative problem solving, there is little obvious weight given to training collaborative teamwork or creativity skills in this domain.
5. Some research in music education demonstrates benefits of creative collaboration, which suggests the importance of incorporating collaborative creativity experiences in the music curriculum.
6. Effective communication among team members is important in creativity, particularly in new product development teams. Therefore, educational programs should incorporate training on stimulating and managing communication in groups.

7. Learning occurs on a deeper level when materials provide for a variety of potential explorations. An assessment method that tests students' engagement in divergent and convergent inquiry on a given problem can be helpful in promoting flexibility with using knowledge.
8. Educators should be encouraged to develop their skills in enhancing both individual and collaborative creativity. This should be beneficial at all levels of the educational spectrum from elementary school to universities and professional schools.

9.14   Conclusions

Although there is a significant literature on creativity in education and its role and benefits, there is very little on collaborative creativity in education. In some disciplines, there are efforts to employ creative methods of teaching, but there are very few reports of systematic attempts to enhance students' creativity.

Research in education focuses on obtaining knowledge in specific areas, but without attending much to using this knowledge for creative exploration. Achievement tests focus on mathematical and verbal abilities rather than creative abilities. Yet, research indicates that intelligence and high grades in school are only moderately related to career success. The average correlation between intelligence and performance at job is low (from .2 to .4) (Wigdor & Green, 1991). Furthermore, intelligence is not related strongly to creativity (Sternberg & O'Hara, 1999), although a minimum level of intelligence may be a necessary condition for creativity (Jauk, Benedek, Dunst, & Neubauer, 2013).

While the world needs knowledgeable and intelligent citizens, there is also a great need for creativity to solve problems and develop innovations. This increasingly requires effective collaboration with others and in diverse groups. Our literature review suggests that there is some evidence of the benefit of creativity programs (e.g., Learn to Think) in primary school systems in China (Hu et al., 2011). However, we know of no research on training in collaborative creativity in schools and the potential benefits of such training in broader contexts.

However, the importance of teamwork skills for working effectively in group settings has been examined intensively (e.g., Paulus, Dzindolet & Kohn, 2012). There is also recent research on the importance of group level skills for effective group functioning. For example, in a study of groups across a range of tasks it was found that the groups functioning the best had equal distribution of conversational turn taking among group members and higher levels of interpersonal empathy or social sensitivity (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010). Individual intelligence of the group members had no impact on group performance in this study. Woolley et al. (2010) have termed such a cluster of group traits "collective intelligence."

Educational environments should encourage students in collaborative creative activities and other group tasks in order to allow for a development of group skills

and collective intelligence. This kind of development is required for success in collective endeavors that are important in the workplace, research groups, and educational settings. Research on group creativity provides much valuable information for guiding the application of group creative activities in school settings.

We end with additional suggestions of our own:

1. To the extent feasible, collaborative exercises should be incorporated into the curriculum to develop students' ability for working effectively in group settings or for generating collective intelligence.
2. Besides encouraging individual creativity in courses at the primary and secondary level, opportunities should be provided for collaborative creativity experiences as well. In addition to sharpening students' collective and creativity skills, such experiences can enhance feelings of confidence in these domains (collective and creative self-efficacy) (Tasa et al., 2007). A combination of enhanced skill and self-efficacy should greatly increase the potential for effective collaboration in and out of school settings.
3. It would also be helpful if teachers and other staff learned effective procedures for creative problem solving to enhance their own educational efforts. Periodic training and workshops for educators on newer methods of collaborative innovation should be helpful in promoting creativity in educational environments and applying collaborative creativity exercises in the classroom.
4. Specialized team skill training at the school level should sensitize students about the best use of the environmental context (e.g., diversity, group size, and brainstorming paradigm) for enhancing collaborative creativity.

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Chapter 10
Reaching for the Star: A Model for Integrating Creativity in Education

Cyndi Burnett and Sara Smith

Abstract The education system is under duress. Key stakeholders constantly pressure educators to both improve test scores and prepare students for an uncertain future. Given these potentially competing demands, it is essential for creativity researchers to provide practical advice for teachers as to how they can build creativity into education. This means giving clear guidance on what educators need to know, what they need to do, and possibly how to do it. This chapter addresses these questions by exploring a Five-Point Star model that offers a path for integrating creative thinking into the curriculum. The first point of the star helps educators understand what creativity is, dispels the myths of creativity, and positions why it is more important now than ever. The second point enables educators to identify their creativity skills and develop their creative thinking abilities. The third point frames the physical and psychological climate for creativity in the classroom. Point four explores how to weave creative thinking skills into any content, by using the Torrance Incubation Model. Finally, point five discusses creativity and problem solving as a course within the curriculum.

> Being a teacher in the 21st century is not an easy task. (Orgoványi-Gajdos, 2016, p. ix)

10.1   Introduction

In many ways, the twenty-first century has not been kind to teachers and the teaching profession. Politicians and policymakers have vacillated between demanding a focus on the core skills of reading, writing, and arithmetic and requiring teachers to prepare students for jobs that do not yet exist. Compounding this problem, there has been exponential growth in the quantity of knowledge to be learned. Throughout all of this change, the constant pressure of budget battles, at both state and federal levels, have often resulted in insufficient funding for school districts to meet any of

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these goals. Given this context, it is not surprising that some teachers have been reluctant to take on the additional challenge not just of educating their students but also "making" them creative. Adding to this problem, knowing how to teach creative thinking is not part of the training for most educators.

Of course, for the majority of teachers, helping students blossom into confident, skillful, and creative individuals may be central to why they entered the profession. But, the day-to-day pressures of teaching within current educational systems can make the goal of propelling student creativity seem like a task that would defeat Hercules. Given that there is little evidence to suggest that this situation is going to change in the near future, it is time for us as educators to address and "fix" the problem ourselves.

Expecting educators to engage in a radical rethinking of their teaching practices is unrealistic and unhelpful. Teachers have a responsibility to do their best for each of their classes. Engaging in risky curriculum experiments might provide useful information, but possibly at a significant cost to the crop of students being educated. For that reason, it is essential that any proposed change to the teaching process allow individual teachers, or entire school systems, to integrate creative thinking into their current curriculum. This should occur in a gradual way that preserves the benefits of teachers' existing practices while incorporating additional benefits of new approaches.

This chapter outlines one way of incorporating creative thinking into the school system, while at the same time avoiding disruption to the existing systems. It is based on a Five-Point Star model (see Fig. 10.1) of incorporating creative thinking into a curriculum. This is a new framework developed by the lead author and introduced for the first time here. The model moves teachers through five points, starting with building an understanding of creativity and ending with including creative thinking as a fully-fledged element of the curriculum. It is important to note that both teachers and their students should benefit from the implementation of any
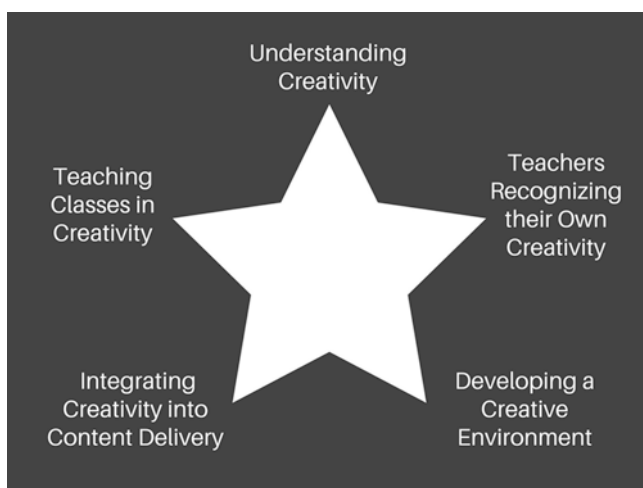
Fig. 10.1 Five-Point Star Model

number of these points. In other words, it is not necessary to move through the entire model to have contributed to students' creative thinking skills. We provide the scaffolding here for educators to gradually implement creative elements into their classrooms, and for schools to support teachers' development in teaching for and with creativity.

10.2   Point One: Understanding Creativity

The Five-Point Star model starts with a simple proposition. In order for teachers to help their students become better creative thinkers, they must first have a clear understanding of what this means. Unfortunately, this initial point can be more challenging than one might assume. Rarely have teachers had instruction in creativity or how it works, so their understanding is often based on assumptions and popularly held beliefs.

In conducting interviews with teachers, researchers have pinpointed specific common misconceptions about creativity (e.g., Beghetto, 2010; Paek & Sumners, 2017; Plucker & Dow, 2010; Westby & Dawson, 1995). These false beliefs can stifle creative thinking in the classroom, even when a teacher claims to value creativity. Addressing these misconceptions is where teacher training in creativity needs to begin. It is essential for teachers to understand the elements of creativity if they are being encouraged to recognize, appreciate, value, and further develop creative thinking within their students (Partnership for 21st Century Skills, 2008).

Some of the more common misconceptions and myths about creativity as related to the classroom are next addressed and dispelled. The resulting picture of the *what* and *why* of creativity provides a strong foundation upon which teachers can build a creative classroom in subsequent points of the Five-Point Star model.

10.2.1   Misconception: Creativity Is About Art

The first thing many teachers think of when they hear the word *creativity* is artistic ability (Paek & Sumners, 2017). Art is recognizable as a personal expression of one's ideas, so it easily introduces the idea that it encompasses creativity. This is problematic because art is offered typically as an enrichment class in schools, which may leave general teachers feeling as though they do not need to focus on creativity in their classrooms. When creativity is thought of as solely artistic, bringing it into history or science classes can seem superfluous. The outlook that creativity is art-focused and therefore separate from academic learning is an unfortunate but all too common misconception. In a study of prospective teachers, Beghetto (2008) found that more than two-thirds of the 176 teachers surveyed believed creativity and academic content were separate and exclusive goals.

10.2.2   Fact: Creativity Is Transdisciplinary

Instead, creativity must be understood as transdisciplinary and an integral part of learning. Creativity involves skills and mindsets that bring about new ideas and can lead to breakthroughs. These breakthroughs can be scientific, literary, mathematical, artistic, or from any other field. While art has been creativity's long-time champion, none of history's most influential inventions or advancements could have happened without creative thinking. Amabile's (2013) componential theory breaks creativity into three aspects: task motivation, creativity-relevant processes, and domain-relevant skills. The domain-relevant skills include knowledge and expertise within a domain—any domain. In schools, this means students can practice creative thinking across all subjects. They just need instruction in different domains, engagement in creative processes, and motivation to be creative.

In 2001, Bloom's Taxonomy (Anderson & Krathwohl, 2001), the ubiquitous teaching tool that organizes thinking skills into levels, was updated to include *creating* at the highest level. Since then, producing original work has been considered the pinnacle of a learner's achievement. As students grow more capable of higher order thinking, they can use the knowledge they gain in a subject toward creative ends. This perspective supports the notion that creativity is vital to deep learning, not unrelated to it.

10.2.3   Making the Change

In educator training, the transdisciplinary nature of creativity can be introduced by reviewing examples of creativity from science, literature, math, technology, and more. Teachers can be given time to become curious about creativity in multiple disciplines, asking questions like "What makes this creative?" The next step is to think about how this way of thinking applies to their classroom: "If I want my students to think creatively, how can I encourage it?" and "When does creative thinking happen and how?" Exploring how creativity spans and connects all subjects provides teachers with a starting point to finding opportunities for encouraging students' creative thinking.

10.2.4   Misconception: Creativity Is Only for the Especially Talented or Intelligent

Often in our society, a strong emphasis is placed on eminent or Big-C creativity—creative contributions that affect human life on a global and historical scale (Kaufman & Beghetto, 2009). Einstein, Picasso, and Steve Jobs are some of our popular mascots of creativity, and their respective creative brilliance makes it easy

to conclude that creativity is a rare trait. Teachers often misperceive creativity as lacking applicability to the majority of their students in the classroom (Paek & Sumners, 2017). And, if creativity is so apparently rare, it can be difficult to see the value in fostering it for the sake of the tiny percentage of students that just might grow to be the next Einstein, da Vinci, or Aristotle.

10.2.5 Fact: Creativity Is for Everyone

What teachers need to understand is that while eminent creativity does come from a small percentage of the population, creative thinking is attainable for us all every day and can be developed. The creative breakthroughs that a teacher pursues each day are those moments when a student finally understands a concept by thinking about it in a new and personally meaningful way—when something clicks, and the world opens up. This is but one example of daily creativity in a teacher's life.

Teachers need to see and hear examples of everyday creativity so they can start recognizing it in their students. Runco (1996) calls this *personal creativity* and Kaufman and Beghetto (2009) term it *mini-c* and *little-c* creativity. Creativity starts small, as a learning moment; as people elaborate on what they know and begin to use it towards novel ends, their creativity grows. This creativity is not recognized by societal standards to be a contribution to humanity, but it is meaningful, nonetheless, to the creative person and perhaps to those around him or her.

Practice in daily personal creativity can foster higher levels of creativity in the long run. For example, a second grade student who figures out that a large number of items can be counted by lining them up in a grid and counting by 5s or 10s is well on the way to understanding multiplication. This moment of personal, mini-c creativity can also fuel later problem solving in which the student finds other ways to visually represent his or her work, thereby recognizing patterns that facilitate the learning process.

10.2.6 Misconception: You Have Creativity or You Don't

Historically, creativity was viewed as a mostly innate facet of human intelligence (Esquivel, 1995). Although this is no longer the prevailing perspective, remnants of this type of thinking still linger. Even the language we use around creativity can propagate this myth: "My student is so creative" and "I'm not creative." Indeed, many people seem to believe that creativity is a trait that is set in stone for each person at birth. This misconception also shows up in the way we structure our schools, often relegating creativity to gifted and talented programs that pull out a select few high-scoring students for special instruction.

10.2.7   Fact: Creativity Can Be Developed

Dweck (2006) developed the term *fixed mindset* to identify the belief that our talents and abilities are inborn and unmalleable. This mindset proves disconcerting for creativity, as Paek and Sumners (2017) state,

> The more teachers believed creativity to be innate, the less they tended to believe that all students have the potential to be creative. … This misconception possibly prohibits teachers from being confident to teach creativity to students who do not exhibit creative ability in their classrooms. (p. 9)

Creativity, we have learned, can be developed and enhanced within both adults and children (Doron, 2016; Scott, Leritz, & Mumford, 2004). The good news is, if a teacher values creativity and believes s/he can help students develop creative thinking skills, students perform better on tasks requiring creativity (Cayirdag, 2017; Paek & Sumners, 2017). This fact points to the importance of teachers maintaining what Dweck (2006) refers to as a *growth mindset*—the belief that a person's abilities can be cultivated, in this case with creativity.

10.2.8   Changing Mindsets

If teachers' attitudes toward creative ability can affect how they interact with students and, in turn, positively affect student performance, teachers must be supported in having a positive view of the creative potential within all students. Practice engaging with students and other teachers using *growth mindset* language can help establish this perspective as part of the classroom culture. *Growth mindset* language means feedback focuses on a student's process with the goal of improvement instead of on a letter grade or the number of missed answers. It also means emphasizing effort and problem-solving over success and failure (Dweck, 2006). Regularly identifying and acknowledging creative behavior in the classroom can also enable teachers to recognize growing creative competency that can allow them to better support students' growth.

10.2.9   Misconception: Creativity Breeds Chaos

Because creativity is often seen as "going against the grain" of what everyone else is doing, the idea of encouraging creativity can cause educators anxiety when they have a classroom full of students to teach. If all students follow their every unusual whimsy, that sounds like chaos. For the sake of getting anything done, teachers feel there must still be a sense of order and purpose. This is a valid point that surfaces as a concern in many teachers' attitudes towards fostering creativity in the classroom (Ranjan & Gabora, 2012).

10.2.10 Fact: Creativity Has a Time and Place

Creativity does involve doing or thinking about things differently. However, this does not mean that someone with a creative idea should be hijacking or steamrolling the conversations or ideas of those around them. Creativity does not mean disrespecting others. Kaufman and Beghetto (2013) coined the term *creative metacognition*, which posits that students can and should develop an understanding of the appropriate time and place to employ their creative ideas. They also emphasized that creativity requires something be relevant or fit to the task; for example, teachers need not accept all off-task behavior as creative expression (Kaufman & Beghetto, 2013). Just as educators help students to think about their learning and develop skills that allow them to learn most effectively, we can also teach them how to use their creativity appropriately and effectively.

10.2.11 Making the Change to Creative Metacognition

One way to develop the skill of creative metacognition in students is using individual idea systems. Examples are a small notebook or digital file for recording ideas they do not want to lose track of but are not necessarily pertinent to the topic at hand.

For example, imagine students working on a project to build the strongest bridge possible from toothpicks. One team member suddenly starts throwing toothpicks at the ceiling to see if they stick. While this *may* be an original use of materials, it does not address the challenge they face. Creative ideas do sometimes seem to come to us suddenly and from nowhere, but it is part of the creative skill set to recognize when to run with a thought and when to tuck it away for later. So, the student wanting to throw toothpicks could stop building for a moment to write down, "I wonder if toothpicks will stick to the ceiling if I throw them?" and then get back to the assigned project. This process can support creative metacognition while honoring a student's natural curiosity.

Another way of looking at creative ideas from students is for teachers to consider new and different ways to deliver and discuss the content that must be covered. Westby and Dawson (1995) studied a group of U.S. elementary teachers' views of creative characteristics and importantly found that the teachers "appeared to have a negative view of characteristics associated with creativity. This in turn suggests that schools may provide an inhospitable environment for creative students" (p. 8). However, creatively minded students can bring new perspectives to classroom discussions that assist the class in better understanding the content.

As solutions, teachers must practice deferring judgment when presented with an unexpected answer or approach and be willing to explore different (on-task) thinking regarding their classroom content. Responses can be rehearsed in teacher training through examples and role-playing. In what ways can creative thinking be

encouraged while making sure all students get what they need? How can we honor a child's musings while staying on topic? Teachers can practice the art of responding to creative ideas and knowing where to take a conversation for the good of the class. They can also work to recognize the strengths of a highly creative student. A literature review of studies looking at teachers' attitudes about creativity indicated that while teachers often do think of positive attributes when describing creative students in a general sense, in practice, they may fail to see the creative potential of highly creative students that do not display those likable characteristics or are not traditionally high achievers (Aljughaiman & Mowrer-Reynolds, 2005).

10.2.12   What Creativity Is

So, if teachers understand that creativity is not necessarily art, for the extraordinarily gifted or disruptive and chaotic, what is it? The standard definition of creativity is work that is original and effective (Runco & Jaeger, 2012; Stein, 1953). If it works and is novel, it is creative. More recently, some scholars have added that creativity also requires appropriateness for the context (Amabile, 2013; Kaufman & Beghetto, 2013). Having a foundation of originality, usefulness, and appropriateness, teachers can begin to see the myriad ways creativity shows up in their environment. For our purposes and context, we will use these criteria to define creativity as new thinking that adds to a student's understanding of a concept and relates to the topic being studied.

   With a clearer understanding of creativity and some time to reflect, teachers can often give many examples of creative thinking generated by their students. Examples of students' creativity include making a connection between the content and something they have experienced outside of class, coming up with an alternative way to solve a problem, generating many ideas for a project, articulating a question that demonstrates curiosity, devising a new way to use materials, and noticing when a process, object, or experience can be improved.

10.2.13   Why Creativity?

The need for creative thinking has become vital in our time. As technology and the interconnectedness of the globe grow at such a rapid rate, education leaders have recognized that our students as adults will be dealing with societal issues on a grand scale, working in careers that do not yet exist, and navigating rapid changes, many of which we cannot even begin to predict (Wagner, 2014). An educational policy guide from the Partnership for 21st Century Skills (2008) focusing on "education" and "competitiveness" in the twenty-first century, lists engaging in creative thinking, solving open-ended problems, and applying knowledge in innovative ways among the skills that schools need to ensure students master if they are to

experience success moving forward. According to P21, "These skills will withstand the test of time, fluctuations in the economy and the marketplace, and dynamic employment demands" (p. 11). Creativity will serve students as they enter the workforce and society as the world grows more complex.

Similarly, the World Economic Forum's (2016) report about jobs in the future lists creativity as one of the top 10 skills that the workplace will require in 2020. Creativity has continued to move up in this list in recent years. Other highly valued work skills from this report are cognitive flexibility and complex problem solving, both aspects of creativity. In fact, according to this source, complex problem solving is consistently the highest in demand as a skill for workers today and is expected to remain the most valued for future workers (World Economic Forum, 2016). Because complex problems are usually ill-defined and unable to be solved by routine methods, they require creative thinking.

We must be willing to devote time and effort to creativity in the classroom, not as an afterthought or limited to students labeled as gifted, but as a goal in and of itself. To do this, the first challenge, as already described, is to ensure that teachers understand what creativity is and its importance in education and their students' futures. The next task is to dig into the teachers' own creativity, to which we now turn.

10.3   Point Two: Teachers Recognizing Their Own Creativity

The second point of the Five-Point Star model focuses on helping teachers recognize their own creativity. Teachers cannot be expected to appropriately foster creativity if they do not have *creative self-efficacy* themselves. This means that a person believes in his or her ability to be creative (Beghetto, 2006). Everyone has the capacity to be creative, and all people have creative strengths, so teachers need time to rediscover their creativity.

Creativity consciousness is among the most important traits for developing creativity, and it starts with basic awareness. Davis (2004) defined *creativity consciousness* as awareness of one's creativity, in addition to a valuing of creativity, an understanding of creative barriers, a willingness to accept novel ideas from others, taking part in creative thinking oneself, and being willing to take risks. In his words, "Increasing creativity consciousness and fostering favorable attitudes toward creative thinking is truly item number 1 in becoming a more creative person and helping others to develop and use their creative potential" (p. 329).

To find out how teachers' attitudes regarding creativity affected their teaching, Cayirdag (2017) surveyed 322 teachers at levels ranging from preschool to high school. Results revealed that a teacher's creative self-efficacy was related to behaviors that foster creative traits in students like independence, motivation, flexibility, and integration. She also observed that teachers with high creative self-efficacy are more likely to teach creatively, providing an inspirational example of creativity to their students. In extensive interviews with eight award-nominated teachers,

Henriksen and Mishra (2015) found that all of them had some sort of creative hobby such as music, writing, or art that they drew from in their teaching practices. With this in mind, it becomes paramount to involve teachers in finding their own creative strengths if they are to support their students' creative thinking.

The first thing we have heard some teachers say when they engage in a conversation about creativity, however, is "I'm not creative." This belief must be confronted before teachers can be expected to develop and nurture creativity in others. A first way to tackle this is by recognizing and acknowledging the inherent creativity in a teacher's job. Teachers come to school every morning not knowing what the day will hold. Any teacher can attest that no matter how much preparation has gone into a day, there is no predicting exactly how students will respond to activities, what interruptions might change the flow of a lesson, or the myriad ways they may have to flex in response to countless other variables. They must be quick on their feet, flexible, and open-minded as they navigate content with the students. What a teacher teaches is constantly being adapted in response to students' ever-evolving educational needs and current points of understanding. A teacher must reach a group of students as a whole and each individually. Like with most creative tasks, there is an end goal in mind, but the path to get there is riddled with uncertainty.

Teachers get practice with creative thinking on an ongoing basis as they navigate the ambiguities of spending a day with often 30 or more young learners. Every time something does not go exactly as expected and teachers have to decide how to respond, they are using creative thinking skills such as flexible thinking, generating possibilities, and challenging assumptions. When teachers realize this, they can start to recognize their creative strengths, which will enhance their creative self-efficacy.

10.3.1   Creative Strengths

Each of us has creative strengths and preferences in how we apply our creativity. Creativity involves many affective and cognitive skills within the stages of the creative process (Puccio, Mance, & Murdock, 2011), and people often feel more comfortable and capable in certain stages or in using particular creative skills. In a training situation, teachers can be presented with a list of creative strengths (see Table 10.1).

In group discussions during professional development, teachers can pinpoint their creative strengths and how they use those strengths in the classroom. Conversations can then branch out to "How might we collaborate and utilize each other's strengths?" and "How might we recognize and draw out these strengths in our students?" Many teachers struggle with reconciling creativity with the restrictiveness of curriculum and prescriptive learning objectives (Dobbins, 2009), so dialogue with a creative mindset on this topic can target the exploration of solutions. This process can start to bring out teachers' creative self-efficacy so they can model creative thinking in their classrooms and feel confident in fostering their students' creativity.

Table 10.1 Creative strengths (Terms compiled from Davis 2004; Puccio et al., 2011)

Recognizing patterns	Making connections between ideas
Risk-taking	Challenging assumptions
Seeing things another way	Elaboration
Sensitivity to problems or gaps	Openness to new ideas and experiences
Playfulness	Perceptiveness
Producing many alternatives	Curiosity
Future thinking	Sensitivity to environment
Expressiveness	Tolerance for ambiguity
Tolerance for complexity	Visualization
Metaphorical/analogical thinking	Intuition
Evaluation	Motivation
Fantasy thinking	Reflection
Ability to analyze	Avoiding too quick decisions

Once teachers know what creativity is and its importance and have pinpointed their own creative strengths, they need some tools and strategies for bringing creativity forward in the classroom. Because students can learn just as much from the classroom culture as they do from lessons, the environment is the first place to start when attempting to create a classroom that encourages creativity.

10.4   Point Three: Developing a Creative Environment

A classroom's environment comprises two elements: (1) the physical structures and contents, and (2) the psychological attributes. Learning environments that have been designed to support creative learning have been shown to increase academic achievement, motivation, confidence, resilience, and engagement, as well as improve school attendance (Davies et al., 2013). This is why the third point of the Five-Point Star model's focus is on the creative environment.

Clearly, creating the right environment offers rewards on multiple levels, but what makes up a creative classroom environment? And, how do educators arrange their classrooms to organically develop and nurture creative thinking skills? To understand what constitutes an effective learning environment, Davies et al. (2013) conducted a systematic literature review (commissioned by Learning and Teaching Scotland) of 210 research papers on learning environments that promote creative thinking skills. This meta-analysis identified a number of factors that help define effective environments. It showed that the physical environment should be open and spacious, encouraging teachers to set up a room that allows students the flexibility to move around. Additionally, these researchers identified numerous studies naming benefits associated with different kinds of materials and resources that are provided for igniting creativity; one such benefit comes from taking students outdoors or to other locations (outside the classroom) to boost their creativity.

None of these findings should be seen as particularly surprising. In fact, many educators, if given free reign over their environments, would organize their classrooms and teaching along these lines. The problem, of course, is that often teachers do not have complete control over all of the resources necessary to create ideal physical creative learning environments. Nevertheless, this systematic review (Davies et al., 2013) points to the way in which educators, and educational systems should be moving, understanding that, in fact, many teachers have at least some degree of freedom when it comes to arranging their rooms and making choices about how their students use the available space to support new ideas.

While the physical environment is obviously an essential factor in teaching creativity, it has been argued that the psychological environment is even more important. This psychological space, often referred to as the *climate*, is defined as "a conglomerate of attitudes, feelings, and behaviors which characterize life in the organization" (Isaksen, Lauer, Ekvall, & Britz, 2001, p. 172). Furthermore, they write that a creative climate "supports the development, assimilation, and utilization of new and different approaches and concepts" (p. 172), which is what we are trying to create for our students. While these researchers were not focused specifically on educational environments, their definition is still relevant for life in a school.

The classroom climate should not be seen as just a passive context in which creativity happens. Rather, it is a place that "provides a cognitive basis for idea generation and encourages the actions required for implementing these ideas ... [and] demonstrates acceptance and recognition for the individual's creative efforts" (Mumford & Gustafson, 1988, pp. 37–38). In other words, there is a continuous interaction between the environment (both physical and psychological) and the occupants within it. Work created within the classroom, which is displayed in the space, helps set the tone and, if positively handled, stimulates new thinking and ideas within the environment.

Generalizing the climate research conducted by organizational scholars (see Amabile, Conti, Coon, Lazenby, & Herron, 1996; Isaksen et al., 2001) provides educational researchers with useful starting points for building creative classrooms. However, the research community recognizes that what is needed is greater empirical work focused on educational settings (Davies et al., 2013; Soh, 2000). Fortunately, some researchers actively study this topic. For example, Cropley (1997) summarized the findings of an extensive literature review that concentrated on creativity in the classroom, identifying nine principles that can be used to directly contribute to generating a creatively supportive climate. Cropley's principles were investigated by Soh (2015) who developed an instrument called the *Creativity Fostering Teacher Behavior Index.*

These principles include the following (Soh, 2015):

- Independence: Developing the ability of students to think, and learn, independently;
- Integration: Teaching in a manner that is inclusive and encourages collaboration;
- Motivation: Understanding the roles of intrinsic and extrinsic motivation, and teaching accordingly;

- Judgment: Practicing delayed judgment to give students time to develop their thinking;
- Flexibility: Valuing and encouraging flexible thinking;
- Evaluation: Developing students' abilities to evaluate their progress;
- Question: Valuing and encouraging students' questions;
- Opportunities: Structuring learning in such a way as to provide students with ample opportunities to use different materials and techniques, and
- Frustration: Helping students develop the mental resilience to overcome frustrations and setbacks.

Some of these principles have analogs within the organizational climate research, but a number of them are quite specific to the educational context and students in particular. By combining Soh's (2015) guidance on the creation of physical environments with Cropley's (1997) principles, educators now have a starting framework for developing climates that actively support creative thinking amongst their students. However, much more work needs to be done in the area of learning environment design. The design guidelines offer schools the chance to significantly improve the opportunities for creativity among students, without disrupting their existing learning process.

10.5 Point Four: Integrating Creativity into Content Delivery

Once the creative environment has been set, educators can move to the fourth point of the Five-Point Star model. This point focuses on deliberately integrating creative thinking skills into any educational experience. The key piece to note is that integrating creative thinking skills into existing content is not the same as teaching creative thinking as a separate topic. Rather, integration focuses on weaving creativity-supporting activities into the existing educational structure and content. One could think of this as enhancing the teacher's ability to teach creatively, thereby subtly influencing students' attitudes and behaviors.

The integrating methodology was first outlined by Torrance (1979) with his Torrance Incubation Model (TIM) of Creative Teaching and Learning (Torrance & Safter, 1990). Torrance's methodology was later developed and elaborated on by other scholars (e.g., Murdock & Keller-Mathers, 2008).

10.5.1 The Torrance Incubation Model

Torrance (1993) describes the TIM as "... a simple, powerful, general-purpose teaching model that integrates creativity skills with content and knowledge" (p. 187). It has three process stages. In the first stage referred to as *heightening anticipation*, teachers arouse curiosity and warm up learners to the content to be covered. In the

second stage, *deepening expectations*, teachers move into the main content of the learning. And, in the final stage, *extending the learning*, teachers continue the learning beyond the walls of the classroom within the context of real life.

While TIM may look similar to other learning models, it has a fundamentally different approach to designing learning activities. The TIM requires and supports educators to weave at least one creativity skill into each stage of any learning design. The focus on incorporating creativity into the teaching of topics is what allows the TIM to enhance both disciplinary knowledge and creativity skills. Further, this unique focus is also the mechanism through which teachers can achieve the twin goals of meeting curricula requirements and developing their students' twenty-first century creative problem-solving skills, and all within the limited contact hours.

The TIM is not simply a high-level design framework expecting a teacher to develop creative activities without any guidance. By studying children who demonstrated creative behavior, Torrance and Safter (1999) created a series of Leap skills that relate to the development of creativity. These skills can be thought of as perspectives from which to view any particular subject. By combining a skill with a learning objective, teachers can generate interesting, engaging lessons that help them with achieving their dual objectives. Table 10.2 outlines the 18 Leap Skills and provides a brief explanation of each one.

Table 10.2 Leap skills (Torrance & Safter, 1999)

The problem	Produce and consider many alternatives	Be flexible
Aware of a challenge or opportunity; define problems	Fluency; generating many options	Generating variety, different categories and perspectives
Be original	**Highlight the essence**	**Elaborate-but not excessively**
Statistically infrequent responses; novel, unusual perspectives	The absolutely essential; synthesizing all, focusing on one	Adding, developing details or ideas
Keep open	**Be aware of emotions**	**Put your ideas in context**
Resisting premature closure	Recognizing cues, understanding through feelings	Putting parts of an experience into a bigger framework
Combine and synthesize	**Visualize it richly and colorfully**	**Enjoy and use fantasy**
Putting together new connections with the given elements	Using vivid, colorful imagery	Imagine, play and consider the nonexistent
Make it swing! Make it ring	**Look at it another way**	**Visualize the inside**
Using kinesthetic, auditory; your full range of senses	Seeing from a new or different visual or psychological perspective	Describing the inside of things, seeing internal dynamic workings
Breakthrough-expand the boundaries	**Let humor flow and use it**	**Get glimpses of the future**
Changing the paradigm, outside given requirements	Responding to incongruities, surprises, discrepancies	Wonder, dream, explore possibilities that do not yet exist

The Leap skills' list provides educators with a flexible and resilient set of guidelines with which to generate learning experiences. However, these should not be regarded as definitive. In recent years, other scholars have presented additional skills related to the creative person, which could easily be integrated into the model. For example, Burnett and Figliotti (2015) built upon the Leap skills, including more contemporary skills such as mindfulness, curiosity, embracing challenges, and risk-taking. Puccio et al. (2011) outlined cognitive skills that include diagnostic, visionary, strategic, ideational, evaluative, contextual, and tactical thinking, as well as affective skills that encompass mindfulness, tolerance for ambiguity and complexity, dreaming, sensing gaps, playfulness, openness to novelty, avoiding premature closure, and sensitivity to one's environment.

At its core, the Torrance Incubation Model is a template for a design, meant to teach creative thinking skills without requiring additional time in the classroom (Torrance & Safter, 1999). However, what typically emerges is an educational experience that is more engaging and fun, allowing for incubation (Burnett & Keller-Mathers, 2016). To use this as a template, a teacher would first need to identify the goal of the lesson, and then select a creativity skill that would complement the lesson. An example can be found in Appendix 1.

10.6 Point Five: Teaching Classes in Creative Thinking

Up to this point, we have been encouraging the enhancement of students' creativity by ensuring that their teachers have a clear understanding of creativity. Other areas related to this change involve developing these teachers' creative skills, establishing an environment conducive to creativity, and weaving creativity skills into existing content. Implementing these four points enables students to express their inherent creativity, without undue restrictions. But, what it has not done is provide them with a clear model of how to apply their creativity to solve the sort of complex, multifaceted problems they will face in life. They have developed their skills in this scenario, but without acquiring strategies to use them.

In 2012, Adobe (2012) conducted a study with 1000 college educated and full-time American employees on the topic of creativity and education. The study, "Creativity and Education: Why it Matters" elicited some clear, albeit unsurprising, findings. As part of the results, a full 85% of respondents agreed that creative thinking was critical for problem-solving in their career, and 68% of respondents believed creativity is a skill that can be learned. Nearly three-quarters (71%) agreed that creative thinking should be "taught as a class—like math or science" (p. 12).

Adobe's (2012) business focus reflects the needs of the creative sector, so it is hardly surprising that many of the respondents would rate creativity highly. But, what is surprising is the significant support for teaching creative thinking as its own separate course. In essence, college educated professionals were saying that it is just as important to invest classroom time in learning creative thinking as it is with learning other subjects. Understanding this shift in the relative opportunity cost of study-

ing creativity is important. Until recently, including creative thinking within an already packed curriculum would not have been a popular choice. However, times are changing, and, in fact, Adobe's survey is not unique. Rather, it is part of a growing number that identify the increasing importance of creative thinking by employers of companies large and small (e.g., National Center on Education and the Economy, 2008; Partnership for 21st Century Skills, 2008; Tomasco, 2010; Trilling & Fadel, 2009; Trowbridge, 2014).

The argument laid out in the preceding paragraphs naturally brings us to the final element of the Five-Point Star model: teaching creative thinking as a deliberate and separate topic within the body of the formal curriculum. Creativity is not only a set of skills that can be learned, but also a capability that can be channeled and applied to specific goals by using appropriate processes as well as techniques. These creative thinking processes can be learned and refined through careful practice, just like any other skill. But, unlike subjects such as physics, many teachers are unprepared to teach creative thinking and may be at a loss trying to define what such a course on creativity would actually cover. Fortunately, over the last 20 years, a number of programs have been developed and tested, and are available for widespread adoption. In fact, many schools already offer some version of these programs, but frequently as an after-school activity.

Many, but not all, of the extant creative thinking programs have adopted a Science, Technology, Engineering, and Mathematics (STEM) perspective as their core. Given the general need for these skills in the twenty-first century and the fact that STEM offers an ample range of interesting opportunities for creative thinking, it makes sense to teach creativity through this lens. However, it is also important to recognize that not all students will be motivated to participate in STEM-based projects, so it is necessary to implement learning opportunities that can develop creative thinking skills beyond the STEM structure. For example, programs that extend STEM to include Arts based activities (often referred to as STEAM) provide a greater range of opportunities for students' whose interests fall outside of traditional STEM disciplines.

Next, we describe different programs, all of which clearly focus on developing creative thinking skills. Each program has been the subject of various research projects that have established some degree of efficacy for the participants. While we would also encourage teachers to develop their ideas for teaching creative thinking, it is more important to start than it is to strive for the perfect solution. The results of these studies should encourage schools to, at the very least, pick one of these programs and make it part of the curriculum.

• Odyssey of the Mind (OM) is an international creative problem-solving program developed over the last 40 years. Schools join the program and form teams coached by an adult. Team members work together to solve a predefined challenge and present their solutions to the challenge at a competition. OM offers a broad range of problems and encourages students to both develop solutions and create novel ways of presenting their ideas (Why Odyssey of the Mind, 2018).

- Destination Imagination is similar to the OM program. In fact, the organization sprang out of the OM company in order to pursue a not-for-profit model. Destination Imagination offers a range of challenges and a series of annual competitions. This program aims to teach a deliberate creative problem-solving process that students apply it to a range of predefined questions. Each team works with the assistance of an adult coach (Destination Imagination—Mission & Vision, 2018).
- For Inspiration and Recognition of Science and Technology (FIRST) robotics competitions, as the name suggests, focus on STEM-based challenges. The FIRST organization offers four separate strands, ranging from relatively simple LEGO® robotic challenges for younger children to sophisticated activities aimed at high school students and beyond. The challenges address real-world engineering problems and mentors with engineering experience lead them (First Inspires—Home, 2018).
- Future City is a project-based learning program aimed at students from sixth to eighth grade. Projects are responses to the powerful question, "How can we make the world a better place?" From this starting point, the children are asked to imagine, research, design, and build cities of the future. Student teams produce five deliverables each that showcase their solution in different ways and at various levels of development. These projects are displayed at regional competitions and a subset are presented at the national finals in Washington, DC, USA (What is Future City, 2018).
- Design Thinking was researched in the Taking Design Thinking to Schools Research Project (Carroll et al., 2010), the purpose of which was to "extend the knowledge base that contributes to an improved understanding of the role of design thinking in K-12 classrooms" (p. 37). This ethnographic study looks at the development of an interdisciplinary design program in a public charter school. The results feature students exhibiting empathy in understanding human needs and feeling like change agents, fostering metacognition, positive affect, collaborative learning, and the "ability to imagine without boundaries and constraints" (p. 52).

10.7   Conclusion

Teachers are caught between the proverbial rock and hard place. They have to deliver education that conforms to national and state guidelines while ensuring their students "make the grade." Failing to achieve these two goals means that many teachers are forced to look for new jobs. The pressure can be intense, and it would be understandable if teachers reacted by focusing exclusively on the test scores by which their institutions are judged.

Unfortunately, this approach is not going to work. Whether it is the rise of Artificial Intelligence-based machines, the effects of climate change on existing businesses, or the move towards an economy based upon Amazon, and Uber style "gig" working, students will have to deal with an unprecedented rate of change during their adult lives. For this reason, we believe that developing students' capacity to navigate change, and generate effective solutions to unique problems is an essential part of any twenty-first century educational process.

If for a moment our reader accepts this argument, then we believe it naturally follows that creative thinking must be made a core element of all curriculum. We have already moved into a time when it is simply not enough to restrict creativity to an after-school enrichment for a subset of students. What is needed is a mechanism through which schools can evolve into institutions that deliberately foster and develop the creative thinking skills of all of their students. Fortunately, to quote Keller-Mathers (2018), "When all stakeholders are ready to engage in finding opportunities and support each other's efforts to bring forward new thinking, amazing results will happen" (p. 17). We believe the Five-Point Star model contributes towards this objective by providing guidelines that enable educators to incorporate creativity into their teaching practice. We therefore, encourage educators to experiment with the model so all students can make the transition to a more creative world.

Appendix 1

Content Goal: To understand the function and parts of a microscope
Creativity Skill: Look at it Another Way

Heightening Anticipation: When students walk into the room, there are large pictures posted of different animals and items at high magnifications (Look at it Another Way). The students can guess what each picture is before it is revealed. The teacher then brings out microscopes to show the students.

Deepening Expectations: The class discusses the different parts of the microscope and what they do. The students practice using the microscope with different magnifications, seeing how the items they are looking at change as they adjust the settings on the microscope (Look at it Another Way). Then, the students write down the role and function of each part of the microscope and draw an item at different levels of magnification. The students wonder about what items in the classroom they can look at differently through the microscope and try it out.

Extending the Learning: The teacher brings up the pictures from the start of class. Students try to guess magnification level based on what they have learned. The teacher provides students with mini-magnifying glasses to take home and look at objects around their houses in different ways.

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Chapter 11
Embodied Perspectives on Creativity, Inquiry, and Research

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Abstract This chapter is about creativity as deeply connected to what it means to be a fully embodied human. Creativity is necessary for all of living, including researching, writing, teaching, artmaking, and mentoring. The author brings her background as an arts-based researcher, dancer, poet, and curriculum theorist to articulate ways the body can be central to inspiring creativity. Explored are ways for the reader to reflect on connections between inhabiting the body more fully as a guiding principle and releasing the creative in multiple forms and pathways. In poetic and visceral language, being emphasized is the importance of an embodied awareness and provides pragmatic guidelines for opening up to the reservoir of creativity within. Practices of physicality as walking and connecting to the natural world are presented as a visceral creativity. The body as a threshold is considered as a way to listen to the body's wisdom and loosen the muscles of making and creating. Specific concepts described are ways to develop a more hospitable and imaginative relationship to one's own body, and literally walk, exploring the body as a place of generativity for creativity in dangerous times. A goal is to inspire readers to listen to their bodies and inhabit a more embodied creativity to inform their research, teaching, and living.

11.1 Introduction

Creativity has now become a hot subject and yet it is has been our birthright all along. We were made to create and be creative. Thankfully, there is more emphasis on connecting the various realms of creativity whether it informs physicists or physical educators or scientists and artists, researchers or rappers. Creativity is central to so many areas of life—researching, teaching, inquiry, discovery, learning, knowing, and artmaking, in addition to wellness and daily living. These areas are all interconnected, as the lifeblood of creativity flows through everything, sometimes

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announcing its presence in bold interruptions. Even with so much written and spoken about on creativity, it so easily gets written out of the lives of many of us—too often we hear, "Oh, I'm not creative!"

This chapter invites the reader to see that being creative is deeply connected to what it means to be fully human, which is our birthright. As soon as we emerge from the womb, we are improvising in the world around us, experiencing and responding through all of our senses—visual, kinesthetic, tactile, auditory, and proprioception. The muscle of improvisation occurs from how one engages in a conversation and creates new ideas, to making the elements of a dance composition. I would like to invite you to locate creativity in your life with as much ease as breathing, and make connections between the lungs of your body and the lungs of creating. There is a direct relationship between reconceptualizing your own relationship to your body and increasing your capacity and ease to an organic creative process.

11.2   An Embodied Framework

I come to creativity as a verb that is the core of my life—connected to my living, writing, teaching, dancing, mentoring, breathing, and being. I am a scholar, dancer, poet, writer and educator who has intentionally fostered all the aspects of my life to move together in partnership. My philosophical underpinning values the connection between the personal and universal and acknowledges they are deeply connected. Parker Palmer (1998) said, "We teach who we are" (p. 2), words that I extend this to the realms of researching, writing, and creating. As human beings, we live storied lives; narratives are being formed by immersion in the everyday. We are found in each other's stories. I extend these narratives to include body narratives, where our body and all the senses are a source of knowledge, learning, wisdom, and material for creation.

My own paradigmatic framework is informed by being an arts-based researcher and curriculum theorist where there is room to bridge the public and private, poetic and phenomenological, and the artistic and scholarly. There is an autobiographic component to many forms of arts-based inquiry, where boundaries are crossed and enlarged to how the personal and political can be deeply entwined. I agree with writer Nancy Mairs (1989) when she says, "the gift of autobiography and narrative "invites you into the house of my past and the threshold you cross leads you into your own" (p. 11). In these realms, there is not a prioritization or separation of the mind over the body. It is important to note that the ideas I have cultivated around enhancing creativity in your own life from an embodied perspective, are within a research paradigm that embraces the connections between the personal and universal. I want to find ways for my readers to reflect on connections among embracing, celebrating, and inhabiting the body as a guiding principle to releasing the creative in multiple forms and pathways.

I tap into my background as an arts-based researcher and curriculum theorist to provide qualitative frames and methods for integrating the personal and universal,

poetic and playful, scholarly and visceral in writing. Multiple forms of qualitative research include arts-based, subtypes of which are poetic inquiry, performative inquiry, artography, narrative inquiry, and embodied inquiry, which encourage interconnections among art, creative process, and scholarship (Leavy 2015, 2017). My particular scholarship has been on developing embodied forms of inquiry, which connect the body's wisdom, artistic forms of movement, dance and practices of physicality and their relationship to researching, creating and teaching (Snowber 2002, 2012, 2013). I am thankful to be among many more scholars in my career who also explore embodied and somatic ways of inquiry and who research as a way to connect the body within qualitative research (e.g., Bagley & Cancienne, 2001; Bickel, 2005, 2008; Blumenfeld-Jones, 2008, 2012; Cancienne, 2008; Cancienne & Snowber, 2003; Margolin, 2014; Migdalek, 2014, 2016, Ricketts, 2010; Ricketts & Fels, 2015; Wiebe & Snowber, 2011; Williamson, 2010; Williamson, Batson, Whatley, & Weber, 2014).

What continues to ignite me is a passion to evoke a *thirst* that can sometimes be neglected in each of us in order to pay closer attention to what the body offers. Here I am not trying to produce evidence, but evi*dance* (Snowber in Leavy, 2017). I want there to be a place for dancing through our creative bones as a way of being, perceiving, and articulating. I will present to you various principles, which I find necessary to take back creativity as a place to inhabit as home base.

11.3   Creativity and the Body as an Endangered Species

Sometimes what is so close to us as a resource is not as easy to inhabit to its fullest potential. Clearly, there are times where we sabotage our own capacity for creating. What is clear is that we have been born as breathing, sensing, messy human bodies, which are deeply connected through muscle, bone, tissue, and the ability to let creativity run through us. I have said many times and continue to say, we are bodies, we do not just have bodies. And, the "are" is a verb. We are the verb of creativity. Human beings are called to create, not only the ability to bring forth life, but to be deeply receptive to the vibrant flow of spirit, eros, or energy, which animates us to create. We have been made as curious and creative human beings who become human doings.

Whether it is in science, art, invention, research or teaching, creativity lives as a thread seeping through to the possibilities of something new emerging. The question is how do we foster the conditions within us to let creativity flow and truly be unstoppable. I would like us to think of our bodies as the landscape or geography for creativity to run through us, and cultivate the relationship between our bodies and the earth. We are the particles of stars and sea and we come from the dust and return to the dust. If the earth does not have water, there is devastation and eventually draught and fires which results in an unsustainable ecosystem. Water is necessary for survival; the body too needs water, movement, breath and food to stay alive. But, what does the body need to thrive, to ultimately create? Is creativity just limited to

professional creators, arts educators, musicians, choreographers, artists, scientists or is it for all to partake in, as we all need water?

Our thoughts and beliefs inform our actions and can transform our own attitudes to inhabit our own brilliance. What has happened repeatedly is we experience multiple splits as humans when separation occurs between head and heart, cognition and intuition, body and mind. It has been documented countless times the impact and ramifications on the relationship between Cartesian dualism and the splitting of mind and body. Yet these dualisms are impossible to truly separate because we are inevitably interconnected. Now more than ever there is a need for our full human beingness to show up. I often say and write that our bodies are a free GPS system, waiting for us to listen to attend (Snowber, 2011). And, we cannot lose this GPS system, for it within us.

11.4   Bullying Our Bodies

Our bodies have been sabotaged by thinking what one looks like, whether he or she has big hips, small chest, distinctive nose, crouching shoulders is who they are, and yet we are far more than this. We are the pulsing, moving, breathing, sighing bodies that have such a fascinating interdependence to every living system that creativity is cellular. By letting a philosophy of the body be relegated to the outer domain, there is a truncation in embracing both the limits and possibilities of what can emerge. When we look at children on the playground, we see kids partaking in risk; swinging high, running with abandon, drinking in their sensory world through touch, smell, sight, and hearing. Movement is at the heart of play. And, play is at the heart of an embodied engagement with the world. Here movement can be turned to dance and ideas can be channeled to discoveries.

Children organically have an embodied way of learning and knowing until it is written out of them when paying attention is equated with sitting still. How many times have you heard, "pay attention and sit still!" Attending is not about sitting still, but about being somatically present with all of our beings. I am more concerned that students in classrooms, live radically awake lives connected to their bodies than they learn dance steps. Forms of dance, movement, somatic practices foster deep attention and in movement one can often find stillness. There is a new saying that "sitting is the new smoking," and I concur that lack of movement influences all kinds of negative mental and physical health ramifications. Sometimes one needs to be moving to be present to inhabiting all of one's capacity for being creative. When I swim, walk, kayak or dance I am most deeply alert. Moving and thinking are connected and dance and somatic scholars have long written about these intersections (Hanna, 1988, 2008, 2014; Sheets-Johnstone, 2009; Stinson, 2004; Ricketts & Snowber, 2013).

It is not surprising that researchers continue to equate creativity with children and so many teachers originally wanted to work with children because of their creative potential. Children remind us who we once were, and I think are often the true

teachers, inviting us into a different way of experiencing the world. I know my own children have been deep teachers to me, calling me to be present in the moment. Their beautiful wise little voices have ended up in many poems and essays over the years, and I was often catapulted into making friends again with wonder. What characterizes or hopefully is integral to a childhood is the act of play. Play brings one to a full-bodied way of experiencing surroundings and ourselves whether that is skipping at the beach, swinging at the playground, or making up stories of how monsters are in the kitchen. There is an abandon to play, and one must suspend judgment in order to create new worlds. Intrinsic to play is risk. My own movement practice that I incorporate in my classes emphasizes play, improvisation, exploration with expression that a person could inhabit at any age. There are moments one can go from being very conscious of what he or she looks like, to remembering what it might have been to move as a child. Here there is room for divergent thinking, which is how creative thinkers operate, as opposed to convergent thinking that arrives when one is editing, deciphering, solving problems or judging.

Divergent and convergent thinking are both needed for creation and production. For example, to write, dance, paint, create one must sometimes go with abandon, let blood go to ink, contractions transform to choreography, pigment to canvas. Then there is the editing process, where one returns to a piece and interacts, sees and listen to its form in a whole new way. The initial creative process takes risk, play, improvisation and abandon where the judger or critic inside us is put on hold. My experience over the last three decades in teaching both my undergraduate and graduate students is that as soon as the part of us that judges or criticizes comes in, there is a blockage to the flow of creativity. The thoughts of self-doubt have a direct correlation to our capacity for creating. We can often bully ourselves out of creating before we even get going. I am also very adept at judging or bullying my own creativity, and in fact wrestle with this constantly. A constant creative practice is essential; it is the water for parched ideas.

Some form of creative practice, even if it is 20 min a day is the anecdote for silencing the critic or judge within us. Imagine if cedar trees could judge their own growth, would they ever grow so strong and stunning, reaching heights. As humans, we have great capacity to judge ourselves to the point where we sabotage the creative process. My experience has been to dance and write almost everyday, no matter what other commitments I have. All of this material goes into my other scholarship, whether it is a performance, essay, poem, book, or ideas for teaching, but I have thousands of pages, which no one would want to read, including myself. The small movement practices I engage in every day, whether it is stretching, walking, swimming, allow for both ideas and muscles to come alive. I have too many obligations and responsibilities that call for attention. Limbering the muscles of movement are warming up the muscles to create. This is why the practice of improvisation in movement has become so central to my own teaching, and opening up places for writing through the body, where a return to visceral and sensuous ways of inhabiting the world breaks open the river of possibilities.

Attending through our bodies call us to living attentively and to be viscerally awake. Beloved philosopher Maxine Greene (1995) reminds us through her many

books and words this call to being awake. Living an awake, vibrant life—rooted in the cells of a physical creativity— has the ability to change the world and us. I concur with dancer and philosopher Kimmerer LaMothe (2013) when she says, "we don't need the freedom from the body; we need the freedom to become body" (p. 147). To become body necessitates the importance of actually moving in order to feel a deep sense of aliveness. Phenomenological scholars Stephen Smith and Rebecca Lloyd explore this fully, extending the need to awaken to the vitality of movement beyond dance whether it is climbing, reaching, riding horses, running with one's dog as a place to be enlivened (Lloyd, 2011, 2012; Lloyd & Smith, 2006, 2010). Embodied knowledge is something we all know deep in our bones; we just need to give ourselves the permission to take the time to move.

This chapter focuses on the "lived body," for the purposes of integrating an embodied creativity and its implication for living, researching, teaching, writing or creating. The lived body draws on a phenomenological understanding of a body that is alive through all the senses and focuses on what is felt. The outer body, highjacked by the media and marketing, concentrates on the outward appearance. Sometimes in order for thinking to be animated one has to move, to think on the feet, let the belly into knowing. For example, I just took a walk in the rain in the middle of writing. I became blocked so I needed to get my thoughts moving. The moss-covered ground was soft under my feet, water sprayed my face, and I could smell the musk fragrance of the pond. I was overcome by the rich networking of green mosses, 20 shades of green in fractals—a symphony of wonder in a wet day in coastal Vancouver, British Columbia. What one might have seen outwardly was a red jacket on a person's body, black rain boots and hands popping out to the atmosphere on a misty grey day. The outer body was unremarkable compared to how many ways I experienced the earth within my own flesh. I left inspired by my ruminations and reminders of the magic and beauty of moss, and how much can be seen through small creations. Robin Wall Kimmerer (2003), bryologist and eloquent writer on mosses, speaks of looking at moss as a way of adding, "depth and intimacy to knowing the forest … intimacy gives us a different way of seeing, when visual acuity is not enough" (p. 13). She sees the world through "moss colored glasses" and speaks of the shared language we all once had comprised of thrushes, trees, mosses, and humans.

When I enter the woods or in a garden I am catapulted out of my worries and concerns and walk among what is most creative: the creation. I am giving the limbs of my body, the cells in my brain the water it needs, the cleanse necessary to let thoughts, ideas, inspiration dwell within me from the feet up. I give rise to the lived body, which has room for a more complex and wondrous comprehension of the nature of flow. Just as the mosses need water to thrive in all the nooks and crannies of their fractal greens, humans need the fluidity of the body's movement to give voice to what is offered through creation to creativity. It is not an accident that the root word for creativity is from creation. The creation of the earth to the creation of paint on the canvas, or words on the page, or ideas in a discovery has roots in the

interconnectedness of the natural world. Said beautifully by the poet Rilke, "If we surrendered to earth's intelligence we could rise up rooted like trees" (cited in Barrows & Macy, 1996). Our natural world is our bodies, and my passion has been to invite others and myself into their own ecosystem of their bodies, where what may be alien, can once again be befriended.

11.5   Befriending the Body for Research Creation

What would happen if we brought the fullness of these bodies to our creativity, our research, our living and moving amongst the planet? Where attentiveness and wide awakeness was animated and literally had an action plan, one of creativity? We are all carrying around genius. There just needs to be room to clear out our sinuses—the sinuses of creation. I love how the philosopher Kierkegaard (1978) says, "I have walked myself into my best thoughts, and I know of no thought so burdensome that one cannot walk away from it" (p. 215). Here is a time to clear out our sinuses and return to the body as a place of knowledge, wisdom, creation, and embrace a visceral creativity. It is as if we have been given everything we need to create, and yet by deeming creativity to only the realms of the mind, we are not accessing all of who we are and leaving ourselves open to a drought of the imagination.

Many of us have been schooled from the neck up, and have even conceptualized creativity from the neck up as if all the brilliance lies in the head. Look at so many of the great writers, thinkers, scientists that found walking was intrinsic to clearing the head, heart and brain. There is ample research on the relationship between walking and creativity or walking and divergent thinking, yet this is ancient knowledge we know in our bones and DNA. Writers and scholars continue to make poignant connections between composing, writing, walking and thinking (Hotton, 2015; Irwin, 2006; Springgay & Truman, 2017). William Wordsworth walked 175 thousand miles throughout his life alongside a prolific vocation in writing. The Japanese haiku poet, Taneda was famous for combining walking and writing. He wrote, "Talentless and incompetent as I am, there are two things I can do, and two things only: walk, with my own two feet; compose, composing my poems" (Taneda, 2003, p. 9, [trans. by Watson]). Like many writers over the ages, these writers' walking *was* their writing.

Thoreau was also a great believer in sauntering. Thoreau (1862) said he could not preserve his health or spirits without spending at least 4 hours a day sauntering through the woods, hills and fields. The etymology of saunter suggests that an earlier meaning would be "to muse." I would like to suggest it is time to saunter into the muse or practice sauntering in order to nourish creativity. The muse is not a room above a house with open doors to the sea, or a romantic person, but the ability to allow the breath of wind to enter our fingers and toes, walk into the forest, sea, and literally get our bodies moving. To let gestures run wild, to feel the energy through our torsos, where blood can turn to ink and sweat can turn to dance.

11.6   Wandering into Wonder

Writing, creating, and walking are all practices of wandering into wonder. Every day, each moment, there can be an invitation to let the body take you where it will, and be keenly aware, of each cell, tissue, breath, impulse which arises and let it have its way. This includes embracing our limitations, limits and constraints.

We have heard repeatedly to get out of your way, but what does that mean? Perhaps it is literally, moving, to find your way, for to get out, implies some kind of movement, a relationship to physicality. So often, we are stuck frozen, locked in a paralysis, with fear in the driver seat instead of fearlessness. When the child plays on the jungle gym, or skips freely at the beach, or twirls in the supermarket – there is a component of fearlessness present, not being overly conscious of the outside world peering in. The lived body has room to roam. To roam into wonder. Perhaps it may be helpful for adults to take the children as an example and twirl on the beach. Annie Dillard (1989) reminds us "to give voice to our own astonishment" (p. 68). This is a quote to live by, create by, to be rebodied to the reality that living in or with awe and astonishment gives rise to creating. Wandering into wonder is necessary for artists and scientists, educators and researchers, and creative and we are all called to create. So how do we wander into wonder, in a day when there is continual suffering happening in each moment, whether it is famine or mass shootings?

11.7   Creating in Dangerous Times

A call to arms is currently a phrase often heard. This literally means a call to confront, make ready for retaliation. I am mindful that as I write this chapter there are devastating mass shootings in schools. North America is a society where arms/guns cannot be put down. I would like to shift our culture to a call to create that takes arms, but in the form of other kinds of arms, legs, hips, bellies. A call to have baby steps, big steps to create as a way of life, as a response to what is happening in the world. More than any other time, we need to return to the birthright of creativity in dangerous times. And, we are living in dangerous times. So, what this means is a life devoted to practice, or what I call small practices and small beauties.

As many of you, I live with multiple lives and roles, whether that is a mother or father, son or daughter, citizen or caregiver, employer or employee, imaginator or singer. We all live in complexities and the commonality many of us have is we are in the throws of being busy. Busyness and time is the great divide. We do not have time. Emails alone take up a huge part of living, which truly becomes doing, more than living. I often think that even after I pass this life, people will be saying, "Why can't she answer that email." There is a way that human society is caught up in this busy, fast-paced relation to time and demands. I am as obsessive as anyone about checking email and doing tasks if I accomplished a few more on my list I would

make a dent in my load. But, all it often does is create more emails needing attention. I therefore have no chance to sense a flow, the wind of the muse, because my computer often dictates time. When I speak of flow, I also align myself to Csíkszentmihályi's (1996, 2008) theories on flow where one finds an optimal psychological state that has a deep engagement, concentration and focus where deep learning and satisfaction coincide. So, my critical task is to disrupt the predictability of my own confinements and excuses which I contribute to. The call is to create and sustain small practices in a life, which allow flow to ignite, interrupt, and return us to the waters of creating.

Over the last few decades, I have raised three sons as a single parent, gone through the ups and downs of the academy, including the challenges of tenure, multiple losses of loved ones, as well as incredible joys. Life was and still is busy, but I knew my main assignment was to stay whole, fostering wellness and access my creative energy for both my family and my life purpose. I had little time to meditate, which once upon a time provided sustenance before raising children. With my level of energy, I needed to be active. My choice was to walk, and I walked my way into stillness. I walked every day and still do over the last two decades, being invited into a meditative flow where each step was a foot to the ground mantra. Sometimes I walked fast, went into reverie or even poured out my soul and wept; other times, my footsteps were slow and sauntering. Most often, I ambled close to water, either the inlet sea hugging the landscapes in the company of cedar and heron, occasional eagles and salmonberries, or where I abide now, near the Fraser River with pathways in an urban environment. Eventually I walked myself into a whole artistic practice of creating and performing site-specific works in the natural world, which included poetry and dance in partnership with creation (Snowber, 2014).

My walking has been linked inextricably to my writing and my writing to my walking. Here I come apart long enough to allow my busy monkey mind, the one that has its own constant rotation, to seep through my skin and sweat and be open to insight and fresh sight. This practice has served me well over the last 30 years, and I have been incorporating practices of physicality and walking in teaching my undergraduate and graduate students for decades. I have developed a methodology of, "writing from the body," which animates the writer and researcher to write from the inside out and let this physicality infuse all their creativity, whether it is writing dissertations or making performances. I have devoted many essays as well as a book devoted to this way of working called *Embodied Inquiry* (Snowber, 2016), touched on briefly here. I take my graduate classes walking, particularly those in "embodiment." In them, we walk in silence, write haikus, let our senses take us to new dimensions or those neglected. We literally return to our senses through our senses.

Sensual knowledge is always waiting as a patient lover. One thing we cannot escape is no matter where we go we take our bodies with us. They are the all-inclusive classroom of knowing, but how one inhabits the body can be shifted. We can return and truly see, hear, smell, touch the fabric of creation from the outside in and the inside out. This becomes the embodied classroom, the lived curriculum, and learning is full-bodied, experiential, visceral and mental, and is often a door to illumination and transformation. Enlivening our creative practices includes a holistic

integration of both cognition and intuition, body and soul, mind and heart. It does not matter how one does this, it matters that there are small and tiny ways to incorporate a place where flow can happen. Small practices. Small beauties. The call to create in dangerous times. The call to be nourished in creative times.

11.8 Body as Threshold to Listening to Creativity

The body invites us into thresholds and gives us opportunity to wake up to all the parts of who we are, and what is deep inside us. Here is a reservoir of stories, ideas, ways of knowing and ultimately becoming which is a rich treasure house of beauty. Some of that beauty may be dissonant, yet we live storied lives, and each of us can only tell our own story. The word threshold is related to thresh and the German sense to tread, as in a point of entering. A window, a door, a passage to move literally through and broken open to what awaits. This is messy business and all artists, thinkers, scientists, dancers, makers, know that getting messy is part of the practice and the passageway to creation. It is a place of danger and opening, an invitation to embrace limitations and break open to pristine ways of perceiving, thinking and creating. But, what does this truly mean in real time? I propose that one way to see the body as a threshold and opening to creativity is to listen radically through and to the body. And, these ingredients too are necessary for research and creation.

There is an internal Google ability all the time happening within the body. We will search Google a thousand times—fingers to keyboard—look up every idea, possibility, fact, or nonfact and decipher its interconnections. There is much talk about "big data" in academic circles, yet there is plenty of big data happening within our bodies. I continue to ask many questions about how we have been colonized by language that is centered on the mind, noticing the absence of the body in matters of understanding, interpretation, or translation. How does one listen to the cadence of his or her own body? How do we hear the hymn of our own hearts? Ultimately, how does one here your own birdsong?

We often look outward for answers or where we think we should go, and seldom consider our wisdom within, body wisdom. Let me give you an example. My area of research is primarily under the domain of arts-based research, which includes poetic inquiry, embodied inquiry, narrative inquiry, autobiographical and autoethnographic forms of research. Within these qualitative forms of research, there is room for a partnership between the personal and universal and the personal is found in the universal and vice versa. Honoring our own lived experiences, stories, the big data of our lives and those around us are ingredients for mining and inquiry. I have had the privilege to mentor and supervise many graduate students over my career, and have had the honour to midwife hundreds of dissertations and theses come to fruition. Most often, I end up encouraging my students to listen deeply to what is arising in their lives in the present moment, because this too can inform their way of

perceiving and ultimately how their research takes shape. This most likely takes listening to the body's nuances, and beginning to trust their own insights, perceptions and their own exquisite voices.

Many times this can be a disruption; we think we are going in one direction and then change. Yet, that may be what the direction was all along, just waiting to emerge. To create takes a listening to the body, where the ink and ideas are going; the paint is going, the movement turning to follow the impulse, which is part of the making process. We are all makers and creators, and our bodies are precious and call us to attention, deep attention in research creation. Terry Tempest Williams (2012) writes, "What is birdsong, but truth in rehearsal" (49). Let us migrate to listening to our own birdsong, which can be the seeds for nourishing creativity.

11.9   Embracing the Mess

As I write this chapter I am in the process of creating a full-length show of dance, comedy and voice called, "Perfect imperfections: The art of a messy life." Even after many years of creating, dancing and writing in the midst of a full life, I keep waiting for completely uninterrupted time to create; a life of slow rhythms to gaze and daze, create, write, dance on the edge of the sea. But, this rarely happens. I grab moments and hours, perhaps several days at an artist residency or afternoons in the studio, often 5–8 a.m. before my university duties. Creating a full-length show heightens the pressure, as it is not a 5-min piece, but over an hour of continual performing. Of course, in my academic world of accountability of what knowledge is the most worth, a full-length performance equals one line on a CV, not even worth writing a journal article, yet it can take years to create.

I keep recommitting to see all of my life is food for inspiration, where philosophy is one with flesh on it. Cooking or driving, mentoring or mothering, walking or swimming, all are moments to breathe, live, and listen to ideas and possibilities, which take form and root for creating performance. Thus, I have journals of all sizes in every corner of my life, every bag, room, office and car. I may never get the time or life I want to create, but I can *live creatively*. I can be devoted to live a creative embodied life, and know this is one of the greatest gifts of being alive. Even when I am 80 years old, if I am fortunate to get to that age, I can dance with the support of the floor and do minimal dances. Our limitations are not lamentations, but places for transforming approaches to creating. Knowledge and wisdom is stored in the marrow and tissues, and it is our task to listen to the places, which are thresholds to break open to creativity. A full-bodied creativity. May we all dare to create in the midst of dangerous and beautiful times knowing that this, too, is research.

I end this chapter, only a beginning, with a bodypsalm I wrote for my graduate class. I write these bodypsalms as really letters to others and myself, yet they really write themselves. They are reminders to let the body have its way.

Bodypsalm to Dare to Create
Write what you dare not write
create what you dare not create
the places hidden in your bones
where longing and aches reside
and your dreams long to arrive
to be massaged to birth

Throw your critic out
let it reach far into the recycling bin
where it transforms to compost
for the wonder of your own stories
honour your tears, joys and disappointments
only mourn for not showing up
for your deep beautiful life
where health and wholeness
celebrate each thread of life

Listen to the impulses of your fingers
the agitation in your feet
and spread wide your toes
to touch the ground and sky
the garment of your own yearning
This is yoga toes for writing
living, breathing into the unknown
Let your discomfort
be a sign that you are going
where you have not gone
an all-inclusive to what is possible
with your unique narrative

Show compassion towards yourself
so fall free to the winter
of your own passage
and know you are called
to only be real to whom you are
This alone is enough.

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Chapter 12
Recapturing American Innovation Through Education: The Creativity Challenge for Schools

Kyung Hee Kim and Nancy Chae

Abstract This chapter introduces a research-based model for how educators can cultivate creative **C**limates, nurture creative **A**ttitudes, and develop creative **T**hinking **s**kills (CATs) in students. Described is how the current test-centric climate of the American education system smothers creativity in its students, leading to the creativity crisis in the United States. The chapter describes the components of the CATs model (Kim KH, The creativity challenge: how we can recapture American innovation. Prometheus, Amherst, 2016): the ION (i.e., inbox, outbox, newbox) thinking skills, 27 creative attitudes, and 4S climates (i.e., sun, storm, soil, and space) that are necessary for creativity development in students. The chapter also addresses how the CATs model can be used as a resistive theory and practice to provide educators with the potential to rekindle the creativity that has been lost. The CATs model can be practically integrated into educators' pedagogical practices. Ways are suggested for educators to cultivate creative climates, nurture creative attitudes, and develop creative thinking skills in students, such as by using children's picture books.

12.1   Introduction

Education should empower all students to reach their maximum potential in their areas of interest. This can be done effectively by fostering their creativity. However, American education has become increasingly dependent on high-stakes standardized tests. Such tests significantly impact as well as narrow test-takers' future options and opportunities, including higher education admissions. Schools teach to the test, tasking students with memorizing the same answers to compete for high scores. Yet, the world continues to change, requiring new questions and responses for relevant and practical challenges, like resource scarcity, poverty, energy demand, global warming, and the like, all of which necessitate creativity.

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   The purpose of this chapter is to discuss a research-based model for how educators can cultivate creative **C**limates, nurture creative **A**ttitudes, and develop creative **T**hinking **s**kills (CATs) in students amidst the test-centric climate of U.S. education. After providing context about the creativity crisis in the United States (Kim, 2011), this chapter introduces the components of the CATs model (Kim, 2016): the ION (i.e., inbox, outbox, newbox) thinking skills, 27 creative attitudes, and 4S climates (i.e., sun, storm, soil, and space). Finally, this chapter offers pedagogical practices for educators to integrate the CATs model to develop creativity in students, especially some ways educators to cultivate the sun, storm, soil, and space climates, such as using children's picture books.

12.2   The Creativity Crisis in American Education

Creativity involves making something unique and useful in one's area of interest by asking new questions and finding new answers (Kim, 2016). This process can lead to innovations in all fields, ranging from small i (everyday-life innovation) to Big I (world-changing Innovation; Kim). Many people mistake creativity as being artistic, but it can exist in all fields beyond the arts in sciences, mathematics, engineering, medicine, business, leadership, parenting, education, sports, and more. Innovation is thus a unique and useful concept, intellectual property, invention, product, or service that results from a creative process (Kim, 2016, Nijstad, De Dreu, Rietzschel, & Baas, 2010).

   However, rather than pursuing creativity, many countries attempt to replicate top-ranking Asian countries' test scores on international tests, notably the Program for International Student Assessment (PISA), SAT, and intelligence tests. The United States has significantly narrowed its own educational philosophy around cherishing the freedom to create, innovate, and invent by mirroring Asia's test-centric climate and privileging teaching to the test since the 1990s. Such changes in schools' climates have been most noticeable in the USA since the 2002 No Child Left Behind Act (NCLB) legislation and the 2015 Every Student Succeeds Act (ESSA), which mandated annual testing of school-aged students (Battenfeld, 2015; Byrne et al., 2015; Mullen, 2017; Otiko, 2015; Wong, 2015).

   These changes have not produced the desired results. Despite annual expenditures of tens of billions of tax dollars to support national testing mandates (Baines & Stanley, 2005), the latest PISA results show that American students' scores still lag far behind Asian countries' scores (e.g., Organisation for Economic Co-operation and Development (OECD), 2015). With the increasing normalization of a high-stakes testing culture, there continues to be a division among student groups due to inequitable practices and a widening achievement gap, which, in turn, diminishes the future of American children (Bohrnstedt, Kitmitto, Ogut, Sherman, & Chan, 2015; Byrne et al., 2015; Lee, 2006; Lee, Shin, & Amo, 2013; Mullen, 2017; Singh, 2013; Wong, Cook, & Steiner, 2015).

Moreover, educators are mandated to focus on standardized tests, rather than holistic standards, and test-taking skills, instead of real-world achievement. Such pressure further disadvantages students who are already behind, that is, those in poverty, minority students, those with learning needs, and English language learners. Additionally, test-centric education promotes testing meritocracy and cutthroat competition by emphasizing *effort* (e.g., *growth mindset* or *grit*) only on test scores. As a result, students experience fewer opportunities for cross-pollination with others through sharing, adapting, and building upon one another's diverse expertise that prompts networking, sound-boarding, collaborating, and win-win competing. Compassion for those in need also declines for students. Consider that testing meritocracy justifies social inequalities—high scorers' deservingness and low scorers' lack of deservingness—through the myth of laziness on the part of low scorers (e.g., Apple, 2006; Au, 2011, 2016; Booher-Jennings, 2008; Moses & Nanna, 2007).

More new teachers and educators entering the field of education are products of high-stakes testing culture than before, and they are less likely than more experienced teachers to infuse creative pedagogies in classrooms (Kim, in press). Therefore, creativity in the United States, which was once one of its greatest strengths, is currently in a state of escalating crisis (Kim, 2011, 2016). The global economic dominance of the United States may end if creativity is not nurtured again and promoted in schools and workplaces. Without preparing students to develop creative attitudes within creative climates to fulfill their true potential, the future will be left in the hands of un-creative individuals with limited insight and abilities for solving real-world problems and creating new opportunities.

Resistance theory highlights the inequities of schooling (Abowitz, 2000). It examines the impact on disadvantaged students by forcing them to conform to expected academic, social, and behavioral norms. This theory promotes action to oppose power hierarchies that reinforce policies and practices of systemic inequity. The so-called *standardized* nature of education practices and high-stakes *standardized* testing severely undercuts students' individuality and originality.

Kim's (2016) CATs model, an inherently resistive theory that promotes nonconformity and produces new thinking, has the potential to reverse the creativity crisis in America. This model based on research to develop creativity in children by educators and parents, denotes three steps in innovation: cultivate creative climates, nurture creative attitudes, and develop creative thinking skills. The United States had excellent practitioners in all three of these areas before the creativity crisis (Kim, 2011). Since American education's focus was shifted to students' weaknesses reflected in low test scores, creativity has suffered. When nations focus attention on compensating for people's weaknesses, individuals tend to become average because they lose the strengths they once had or potential to develop them. In contrast, if they attend to maximizing their own strengths and leveraging others' strengths to compensate for weaknesses, they tend to produce innovations (Kim, 2016).

12.3   Creative Thinking Skills

This section describes the major components of the CATs model and provides strategies to reverse the current creativity crisis in American education. To develop creativity and achieve innovation, students require creative thinking skills, or what Kim (2016) calls ION (i.e., inbox, outbox, and newbox) thinking skills (see Fig. 12.1).

12.3.1   Inbox Thinking

Inbox thinking is focused and narrow. It includes lower-level thinking skills, such as memorization, comprehension, and application. Although these are considered lower-level skills, they are necessary foundations for students to develop expertise or mastery in a specific area. Creative thinking rests atop expertise in a chosen area. Only through mastery, can students effectively apply their knowledge to real-world problems and develop useful solutions.

To initiate the development of mastery in a certain area, a playful introduction is necessary, not a high-stakes, assessment scenario (Kim, 2016). Playfulness in learning nurtures curiosities, which are intensified by real-life examples and applications of what students have learned. While they develop strong interest in a curiosity, interest, or preference (CPI), if they are inspired by something (e.g., an event or an experience) or someone (e.g., a role model or a hero/ine), they become driven by a desire to explore, such as through reading more about the topic, perhaps for pleasure. However, this inherent drive and desire for exploration cannot happen while studying for a test. Students' process of exploration and the inspiration they feel empowers them with the knowledge and skills required by their CPI. With a developed CPI, this, in turn, nurtures students' self-efficacy and specific strengths to
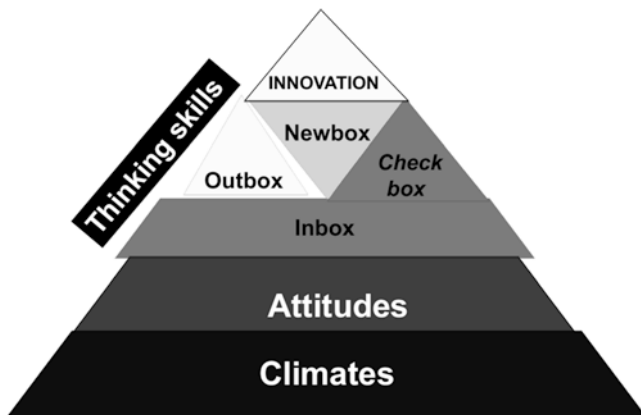
Fig. 12.1 CATs: Creative Climates, Attitudes, and Thinking Skills (inbox, outbox and newbox)

develop their passion. Once students develop a passion for a topic or subject of interest, they become courageous persisters who work or produce continuously, often and daily. These passionate learners then build their expertise in their chosen topics or subjects of interest (i.e., dance, botany, literature, and more). (Kim, 2016).

12.3.2 Outbox Thinking

Outbox thinking is unfocused and broad, and is for seeking nonconforming, unique ideas. Outbox thinking or outbox imagination is a set of higher-level thinking skills: fluent, flexible, and original thinking. By using or combining the knowledge and skills of areas of interest, students can ask new questions and find new answers. When inspired by big ideas or role models, their interests in the area are intensified and they become inquisitive visionaries. Further, if they have the freedom and opportunity to break norms to become defiant dreamers, they can see beyond their confinements and the confinements of others (Kim, 2016).

Picture books are art objects comprised of a series of images accompanied by short passages of text. Because picture books invite active participation from their readers, they are effective tools for cultivating creative climates, nurturing creative attitudes, or developing creative thinking skills (e.g., Hsiao, 2010; Sun, 2017; Tsai, Chang, & Lo, 2018). The benefits of using picture books applies to all ages (Bloem & Padak, 1996; Carr, Buchanan, Wentz, Weiss, & Brant, 2001; Wolfenbarger & Sipe, 2007). Visuals support a wider range of reasonable reader interpretations than dense prose, so they encourage readers to generate a wider variety of unique responses and imagined worlds (Tsai et al., 2018; Wolfenbarger & Sipe, 2007).

Such open-ended stimuli invite personal curiosity; readers shape the story and make it their own, becoming active agents of meaning making. This quality of picture books is especially useful for collaborative discussions and activities or questions designed to encourage the search for, and construction of, meaning, whether within a single book, inter-textually, or in connection to real-life experiences (Hsiao, 2010; Sun, 2017; Wolfenbarger & Sipe, 2007). When individuals are exposed to diverse literature, they should be able to see themselves in the books, while also taking the perspectives of others. Self-reflection and reflection of others' experiences develop empathy, imagination, curiosity, and multiculturalism, all of which are important characteristics in creativity development (Kim, 2016).

To enhance outbox imagination, students can practice using picture books that ask new or unexpected questions, using Sarah Perry's *If …,* for example. Students can find as many answers as possible to a question like "If fish were leaves …" or "If mice were hair …." Time for finding answers or generating ideas is called pollination time (Kim, 2016). Students must first generate ideas alone (self-pollination) and then as a group (cross-pollination). This sequence is more effective than cross-pollination time alone. As Kim (2016) writes, when exploring ideas, students can effectively engage in self- *and* cross-pollination time through:

1. Idea capturing: Being prepared to capture ideas at anytime and anywhere by carrying writing tools because the best ideas come when least expected.
2. Clear goal setting: Defining overall and specific goals for which ideas are generated, including setting certain time limits for brainstorming (e.g., 30 min) or developing a certain number of ideas (e.g., 50 ideas).
3. Externalizing: Displaying generated ideas for oneself and others to see.
4. Sense-pleasing: Increasing one's positive mood through the senses (e.g., listening to pleasant music, being in a natural setting, watching a funny video clip, or enjoying a tasty snack or good smell, etc.).

Beyond this, when collaborating and working with others, the following conditions are required for effective *cross*-pollination time *with others*, such as peers, teachers, parents, mentors, and others:

1. Diverse groups: Accessing diverse backgrounds, personalities, and perspectives for unique ideas.
2. No criticism or praise: Group members defer judgement on the quality of ideas (until time for inbox-critical thinking).
3. Constructive conflicts: Presenting different or even opposing ideas.
4. Piggybacking: Adding on to others' ideas.

12.3.3   Inbox-Critical Thinking

Inbox thinking also includes deeper-level critical thinking. The elements of inbox-critical thinking are checking, critically analyzing, and evaluating the outbox answers or solutions that are generated earlier for their *useful*ness (the check box of inbox thinking; Fig. 12.1). To enhance critical thinking, students can create a list of criteria to judge the qualities of outbox answers or solutions to a problem. For example, they can assign numbers (e.g., 1–5, where 5 is the best) to each solution by criterion, such as:

1. Aesthetic: How artistic or beautiful each solution is.
2. Speed: How quickly each solution can be completed.
3. Novelty: How new each solution is.
4. Ease: How easy each solution can be implemented.
5. Effectiveness: How effective each solution is to address the problem (Kim, 2016).

Using criteria in this way, students can see each solution's strengths and weaknesses compared to other solutions or answers.

12.3.4   Newbox Thinking

Newbox thinking or newbox connection combines both inbox-critical thinking and outbox imagination to transform ideas, answers, or solutions into a new creation. Newbox thinking involves connecting unrelated ideas, improving, and transforming those ideas into a *new creation*, and finally promoting it to be recognized by others as a unique and useful *innovation*. Newbox thinking exhibits the highest-level thinking skills, such as s*ynthesis*, or connecting and putting seemingly irrelevant ideas or unique and useful elements of the ideas together, and *refinement*, which improves upon synthesis by refining ideas through a balanced process of elaboration and simplification.

To enhance synthesis skills, students can practice finding similarities among seemingly unrelated ideas, objects, or beings. For example, "What are similarities between online databases and scholars?" Students can connect unrelated ideas using word association questions, for example, "How can the words, *goat*, *cottage*, and *cake* connect with one word?" Additionally, they can combine ideas using similes and metaphors. For example, "How is developing children's creativity like growing apple trees?"

In the case of refinement skills, students can practice elaboration by adding details or features to their creations or embellishing them with descriptions, arts, inventions, and the like. Students can practice elaboration by answering questions with rich information, rather than just simple or yes-or-no answers. With simplification, they can remove non-essentials to make their creations easy or clear for others to understand or use. Once students produce a unique and useful creation, they need to promote it if they want their creation to be recognized, perhaps even as a Big Innovation (Kim, 2016).

12.4   Creative Attitudes: The 4S Attitudes

Creative thinking skills do not occur overnight by a flash of brilliance or an *Aha!* moment of inspiration. Creating thinking skills must be developed and enhanced. The most effective way to develop students' ION thinking skills is to nurture their creative attitudes. Attitudes are more teachable and developmental than personality traits, which tend to be enduring. Educators must provide creative climates in classrooms and schools to produce creative learners and thinkers. Creative attitudes are characteristics shared by all notable innovators, which enable creative minds.

Research has identified 27 attitudes that predict individuals' innovations better than their IQ scores (Kim, 2016). These creative attitudes are categorized as sun, storm, soil, and space attitudes (4S attitudes), which are nurtured by the sun, storm, soil, and space climates (4S climates) respectively. Individuals' sun and space

attitudes promote their outbox imagination. Their storm attitudes encourage their inbox expertise, and soil attitudes help to develop their inbox-critical thinking. Individuals' newbox connections require all 4S attitudes, which enable them to utilize their maximum potential to achieve an innovation.

12.4.1 Sun Attitudes

Sun attitudes are characterized as individuals' big ideas and playfulness to sustain their curious impulses. Sun attitudes are nurtured by the sun climate that provides inspiration and encouragement, like sunlight and warmth. The sun attitudes help students become inquisitive visionaries who follow their curiosities and apply *outbox imagination* to their big ideas.

Outbox imagination, which is thinking fluently, flexibly, and originally to imagine something unique, is facilitated by the following sun attitudes:

1. Optimistic: Seeing positive outcomes regardless of circumstances.
2. Big-picture thinking: Projecting vision beyond the here-and-now to construct a meaningful life in the big world.
3. Curious: Insatiably seeking new information with child-like wonder.
4. Spontaneous: Being flexible and immediately acting on opportunities.
5. Playful: Approaching situations in exploratory ways and treating challenges as fun games.
6. Energetic: Deriving energy and motivation from curiosity impulses or passions (Kim, 2016).

12.4.2 Storm Attitudes

Storm attitudes are characterized as individuals' strengths to persist with and overcome challenges. Storm attitudes are nurtured by the storm climate that provides high expectations and challenges. The storm attitudes help students become courageous persisters who build and use *inbox expertise* to achieve an innovation despite failures. Inbox thinking, which is memorizing, comprehending, and applying in-depth content knowledge and skills to develop expertise in a topic (or subject), is facilitated by the following storm attitudes:

1. Independent: Making decisions free from others' influences.
2. Self-disciplined: Delaying instant gratification and avoiding distractions.
3. Diligent: Being meticulously hard working.
4. Self-efficacious: Accurate self-confidence on specific strengths.
5. Resilient: Thriving on challenges and failures.

6. Risk-taking: Leaving secure situations for uncertain rewards.
7. Persistent: Continuous commitment to goals.
8. Uncertainty-accepting: Comfortably acting on the unknown future (Kim, 2016).

12.4.3 Soil Attitudes

Soil attitudes are characterized as individuals' open, complex minds that find diverse resources and others' strengths and leverage these. Soil attitudes are nurtured by the soil climate that provides diverse resources, experiences, and viewpoints. The soil attitudes help students become complex cross-pollinators who strengthen their expertise by others' strengths and enhance *critical thinking* to achieve an innovation. Inbox-critical thinking, which is critically analyzing and evaluating unique ideas to check their usefulness, is facilitated by these soil attitudes:

1. Open-minded: Delaying judgment and considering different viewpoints.
2. Bicultural: Embracing new cultures while retaining their cultural identities.
3. Mentored: Learning from experts' brutally honest feedback.
4. Complexity-seeking: Thinking in shades of grey rather than in black and white.
5. Resourceful: Finding and using resources and opportunities (Kim, 2016).

12.4.4 Space Attitudes

Space attitudes are characterized as individuals' nonconforming ideas or expressions that challenge the status quo and authorities. These are nurtured by the space climate that provides space to think deeply and freely, which develops individuality and originality. With space attitudes, students become compassionate rebels who defy the crowd to see what others cannot, and they broaden their *outbox imagination* to magnify the uniqueness of their creation.

Outbox imagination, which is thinking fluently, flexibly, and originally to imagine something unique, is facilitated by these space attitudes:

1. Emotional: Understanding their feelings and those of others and expressing them.
2. Compassionate: Empathizing with others and improving the world.
3. Self-reflective: Analyzing their and others' feelings, thoughts, and experiences.
4. Daydreaming: Trying out a series of unrealistic or futuristic thoughts.
5. Autonomous: Being intrinsically motivated to do something.
6. Nonconforming: Choosing to differ from mainstream thought or behavior.
7. Gender-bias-free: Rejecting gender stereotypes.
8. Defiant: Challenging existing norms, traditions, hierarchies, or authorities (Kim, 2016).

12.5   Creative Climates: The 4S Climates

All children are born curious and unique with an innate capacity for creativity, but their creative attitudes and thoughts can be nurtured or hindered by their climates. These include families, schools, organizations, societies, and cultures. The most conducive climates to developing creativity into innovations are similar to the climates that grow the best apples.

Apples require (1) bright and warm sunlight; (2) fierce storms; (3) nutrient-diverse soil; and (4) open space. Likewise, innovations require (1) inspirational and encouraging *sun* climate; (2) high-expectation-holding and challenging *storm* climate; (3) resources-, experiences-, and viewpoints-diverse *soil* climate; and (4) deep- and free-thinking *space* climate (Kim, 2016). As the base of the pyramid (Fig. 12.1) indicates, the most critical aspect of the creative process is the climate, rather than the creation or the creator. Educators have most (though not all) of the control over students' climates in the classroom or school. Educators can provide physical and psychological surroundings and conditions that help students effectively express their creativity. This is especially important for students who only have access to creative outlets in the school environment. A lack of such creative climates diminishes creative attitudes, thoughts, and expressions.

12.5.1   Sun Climate

U.S. test-centric climate focuses on test scores, which encourages teachers' teaching to the test rather than playful introductions to a topic. This climate also encourages students to learn by rote memorization, with few opportunities to apply what they have learned, stifling their curiosities. Students read for test-preparation rather than pleasure, missing out on developing their cognitive skills from engaged reading and feeling motivated by curiosity (Chou, 2013; Kohn, 2010; Miller, 2015). Reading becomes a monotonous search for specific information to be retained and regurgitated later, blocking meaningful interactions with the written word. Students view reading as a chore and develop a dislike and avoidance of the most versatile and widely available tool to build expertise and inspire innovation (Allington & Gabriel, 2012; Anagnostopoulos, 2005; Assaf, 2006; De Davis & Willson, 2015; McCarthy, 2008). Such limited climates allow for few opportunities for inspirations or big dreams, inhibiting students' optimism and narrowing their future vision.

American innovation, however, can be recaptured by cultivating the sun climate again. A bright sun climate inspires students to pursue big ideas, playfully explore these ideas, and develop interests through real-life examples and applications. Educators can use picture books, such as:

- Chris Van Allsburg's *The Mysteries of Harris Burdick*
- H. A. Rey's *Curious George* series
- Chris Van Dusen's *If I Built a Car*

- Patrick McDonnell's *The Little Red Cat who Ran Away and Learned his ABC's: The Hard Way*
- Kobi Yamada's *What Do You Do with an Idea?*

Students also follow their dreams by exploring and reading about their inspirations, which later becoming their passions. By building students' reading habits for pleasure earlier in life, students' curiosities and interests intensify, and they aspire for big dreams, beyond wealth, due to being inspired by something (e.g., objects or events) or someone (e.g., role models or hero/ines). Moreover, the sun climate introduces notable innovators' lives, especially their early life stories, to inspire big dreams. To do so, educators may use picture books, such as:

- Chris Barton's *Whoosh! Lonnie Johnson's Super-Soaking Stream of Inventions*
- Chelsea Clinton's *She Persisted*
- Candace Fleming's *Papa's Mechanical Fish*
- *Who Was* series
- Gilbert Ford's *The Marvelous Thing That Came from a Spring*
- Vashti Harrison's *Little Leaders*
- Lonnie Johnson's *Super-Soaking Stream of Inventions*

12.5.2   Storm Climate

U.S. test-centric climate makes high scores the only goals that matter, preventing students from developing big dreams (e.g., goals for inspirations). The unforgiving nature of testing and test scores fosters students' fear of making mistakes and failing, which prevents them from taking risks. High-stakes testing begins at age eight (third grade), but the pressure from testing begins even earlier, often before age five (Bassok, Latham, & Rorem, 2016; Booher-Jennings, 2005; Brown, 2016; Russell, 2007, 2011). Young children develop self-images as failures, not learners, early in life (Gesell Institute, 2010; Heckman, Krueger, & Friedman, 2004; Jones, 2015; Stipek, 2006), which inhibits them from learning from mistakes and failures. The climate's emphasis on *effort* solely for high scores allows students few opportunities to master a chosen topic, build self-efficacy in it, and develop it into their passion (Kim, in press; e.g., Hsu, Hou, & Fan, 2011; Tierney & Farmer, 2002).

American innovation, however, can be recaptured by cultivating the storm climate again. The fierce storm climate provides high expectations and challenges to students, which are necessary for building their resilience and persistence. The big dreams from the sun climate become clear goals in the storm climate. In the storm climate, students are provided with brutally honest feedback to develop a specific strength (i.e., in-depth expertise). Students work toward mastering the knowledge and skills of a chosen topic in pursuit of their goals. The storm climate also promotes students' resilience by gradually enlarging challenges and sharing stories of notable innovators' adversities, and educators may use picture books, such as:

- Robert Coles's *The Story of Ruby Bridges*
- Delores Jordan and Roslyn M. Jordan's *Salt in His Shoes*
- Kathleen Krull's *Wilma Unlimited*
- Debbie Levy's *I Dissent: Ruth Bader Ginsberg Makes Her Mark*
- Dan Santat's *After the Fall*
- Barb Rosenstock's *Ben Franklin's Big Splash: The Mostly True Story of His First Invention*

The storm climate also strengthens students as they take risks and learn from their own and others' mistakes and failures, and educators are encouraged to use picture books, such as:

- Charlotte Foltz Jones's M*istakes That Worked: 40 Familiar Inventions and How They Came to Be*
- Corinna Luyken's *The Book of Mistakes*
- Barney Saltzberg's *Beautiful Oops!*
- Andrea Tsurumi's *Accident!*

Moreover, students develop persistence by continuously working daily to follow their passions, achieve their goals, and excel at something they love to do. Persistently producing many creations increases the chance for one of their ideas to become recognized as an innovation (Kim, 2016). Recommended pictures books to encourage persistence include

- Carme Agra Deedy's *The Rooster Who Would Not be Quiet!*
- Ashley Spires's *The Most Magnificent Thing*
- Mem Fox's *Koala Lou*
- Vera B. Williams's *A Chair for My Mother*

12.5.3   Soil Climate

U.S. test-centric climate promotes testing meritocracy that emphasizes *effort*, but the truth is that students' socio-economic backgrounds tend to impact their scores more than their effort or school characteristics (e.g., Dobrick, 2014; Grodsky, Warren, & Felts, 2008; Singh, 2013). Yet high-scorers blame low-scorers for their laziness while low-scorers blame themselves, perceiving their lack of effort as the only obstacle to success (e.g., Apple, 2006; Au, 2011, 2016; Booher-Jennings, 2008; Moses & Nanna, 2007). This fosters cutthroat competition for high test scores and rankings, which inhibits cross-pollination with others (Kim, in press). Moreover, students' sole focus on preparing for tests prevents them from being exposed to diverse experiences and viewpoints, which in turn minimizes opportunities for them to develop critical thinking skills and complex minds (Kim, in press).

American innovation, however, can be recaptured by cultivating the soil climate again. The diverse soil climate provides students with diverse resources, experiences, and viewpoints. The soil climate includes people (e.g., mentors or non-peer

collaborators), knowledge (e.g. academic and independent learning), things (e.g., learning tools or objects), and perspectives (e.g., different intellectual, fields, or cultural perspectives). Students can also cross-pollinate with diverse people, networks, and communities to build upon one another's strengths and passions, and educators may use books, such as:

- Brian Biggs's *Tinyville Town Gets to Work!*
- Jen Campbell's *Franklin's Flying Bookshop*
- Junot Díaz's *Islandborn*
- Matt Lamothe's *This is How We Do It: One Day in the Lives of Seven Kids from Around the World*
- Patricia Polacco's *The Junkyard Wonders*

It is important to acknowledge that cross-pollination focuses on one's strengths, not weaknesses, and students continue to learn about how everyone has different strengths that benefit all. To promote collaboration while also highlighting uniqueness, educators may use picture books, such as:

- Leo Lionni's *Swimmy*
- Trudy Ludwig's *The Invisible Boy*
- Margaret Mahy's *The Seven Chinese Brothers*
- R. J. Palacio's *We're All Wonders*

Cultivating the soil climate also develops students' cognitive complexity through various experiences, including early job experiences and interactions with diverse people, and in addition, students practice perspective-taking and gray thinking, instead of good-or-bad or black-or-white thinking (Kim, 2016).

12.5.4 Space Climate

U.S. test-centric climate focuses only on the right answers and repeating the same, old answers. This focus on finding only the right answers or one answer discourages students not only from asking new questions but also from generating multiple answers, which limits their fluent imagination (Kim, in press). Test-centric education forces conformity, stifling individuality and original imagination. Conformity occurs in three ways by: (1) enforcing school accountability against one-size-fits-all standards for specific content and skills; (2) controlling both content and methodology, which turns teachers into technicians following the same scripts; and (3) forcing students to learn exactly what and how (i.e., rote learning). Different, unusual, or unexpected answers are wrong and often banned (e.g., Au, 2011, 2016; Booher-Jennings, 2008; De Davis & Willson, 2015; Duffy, Giordano, Farrell, Paneque, & Crump, 2008; Fulcher, 2009; Moses & Nanna, 2007). Students are forced to learn the standards and tested materials set by authorities, which fosters their unquestioning belief in authorities. Such experience of conformity limits their ability to debate

or argue as well as to question or challenge rules, conventions, or hierarchies (Kim, in press).

American innovation, however, can be recaptured by cultivating the space climate again. The open space climate allows students to experience a space where they can think deeply and freely, and students also experience the time to develop their own individuality through questioning and learning. Educators can enhance students' distinctiveness and ability to challenge the status quo, realize their full potential, and achieve their unique creation (Kim, 2016). The space climate gives space and time for students to play actively, think deeply in solitude, and let their imagination soar, and educators may use picture books, such as:

- Kevin Henke's *Chrysanthemum*
- Suzy Lee's *Lines*
- Jack Prelutsky's *Me I Am*
- David Shannon's *A Bad Case of Stripes*

The space climate also promotes compassionate acts by helping others in need and reading about how compassion benefits all. To encourage compassion, educators may use picture books, such as:

- Matt de la Peña's *Last Stop on Market Street*
- Arnold Lobel's *Frog and Toad are Friends*
- Carol McCloud's *Have You Filled a Bucket Today?*
- Jerry Pinkney's *The Lion and the Mouse*
- Jacqueline Woodson's *Each Kindness*

Moreover, the space climate promotes challenging rules and authorities by asking new questions and finding alternative or multiple answers. To promote outside-of-the-box thinking, educators may use picture books, such as:

- Linda Liuka's *Hello Ruby: Adventures in Coding*
- Jenny Offill's *11 Experiments that Failed*
- Antoinette Portis's *Not a Box*

The space climate also promotes teaching strategies that include practicing the art of debate, and to encourage nonconformity and defiance, educators may use picture books, such as

- Andrea Beaty's *Rosie Revere, Engineer*
- Demi's *The Empty Pot*
- Jessica Herthel and Jazz Jennings's *I Am Jazz*
- Patty Lovell's *Stand Tall, Molly Lou Melon*
- Robert Munsch's *Stephanie's Ponytail*
- Dr. Seuss's *Yertle the Turtle*
- Jeanette Winter's *The World is Not a Rectangle: A Portrait of Architect Zaha Hadid*

12.6 Conclusions

Innovators are nurtured by, rather than born into, their 4S climates that greatly influence their 4S attitudes and ION thinking. Inbox expertise in one's chosen field, outbox imagination, critical thinking, and newbox connections take years to develop; however, these are not mysterious gifts or talents only available to geniuses. ION thinking and the 4S attitudes are teachable and learnable skills for everyone. When educators more consistently nurture students' 4S attitudes, the students are more likely to use ION thinking. Together with the 4S climates and 4S attitudes, ION thinking empowers students' creative minds during the creative process.

The future depends on innovations in education. Innovations, as unique and useful outcomes, resist the normalization of high-stakes standardized testing and pedagogical practices that teach to the test. The confining, pressurized, and discouraging nature of U.S. test-centric education hinders creativity development in students. Imagine the unlocked potential among students, who now only sit uncomfortably and restlessly in rows, miss playtime and exploration to prioritize increased rote learning, and become experts in bubble sheets for multiple-choice tests. Creativity will continue to decline if American education does not support educators with the necessary tools and freedom to integrate creativity in curricula, classrooms, and overall school cultures.

Finally, creativity has the power to transform the good to the best. History has shown that it only takes a few educators to make striking advances for humankind. Question established authorities (e.g., NCLB, the Department of Education, Educational Testing Service [ETS], College Board) and empower students through the CATs model to recapture the American innovation that has been tested out of them.

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Chapter 13
Collaborative Therapy and Playback Theatre: A Collaborative-Dialogic Model of Insight

Michael S. Eason, Trevor H. S. Lam, Anna N. N. Hui, Raysen W. L. Cheung, and Elaine S. C. Liu

Abstract This chapter discusses findings from two original empirical studies in psychotherapy/counseling and playback theatre (PT) using creative collaborative methods to examine insight in professional practice domains. One study was an exploration of the meaning-making process amongst social workers and social work students who engaged in PT, while the other was an investigation of the experience of clients' insight while undergoing collaborative language systems (CLS) psychotherapy. Both counselors and social workers belong to the super creative core, that is, creative professionals who work in professional services that help individuals gain a creative perspective in making changes in one's personal development. An original collaborative-dialogic model of psychotherapeutic insight, proposing that insight is a collaborative accomplishment through dialogue, is presented as a framework for insight development. Additionally, the mechanisms (the *how*), objects/contents (the *what*) and outcomes (the *significance/meaning*) of insight and meaning-making are compared in these two studies. Our studies indicate that PT is a creative medium for enhancing reflective thinking among social workers/social work students in professional education, and that collaborative therapy is a creative technique for professional counselors in generating clients' insights. Implications for theory and professional practice domains are discussed.

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13.1   Introduction

Creativity is viewed as a fruitful and productive activity across many domains of human experience, including in professional practice and education fields. According to Florida's books on *The Rise of the Creative Class* (2002) and *The Rise of the Creative Class: Revisited* (2012), counselors, social workers, psychologists, and educators all belong to the super creative core in the social science, education, and training fields. This professional type of creativity (Pro-C or professional creativity) is defined as a developmental and effortful progression to attain professional-level expertise in a knowledge domain or an industry, according to Kaufman and Beghetto's (2009) 4C model of creativity. This chapter explores original research on how creative methods were utilized in the two professional practice domains of psychotherapy and social service provision to enhance insight and meaning making. Practical and theoretical implications are discussed along with suggestions for creative educational practices.

13.2   Insight in Psychotherapy

Insight, broadly defined, is often simply conceptualized as new understanding, awareness, or knowledge. It has often been described as an "aha!" experience or a eureka moment. From its beginnings with the Freudian psychoanalytic notion of insight as the process of bringing unconscious thoughts and feelings into conscious awareness, insight has played a significant role in developing psychotherapy practices. While psychoanalyst Sigmund Freud himself only used the term *insight* once in his writings, "reverence for the process of learning and the attainment of knowledge that infuses Freudian theory probably laid the groundwork for the assumption that achieving insight into one's psychic processes correlates with mental health" (cited in Messer & McWilliams, 2007, p. 10). Post-Freud, for many years the psychological study of insight has focused on laboratory-based, problem-solving experiments (Sternberg & Davidson, 1995). Insight has been explored in such domains as human creativity, decision making, psychiatry, and counseling/psychotherapy (henceforth, we use the terms *counseling* and *psychotherapy* interchangeably).

Klein's Triple Path Model (2013) was designed originally to help explain insightful decision making in naturalistic settings. This framework suggests three ways of building one's own insights or assisting clients in psychotherapy to attain insights. The first insight production method is the connection path (inclusive of coincidences and curiosities) for insights, which involves encouraging clients with making connections to new information provided in a process rather than disapproving their original way of thinking. The second method is the contradiction path for insight, helping clients with making observations of others' behavior in order to

learn new criteria for behavior and to give up holding onto some contradictory beliefs relevant to their own. The third method, the creative desperation path for insight, is for clients whose diagnosis involves unconsciously fixating on a flawed belief and not being aware of assumptions they make. This type of client could be helped with a designed analogous experience that challenges such a belief. The importance of these insight-building methods is that they require therapists to listen and to appreciate clients' own experience and any thinking that is obstructing them. Disapproving their thinking and providing an answer right away without a developmental participatory process for the client is not what we recommend. Therefore, for a psychotherapist to be competent in creating a process for clients to become insightful, it is important for the psychotherapist to set a goal for him or herself to appreciate this special path for growth.

In the field of psychotherapy, insight continues to be a rich topic of academic investigation, without full consensus regarding issues of research methodology, measurement, and definition (Hill et al., 2007). One reason for the varying definitions and conceptualizations of insight is the different theoretical backgrounds of the practitioners utilizing the term. For example, in cognitive behavioral therapy (CBT), *insight* has been defined as "the acquisition of new understanding" (Holtforth et al., 2007, p. 57). They further note that insight in CBT has also appeared in the literature under various other names such as "cognitive change, cognitive restructuring, rational restructuring, cognitive realignment, rational re-evaluation, or discovery of irrationality" (p. 59). Alternatively, in humanistic or experiential therapies, insight may be defined as awareness, meta-awareness, or a new perspective (Pascual-Leone & Greenberg, 2007). Regardless of the nuances inherent in describing it, insight has broad relevance to the totality of psychotherapy discourse as it is noted as a factor that is common across various treatment modalities (Lehmann et al., 2015). That is, insight is assumed to play a role in all therapies, no matter the theoretical background in which the therapy is rooted.

A recent consensus of experts in the field has defined insight as "a conscious meaning shift involving new connections (i.e., 'this relates to that' or some sense of causality)" (Hill et al., 2007, p. 442). While this definition provides some clarity as to what insight is, that is, a shift in meaning involving some sense of newness, connection, or causality, it does not explain an underlying mechanism or process for insight production. To address this gap, Eason (2017, henceforth referred to herein only sparingly with the year), one of the chapter's authors, designed a participatory research inquiry into the nature of insight as collaboratively (co)produced between the therapist and the client in therapy. His doctoral research resulted in an original collaborative-dialogic model of insight, proposed to be applicable across therapeutic modalities as rooted in something common to all modalities: the therapeutic dialogue. This model of insight is illustrated later in the chapter (see Fig. 13.1).

Due to its all-embracing and transtheoretical nature, Hill et al.'s (2007) aforementioned definition of insight is utilized as our working definition of insight. While Eason's research and updated definition was also embedded in Hill et al.'s work, the former expanded upon the underlying mechanism of the process and is thus pro-

vided here as a new contribution to the literature on psychotherapeutic insight, describing it as

> a conscious meaning shift involving new connections, occurring collaboratively between a therapist and a client through the process of a therapeutic conversation or upon post-session reflection of the therapeutic dialogue; the content of the insight may vary from client to client. (Eason, 2017, p. 152)

13.3 Insight in Social Service Provision/Social Work

As a construct, insight is not as heavily associated with the practice of social work as it is with psychotherapy. For our purposes, it might be more practical to use the term *meaning making* (instead of insight) when referring to the new knowledge or awareness gained through social work provision, as literature does exist to address that topic. Additionally, meaning making and insight have many similarities and quite often overlap, with the process of meaning making itself being one pathway to insight (Eason). Meaning making is thus an aspect of the insight process. Here, we adopt a postmodern conception of *meaning making*; i.e., since reality is socially constructed, it follows that insights and meanings—as particular aspects of reality—are also socially constructed, embedded and negotiated through dialogic interaction. So, meaning making is a component or aspect of insight in the reflective practice of social work (Krueger, 2005).

Meaning can be defined as "shared mental representations of possible relationships among things, events, and relationships. Thus, meaning connects things" (Baumeister, 1991, p. 15). Meaning appears important for individuals undergoing different life experiences. Meaning making when confronting stressful life experiences may focus on "restoration of meaning in the context of highly stressful situations" (Park, 2010). In Park's meaning-making model, the basis of making meaning is referred to as "global meaning," a cognitive framework that people can use to interpret their experiences and motivation. And, situational meaning is how individuals appraise a particular situation and assign meaning to them. The process of meaning making is initiated when there is a discrepancy between global meaning and situational meaning. If successful, people "restore a sense of the world as meaningful and their own lives as worthwhile" (Park, p. 258).

While individuals may gain insight or meaning into multiple different areas of identity, one particular focus of this chapter is professional identity. Generally, with the identification of various facets including benefit-finding (Sonenshein & Dholakia, 2012), professional identity (Barraclough, 2014) and professional development (Daley, 2001), meanings identified by professionals about their work experience can then be categorized into these three main themes.

The first theme of benefit-finding is a construct referring to the careful appraisal of an event or relevant experience being linked to positive emotions and benefits more than adversity (Tennen & Affleck, 2002). Such events or experience include

lessons learnt from previous events (McTighe & Tosone, 2015), the meanings and reasons of experiences (Dutton & Jackson, 1987), and the interpretation of the positive influence on self from experiences (Tennen & Affleck).

A second main theme is professional identity. According to Hutchinson and Tracey (2015), professional identity entails understanding the self, regarding one's profession, and what is established from our knowledge, actions, and perception of self. Such factors arise from individuals' personal beliefs, motivation, and characteristics (Lister, 2000), their interpretation on work contents (Pratt, Rockmann, & Kaufmann, 2006), and personal values reflected from conflicts and questions in relation to work content (Postle, 2007). Additionally, such creative and professional identities refer to both self-understanding (how individuals think of themselves) and the reflected appraisals on their understanding of self through a looking glass, shaped outside of oneself (Oyserman, Elmore, & Smith, 2012; Wallace & Tice, 2012).

The third theme of professional development within the social services field is essential. Social workers, like therapists, must be current on the latest research and best practices associated with their field in order to provide effective and ethical working relationships. Professional development in this context alludes to the continual growth of people's professional perception of their future career. Beresford, Branfield, Maslen, and Sartori (2007) proposed that professional development could be affected by individuals' relationships with their service users who may come from a variety of backgrounds. Additionally, relationships with supervisors were also found to influence professional development (Peach & Horner, 2007). Therefore, these two factors (relationships with service users and with supervisors) highlight the importance of the interpersonal component to professional development.

In sum, the research findings on meaning making in social service/social work provision cover a wide range of topics, but these have consistency when it comes to professional development and identity formation. These reflect and overlap with similar findings about insight as a topic in psychotherapy, according to Eason. The way in which some insights in psychotherapy are linked to identity are discussed later herein.

13.4   Collaborative-Dialogic Model of Psychotherapeutic Insight

As previously mentioned, Eason developed a model of psychotherapeutic insight that can be broadly applied to therapeutic conversations regardless of therapeutic modality. In this model (see Fig. 13.1), insight is viewed as a conversational accomplishment arising from the collaborative therapeutic dialogue and is comprised of three aspects: an object or content, a process or mechanism, and an outcome.

Eason's co-participants (clients in ongoing psychotherapy with him) gained insight into five content areas: feelings/emotions, issues/struggles, identity/self,
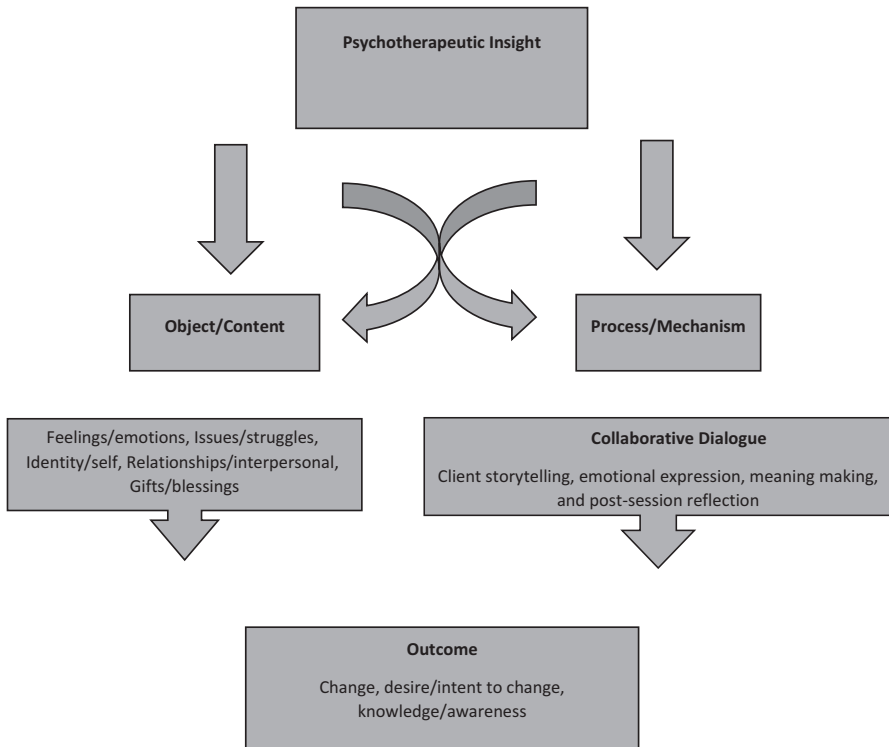
Fig. 13.1 Collaborative-dialogic Model of Psychotherapeutic Insight (Eason, 2017)

relationships/interpersonal, and gifts/blessings. These insights arose through the process of a collaborative dialogue involving four components: client storytelling, emotional expression, meaning-making, and post session reflection. Ultimately, the outcomes of these insights were compartmentalized into three main themes: change, desire/intent to change, and knowledge/awareness. These components of insight are elaborated further in the Discussion section of this chapter.

Insight has been noted as "something all psychotherapies provide in one way or another" (Wampold, Imel, Bhati, & Johnson-Jennings, 2007, p. 134). While there is definitional confusion regarding the exact nature of insight, its relevance in therapeutic ventures is not under suspicion. But, insight is not confined solely to the practice of psychotherapy; rather, its field of influence extends into other professions, such as education, art, and any endeavor involving creative and novel solutions, actions, or ways of thinking. If conceptualized as a new form of meaning making, then insight is also a relevant factor in social work and playback theatre (PT), as Lam (2017) demonstrated and clarified further.

13.4.1 Collaborative Therapy (CLS)

Psychologists Harlene Anderson and Harold Goolishian developed CLS, a form of psychotherapy, in the United States. CLS is a postmodern approach to therapy grounded in the theoretical framework of social constructionism, hermeneutics, and narrative theory (Anderson, 1997). A full description of these deeply complex ideas is beyond our scope, but, as a brief overview, social construction theory is the idea that reality is constructed collaboratively through social meaning making. Hermeneutics is the art of interpretation, originally rooted in elucidating religious texts. Narrative theory supports the notion that our lives are storied and that we make meaning by telling stories in some form (Anderson, 1997; Bruner, 1990). Narratives are not just stories about our lives, but narratives *are* our lives is the idea.

In addition to its theoretical framework, CLS is postmodern in its application and delivery of therapy. It focuses on the therapeutic relationship and decenters the position of the therapist from expert to learner, thus having a focus on "curiosity and 'not knowing'" (Gehart, Tarragona, & Bava, 2007, p. 375). This nonexpert position is also adopted when one wishes to conduct research from a collaborative stance, as Eason demonstrates in his work on psychotherapeutic insight.

Therapist-client relationships in CLS are more egalitarian than traditional therapy relationships that view the therapist as an authoritative source of knowledge. Knowledge in CLS is not passed directly from the therapist onto the client; rather, it is (co)created through and within the conversational dialogue between therapist and client (Anderson, 1997). As such, the position of curiosity maintained by the therapist involves creating a space in which the client can inquire and be curious around events in her or his life without the therapist presupposing the personal meaning attached to these events. Meaning is coconstructed in this safe space and with the mutual curiosity that guides therapeutic conversations. This spirit of curiosity transforms into "mutual learning as client and therapist coexplore the familiar and codevelop the new, shifting to a mutual inquiry of examining, questioning, wondering, and reflecting with each other" (Anderson & Gehart, 2007, p. 47).

13.4.2 PT

PT is a form of theatre developed by Jonathan Fox and Jo Salas in the USA during the mid-1970s. Audience members share personal stories from their lives during an improvisational production. These are then spontaneously acted out on stage by a group of performers, called "the troupe" in PT. Far from being an unknown phenomenon, PT is conducted in a variety of settings, such as schools, hospitals, and community centers, and was performed as of well over a decade ago in 50 countries worldwide (Salas, 2005). For example, the Hudson River Playback Theatre in New York developed programs to help more than 15,000 students of various ages deal with bullying. Salas also reported that the PT process fosters a sense of solidarity, empowerment, and compassion around the problem of bullying.

PT as a process also involves a performer who serves as a conductor and a participant who takes the role as a "teller." In a performance session, the conductor invites the teller to come on the stage and share his or her narrative, or personal story of their choosing. During this sharing, the conductor asks questions that guide the teller to explore the meaning of his or her narrative. After the teller has finished, the actors and musician(s) improvise on the narrative while performing it. When the enactment ends, the teller shares feedback on the performance, a self-reflection, generating new meaning or insights before the conductor invites the next teller onto the stage.

It should be noted that the founders of PT do not equate it with psychotherapy. Nevertheless, there are commonalities between PT and some forms of therapy focusing on storytelling and meaning making, such as Michael White's (2007) narrative therapy and the field of psychodrama. In the Cognitive Behavioral Narrative Psychodrama model proposed by Azoulay and Orkibi (2015), the components of narrative therapy are integrated in its second phase of role playing. Through dramatic externalization, the problem-saturated narrative is deconstructed; individuals learn to externalize the problem, i.e., to separate it from their sense of identity and instead attribute it to modifiable situations. This aesthetic distance from the problem enables individuals to step back and reflect on the problem, and to be ready for initiating a dialogue to make a change.

There is also evidence that PT can be a useful tool in mental health recovery. In their study from the mental health field, Moran and Alon (2011) utilized PT with 19 adults recovering from depression, schizophrenia, and bipolar disorder. Using both quantitative measures and qualitative reports, after a 10-week PT course, participants reported benefits of enhanced self-esteem, self-knowledge, fun and relaxation, connection, and empathy for others. Additionally, in another study (Salas et al., 2013), PT was incorporated into a training program for 1st-year medical students at the Baylor College of Medicine in Texas, USA. These students were able to share stories openly, thus creating more solidarity than is typical in such intense programs and lessened feelings of pressure and isolation. Results indicate that PT can be a useful tool for improving students' reflections and communication skills and for fostering a sense of community while assisting in professional identity development. Such outcomes suggest that PT could be integrated successfully into mental health recovery programs. PT is also an example of thinking-outside-the-box by using an innovative method for enhancing Pro-C within a professional practice domain.

PT and CLS therapy can be viewed as creative modalities for use in professional practice domains. These share many basic concepts, such as stories and storytelling as a means of communication and human connection. CLS and PT also find common ground in the framework of social constructionism and its emphasis on collective meaning making. As PT cofounder Salas (2009) states, "People need stories in order to know who we are as individuals and as a society. The stories we tell of ourselves and our world crystallize and communicate social and personal self-knowledge" (p. 447). To clarify, the professional practice stories we are exploring here are located in the fields of social work and psychotherapy, with the respective creative modalities of PT and CLS therapy.

13.4.3 Study Description Using CLS

In Eason's study, the researcher Michael Eason invited his therapy clients to participate in the research process. Mindful of the potential ethical issues involved, he employed multiple safeguards against researcher bias effects. Such due care included participant verification (clients reviewed the interpretation of results, with freedom to agree or disagree) and triangulation (multiple sources of data and data collection techniques, such as therapy transcripts, research interviews, clients' completion of open-ended questionnaires, email correspondences, etc.) Moreover, the study aligned with a collaborative, participatory approach to research methodology. Eight participants engaging in ongoing psychotherapy with the therapist contributed to the project. A small but diverse sample, demographics constituted a mix of four different nationalities, a 50/50 male-female split, ages ranging from 21 to 52, with a median age of 33.75, and a variety of occupations. Also, they gave different reasons for seeking psychological treatment. Treatment reasons included depression, anxiety, depression and anxiety mixed cluster, and relationship issues. Such diversity lends validity to the theoretical generalizability of the sample, despite its size.

The collaborative research methodology involved an iterative process of co-participatory inquiry. After the client agreed to participate in the study, the next regularly scheduled therapy appointment was chosen for the project. This arbitrary selection eliminated any potential bias in terms of selectively choosing only positive or successful sessions. The chosen therapy session was audio-recorded and transcribed solely by the researcher. This decision follows guidelines for collaborative research and qualitative interviewing (as per Anderson & Gehart, 2007; Brinkmann & Kvale, 2015) for being fully involved in the data and "creating maximum familiarity with the text and ultimately allowing for a more thorough and efficient analysis" (Gehart et al., 2007, p. 381).

After transcribing the therapy session, the therapist/researcher analyzed the text using thematic analysis, specifically Angus, Hardtke, and Levitt's (1996) narrative processes coding system (NPCS). The NPCS segments of the analysis underwent interrater reliability checking with a psychologist not connected to the study, and high levels were established (90% and 85.7%). The clients (also acting as co-researchers) were given a copy of the transcript as well to analyze, providing any feedback regarding their experience of reading it. The clients also completed a modified Helpful Aspects of Therapy (HAT) form (adapted from Elliott, Slatick, & Urman, 2001).

Following an average of 3 weeks from the recorded session, client and therapist met for a second interview, this time as co-researchers coming together to investigate together the original transcript. In this different role, the client is empowered as an equal participant, sharing a curiosity around the subject matter and given space to freely and openly provide her or his feedback. In this collaborative research dialogue, co-participants compared their respective analyses, and this sharing session was transcribed in its entirety. In the final work, Eason produced convergent and divergent perspectives, themes/patterns, and analyses in a narrative product

reflecting the voices of both therapist and client. A key contribution from the work was the development of a collaborative-dialogic model of psychotherapeutic insight (Fig. 13.1), as already described.

13.4.4 Study Description Using PT

As previously noted, PT involves the impromptu performance of personal life stories from audience members. For Lam's (2017) study, the conductor, a collaborator of the researcher, was an experienced member of the PT company. The conductor began the PT by inviting audience members to share their narratives. Those responding were practicing social workers and social service associates (including project officers in the social service teams of some non-governmental organizations), and in-training social service associates with initial experience providing social services through practicums and internships.

Based on Lam's quantitative results, these tellers/participants showed greater reflexivity after watching performances in PT, with higher scoring in reflections reported along with more initiations in reflective narration in post-performance interviews. In-service tellers and those with more job experience demonstrated greater initiations for reflection on the performance. Tellers with trust towards the conductor also reported more reflections after watching performances. Lam's analyses indicated that tellers' themes based on their reflections on professionalisms before performances were as follows: benefit-finding, professional identity, and professional development. Participants found benefits from their experience of the interview for helping them organize and make meaning on their social service experience. They also identified features that would in turn contribute to the construction of their professional identity, such as listening to people, better understanding of the service user group (client base), and more. And they further commented on their future career and professional goals. After performances, tellers also reported reflections inspired by the actors and symbolizations and metaphors from the reenactments in their performance evaluations.

13.4.5 Therapeutic Path of Insight: Collaboration and Playback

In alignment with a collaborative approach to both research and therapy, Eason's collaborative-dialogic model emphasizes the value of the therapeutic relationship in insight development. Insight is thought of as a conversational accomplishment between two parties: the therapist and the client. This conceptualization of insight is different from other domains, such as creativity or decision making, wherein the development of creative insight typically occurs as a solo or individual

accomplishment. Psychotherapy (as the talking cure) is by its very nature collaborative, so it makes intuitive sense that results emerging from the psychotherapeutic endeavor, such as insight or lifestyle changes, are collaboratively inspired. Eason's research provides preliminary empirical support for the notion that effective psychotherapy is more of a collaboration than a solo accomplishment.

Insight attainment from a collaborative-dialogic perspective suggests a therapeutic path or underlying mechanism of insight. In the professional practice of psychotherapy, insight seems to be generated from a type of collaborative dialogue consisting of four components: client storytelling, emotional expression, meaning making, and post-session reflection. The three key processing modes in therapy (i.e., client storytelling, emotional expression, and meaning making) were pre-established by Angus and Greenberg (2011) in working with emotion-focused therapy.

Based upon his 2017 collaborative research project, Eason added the process of post-session reflection to these three pre-established modes. Post-session reflection occurs after the session has ended. At this time, clients have the opportunity to reflect on thoughts and emotions that arose during the co-constructed dialogue, as with Eason's study whereby the client in session arrived at new insights through this process of reflection. These post-session reflection opportunities are considered extensions of the therapeutic collaborative dialogue. Even though the therapist is not physically present during the post-session reflection, reflections are focused upon the therapeutic dialogue; thus, post-session insights have their seeds in the actual therapeutic hour but sometimes tend to sprout only afterwards.

As for PT, the path of insight is more ambiguous as PT is not primarily a therapy. Indeed, "most writings that address PT's therapeutic attributes avoid defining it as a therapy and therefore do not supply the reader with a clear therapeutic route to follow" (Barak, 2013, p. 109). We address this knowledge gap by suggesting that the therapeutic route of PT follows a similar path to the route of insight development in psychotherapy and by showing examples of commonality from original research (i.e., Eason, 2017; Lam, 2017) that support this claim.

13.5   Discussion

We have presented research from two creative approaches: CLS and PT. In exploring insight production in the professional practice domains of psychotherapy and social work, Eason's model of insight was utilized as a framework to suggest a causal mechanism. Through the process of his analysis, insight as a construct was broken down into an object/content, while simultaneously consisting of a process/mechanism. Insight also results in some form of an outcome for the client. Thus, insight has these three components: object/content, process/mechanism, and outcome. Similarities and differences related to the model as applied to the domains of psychotherapy and social work are now discussed.

13.5.1   Object/Content: Component of Insight

In Eason's study, insights as experienced by clients were divided into five content areas: feelings/emotions, issues/struggles, identity/self, relationships/interpersonal, and gifts/blessings. This finding implies that clients do not simply have ambiguous insights; instead, insights seem to occur in relation to an object or a subject matter, such as relationships with family member(s), their past or future, or a specific feeling. To elaborate, a client may experience insight about a repressed emotion from their past, about a struggle with an aspect of their identity, about a toxic relationship in their life, and so forth. The content of an insight varies from client to client.

Elliott (2007) previously identified five content areas around which insight events in therapy are themed: interpersonal patterns, reason/goal, specific emotions, type/kind of experience, and responsibility/attribution. Eason's study replicated Elliott's content areas of internal patterns and specific emotions and further identified three additional content themes: issues/struggles, identity/self, and gifts/blessings. (While these are largely self-explanatory, the theme of gifts/blessings may require clarification. These are simply positive traits or strengths the client identifies as having, such as being a good friend or having high self-esteem). These three alternative themes reflect the insight contents found amongst Eason's group of respondents, as different from Elliott's group, suggesting that other researchers could further identify different as well as additional themes in their own work with clients on this topic.

From Lam's (2017) PT study, tellers' insights from the analyzed interviews matched the contents in the collaborative-dialogic model, such as feelings/emotions and relationships/interpersonal. Although all these contents were related to the tellers' professions, these could still be matched with the terms under the "object/content" category. Feelings/emotions corresponded to the theme of feelings identified in tellers' performance evaluations. The other content areas corresponded to themes identified in tellers' reflexive narrative process—issues/struggles and relationship/interpersonal to the theme of professional development, identity/self to professional identity, and gifts/blessings to benefit-finding.

13.5.2   Process/Mechanism: Component of Insight

For the process of insight production in psychotherapy, Eason recently proposed his collaborative-dialogic model of insight. The mechanism of insight is a form of collaborative dialogue involving the components of client storytelling, emotional expression, meaning making, and post-session reflection. This collaborative dialogue shares certain commonalities with the process of PT in Lam's (2017) study.

To explain, during PT interviews, the conductor would ask tellers questions to guide their reflection on emotions and the life experiences under discussion. This process is similar to collaborative dialogue in Eason's study in the way that it

involved tellers' storytelling and the conductor's inviting their review of their own personal narratives. Emotional expressions were encouraged to let the tellers both recall emotions in that experience as well as reflect upon them. When tellers engaged in the dialogue and later performance, they interpreted the actions and words of the actors and symbols involved, suggesting they had made meaning from both the dramatic elements and their own narratives. In Lam's study, a post-performance evaluation/review was added, and some tellers reported their reflections based on the performance. This post-performance evaluation/review is similar to the post-session reflection in Eason's study. Therefore, both the interview and performance can be theorized as therapeutic routes to insight in PT.

From both these studies, the path to insight or meaning-making involves a reflective component and an externalizing component. In CLS, the reflection can occur as therapy and client reflect together on their conversation within the therapeutic hour. It can also occur post-session as the client independently continues to reflect on and draw meanings from the therapeutic dialogue. In PT, meaning making can be instigated when the teller asks the audience member for feedback on the performance just witnessed. In addition to reflection, both these processes involve a component of externalization, or outwardly representing inner states, feelings, thoughts, narratives, etc. In therapy, client stories are externalized verbally through collaborative dialogue, while in PT an audience member's stories are externalized through the improvisational performance.

13.5.3   Outcomes of Insight: Component of Insight

In Eason's study, the outcomes of insight are identified as change, desire/intent to change, or knowledge/awareness. There has long been a debate in the psychotherapy literature about whether insight is only useful if linked to some form of behavioral change or, alternatively, if insight has intrinsic value even in the absence of change (e.g., Castonguay & Hill, 2007). The collaborative-dialogic model supports the latter notion: insight may sometimes, but not always, lead to change. But, even without change, the new knowledge and awareness gained are of value to the client. For example, in the Eason study, one client (#1) came to the following insight: "I deeply and truly miss my father. More than I thought I would. I feel if he was around things would have more clarity" (p. 132). This client-identified moment of insight is not linked to making behavioral change or any other in her life; instead, it is a cathartic release of previously repressed or unacknowledged painful feelings.

While Lam's (2017) research was not focused on insight per se, insight development and meaning making did occur during PT and reflection on the improvisational performance. The finding that tellers showed greater engagement in reflection after watching their performance suggests that PT performances can serve as a catalyst for insight, as reflection is necessary for insight production (Friedman, 2013; Lacy, Michaelson, & van Laar, 2007). The boost in reflection following the

witnessing of a performance again reiterates the importance of externalizing our narratives as a way of gaining new perspectives on them.

As PT is an endeavor that involves components of storytelling, emotional expression, meaning making, and reflection—all of which are attributes of insight-producing collaborative dialogue—it is likely that PT is also capable of producing insight. While the insight is not "psychotherapeutic" in nature (as it is not embedded in the dialogue of therapist and client), it is nonetheless a version of insight that seems to have salubrious and meaningful effects on those experiencing it.

13.6 Limitations and Future Directions

Due to time constraints on both of the original 2017 studies, neither Eason nor Lam was in a position to gather longitudinal data. Thus, it would be useful for future study to be of the impact of insights from CLS and PT over time to determine if these insights are of a temporary or more permanent nature. A long-term study would also allow for more direct observation of potential causal links between insight and change, as change tends to occur gradually. Because Lam's (2017) study was more focused on the process of meaning making than insight development, understanding that these terms share similarities, it would be useful to examine solely the nature of insight as a construct in PT.

It is also important to note that both research projects presented in this chapter were pilot studies by emerging scholars Eason and Lam, both of whom were supported by mentors at City University of Hong Kong who are also the co-authors of this chapter. These two research projects were conducted in educational settings at university level in the multicultural climate of Hong Kong. As noted, Eason's study was doctoral research that resulted in his dissertation, while Lam's was an undergraduate final year product. As with most pilot studies, these are open to be amended and expanded in the future research.

Additionally, Eason (2017) suggested that insights occur in relation to feelings/emotions, issues/struggles, identity/self, relationships/interpersonal, and gifts/blessings, adding to content areas Elliott (2007) had already identified in the literature. These, however, were the content areas reported from the analysis of his relatively small client sample. Future researchers may develop additional content areas that would help further extend the model by adding to the corpus of insight-producing content areas in psychotherapy.

13.6.1 Theoretical Implications

The proposed collaborative-dialogic model of psychotherapeutic insight may be applicable to insight production in professional practice domains other than therapy, such as PT and social work provision. This adaptability of the model was

demonstrated with reference to similarities of the meaning making processes intrinsic in these endeavors. Insights clearly occur outside the context of a therapeutic dialogue; however, the underlying process (or therapeutic route) of insights may be similar, involving an experience of meaning making and often reflection or a reflexive component.

The externalization of inner narratives also seems to play a role in the creative production of insight. In therapy, clients externalize their inner stories through dialogue with the therapist; in PT, participants visually witness their inner stories played out on a stage, sometimes with various alternative endings that allow one to re-author their lives. Both processes have the potential to shift perspectives and be empowering for those involved.

13.6.2 Professional Implications

PT and CLS can be viewed as educational tools for aspiring therapists and social workers. Each method is creative in its own right and seems to have an efficacious result on reflection, meaning making, and insight. Trainees and students could participate in PT or CLS as routes for further reflection on both professional and personal identify formation.

Moreover, Eason's (2017) collaborative research approach suggests that students and aspiring professionals could benefit from using creative research methodologies as a way of expanding their horizons. One specific suggestion regarding the collaborative approach is that training programs for counseling/therapy (including internships and practicums) should require counseling interns to transcribe a few of their own sessions for self-review and review with a client of their own (Anderson & Gehart, 2007). The transcription process and collaborative reviewing of transcripts can be a rich source of insight formation, as Eason's (2017) study demonstrates in these clients' quotes (pp. 138–140):

> I also realized that I am a lot more emotionally vulnerable in these sessions than I thought I was and that I've opened myself up a lot more to introspection and reflection. It was a very hard experience, reading back my thoughts and my words because often, I will talk about how I am feeling and events in my life and there is still a bit of a barrier between what I am saying and my takeaways. To actually see my words in written form, it has given me a new perspective on what I have been saying. (Client #5)

> It's allowing me to probably self-reflect a lot more than I probably usually would. Which I think is a good thing. (Client #5)

> So I think just the process of looking back over this is helpful because it gives you a second chance, you know a second bite of the apple as they say, so you can analyze your analysis. Or rather than it just being the first, the first discussion being the only one, to then go back and look at it. It's like reading a book a second time and picking up things that you didn't notice the first time because the first time you were just trying to follow the plot. (Client #4)

Similarly, the use of PT can prove effective in social work training programs and professional development for meaning making and gaining empathy (Lam, 2017). The ongoing process of professional development can be fostered by engaging in activities such as PT. These creative, educational learning opportunities seem to encourage a growth mindset by encouraging reflection and reflexive engagement.

From an educational perspective, the somewhat nontraditional methods of CLS and PT offer a plethora of practical applications for supporting both creative learning and creative teaching. They can be used as educational tools that support ongoing professional and personal identity development while providing opportunities for insights and reflections that might otherwise be missed in more traditional or restrictive educational settings. In such environments, teacher authority and rote learning may sometimes eclipse opportunities for creativity, as Mullen's (2018; also Chap. 1 in the present volume) recent educational study, set in China, has demonstrated, with the rich promise of younger and older students and teachers' creative engagement, expression, and innovation in impossibly restrictive circumstances.

13.7 Conclusion

Counselors and social workers belong to the super creative core, being professionals who work with others in creative ways to achieve creative ends. The research we have presented demonstrates how the nontraditional methods of CLS and PT are capable of generating insight and meaning making for both clients and professionals. An original collaborative-dialogic model of psychotherapeutic insight that suggests an underlying mechanism for the process was discussed along with an updated definition of psychotherapeutic insight. As such, this chapter utilizes original creative research from educational settings to stimulate future research while addressing real-world applications for professional practice.

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Part III
Applications of Creativity Theory in Real-World Practice

Chapter 14
School Environments: Friend or Foe for Creativity Education and Research?

Niluphar Ahmadi, Laurine Peter, Todd Lubart, and Maud Besançon

Abstract Creativity is considered a 21st century competency. Creativity is integrated in national curricula and in international texts. However, despite its recognition by educational authorities, such as Ministries of Education, creativity is not well implemented in classrooms. Indeed, even when educational practitioners admit that creativity is important for education, it does not mean they seek systematically to implement it in schools. This difficulty is one of the significant issues that creativity research encounters. In response, this chapter aims to provide a reflection, based on the current literature, about the place of creativity in school environments. Considering the past 50 years of research and reflection on creativity, several factors hindering or fostering creativity implementation in education and research are evoked regularly. Hence, we propose an overview of these factors, with the goal that practitioners and researchers take into account observed situations, relieve the current duress under which creativity finds itself, and in the future contribute to field research on creativity and ultimately the development of creativity in schools.

14.1 Introduction

Creative thinking skills have been attracting increasing interest among educational actors (Cachia, Ferrari, Ala-Mutka, & Punie, 2010). This focus on creativity has been strengthened by the fact that creativity, identified as a 21st century competency, is an expected ability of current and future performance. For example, the P21's Framework for 21st Century Learning (Partnership for 21st Century Learning, 2015) presents the skills and knowledge required for tomorrow's children to be successful. This includes the ability to think creatively (e.g., "use of a wide range of

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Table 14.1 Elements fostering and hindering creativity in schools and creativity research

	Elements fostering creativity	Elements hindering creativity
In curricula	Creativity as a way to solve new problems (Lucas, Claxton, & Specter, 2013)	Creativity as arts only (Wyse & Ferrari, 2015)
	Creativity allows artistic awakening for students (Cachia et al., 2010)	No training or assessment of creativity in curricula (Cachia et al., 2010; Sternberg, 2015)
In teacher practice	Creativity develops well-being, communication, and cooperation, contributing to a positive classroom climate (Dunn, 2004)	Wasting time on creativity (Beghetto & Kaufman, 2014)
	Motivated students are more engaged in creative tasks (Craft, 2005)	Fear of not following the curriculum or not finishing it (Cachia et al., 2010)
	Teacher and pupils are open-minded (Cropley, 2009)	Creativity contributes to poor behavior management (Beghetto & Kaufman, 2014)

idea and create new ones" (retrieved from the Partnership for 21st century learning website[1]), the ability to work creatively with others (e.g., implies being "open" and able to "develop, implement and communicate new ideas with others" (retrieved from the same website[2]), and the ability to implement innovations.

Indeed, introducing creativity in educational contexts may bring significant benefits for societies, such as greater probability for major discoveries and economic development (Sternberg, 2015). However, despite the significant benefits that creativity can bring, we cannot claim yet that creativity has been well implemented in classrooms. Moreover, even if creativity can be supported in school curricula, there are still limits to its full development in schools. These restrictions impact research on creativity in schools as well.

In this chapter, we provide an overview of the variables leading to the development of creativity in school environments and the ones that hinder it. Our main purpose is to offer researchers and other educational protagonists, such as teachers, clues about enabling factors and challenges for developing creativity in schools.

Regarding factors that foster creativity in schools, the impact of teachers' practices is important but cannot be understood fully without considering that teachers work in an institutional context. Indeed, opportunities that environments provide are significant for helping to develop children's creative thinking abilities (Sternberg & Lubart, 1995). The term *environment* is conceived broadly and encompasses various contextual facets (e.g., classroom environment and school climate). As researchers, we cannot overlook and very often have to anticipate the difficulties that may be encountered in educational environments.

In Table 14.1, we present several elements that can foster or hinder creativity. The purpose of this display is to highlight some of the main limitations that some educational practitioners associate with creativity. Indeed, elements hindering creativity may be more an opinion of such protagonists than empirical findings from

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[1] http://www.p21.org/about-us/p21-framework/262

[2] http://www.p21.org/about-us/p21-framework/262

research; in contrast, benefits that creativity brings to classrooms have received support by researchers. In brief, this table is a resume of how some educational characters see creativity as a foe in education and how 50 years of research in psychology and education demonstrate that creativity is, conversely, a friend in schooling environments (e.g., Craft, 2005; Cropley, 2009).

14.2 Creativity That Fosters and Hinders Teacher Practice

In reality, implementing creativity in practice and providing a well-organized environment for research is difficult. Based on research by Cachia et al. (2010) and Wyse and Ferrari (2015), one gains insight into realities of creativity in educational institutions. Using data from European Union countries' curricula (27 of 28 countries in the European Union) and from 7659 teachers' in-country responses, Cachia et al. (2010) indicate that teachers' representations of creativity are positive. In their sample, 95% of the teachers surveyed considered creativity a capacity that everyone can develop and that it is not only about the arts.

However, when researchers look at curricula from one country to another, creativity is not mentioned very much (although it appears at least once in each state curriculum). Further, creativity is often associated with the arts in curricula. In France, for example, this is the case. If one is a researcher or a teacher in a school where creativity is seldom mentioned and tends to be assimilated specifically in the arts, it can be very difficult to observe creative practices in other classroom subjects (e.g., economy, social sciences, mathematics, biology, and computer science). For example, in French middle schools, there is a specific moment for "creativity" restricted to graphic arts and music; these moments tend to disappear when students arrive to high school. Indeed, creativity is quite restrictive after elementary school. Secondary-level teachers do not have reasons to try new things and develop their pupils' creative minds. Creativity in math, for example, is not assessed on exams and the impact of creativity is not directly linked to the curriculum. Thus, when research on creativity is conducted in high schools, it seems logical to observe the lack of creativity-related practices. On a more encouraging note, Wyse and Ferrari (2015) indicate that in some national curricula (e.g., Northern Ireland and Wales) creativity is considered a thinking skill, not only as an ability displayed in the arts. They testify as well to a significant evolution with respect to the representation of creativity in education across all European curricula.

Indeed, today creativity is mentioned in every European country's curricula, albeit with differences regarding the extent to which creativity is integrated. In this context, these few cases associated with the Organisation for Economic Cooperation and Development (OECD) report on creativity (Lucas et al., 2013) are encouraging. These should provide more visibility about its benefits and insights into why creativity is a significant thinking skill in education. This acknowledgement of creativity in curricula can lay the foundation for new ways of conceiving creativity for educational practitioners. Even if this does not involve the majority, we expect that

some teachers will become more benevolent toward students' unexpected ideas in classrooms.

Consider France where creativity is seldom evoked in curricula. In our classroom research, we have encountered teachers aiming to develop their pupils' creativity (teaching for creativity) and exercising the freedom to teach in a more creative way (teaching creatively), even if the national curricula are not particularly supportive of creativity. Observations of ours suggest that creativity can be integrated spontaneously in teachers' practices. For example, in a French literature class at elementary school, we learned that children had studied moral fables where main characters are represented by animals. During the class, fables were studied through theater: the children each played one character. They created theater decorations and put on a show at the end of the year for their parents. The teacher using a typical lesson in the French course (La Fontaine's fables) and bringing theater to it offers children the opportunity to experiment (active learning) with implicit and powerful meanings of the fables using several "arts" (such as acting and painting) and making associations between or among them to create a product: the theater act.

Educators are confronted, however, with the dilemma of completing their curriculum by the end of school year and taking into account 21st century competencies in their classroom. Beghetto and Kaufman (2014) note that teachers can feel pressure, thinking they do not have enough time to develop creativity in their classrooms, even if they think creativity can be taught. Half of the teachers from Cachia et al.'s (2010) sample recognized the interest of creativity in education. Teachers may also be reluctant to implement creativity because of their concern about having to manage student misbehavior during creative moments. Indeed, as Beghetto and Kaufman state, there is a time and place for creativity, but a teacher may worry about, and even fear, having to deal with negative repercussions from creative sessions. Notably, teachers can be afraid of "out of control" situations in which pupils use creativity (even if unintentionally) as a way to disturb the pace of learning in the class; consequently, the teacher would end up spending more time redirecting misbehavior than promoting a new and original situation. Therefore, some teachers think that when children are given opportunities to think "outside the box" they will ultimately misbehave.

However, in these cases and most of the time, creativity cannot be held accountable for this misbehavior. Based on observation of preschool and elementary classrooms (Pianta, La Paro, & Hamre, 2008), students' unruly behavior can result from a lack of clear instructions and task management before beginning a new activity. As examples, children may not know how to use the materials at their disposal or there may not be enough materials for everyone to use; in other instances, all children may rush at the same time to the activity table rather than being sent in small groups (Pianta et al.2008). Such moments can occur in any lesson and in any classroom. However, teachers can end up designating creativity as the source of the problem and not focus on situational variables, such as providing clear instructions and managing behaviors.

Ultimately, creativity has significant benefits in classroom contexts. Indeed, teaching for creativity can contribute to developing more autonomy for learner's self-evaluation and formative evaluation, and respect between pupils learning to cope with frustration and failure (Cropley, 2009). Consequently, creativity can contribute indirectly to student well-being (Plucker, Beghetto, & Dow, 2004) and develop communication skills (Dunn, 2004).

Accordingly, bringing more creativity into classrooms can help with managing behavior. Indeed, in a classroom where children and youth are more autonomous, better able to listen and share their views with classmates, and learn to cope with frustration, they will likely be less prone to boredom at school. In turn, there will be fewer occasions for disturbing the pace of classroom learning. Thus, in response to the fear of wasting time because of the need to management behavior, creativity can be an efficient solution for avoiding unruly behavior and facilitating rather than burdening the completion of curricula. In fact, initiating creative moments in the classroom implies teaching children and youth to develop their communication and cooperation abilities (Ahmadi & Besançon, 2017). In addition to finding new ways to resolve problems, students can make links among concepts and expand their learning to "real life" situations. This can lead to more engagement in the learning process, a development of personal interests, and skill building with problem solving, critical thinking, metacognition, and more.

In our fieldwork, when we found that teachers had interest in research on creativity, most of the time they proved motivated to teach and more engaged in developing their students' creativity than the average colleague. One of the limits of relying on this kind of sample for our studies is that we miss observing the real-life issues involved in everyday creative practices in school. Indeed, volunteer teachers who participate in our studies usually have some knowledge about creativity or at least hold a positive view of it. Based on our previous research, only the teachers interested in creativity (such as developing creative practice and their students' creativity) or at ease with creativity assessment in their schools agreed to open their classrooms to researchers (Besançon & Lubart, 2008). So, these teachers may know how to teach creativity, or at least are open to integrating more creative practices.

However, even though it is interesting to work with motivated teachers who voluntarily share their perception of creativity, as well as practices and challenges, notably, we are aware of missing teachers. These are the ones who are reluctant about creativity or at least feel they do not have time for creativity. In France, meeting with such reticent or resistant teachers is only possible when it comes to research projects endorsed by the Ministry of Education or during international projects, such as an OECD sponsored one. Otherwise, and more commonly it is particularly difficult to work with the overall population of teachers with little commitment to creativity in everyday life. Nonetheless, we would like to be able to understand their reluctance to implement creativity in a classroom context.

14.3   Creativity in Curricula and Assessment of Teacher Practice

The question of creativity in curricula cannot be raised without addressing the form of assessments used in schools. Traditional assessment in classrooms is considered to be summative (Sternberg, 2015). However, summative assessment does not provide a fertile ground for acceptance and use of creativity by teachers. With summative assessments, teachers assess learning, providing an overview of each student's retention of information, allowing for comparisons to be made (which can serve as a standard for vocational guidance, for example; see Dixson & Worrell, 2016). Generally, such assessments do not occur during instruction but at the end of a learning sequence.

Hence, the purpose of summative assessment is to measure learning outcomes and check that students have retained material in the lesson. Examples of summative assessments are performance assessments, papers, projects, national tests, and so forth. Connected to creativity, performance assessments (multiple choice, timed exam, and continuous assessment) present negative or weak correlations ($r = -.30$ to $-.58/r = .16$; Chamorro-Premuzic, 2006). Indeed, when a child is creative, s/he comes up with new solutions and may provide an original idea within a specific task or domain (e.g., essay; group discussion).

In a classroom where summative assessment is the standard, how can creativity be used and become a new standard of learning? Even if creativity can be assessed in classrooms with domain-specific assessments (for a review of creativity assessment and its domain specificity see Barbot, Besançon, & Lubart, 2015), what can teachers (or others such as principals) do with the creative potential of their students? Without a response to these questions, the place of creativity in classrooms and its use will remain unclear as well as underutilized.

Moreover, to develop creativity in class, presenting problems that are more open (where several answers can be expected) to students is encouraged (Horwitz, 1979). With this kind of problem and with the goal of elaborating a creative idea, two types of thinking are involved: Divergent thinking, the process by which the child produces numerous ideas from a stimulus, and convergent thinking, which involves combining ideas and selecting an optimal and original response to the problem (Barbot, Besançon, & Lubart, 2016). For students with high creative potential in one specific content domain, these two types of thinking are strongly correlated (Barbot et al., 2015). So, one of the difficulties of implementing creativity in classrooms is not only assessing creativity but also considering the several types of problems children can encounter. The more simple way would have us think of how teachers can assess creative answers to open problems.

In the same vein, teachers are not trained to assess creativity or teach in ways that develop their pupils' creative minds. Therefore, should we expect them to accept studies of creativity in their classroom or make use of them? Even if teachers understand why creativity is important for the future of society, they are not trained to apprehend why it is vital to study and use creativity in their classroom and to develop

the creative potential of their students and themselves. Answering all such questions demands that creativity specialists engage with educational trainers to transform actual curricula as well as prepare teachers. Indeed, based on the 21st century skills context, the demand for "new" skills, such as creativity, is increasing and, for some time now, has been strongly recommended for academic and career success (Sternberg & Lubart, 1996). A consequence of this demand is the need to recognize creative individuals and, more than this, have the ability to assess them. For this question, we can legitimately ask ourselves if creativity assessment in schools will be used later in this way to invest in the creative development of individuals. As well, it requires that researchers have some agreement on the fact that creativity can be assessed in schools and why. This raises the question, what is the purpose of assessing creativity in schools?

Even if such questions have not yet been addressed clearly, based on our experience as creativity researchers, some teachers have responded to them. Indeed, we were able to meet teachers who introduced in their courses tasks for developing creativity, such as action-oriented projects, and who facilitated these through brainstorming, role-playing, and interacting. These teachers were well aware of the potential of their pupils and characteristics differentiating them, such as beliefs, personality, emotions, and motivations. Taking account these different sources, teachers may consider multiple ways of communicating results and assessing children's progress. Related to creativity, the use of formative assessment can contribute to directing the development of creative potential in the classroom (Lucas et al., 2013).

Formative assessment aims to ascertain difficulties in learning and improve teaching by focusing on learning goals. The idea is to determine if goals have already been achieved and to make progress with those not yet reached (Dixson & Worrell, 2016). Teachers using formative assessment can provide personal feedback to children, contribute to their ability to accept criticism, and even encourage them to assess their peers' abilities. On the subject of creativity, formative assessment provides feedback that can help students regulate their learning and lead to better performance (Barbot, Besançon, & Lubart, 2011). In this context, even if curricula were not evolved enough to assess creative skills, in our previous research, we were still able to observe unconventional ways to teach for creativity in the classroom and even assess these (Besançon, Lubart, & Barbot, 2013). Some children can develop their creative potential despite the absence of creativity in classic classroom courses; thus, we found that there are practitioners who are teaching and assessing creativity in classrooms.

As an example of teachers fostering creativity in the classroom, we refer to a project that took place in a French middle school class. There, pupils, ages 11 and 12, worked with a history teacher on their representations of "the school of their dreams" and developed possible solutions for achieving it. The teacher encouraged thinking of open-ended questions and finding different solutions relevant to their classroom subject. Notably, the teacher used open-ended questions to initiate brainstorming during history class (e.g., about schools in several historical periods) and to think about the novel solutions that the pupils could invent to answer her questions.

The use of historical background information changed the learning routine in the history lesson—children were more prone to brainstorm about history with this teacher.

From a more general view, this project impacted significantly the quality of learning. It turned out that the students were able to reflect on being more engaged in learning when they are the most attentive and available for learning, and how they can make learning more interesting and enjoyable for themselves. Through this project, the teacher was able to identify particularly creative students. Responding to this need, she offered more opportunities for classroom reflection in traditional learning sessions. Implicitly, without directly evoking creativity, this teacher invited her pupils to explore divergent and convergent thinking and experience having an open attitude in class. She also identified children who like being creative and adapted the lesson to their varying needs and interests. After this project, this teacher reported to us a notably more positive classroom climate and higher engagement.

14.4   Discussion

Finally, as creativity researchers, we are no longer surprised by the difficulties encountered with our studies in schools. In brief, various problems about how creativity is perceived as well as developed in school underlie the misunderstanding of creativity at the classroom level. Too often teachers see creativity as a difficult competency to assess and as a process that contributes to unruly behavior; another problem is that they associate creativity solely with the arts. Consequently, when we undertake our research, at times we have found physical conditions (e.g., classrooms) and resources (e.g., curricular materials) to be impoverished. Teachers who were willing to partake in our research faced difficulties trying to convince their schools to provide time and space for research. Creativity is not the priority in curricula or delivery. Concerning obstacles, we have encountered along with teachers fire drills programmed during creativity assessment (whereby, of course, researchers are not informed) and research time allocated during lunch hour when children are not the most attentive. Such challenges might hinder further our studies and challenge more researchers to examine the challenges of trying to pursue creativity situations in schools and engaging others in it.

Another important issue regarding research on creativity in schools is the misunderstanding that can occur between researchers and teachers. Indeed, as we said, teachers are not trained or fully supported in the practice of classroom creativity (as in the case of the French example previously mentioned). If they are interested in the research project, it can be difficult for them to implement results of our work in their daily practice. Also, we cannot expect to be well hosted in schools if we do not build a solid place for creativity research in schools. Indeed, researchers need to be a full partner in the educational process in order to implement and study more successfully creativity practices.

Even if schools should support our presence in classrooms, such research is very time-consuming and demanding. One needs the time to administer creative measurements, analyze the impact on research sites, and communicate the result to schools and in scientific papers. Also, the time needed by researchers for arriving at consensual conclusions about how creativity should be implemented in schools (at least between or among researchers from the same context or country) should occur. The lack of a consensual report from researchers can be frustrating for teachers and researchers as well. Typically, the results and conclusions of our studies are accessible only after a long period and are discussed amongst research colleagues. When researchers stay in the same location, creativity remains localized to the same state for decades (Sternberg, 2015), which can be another problem.

Thus, we wish to identify as a central issue involving creativity research in institutions the need for a fundamental change in how organizational members (e.g., heads of teachers' training institute and teacher trainers) view researchers. Researchers who come and leave schools in a short time are not reliable partners but others of us who stay longer could very well be. Thus, a real issue facing us in our future research is how to become an integral part of the change process in education systems. Just as teachers and children are used to guidance counselors in schools, we hope they will become accustomed to spending time with educational researchers (of creativity and from other topics) in the future.

To improve research on creativity in schools, it might be worthwhile to rethink the organization of students' classes and subjects. One possibility involves the development of alternative pedagogies, informed by Montessori, Steiner, and Freinet for example, that place pupils at the center of their learning. Indeed, children can learn and experiment by themselves. In fact, Montessori pedagogy is based on their sensory impressions and the material for it was developed with different textures and stimuli (Montessori, 1958/2004; see also Besançon & Lubart, 2008). On the other hand, Freinet (1994) theorized that there is a natural dynamism of the child to learn from and accomplish some activities. He discussed also the idea that failing is a normal part of learning process. Finally, the Steiner pedagogy proposes the idea that education should take into account the whole child—spirit, body, and mind (Edmunds, 2004; see also Kirkham & Kidd, 2015).

However, research in these alternative schools has other limitations. A major constraint is cost; unconventional pedagogies are often very expensive, limiting parents and children's accessibility. Thus, only families that can pay the high cost of registration can enroll their children in these schools. For example, in France, annual fees are over 5000 € ($6092 USD) for Montessori schooling whereas education is free in public schools. Parents who pay this belong to high socio-professional categories and generally live in a rich cultural environment. In addition to the school context, we know that the family environment (economic and social capital) is also very important in the development of children's creativity (Besançon & Lubart, 2015). For example, children living in the countryside versus from the center of a city are in a different situation. The rural children are located far from cultural places such as museums, theaters, libraries, and so forth. Because they have fewer

opportunities to explore being creative in or beyond the arts, they must rely on use their immediate environment to develop creative insight, ability, and knowledge.

Importantly, the majority of private schools using alternative pedagogies are not linked to the French national education system. They are independent and thus not required to follow the curriculum established by the Ministry of Education. This independence can be a hindrance for parents who may think their child will not be focused sufficiently on content, and possibly fail to graduate and find work in the future. Also, the professional training of teachers in private schools raises questions about credibility. Moreover, even if schools are projecting that they use alternative pedagogies, there is no professional organization verifying that schools use pedagogical sound practices theorized by pedagogues like Montessori.

Despite such limitations, alternative pedagogies are examples to be considered in the development of students' creativity. Indeed, the structure and organization of the creative classroom means that it is designed to allow for movement, sensory experience, communication, and mutual help between pupils. In alternative pedagogical settings, the teacher is often regarded as a support for the child, not a central figure. Moreover, general characteristics of alternative pedagogies such as collaboration and open-mindedness would make it possible to develop creativity among students. Principles from alternative schools therefore provide a starting point for rethinking the organization of the classroom and curriculum in traditional schools.

14.5   Conclusion

Finally, alternative pedagogies provide fruitful ground for developing teachers' practices in traditional educational settings. Indeed, with the Internet as a resource, teachers who are not trained in alternative pedagogies can find instructional support for Montessori, Steiner, Freinet, and other kinds of specialized schools and classrooms to help them develop their own practices.

Consider that the Internet has greatly boosted the possibility of anyone teaching creatively. The Internet is a powerful vector for teacher training that contributes significantly to creative classrooms as well creative communities. Indeed, in online venues, teachers can share their everyday practices of creativity and exchange techniques used and benefits, which researchers can consult. Creativity researchers would like to be able to access creative environments (whether physical or virtual) that offer new ways to assess the professional development of teachers who are taking risks, trying out new practices, and emancipating themselves from their traditional curricula guidelines. Being interested in this variability could also help to measure impact of this new way of developing practice on the creative potential of their pupils.

Finally, despite benefits in education, creativity has still a long way to go before we can consider it widely accepted as an ability worth valuing and developing in schools. Indeed, even if some European curricula have evolved progressively to meet the expectation of a rapidly changing world, creativity is still not considered

as an important capability in several countries. In this context, creativity is still far from many educational practitioners' daily concerns. For all such reasons, creativity-focused research and practice in educational settings is not yet a major trend, which we hope will change.

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Chapter 15
Supporting Creative Teaching and Learning in the Classroom: Myths, Models, and Measures

David H. Cropley and Timothy J. Patston

Abstract Creativity is enjoying a resurgence of interest in the education systems of many developed countries. The core of this is the recognition that *creativity*, in its broadest sense that encompasses divergent thinking, problem-solving, and related abilities is a core skill in the twenty-first century. While there is a great deal of rigorous, empirical research that underpins creative teaching and learning, there remains much rhetoric, myth, and misconception that militates against efforts to embed creativity in the modern classroom. In this chapter, we first explore some of the general beliefs that frequently interfere with efforts to broaden and systematise the understanding of creativity. We also examine specific evidence from teachers, suggesting that this practitioner cohort is favourably primed and disposed to teach both *for* and *with* creativity. In the literature of creative education, we identify and address a significant gap relating to developmental models of creativity. Finally, we discuss some of the nuances of creativity in school settings, offering specific advice for school teachers who are at the coal-face of creative education.

15.1 Introduction

Around the world, national education bodies as well as individual schools are calling for a shift from traditional pedagogy and standardized testing to a more creative education paradigm (Beghetto & Kaufman, 2017; Beghetto, Kaufman, & Baer, 2014). Teachers are being advised, if not compelled, to introduce creativity into their daily classroom practice in countries ranging from Australia (Australian Curriculum Assessment and Reporting Authority (ACARA), 2010), to Iceland (Ministry of Education, Science, and Culture (MESC), 2011), and Hong Kong

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(Hong Kong Examinations and Assessment Authority (HKEAA) & Hong Kong Curriculum Development Council (HKCDC), 2007).

This push for creativity is experiencing a resurgence of interest for many reasons. Cropley (1997), for example, explains that creativity is an integral part of the psychological functioning of children, and therefore a necessary component of a well-rounded, equitable education. Rosenstock and Riordan (2017) emphasise creativity as one of the *dispositions* necessary in the modern innovation economy. Bakhshi, Downing, Osborne, and Schneider (2017) add that *skills* such as creative problem solving, and *abilities* such as originality, are amongst those in greatest demand in future occupations in the United States and the United Kingdom.

ACARA (2010), like its counterparts in Iceland and Hong Kong, recognises that the twenty-first century is characterised by rapidly changing environmental, economic, and social factors. This requires that individuals—creative problem solvers—be equipped with the skills to find new and effective solutions to problems arising in this new paradigm. On top of this, employers continue to call for creativity, and the related capacity for innovation, as desirable abilities of prospective employees. Symes (2014), for example, noted that 45% of human resources decision-makers identified innovation and creativity as two of the most important skills to develop within workforces seeking to drive organisational growth. Adding to this, Frey and Osborne (2017) argue that "occupations requiring a high degree of creative intelligence" (p. 262) are amongst those *least likely* to be automated over the coming decades.

As this push for creativity in the classroom gathers pace, a great deal of knowledge is available—much of it long-standing—to inform the process of developing guidelines, tools and resources for schools and teachers. Examples of such design work include Getzels and Jackson (1962) and Torrance (1963) who set out many of the basic principles of creativity in school education, as well as Cropley and Field (1968) who described creativity not as a level of ability but as a style for *expressing* ability. Other notable examples of guidelines, tools and resources for classroom creativity include Beghetto and Kaufman (2014), Cropley (2001), Davis (1982), Renzulli (2016), Runco (1992), and Sternberg (2003).

Cropley (2018), however, notes that while schools are capable of embedding creativity in the modern curriculum, the actual implementation of this requires two factors. First, the development of creativity necessitates *focus* and *differentiation*: It is not enough simply to attempt to foster creativity in a general and diffuse manner. Second, the development of creativity depends on a *dynamic* approach that accounts for the interaction of key components—the person, the process, and the environment. We explore these requirements later in this chapter.

However, before creativity can be embedded in the twenty-first century curriculum, it must be allowed to fall on fertile ground. This means that before schools and teachers address the question of *how* to teach for and with creativity, it is first necessary to explore what barriers, if any, exist that might derail efforts to transform education in this important area.

15.2   General Beliefs About Creativity

One of the enduring frustrations in creativity research is the persistence of myths and misconceptions—that is, unproven or incorrect beliefs, opinions, or attitudes. Plucker (2017), for example, acknowledges that these may act as a shield, blocking individuals from developing a deeper understanding of creativity. While myths and misconceptions are relatively harmless in some contexts, in education these have the potential to frustrate efforts to embed creativity in the twenty-first century curriculum (Patston, Cropley, Marrone, & Kaufman, 2018), to the possible detriment of students and future employers alike.

A driving force behind many of these erroneous beliefs may be a centuries-old positive valence ascribed to creativity (see, e.g., Cropley, 2016; Cropley, Kaufman, White, & Chiera, 2014). This general "benevolence bias" (Cropley & Cropley, in press) makes it difficult for individuals to see creativity as anything other than benign and altruistic, thereby reinforcing mystical and artistic collocations.

The myths and misconceptions of creativity take many forms and may manifest as implicit beliefs (e.g., unconscious associations of creativity with art) or explicit misconceptions (e.g., claims that creativity cannot be taught). Even in research literature, where it might be expected that clear and consistent concepts would be readily available, it seems that many authors default to the pervasive myth that creativity is somehow incapable of being defined. Notwithstanding their constructive comments on the importance of creative intelligence to the future economy, Frey and Osborne (2017) fall victim to this myth, stating, "The psychological processes underlying human creativity are difficult to specify" (p. 262). Similarly, Mishra and Henriksen (2013) begin a discussion of creativity by restating their belief that creativity is poorly defined, while Ihsen and Brandt (1998), in an editorial on creativity in engineering, celebrate the fact that the 13 papers in their special issue present 13 different definitions of creativity!

Cropley (2018) summarises myths and misconceptions in three ways. First is the myth of *ineffability*—creativity cannot be defined. Second is the myth of *ineluctability*—creativity cannot be controlled. Third is the myth of *inscrutability*—creativity cannot be understood. Cropley (2016) offers a more detailed, historical discussion of the origins of these myths.

Another persistent and damaging fallacy in creativity surrounds the question of whether creativity can be taught. Years ago, Acar (1998), for example, argued that no widespread agreement exists on the question of whether creativity can be taught, while Törnkvist (1998) reiterated earlier claims made by Evans (1991) that it is not possible to teach creativity.

While there is substantial evidence of pervasive myths and misconceptions about creativity in the general population, one should ask if these also influence teachers' beliefs about creativity. If teachers hold faulty beliefs about creativity, then it is likely that these will, at best, slow down efforts to embed creativity in the curriculum, and, at worst, block or corrupt these efforts entirely. Benson (2004) stressed the

importance of identifying and addressing misconceptions to facilitate the development of creativity. Conversely, one must avoid generating a new myth—that is, that teachers do not understand creativity. If teachers do hold largely valid and accurate understandings of creativity, then this offers a springboard for embedding creativity in the classroom. It is important, then, to ask if teachers' beliefs support the substantial evidence of pervasive myths and misconceptions about creativity in the general population.

15.3   Teacher Beliefs About Creativity

Some of the general myths and misconceptions about creativity might be expected to exert a specific, albeit damaging, effect on creativity in education. For example, the notion that creativity is a special talent or ability frequently associated with *dysfunctional* behaviour (see Kaufman, 2016; Sternberg, 2015), could account, at least in part, for evidence that teachers appear to *dislike* creative students. Westby and Dawson (1995), for example, found a negative correlation between teacher judgements of their favourite students and creativity. Reinforcing the possible detrimental impact of myths and misconceptions, the Westby and Dawson study also found a disparity between teacher concepts of creativity and traditional concepts. In other words, whether teachers actually dislike creative students or disliked what they erroneously thought were creative students, there are issues needing correction in relation to teacher beliefs about the attributes of creativity.

Another myth or misconception with the potential to block efforts to embed creativity in the twenty-first century classroom is the so-called *arts bias* (e.g., Patston, et al., 2018). Creativity is frequently misrepresented as an exclusively artistic ability (e.g., Glăveanu, 2014; Runco, 2007), with two effects in education readily apparent. First, if teachers subscribe to such a belief, it is possible that they are only associating creativity with exceptional levels of human artistic endeavour, consequently reasoning that creativity can only be found in the Picassos and Rembrandts of the world as represented by creative products. This *Big C* characterization of creativity (Kaufman & Beghetto, 2009)—the notion that creativity is associated with *exceptional* individuals—is likely to discourage most teachers from attempting to embed creativity in their curricula on the grounds that it is inaccessible to most students. Linked to this is the implication that because creativity is found only in the arts, it is irrelevant to most subjects—why teach for or with creativity in mathematics, physics, English, geography, and so forth if creativity is not found in any of these domains?

In a recent study of teacher implicit beliefs of creativity, with a large sample (N = 2485) from seven countries, Patston et al. (2018) explored the particular issue of arts bias. Contrary to the expectations in much of the literature and the researchers' own hypotheses, the findings indicated that teachers across different countries, disciplines, and different teaching levels appear to reject an arts bias in creativity. In other words, they appear to understand that creativity *is not* exclusive to the arts.

While this encouraging result suggests that efforts to embed creativity in the school curriculum are unlikely to be hindered by faulty misconceptions, there remain nuances that inform specific efforts to help classroom teachers more toward a more creativity focused paradigm in their classes.

The picture that we have constructed so far is as follows. Creativity may be subject to a range of unhelpful myths and misconceptions in the general population that block efforts to embed creativity in education. However, within the narrower population of teachers, these myths and misconceptions may be less prevalent than supposed.

Drawing on empirical evidence, Patston et al. (2018) have suggested a more differentiated approach to supporting creative teaching and learning in the classroom. This is in line with Cropley's (2018) call for an approach that is both *differentiated* and *dynamic* and is supported by Soh's (2015) *Creativity Fostering Teacher Behaviour Index*. Soh suggests that teacher attitudes and behaviours can have a significant impact upon the development of creativity in the classroom. One piece of the puzzle, however, remains unresolved: developmental levels of creativity. Even with accurate teacher beliefs, with the support of robust instruments that assess products, teachers' efforts to embed creativity in the curriculum, and in their classroom practice, will remain only partially differentiated unless the developmental levels of creativity are defined. Even the richest, most differentiated and dynamic model of creativity will struggle to find widespread application in schools unless it answers the question: what should this child be capable of at any given age/grade/stage? What, for instance, should teachers expect in terms of *idea generation* in mathematics at age 6, compared to *idea generation* in biology at age 17? What will a *preference for complexity* look like in an 8-year old, compared to a 15-year old?

In the next section, we explore the question of developmental models of creativity in education, before proposing suggestions and offering guidance for teachers seeking to embed creativity in their classrooms.

15.4 Developmental Models of Creativity

Schools run on scope and sequences in subjects and across grade levels. National curricula incorporate advice of a developmental nature as to what stage or age a student should be at in a particular subject, usually based on the knowledge they have or the skills they can apply (ACARA, 2010). Discipline area teachers utilize material that fits their students while stretching them in some way and leading them on to the next unit of work. Experienced teachers understand what students are capable of and what they are not yet able to do at any point in time in their subject or unit. Over the past 100 years broad consensus has developed across countries about what students at certain ages should be capable of doing in the classroom (e.g. Shaheen, 2010) in terms of emotional and cognitive development. Such information, however, is lacking in terms of skills associated with creativity.

With the introduction of creativity into national-level curricula around the world, national education bodies as well as individual school districts and schools are faced with a practical, implementation problem. If teachers are to teach both for and with creativity (Craft, 2000), what are the developmental stages of creativity they can match to their curriculum, and how will these developmental stages guide the design and implementation of a new curriculum?

Despite over six decades of research in the field of creativity, information is sparse in terms of its developmental trajectory in children and adolescents for complex reasons. The field of creativity is maturing and the focus has become increasingly *facet-based* (Barbot, Lubart, & Besançon, 2016), as in examining ways in which creativity manifests across a range of domains (Baer, 2016). What then are current research trends relative to the developmental trajectory of creativity in children and adolescents?

Developmental studies in creativity have in some ways been hamstrung from the beginning. Consider the seminal Torrance paper (i.e., Torrance, 1968), which proposed that creativity is a non-linear process, with "slumps" at various ages. This view is compounded by confusion as to whether creative development should be categorised as purely related to individual psychological development or to social and cultural development (as per the criticisms of Blamires & Petersen, 2014).

Cropley (2001) has reviewed a number of creativity studies touching on the question of developmental trends. Examining Torrance (1968) and related "slump" studies (e.g., Camp, 1994; Krampen, Freilinger, & Wilmes, 1988; Smith & Carlsson, 1990), he suggested that slumps and surges in children's creativity may be as much due to the effect of how much school a child has completed (i.e., the *environment*) as these are to age-related cognitive changes (e.g. a change from preoperational to operational thought, or from egocentric to socio-centric thinking). This Piagetian view of development contrasts with the view espoused by Vygotsky (2004), who proposes that creativity develops in two ways, firstly as the application of imagination to experience and secondly as the combination of ideas from a variety of elements. Creativity develops as experiences become richer, more diverse and more complex.

Taylor's (1975) framework is an example of what may be classified as an attempt to define *developmental* models of creativity. Taylor's model specifies five developmental levels of creativity: *expressive* creativity, *technical* creativity, *inventive* creativity, *innovative* creativity, and *emergent* creativity. It is certainly the case that Taylor's levels correspond to age-related changes, that is, the degree of higher-order thinking implied by inventive or innovative creativity that will generally preclude children from these levels. However, the actual ages corresponding to each level were not explicitly defined.

Rosenblatt and Winner (1988) offered a more child/school-centric developmental model of creativity. They identify three phases of creativity in children's creative lives, beginning with a *preconventional* phase applicable to children from 6 to 8 years of age. This is followed by a *conventional* phase applicable to children between the bands 6–8 and 10–12 years of age. Finally, the model defines a *postconventional* phase describing children from about age 12 extending to adulthood. This

model offers a more functional mapping of age/grade to the expected creative capacity of children. The three levels broadly correspond to primary/elementary, middle, and high school levels, thereby serving to provide the basis for teacher guidance in terms of what might be expected from children at different grades/ages.

Cohen (1989) focused on the idea that children's concepts of creativity must be linked to adult's concepts of creativity, proposing a continuum of levels and stages that could be mapped against time. This proposal is similar to the Four C model (Kaufman & Beghetto, 2009); this suggested that creativity can be considered in four stages. The *mini-c* level is in line with the developmental views of Vygotsky (2004), the beginning of the learning process, when concepts become not only novel, but also meaningful. The *little-c* level is more about the application of knowledge and skills in a specific domain. *Pro C* is the equivalent of professional expertise in a domain or field of endeavour (such as being a classroom teacher), while *Big C* level is about creativity which alters the perception of a domain or field. Most school education is about working with students at the *mini-c* or *little-c* level (Kaufman & Beghetto, 2009).

Urban (1991) proposed a general model of developmental levels that drew on data from studies involving the Test of Creative Thinking–Drawing Production (TCT–DP). Comprising six stages, this model is based on observations of behaviour in children, demonstrating a developmental progression in terms of the production of novelty. The stages begin with *autonomous scribbling/drawing*, and move through *imitation*, *concluding/completing*, *isolated animation/objectivation*, *producing thematic relations*, and ending with *forming a holistic composition*. Cropley (2001), in summarising elements of developmental models of creativity, linked these to Piaget's stages of cognitive development (e.g., Piaget & Inhelder, 1969). In doing so, Cropley makes the salient point that age-related differences in creativity result from a complex combination of internal (i.e., psychological) and external (i.e., social) factors, and that this complexity may explain some of the difficulty in obtaining a highly concretised, age/grade-specific developmental model of creativity. This can also be explained by the idea that these factors may be highly individual and fluid (Vygotsky, 2004) due to individual social contexts and environments (Sawyer, 2003).

In fact, the elements of the developmental stages of creativity that have been described above have a high degree of coherence, as Table 15.1 shows. In addition, from these stages, it is possible to define not only what the stages are, and how they relate to developmental concepts expressed by both Piaget and Vygotsky but also at roughly what age/grade they occur. It is then possible to suggest specific cognitive behaviours that might be expected at each stage (Table 15.1).

The most recent analysis of developmental aspects in the field of creativity was Barbot et al. (2016), in which they refer to "peaks, slumps and bumps" in their summary of the literature. They propose an "optimal fit" model which supports the idea of a highly individual and somewhat fluid developmental trajectory:

> This "optimal-fit" view translates easily in a developmental perspective: performance outcomes in a given creative outlet will depend upon the specific creative-task characteristics

Table 15.1 Elements of a developmental psychology of children's creativity

Zone of proximal development (Vygotsky) (age not fixed)	Cognitive stage (Piaget)	Approximate ages	Stage of creativity (Rosenblatt and Winner)	Concrete expression of creativity		Typical cognitive behaviours
				Urban	Taylor	
Dynamic process of personal construction within socio-cultural context, primarily through play	Preoperational thinking	2–7	Preconventional creativity	Autonomous scribbling	Expressive spontaneity	Children operate with isolated concrete fragments of information
				Imitation		If they make linkages among bits of information, these are based purely on spatial or temporal proximity
Collaboration between thinking and imagination	Concrete operations	7–12	Conventional creativity	Completing	Technical creativity	Children begin to form systematic concepts of the world, but these are based on concrete properties of stimuli
				Isolated objectivation	Inventive creativity	Concepts become increasingly complex, but are still isolated from each other
						Concepts do not go beyond what already exists
Collaboration between thinking and imagination develops as skills and knowledge increase	Formal operations	12+	Postconventional creativity	Producing thematic relations	Innovative creativity	Fragments of information are linked to form *thematic* structures reflecting children's subjective understandings, not just the concrete physical properties of experience
						Children add additional material of their own to flesh out fragments
						Concepts are linked together to form more complex and *abstract* structures
						Concepts may go beyond what already exists (creativity)

and the asynchronous development of person-level characteristics … leading to outcomes of variable creativity over time. (p. 40)

This model could be of interest to teachers because it is in alignment with current educational theories and practice which emphasise differentiated teaching and learning (Landrum & McDuffie, 2010). It acknowledges that creativity is task specific, meaning that creativity can be applied within specific subject contexts, it requires a developing level of both attitudes and skills, and it changes over time. In other words, creativity develops along a highly individualised pathway. The model also implies that teachers can influence student's creativity attitudes and skills, which can be taught.

In a recent iteration of the Australian National Curriculum (ACARA, 2010), the *Critical and Creative Thinking Capabilities* are articulated in a scope-and-sequence learning continuum. This consists of four elements: ***inquiring*** by identifying, exploring, and organising information and ideas; ***generating*** ideas, possibilities and actions*; **reflecting** on thinking and processes; **analysing**, synthesising and evaluating reasoning and procedures. Unfortunately, the origins of and evidence for this sequence do not appear in the national curriculum.

It is rather obvious that clearer guidelines and better measures for accurately assessing the developmental trajectory of creativity must be found. These guidelines and measures must take into consideration the teaching and learning environment, students' individual characteristics in terms of attitudes and behaviours, and the acquisition of explicit skills in creativity (e.g., such as problem solving, critical thinking, and divergent thinking, as applied in individual subject contexts). Such guidelines and measures should also acknowledge that the assessment of progress is not only about achievement in standardised international test scores (Amrein & Berliner, 2005), but also about developing skills for life (Shaheen, 2010). The following sections offer a new framework of creative education currently being implemented in an Australian school and examples of how creativity can be successfully implemented into the classroom at all levels of schooling.

15.5 Models of Creativity in the Classroom: Tailored Pedagogy

Teachers should be experts in their subjects and in pedagogy, not experts in everything. When a field such as creativity is introduced into the world of education, it is essential that teachers see both the need for and the relevance of any changes to their practice. Importantly, they should be given resource materials and the necessary professional development to help them implement this alternative education paradigm (Longshaw, 2009). Sternberg (2015), however, has observed that "There are hundreds of books and thousands of articles on how to teach children to think creatively. If one walks into a classroom, however, one is not likely to see a lot of teaching for creative thinking" (p. 115). In order for creativity to be successfully implemented, relevant and strategic professional development of teachers is needed.

Given the high level of misconception about creativity and dysfunctional implicit beliefs about creativity, in addition to the sparseness of research into developmental aspects, such questions arise as what kind of information and professional development would be best for teachers and where might they start.

Wallas' (1926) model of problem solving is an example of a cognitive framework of creativity, as is the Creative Problem Solving (CPS) model developed by Osborn (1952). Both models have four stages that involve applying cognitive skills for solving a problem. The first commonly cited model of product based creativity is the Four Ps, initially developed by Rhodes (1961). This model focuses on the components leading to a creative product; while acknowledging that the environment (known as "Press" in this model) has an influence upon creativity, the primary aim is the production of a product. In teaching, the equivalent would be that learning is only useful if it can be formally assessed with a standardised test and given a score.

Creative education should be, like creativity itself, context specific. Various frameworks and models have been proposed in a variety of domains, such as the Four C model (Kaufman & Beghetto, 2009). However, most lack "ecological validity" in that their results can be difficult to apply in real-life settings, such as a classroom (Gruszka & Tang, 2017).

Frameworks in education are rarer still. The idea of creativity being a separate "subject" (Likar, Cankar, & Zupan, 2015) fails to take into account the domain-specific nature of creativity (Baer, 2016). Similarly, using language that is received as jargon to teachers (Lin, 2011; Tsai, 2015) is unlikely to result in pedagogic change. Teachers essentially want to know three things in order to make changes to, or developments in, their practice, such as creativity: Where does it (creativity) fit into the curriculum? Does it affect my personal pedagogic style? How can it be assessed? (Craft, 2003; Shaheen, 2010).

To address these key questions, the *Results, Investigation, Student, and Environment* (RISE) Approach to Creative Education (Patston, 2017) was developed. The RISE Approach is based on well-established research and theory, both newly applied to the school environment and to Australian standards and practices. The RISE Framework is currently being trialled in a K-12 school in Australia and is undergoing a validation study conducted in collaboration with the University of Connecticut, University of South Australia and University of Melbourne.

As its name implies, the RISE framework has four interconnected elements: results, investigation, student, and environment. The model's components are such that teachers are supported to teach for and with creativity (Jeffrey & Craft, 2004), applying each element of the model to their specific subject context. To elaborate on the RISE elements (Fig. 15.1), a sub-section devoted to each one follows.

15.5.1   *Results*

Results are the eventual products or outcomes that are desired. In terms of the classroom, results can take the shape of student learning and activities, teacher lesson plans and work, and other types of classroom experiences. Important
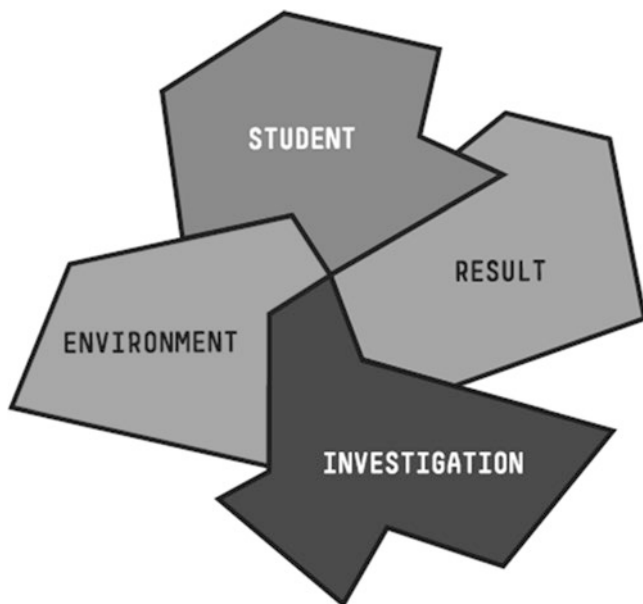
Fig. 15.1 The RISE framework of creative education (Patston, 2017)

concepts include how creative work is evaluated, how creativity is included in rubrics or larger assessments, how peer-to-peer interaction is used to improve results, and how teachers are utilized to judge student creativity, as those most qualified to do so. This aligns with current theories of formative assessment (Andersson & Palm, 2017).

15.5.2 *Investigation*

Investigation is the way that people create. People may investigate in many different ways, with individual preferences, styles, or strengths. Creative thinking skills (such as idea generation, evaluation, and iteration) are a vital part of the investigation process (Kaufman, 2016). This can happen alone but there are many benefits to creating with peers in small groups (Allsopp, 1997). Teachers play a strong role in nurturing the creative process of students. Important concepts include different stages of the investigation process, the importance of teachers in nurturing student investigation, and the construction of student groups with the best mix of diversity.

15.5.3 Student

Students are those who benefit from a learning environment; and teachers are learners too! Each student has particular strengths that can be used to enhance the learning experience. Key concepts include personality (such as openness to experience and conscientiousness), intellectual strengths (such as problem solving, memory, and knowledge retention), motivation, risk taking, resilience, and past experience (Sternberg & Lubart, 1993).

15.5.4 Environment

Environments (e.g., school, family, social, and classroom) represent different systems that may influence creativity. Each environment can be influenced by many different variables, from school administration to available resources and technology and the classroom atmosphere teachers and students generate and simple ideas such as seating plans. Important concepts include creating and maintaining a supportive environment, nurturing creativity within prevailing constraints, and ensuring to the extent possible that all students feel safe enough to be creative (Beghetto & Kaufman, 2014).

15.6 Applications of Creative Education Across Subjects

Patston's (2017) RISE Framework of Creative Education is currently in use in a four-campus school in Australia, from Kindergarten to Year 12 classes. All teachers (n = 215) participated in a blended learning program (Means, Toyama, Murphy, & Baki, 2013), combining online instruction and small group meetings to introduce them to the theory and practice of creative education and concepts and evidence behind the RISE model. Then they developed lessons or units of work that included elements of RISE, and were invited to initially make relatively small changes to their pedagogy while adhering to the Australian Curriculum guidelines (ACARA, 2010). The following five examples across subjects and grades are currently in use at the school.

15.6.1 Example 1: Environment: Grade 5

At the start of the school year, all furniture and removable fittings were taken out of the room. In the empty space, students were asked to design their ideal learning environment. They discussed ideas and presented them in a format of their choosing, working as a team. The final layout is what they designed. When speaking to their teachers, students expressed interesting observations, such as surprise over

how much they knew about the kind of learning environment and spaces in which they could best learn. The discussions were rich, students collaborated in a selfless manner, and opinions were respected. They came up with many creative and useful ideas not thought of by the teachers. It became clear that these learners understood the role of different learning spaces (e.g., individual, small group, different seating plans) being utilised throughout the day, and the need to change their behaviour accordingly and seamlessly.

15.6.2   Example 2: Student: Year 10 Maths

A study conducted at the University of Melbourne (Young, 2016) found that students can struggle to find value in mathematics as a subject, beyond doing homework and exams. One of the reasons for this difficulty is that math can be seen to be prescriptive, rather than creative. At the end of a lesson Year 10 students were offered a problem they did not know how to solve. Their homework was to try to do as much as they could and bring their work efforts to class the next day. In the following lesson, students were randomly assigned to a group of four or five to compare notes and see if they could develop the process toward a solution. Each group presented their work and then the class came to a consensus on the process and the solution if they could.

Teachers observed the following: Even the least able student was able to make some progress with the homework. Randomly assigning groups was more effective than choosing groups based upon ability. Also, the small group peer-to-peer teaching worked well, supporting evidence from the literature (Allsopp, 1997). Initially, the teacher struggled with not directing the lesson, but was pleasantly surprised at how well the students did without their direct instruction. They also witnessed their students' motivation increasing when solving problems together.

15.6.3   Example 3: Investigation: Year 8 Science

There has been a movement toward STEM education in the twenty-first century. Part of the value of STEM, and project-based learning, is that students learn the value of iteration, which is a component of creativity focusing on repetition in the face of failure. While many STEM projects rely on the use of digital technology, it is possible to obtain the same understanding of processes and concepts using analogue tools, as in a Rube Goldberg machine. Rube Goldberg was an American cartoonist, best known for his series of comics depicting complicated, deliberately over-engineered contraptions that perform a very simple task (Kim & Park, 2012). One step triggers the next in a chain reaction until the final task is complete. In this project the students had to use a variety of machines, such as levers, pulleys, and inclines in order to achieve a task—the ringing of a bell. The students were not

given any digital or electronic devices, just everyday items such as string, toilet rolls, and disposable plastic coffee cups.

The teachers' observations were as follows. Their students embraced the patience and problem solving skills required to develop their solutions to the problem. Those students with little patience for doing book exercises were more than happy to have 10, 20, or even 50 failures before coming to their final solution. Teachers made similar positive observations to those reported in example 1, including higher levels of student engagement and motivation. Students came up with many creative and useful ideas and so forth, and they could perceive the value of understanding the theories of physics and mathematics underpinning their projects.

15.6.4   Example 4: Results: Year 10 Texts and Traditions (Religious Studies)

With subjects that are perceived as hard or boring by students, it can be tempting to infantilise one's teaching using animations, simple videos, and more rather than challenging the development of their critical thinking skills. The same can be said of assessment, that hard subjects require hard assessments. The model of assessment used in this subject combines the creative with the traditional. In Texts and Traditions the students were given their end of semester exam to look at in the 1st week of classes. They were asked to discuss the types of questions asked and the knowledge they would need to build over the semester. Then they discussed what type of note-taking they might like to use; they played with some different forms ranging from handwriting to using a computer, photos, or recordings. As with the previous examples, students were given agency extending to choices over a part of their learning process. Student agency is a form of self-determination, which is a key to developing creative skills (Ryan & Deci, 2000). Regarding assignments, they were invited to choose a format, understanding that the key was to demonstrate understanding. They also self-assessed and peer assessed their work in class before final marks were decided.

Throughout the semester the exam paper was shown every 4 weeks and the students were asked to consider how their understandings were developing. If they had misunderstood a concept, then this misunderstanding was identified well before the final exam. The teacher observed that after the initial shock of being given an exam well in advance (6 months) and being shown the questions on it, students expressed gratitude that they could determine their learning strategies over time. They valued having the freedom to take notes in a format of their choice and to experiment with note-taking techniques. The small group peer-to-peer teaching and sharing of note taking, memorisation, and study techniques had worked well. Students were able to conduct both self and peer assessment, and reported that this had given them a deeper sense of immersion in the subject. In addition teachers reported that the students had developed a deeper understanding as to why certain concepts were important and how themes could be connected in the final exam.

These examples show that teachers can teach with creativity and for creativity in their classes, while still meeting curriculum requirements. Teachers were reporting that they felt more engaged with their teaching as they had more choices in their classes through designing new activities through the lens of creativity, but still linked to their curriculum, once again supporting the idea of self-determination and creativity (Ryan & Deci, 2000), and that students felt more motivated and engaged in their learning, attributed to having been given more freedom and choice.

15.6.5   Example 5 Student: Year 9 English

A key element in the RISE framework is the Creative Student. Students' attitudes and beliefs matter, in that those who believe that they are not creative are less likely to be creative (Tierney & Farmer, 2011). The goal of this trial was to find a way for the more reticent and introverted students in English classes to participate in discussion and engage more actively with the content in small group work, thus enhancing their creative self-belief.

In considering this, the assumption that students who speak the most write the best (essays) had been challenged. In this setting, the teacher faced the following predicament: Some students needed to talk aloud their ideas in order to process information before they wrote. Other students listened to their peers talk and did not contribute their own ideas yet still wrote well. Another type of learner was those who found it easy to contribute ideas but challenging to put the ideas down on paper.

The teacher focused on three learners, demonstrating that the RISE framework can be highly context specific. These were two boys (J and K) who rarely spoke and whose essays were of a poor quality; one boy (L) who spoke frequently and added much value to the classroom conversations but whose essay was of a very poor quality, and a girl (M) who never spoke and whose essay was of a good quality.

In sum, for all students in this trial the effect of building a closer personal relationship led to a significant improvement of writing skill—specifically the ability to construct clear arguments and articulate reasons soundly. In the case of J & K, this ability to construct arguments more effectively led to increased participation in class discussions, and relative to C he more confidently put forward his thoughts and significantly improved his writing. M (the girl) was an interesting case. She did not increase her participation but based on her grades prior to the trial her engagement with the subject increased significantly. In terms of the RISE Framework, impacting the Creative Student had an impact upon the Creative Result.

15.7   Measuring Teacher Behaviours

A challenge which teachers face in their efforts to foster creativity in the classroom is the impact their behaviours may have on student learning. Even in an environment in which implicit beliefs (e.g., unconscious biases) have been addressed, there

remains the question of how teachers' explicit classroom behaviours impact on the development of their students' creativity. It has been known for decades (Milgram & Feldman, 1979) that some teachers are more effective in developing students' creativity than others. Cropley (1982) noted that those creativity-fostering (and inspiring) teachers act in particular ways. They provide a model of creative behaviour, reinforce creative behaviours, protect creative students from unwarranted criticism, and establish a supportive classroom atmosphere.

To help teachers understand the impact of their behaviour on the development of creativity in classrooms, Soh (2000) used a set of nine key creativity-promoting behaviours of teachers that Cropley (1997) had developed to define a practical, self-assessment scale. The *Creativity Fostering Teacher Behaviour Index* (CFTIndex) is a set of 45 items, organised around the nine principles defined by Cropley, and addresses actual *behaviour* in teacher-student transactions. In this way, the index gives teachers specific insights into how they may be fostering or inhibiting the creativity of their students. The index also serves as a diagnostic tool in support of teacher training and development for creativity, with Soh (2015) also reporting the use of the CFTIndex as an observational instrument.

Soh's (2015, 2018) more recent research documents the psychometric properties of the CFTIndex across a number of different studies. The results generally support the proposed factor structure and scale reliabilities reached satisfactory levels. Table 15.2 shows the original CFTIndex items (Soh, 2000) with suggestions for modified text relative to two questions aimed at improving reliability.

15.8   Conclusion

The current push for greater creativity in schools, evident across developed countries, is a necessary response to the challenges of rapid environmental, economic, and social change. The problems that arise from change require a future workforce equipped with the skills and abilities—broadly speaking, a capacity for creativity and innovation—that will enable individuals as well as societies to prosper. However, this reorientation of school education towards greater creativity in classroom must be informed by an understanding of current beliefs and biases that have the potential to impede, if not block, efforts to embed creativity as a core component of twenty-first century curriculum. Teaching for and with creativity must not be hindered by faulty definitions of creativity, or by an assumption that creativity is found only in the arts.

This chapter has explored general myths and misconceptions of creativity, asking to what extent these are evident among teachers. We present a mixed picture, suggesting that there are some pre-existing beliefs that should be corrected in order to smooth the way for greater creativity in schools. Addressing and correcting myths and misconceptions makes it possible to develop a more differentiated and dynamic approach to teacher training and development in creativity. For example, if there are differences in how mathematics teachers and music teachers understand creativity,

Table 15.2 Creativity Fostering Teacher Behaviour Index (Soh, 2000)

Subscale	Item	Item content
1. Independence	1	I encourage students to show me what they have learned on their own
	10	I teacher my students the basics and leave them to find out more for themselves
	19	I leave questions for my students to find out for themselves
	28	I teach students the basics and leave room for individual learning
	37	I leave open-ended questions for my students to find the answers for themselves
2. Integration	2	In my class, students have opportunities to share ideas and views
	11	Students in my class have opportunities to do group work regularly
	20	Students in my class are encouraged to contribute to the lesson with their ideas and suggestions
	29	I encourage students to ask questions and make suggestions in my class
	38	Students in my class are expected to work in group cooperatively
3. Motivation	3	Learning the basic knowledge/skills well is emphasized in my class
	12	I emphasize the importance of mastering the essential knowledge and skills
	21	My students know that I expect them to learn the basic knowledge and skills well
	30	Moving from one topic to the next quickly is *not* my main concern in class
	39	Covering the syllabus is *not* more important to me than making sure the students learn the basics well
4. Judgement	4	When my students have some ideas, I get them to explore further before I take a stand
	13	When my students suggest something, I follow it up with questions to make them think further
	22	I do not give my view immediately on students' ideas, whether I agree or disagree with them
	31	I comment on student's ideas only after they have been more thoroughly explored
	40	I encourage students to do things differently although doing this takes up more time
5. Flexibility	5	In my class, I probe students' idea to encourage thinking
	14	I encourage my students to ask questions freely even if they appear irrelevant
	23	I encourage my students to think in different directions even if some of the ideas may not work
	32	I like my students to take time to think in different ways
	41	I allow my students to deviate from what they are told to do
6. Evaluation	6	I expect my students to check their own work instead of waiting for me to correct them
	15	I provide opportunities for my students to share their strong and weak points with the class,

Table 15.2 (continued)

Subscale	Item	Item content
		I provide opportunities for my students to assess their own strong and weak points and act accordingly before submitting their work[a]
	24	My students know that I expect them to check their own work before I do
	33	In my class, students have opportunities to judge for themselves whether they are right or wrong
	42	I allow my students to show one another their own work before submission,
		I encourage my students to define for themselves what they are trying to achieve in assignments[a]
7. Question	7	I follow up on my students' suggestions so that they know I take them seriously
	16	When my students have questions to ask, I listen to them carefully
	25	My students know I do not dismiss their suggestions lightly
	34	I listen to my students' suggestions even if they are not practical or useful
	43	I listen patiently when my students ask questions that may sound silly
8. Opportunities	8	I encourage my students to try out what they have learned from me in different situations
	17	When my students put what they have learned into different uses, I appreciate them
	26	My students are encouraged to do different things with what they have learned in class
	35	I don't mind my students trying out their own ideas and deviating from what I have shown them
	44	Students are allowed to go beyond what I teach them within my subject
9. Frustration	9	My students who are frustrated can come to me for emotional support
	18	I help students who experience failure to cope with it so that they regain their confidence
	27	I help my students to draw lessons from their failure
	36	I encourage students who have frustration to take it as part of the learning process
	45	I encourage students who experience failure to find other possible solutions

[a]Suggested replacement text aimed at improving scale reliability

then differentiated training and development will acknowledge these differences, and train these groups accordingly. Similarly, a dynamic approach to creativity will ensure that the impact of elements such as individual motivation, cognitive processes, and the environment inform and guide teacher creativity training and development.

With this *differentiated and dynamic* philosophy in mind, we discussed an under-developed aspect of creativity research that forms an important basis for teachers seeking to teach for and with creativity. Developmental models of creativity are necessary to help teachers move from a vague and unfocused approach to the differentiated and dynamic model of creativity in the classroom that we advocate.

Drawing on developmental concepts of creativity in children, we have offered more concrete suggestions for the implementation of classroom creativity extending to teacher training and development in this area.

Finally, we have discussed tools that support the implementation of creativity in the classroom. In particular, we looked at the RISE Framework of Creative Education, designed to assist teachers teach both with and for creativity, and the *Creativity Fostering Teacher Behaviour Index* (CFTIndex) as a self-evaluation tool that targets actual behaviour in teacher-student interactions with respect to creativity.

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Chapter 16
Creativity and the Urban Teacher: A STEM-Related Professional Development Program

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Abstract We examine the urban context of learning for the fellows in a partnership between Michigan State University (MSU) and Wipro Limited, a leading global information technology, consulting and business services company, which resulted in the Wipro Urban STEM Fellowship Program at Michigan State University (MSUrbanSTEM) program. This grant-funded fellowship provided full tuition scholarships and stipends for 124 highly motivated teachers in Chicago Public Schools (CPS) who demonstrated a passion for teaching STEM. The fellows were divided up into three cohorts. Each cohort participated in an innovative yearlong integrated learning experience to build STEM teachers' capacity to lead and inspire transformative, innovative practices in urban K-12 schools. In this chapter, the fellows' instructors explore how to support these teacher participants in their efforts to foster creativity in an era of intensified authority, control, and resistance. By engaging in creative pedagogies explicitly connected to disciplinary knowledge, the program aims to disrupt traditional ideologies around teaching. The mission of the MSUrbanSTEM program is to empower K-12 math and science teachers in CPS to create transformative, innovative, and multimodal instructional experiences through project-based and experiential learning experiences. Each educator participant was encouraged to engage in inquiry around how the ideas of wonder, improvisation, invention, and reflection connected with his or her subject-matter expertise. As reported by way of this case example of teacher creativity, these strategies supported the activities the teachers engaged in throughout the year. The fellowship itself provided a foundation for fellows to develop projects for reshaping aspects of their teaching practice.

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16.1   Introduction

Schools and teachers in urban contexts are faced with increasing and varied challenges. These include budget cuts, low teacher retention rates, and the in-school impact of difficult outside of school experiences students and their families face, such as abuse, addiction, health and financial problems (Milner, 2012). Matsko and Hammerness (2013) observe that urban educators are charged with addressing "complicated, interrelated issues … including racial and ethnic heterogeneity, concentrations of poverty, and large, dense bureaucracies" (p. 128). Efforts to support and evaluate urban students in such contexts sometimes reinforce negative practices, such as low teacher expectations and avoidance by teachers and administrators of the intellectual risks that necessary for creativity in teaching and learning. Teaching and learning in urban contexts often focus on lower-order skills, such as memorization and test-preparation, rather than higher-order skills, such as conceptual understanding and creativity (e.g., Ketelhut, Nelson, Clarke, & Dede, 2010). The purpose of our chapter is to consider the importance of integrating higher-order skills like creativity in teacher's pedagogical practice and ways that teacher professional development can better support and nurture creativity.

We examine a case of teacher professional development in a program aimed at inspiring more innovative and creative teaching practices by urban teachers. In the MSU-Wipro Leadership Teaching Fellowship Program, experienced Chicago Public Schools (CPS) teachers were able to develop creative instructional experiences for their students that were transformative, innovative, and multimodal. We describe how these urban teachers engaged in creative practices and project-based and experiential learning experiences while participating in the program, and the manner in which these experiences were informed by the urban context in which they taught. Through this case example of teacher creativity, we look at how teacher professional development can influence urban teachers' practices and perspectives toward greater creativity in both their work and thinking.

16.2   Creativity in Urban Contexts

In times of budget cuts and standardized testing, urban educators face a situation where they are forced to make tough choices about what content to provide to students, as well as how to provide it. With limited time to cover the material, teachers may feel pressure to "teach to the test;" a test with outcomes that may be linked to teacher performance rating. "Creativity is perceived as a luxury in a setting that is trying to combat criticism of inadequate instructional structures as measured by student achievement on standardized tests" (Kaimal, Drescher, Fairbank, Gonzaga, & White, 2014, p. 3). In this challenging environment, teachers and students tend to avoid taking risks or trying new things in teaching and learning that do not have demonstrative connections to testing outcomes.

Henriksen and Mishra (2015) observe that risk-taking behavior has long been considered an integral component for creativity. Such risk-taking is strategic, in that when allowed to do so, teachers inform their teaching with what they know about pedagogy, content, and student learning by seeking out new and effective approaches to instruction and learning. Pegg (2010) explains that while creativity is valued in education, such explorations may not be rewarded in performance-driven environments, especially those heavily burdened with social or economic problems.

16.3 Examining Creativity in the MSUrbanSTEM Program

As authors, we are members of the MSUrbanSTEM instructional and research teams. Some of us were heavily involved in developing the curriculum and activities, supporting the teacher fellows intensively along their yearlong learning journey, offering feedback to them in order to positively push their practice forward while applying the fellows' feedback of the program for instructional and programmatic improvement. Some of our research team's coauthors had more limited interaction with these fellows, but they know the data and their experience at an interpersonal level. We have all served this project for the same reason: to support these teachers leaders in developing creative pedagogies imbued with a positive mindset and that offer meaningful learning experiences for their students. We also supported teachers in addressing administrative challenges that impacted their teaching practice. As follows, we provide context about the MSUrbanSTEM program, then share a brief review of the literature on creativity and teaching, followed by a discussion of the outcomes, data, and learnings derived from this experience.

Regarding context, the goal of the MSUrbanSTEM program was to support 124 K-12 math and science urban educators in CPS over 3 years (2014–2016). The teachers underwent an ongoing professional development experience for the 1-year fellowship period. The teachers were grouped into three cohorts. In the first cohort, there were 25 fellows. In the second cohort, there were 50 fellows and in the third cohort 49 fellows. All fellows completed their work (3 graduate level courses totaling 9 credits) through a hybrid model of online work and intense face-to-face meetings. The educators who applied for and were accepted into the fellowship were educational practitioners in CPS with direct impact on students. Program participants mostly included classroom teachers, with a few discipline-specific coaches and administrators at the building level.

An integral part of supporting these educators involved doing our best to understand the urban context in which they teach, tailoring our design of experiences to this reality. For our fellow participants, this teaching context is the large, densely populated cosmopolitan area of Chicago, a mass school system in the United States that has struggled financially to equitably meet the needs of its diverse populations. In their daily teaching roles, the fellows were charged with teaching students from a wide variety of racial and ethnic backgrounds. Some taught students who were multilingual, while others had students who had not yet learned English as a

language. Despite these challenges, the MSUrbanSTEM teachers were interested in enhancing the ways in which they attempt to meet the needs of learners in their classrooms. They also wanted to learn more ways to cultivate a community of practice amongst colleagues to support STEM learning in their schools. These interests motivated them to apply for this program, in turn helping the instructional team design the best way to support these teachers around expanding creative teaching practice within their classrooms and schools.

16.4   Exploring the Creativity and Educational Literature

In the subsections that follow, we discuss educational theory, research and literature that support the importance of focusing on teacher creativity. We consider the gap between what existing creativity research offers, and what hands-on educational practice and teaching need. Further, we consider current scholarship with a more social orientation toward classrooms or a more pragmatic look at what creative teachers do, to consider themes that may be important for creative teaching in urban STEM contexts.

16.4.1   Gap Between Research and Practice in Creativity

Creativity is viewed increasingly as an important twenty-first century skill, receiving attention in the popular media and in educational policy (Bell, Limberg, Jacobson, & Super, 2014). Converting this interest in creativity into actual teaching practice is a different matter altogether, even though there exist current and even powerful examples of this integration. Teaching creatively or instantiating creativity in practice is complicated, partly due to the open-ended nature of the construct and the relative scarcity of practical research in this area (Hargreaves, 1997). Even outside of creativity, the overall disconnect between research and practice is a long-standing concern in education (Levine, 2007). The ivory tower of academia and thus professors' research has long been seen as disconnected from the everyday life of classrooms and teaching (Lovitts, 2001), while practitioners are often criticized for not employing the most effective research-based strategies (Perry, 2016). When it comes to creativity this challenge is significant, because creativity is already perceived as a subjective or vague concept and because practitioners may feel uncertain about how to instantiate it without guidance or clarity. This, of course, raises the question as to how much of the existing research on creativity is directly relevant to, or applicable for, educators.

Despite the wide body of important work done in the field of creativity research—a great deal of it is not grounded in K-12 education contexts or framed in ways that would be practical and thus useful to teachers. This is particularly the case for unique or challenging contexts, such as urban settings.

16.4.2   Research in Creativity

In this section, we briefly review work in the field to consider some alignments and misalignments between creativity research and teaching practice. We also suggest recent work in educational research that may be more directly relevant for teaching and learning considerations. Our attempt is to offer a frame for informing creative teaching practice and for setting the foundation for the teacher professional development work developed in this chapter.

The construct of creativity is an ancient one (Starko, 2013), but formal research on this concept picked up significant interest in the latter half of the twentieth century, sparked by Guilford's (1950) address to the *American Psychological Association* on the subject. Guilford's call to action led to a wide range of research studies, with branches and applications in many directions. Creativity scholarship has touched on (and built upon) research from neuroscience, economics, design, social justice, the arts, and more (Kaufman & Sternberg, 2010). Yet, despite the existence of diversity in creativity research, for much of recent history, the most highly touted academic research has been around the psychological aspects of individual creativity (Runco, 2014). The foundational core of the field stems from a cognitive or psychological perspective, often focused on the self; further, such research is often done through psychometric examination or testing more than application in social and classroom contexts (Plucker & Renzulli, 1999).

Psychological theories of creativity explain different cognitive processes underlying the creative process or aspects of cognitive style that might account for creative thinking (e.g., Cropley, 2000). A key area of creativity study in psychology through the late twentieth century focused on psychometric approaches—individualistic examinations of creative potential within the mind and construction of a battery of tests to measure individual creative potential and performance (Runco & Chand, 1995). Stemming from this, Davis and Gardner (1993) linked creativity with a theory of multiple intelligences, emphasizing the importance of creativity to the domain of education. They proposed that creative individuals have "inborn sensitivities" to specific kinds of information or ways of learning and operating.

To be sure, these dominant discourses in creativity research have been notable for advancing our understanding of individual human creative potential. However, this focus on individual creativity—or internal psychological states, capacities, and skills—is both limiting to, and separate from, the highly social, practical, and hands-on needs of most classroom teachers. There is not always a clear practical connection between common psychometric or psychological approaches in creativity and what teachers do in the classroom. Even beyond the specific creativity tests that dominate psychology, it can be hard for teachers to find much in most creativity research that directly speaks to their practice. Henriksen, Mishra, and Mehta (2015) reported that a review of existing creativity measures indicated that very few measures or instruments were practically applicable to education. Their independent analysis of all existing creativity measures listed in databases that catalogue psychological measures (such as in the PsychTests database or Mental Measurements

Yearbook—both key APA databases for psychological instruments), showed that only 3% of existing creativity measures addressed areas of possible relevance to teaching (and not all of these were relevant to working with children or youth). Many existing measure covered self-report of thinking styles, or individual psychological tests of creative thinking—but very few dealt with the kind of social or developmental needs that teachers and students in classrooms might experience.

Moreover, most educational research on creativity has focused on gifted and talented students, which is somewhat exclusionary and attends only to those seen as special or exceptionally talented. Such measures of creativity, such as the Torrance Test of Creative Thinking, the Guilford Alternative Uses Test, or other common psychometric tests of divergent thinking (i.e., the ability to come up with many divergent ideas) or psychological correlates of creativity, may also suggest researcher blindness to social and cultural factors that may complicate how creativity is defined, instantiated, taught, and measured (Karp, 2017). Focusing on just those students pre-identified as being gifted or talented is problematic. Teachers must work with and develop the opportunities of all students, not merely those with high scores on internal measures of creativity.

Moving beyond this specific focus on talent, we must acknowledge that teachers function/work/create within the social setting of a classroom. Classrooms tie together school culture, personal relationships, interactions among students and teachers, subject matter with the norms, roles, and tools of schooling. Much psychological creativity research has not connected to these realities, and often misses the broader forest for the trees.

In recent years, as social and constructivist theories of learning have emerged more clearly, researchers have aimed to bring creativity into the complex and practical social arena of teaching. For instance, Sawyer (2011a, b) speaks to the collaborative, constructivist, and social dynamics of creative teaching. He suggests that the commonly known values of constructivist and social theories of learning inherently align with good teaching and creative educational practice (Henriksen, Mishra, & the Deep-Play Research Group, 2017). Craft's (e.g., 2003, 2005) work considers practical dilemmas in implementing creativity in the classroom and inherent tensions and possibilities as well. Yet, little research suggests that strategies have been actively sought out for classrooms that respond to the practices of creative teachers who are successful.

Henriksen (2011) and Henriksen and Mishra (2015) have looked at how creativity emerges in effective teaching practice. Their research showed that a key factor in developing a mindset for creativity is in cultivating an openness for the new. The teachers they studied describe creativity not as a process or skill separate from other thought processes, but as a mindset that they actively aim to practice and strengthen in their own minds. This creative mindset revolves around a student-centered focus on problem solving for effective practice, a willingness to try new things, and a belief that creative thinking is accessible to everyone (not merely people deemed "artistic" or "special"). Key themes that arose from this study were real-world teaching and learning, *cross-curricular connections*, and taking intellectual risks—

with an overarching idea that we teach who we are, or that creative teachers integrate aspects of their own interests, personalities and preferences into their practice.

In the examples of creative lessons from each teacher across a range of contexts (Henriksen & Mishra, 2015), a common tendency was to create lessons with a focus on real-world learning. This was instantiated in different ways and with varying subject matter across subjects like math, science, language arts, or general elementary education contexts, but all of the teacher participants tried to root their lessons in a real-world or "authentic" basis or framework. This type of real-life teaching requires that teachers seek connections between the content they teach and activities or links with applications in actual settings.

The teachers in Henriksen and Mishra's (2015) study also focused on cross-curricular connections. In some cases, they gave examples of teaching school subject matter via the medium of the arts or music. They also used a variety of cross-curricular approaches in ways that made sense for their own interests and practice. This may mean, for example, teaching subjects like mathematics using advertising activities, or language arts using an idea from music theory. The goal of blending different areas of curriculum allowed for unique creative hooks or views of learning.

Finally, a key finding from the creativity paradigms of successful teachers is a willingness to take risks, as mentioned. Teaching with and for creativity does *not* denote careless or "risky" teaching, but rather a willingness to think "outside of the box" and take intellectual or teaching risks by trying out new ideas and approaches to lessons and classroom practices. The importance of intellectual risk taking is also a common finding of psychology research, which suggests that to be creative, one must take risks, allowing innovative approaches to emerge (Cropley, 2015).

An organizing idea behind these themes described above was that creative teachers use a variety of avocations and creative pursuits in their lives outside of school, which creatively affects their teaching practices. The idea that we teach who we are as described above, or that aspects of our own selves and lives can and should be woven into our teaching practice and presence with students. This concept can resonate not only in creativity research but also in the varied nature of teaching in practice—whether this involves STEM teaching, urban settings or any of the rewarding but inherently challenging spaces in which teachers find themselves.

16.5   Key Aspects of Our Instructional Strategy

The MSU-Wipro program was launched in summer give the year with an intensive face-to-face, 2-week session. As mentioned, this was followed by a yearlong blended experience (online for the most part with face-to-face whole-day Saturday meetings four times a year) where the teachers applied what they learned from the initial session to their classroom teaching and interactions with colleagues in their schools. STEM educators (N = 124) participated over 3 years. Teacher creativity was supported and enhanced through the teachers' development of their

technological pedagogical and content knowledge (TPACK). The goal was to develop technology-rich contexts that allow for the creative interplay of technology, pedagogy, and content. The approach, which we have described elsewhere as deep-play (Koehler et al., 2011), fosters TPACK as well as the creative knowledge and skills needed for re-designing and repurposing technologies, tools, and techniques for effective instruction in contexts (in this case, the urban classroom).

Our model or approach emphasizes contextualized playfulness, creativity, and new ways of seeing at the intersections of content, pedagogy, and technology. Through experiences with new technologies, tools, and techniques, we hope that teachers came to understand that, because many technologies are not designed for classroom settings, they would need to creatively repurpose these to make them useful for pedagogical purposes.

For instance, within the context of learning about scientific misconceptions, the fellows created stop-motion videos that actually *enhanced* the misconceptions, and through that process reveal the fallacy that undergirds the misconception in the minds of learners. Another example is what we have called the Veja du activity. Déjà vu is the process by which something strange or unfamiliar becomes abruptly and surprisingly familiar. Veja du is the opposite. It is the seeing of a familiar situation with "fresh eyes," as if you had never seen it before. For example, our fellows would take pictures and create images of everyday objects in ways intended to hide their true nature and re-see them (e.g. seeing a chair from bottom up, a computer from an unfamiliar angle, or a fire hydrant at so close up as to simply see the color and texture). The act of creating and sharing these pictures led to important conversations about representation, seeing, perception, creativity and design—about how our perceptions of the world around us are key to creativity in any context. The idea behind this, in making the familiar strange, has been historically noted in in common practice as a useful tool toward creativity, as a way of re-seeing what is right in front of us (Summer & White, 1976; Mannay, 2010). This activity also highlights how the specific affordances of technology (in this case, the digital camera) may serve to help facilitate creative thinking or actions. This activity is used early in the semester in order to foreshadow the deep-play we expect during the semester. It requires students to see the world in new ways and also scaffolds the development of new skills (technical and aesthetic) with digital cameras that allow them to later repurpose the technology for new tasks. Later in the term, this activity is combined with an images activity which askes our fellows to see the world through their disciplinary lenses, to see the world as a physicist or mathematician might do so.

Other such examples of creative repurposing would be using Twitter as a medium of synthesis of ideas in a reading, with the 140 character limit acting as a significant constraint. We also do several creative micro-design activities included writing a short story in 55 words, finding letterforms in nature using digital cameras, using magic as a way of introducing mathematical ideas, creating time-reversed videos to understand the second law of thermodynamics, creating video synopsis of chapters in a book and so on. These tasks were usually constrained tightly in terms of resources and time provided. Our fellows found these tasks invigorating and challenging. Through these activities, we attempted to embody many of the social,

collaborative and creative goals we espouse in this program. For instance, the assignment on writing a story in 55 words demonstrated how constraints (of medium) can actually encourage creativity, when most of our fellows believed that creativity necessarily required open-ended, time-consuming, unstructured activity.

16.5.1 Creative Pedagogies in Practice

The design of the MSUrbanSTEM program was developed out of our prior experience with the Master of Arts Program in Educational Technology (MAET) program at Michigan State University, Michigan, USA. Specifically, the MAET program uses a unique and rigorous approach towards instructional and professional development. The goal is to support and develop thoughtful, innovative, and creative practitioners who integrate content, technology, and pedagogy in creative ways. Some of the key tenets of the pedagogical approach here include Learning by Design, as next discussed.

16.5.2 Learning by Design

The instructional approach involved real world, hands-on engagement with tools, techniques and pedagogies and their relationship to core constructs in the STEM disciplines. Design as conceptualized in the program was a purposeful, collaborative approach that spotlighted developing creative solutions to problems of practice. With this, focus is maintained on powerful disciplinary ideas even while keeping state and national standards (such as Common Core standards) in mind. Thus, learning by design allows teachers to participate in in *deep* conversations about their practice; provides them opportunities to experiment and *play* with ideas, tools, and subject matter, and offers contexts to reflect on their learning.

16.5.3 Conceptual Integration Across Multiple Delivery Modes

The MSUrbanSTEM program was integrated conceptually and practically across two modes of delivery (face-to-face and online). The instructional team worked with the teachers across platforms, not just on imparting knowledge of the latest digital tools and technologies but rather aiming to help these fellows thoughtfully and creatively repurpose tools at their disposal for meeting student learning goals. The program's learning community extended well beyond the time spent in specific programs or courses. Fellows, across cohorts, became part of an affinity group (Gee & Hayes, 2012), mainly using social media (Twitter and a private Facebook group) that continues to be active even after they had graduated from the program.

16.5.4 Deep-Play at the Program's Heart

At the heart of our MSUrbanSTEM approach to professional development is what we have previously called *deep-play*. As Koehler et al. (2011) write:

> *By Deep-Play we mean an engagement with rich problems of pedagogy, technology and content and their inter-relationships. Deep-Play is creative, seeking to construct new ways of seeing the world, and new approaches to using technology, in order to develop creative pedagogical solutions.* By engaging in design with Deep Play, educators can see themselves not as passive users of technology, but rather as active designers of technology, who creatively repurpose tools, technologies, and artifacts to meet their own goals and desires (italics in original). (p. 154)

Deep-play as an instructional approach encouraged the participants to "play" with technology even while reflecting on deeper issues related to content and pedagogy and their integration. This element of the MSUrbanSTEM program (i.e., deep-play) encourages teachers to be creative in their pedagogy. The program attempt several key goals around this relative to our participating fellows to:

1. Inspire teachers to repurpose everyday items to use as teaching and learning tools in the classroom;
2. Help teachers create active classrooms for their students;
3. Teach with hands-on activities that allow the learner to use various senses and intelligence types;
4. Be reflective of their practices for the sake of always being a better teacher, and
5. Use artifacts and metaphors to demonstrate understanding and profound thought.

During the program, the instructional team emphasized how the act of making or creating can provide rich, transformative learning experiences. In order to help the fellows embrace this idea, we exposed them to readings and activities. These activities were designed intentionally to send the message that creativity is not a gift given to a select few, but a habit of thinking about and engaging with the world that can be learned. This process involves the thoughtful integration of creative pedagogical decisions instantiated in a range of projects, small and large, such as the examples provided above. What is common to all the activities designed and implemented by the instructional team is to nudge students to look at the tools they have in terms of their inherent constraints and affordances and through that to push them to think carefully and creatively about how to leverage them to meet their core student-learning goals.

16.6 Formative and Summative Assessments

In this section, we illustrate how strategies such as flexible grouping, team-building and collaborative work processes, use of formal and informal active learning spaces, improvisation, and strategic technology integration were all used to support creative

risk-taking amongst the fellows. In the program, we take a rigorous, student-centered approach to explore how creativity is encouraged through the following tenets in our instructional practice: learning by design; demonstrating explicit connections between classroom practice, theories, and standards; multiple levels of conceptual integration across modes of delivery; innovative use of technology, and the development of learning communities.

In order for pedagogy to be classified as creative, it must meet three criteria: "…model a community of practice (COP), focus upon redefining pedagogy and provide an appropriate technology support infrastructure" (Cochrane, Antonczakb, Keeganc, & Narayanan, 2014, p. 4). The program's instructors integrated an array of formative and summative assessments that supported the community we built among our cohorts, as well as encouraged exploration as they examined technologies to support their teaching practice in an effort to give fellows constant practice in honing their creativity. While assessments are not a new concept to teachers, these have varying levels of value for student learning, depending on their context. Black (2015) states that many scholars and teachers "regard assessment as a peripheral component of pedagogy, one that is inescapable but which always threatens to undermine the most valued aim, that of developing the learning capacity of their students" (p. 163). Continuing, Black argues that, in practice, implementing innovative formative and summative assessments is often challenging for teachers for many reasons.

As though echoing Black, the program fellows expressed challenges to implementing different forms of assessments for several reasons. These included but were not limited to

- Scheduling a mandatory week of standardized testing into a packed curriculum with little notice.
- Difficulty getting buy-in from colleagues, administration, and parents
- Obtaining time and resources needed to create assessments, and
- Differentiating assessments based on the wide diverse learner characteristics they need to support.

During the ten face-to-face sessions that launched each of the three academic years for the fellows, the instructional team integrated a wide range of assessment practices for them to consider modeling in their classrooms.

16.6.1 Formative Assessments

We now describe a small sampling of the formative and summative assessments fellows completed to help support their instructional needs and enhance their ideas around creative pedagogies. During the face-to-face sessions of the course, fellows, on average were asked to complete three to five formative assessments each day. One of the most challenging yet popular forms of formative assessments were Quickfire Challenges Wolf (2009). In a Quickfire Challenge, participants complete

a challenging, authentic task within a tight time frame that combines content and technology. The assignment is tiered so that they can customize the activity based on their comfort level with technology. Quickfires provide a safe and collaborative way to fail and iterate (Horton, Mehta, & Shack, 2017, p. 247).

Within each cohort, fellows self-selected themselves into groups of five that were diverse in level of technology skill, and grade and subject level taught. Each group worked together to develop the products required from the Quickfire challenge, such as videos, digital posters, and games. Initially, the goal for each group was to complete the challenge in a timely manner. As the group collectively became more comfortable with the format of the assignment and their membership, the fellows were able to spend more time taking risks that could involve enhancing their product. Thus, we aimed to give them opportunities for exploring learning and pedagogical work that required the critical risk-taking aspect of creative teaching that Henriksen and Mishra (2015) note is so important. Along those same lines, the focus on authenticity brings the element of real-world relevance to the task, as we next describe.

16.6.2 *Video Story Problems: Deciphering the Disciplines in Real World Contexts*

In the video story problem, teachers are given 30 min to create a video that communicates a story problem with real-world application. The goal of this exercise is to help teachers practice transiting from teaching a subject area to fostering the disciplined minds of their students (Mansilla & Gardner, 2008). The activity requires teachers to consider a real-world application for the skills they are already teaching in their class, and create a video that illustrates the problem in some context students would see in their actual life. Teachers engage with the real-world component of creative teaching as they capitalize on their students' interests and lives to incorporate those elements into the story problem. Thus, they increase the connection between their students' world and the subject area in which they teach.

Each group of fellows brainstormed ideas for the product and then created a video based on their ideas in the time allotted. If they had more time, they were encouraged to make the Quickfire "extra-spicy" by adding technological and production-value enhancements to their video or creating an appendix to enrich the content of their video. Teachers were able to create videos that encouraged students to apply their knowledge of math, science, and engineering to determine the solutions to the proposed problems they found around the city. The fellows found and proposed questions like how much soil does it take to fill a cylindrical cement planter, how much water was dispensed from a bottle-filling drinking fountain, what was the speed of our walk to lunch, how do we classify materials based on observable properties, and how much money does the parking meters generate?

We found that two different groups captured a video of the same building front. Due to a difference in the ages of learners that they worked with, what the teachers saw in the building's structure was different. The teachers of earlier grade levels asked students how they could count the total number of windows on one side quickly. The other group of fellows taught at the high school level and they discussed the size of buildings in the city in general in terms of proportions and scale in relation to other buildings around the world. They asked their students to calculate the number of red bricks it takes to complete this window-filled front of the building. This example highlights what we saw emerge from these videos – how our teachers see STEM in the city is focused on the knowledge and skills of their learners.

16.6.3 Breaking the Laws: Confronting Misconceptions Through Video Creation

The Breaking the Laws activity is intended to directly confront assumptions or conventions and engage risk-taking by viewing existing content differently. Prior to this activity the class engages in a conversation about barriers to learning, using Lee Shulman's research on the "epidemiology of mislearning" as the anchor text for the conversation. One of the major points of emphasis of this discussion is the disruptive role misconceptions play in learning. Shulman explains that misconceptions are one of the most disruptive barriers to learning because unlike simply forgetting information, a misconception can often result in a person confident that they understand something, when they truly do not (Shulman, 1999). As a part of the reading and discussion, teachers confront the idea that science is often not taught in a way that requires students to confront paradoxes and conflict brought on by their own preconceived notions. In an effort to help teachers conceptualize this issue and see its effect on their students' understanding, teachers create a stop motion video that purposefully breaks the law of physics, thereby perpetuating a misconception. An "extra-spicy" version of this assignment would have fellows create a second video that responds to the misconception illustrated in their first video, as an opportunity to extend the thinking and take it farther into real-world teaching.

Through the exercise, the fellows developed their video creation and design skills and utilized this medium to help them explore misconceptions that their own students may be holding onto that prevent them from reaching deeper levels of understanding. Thus, they again were called on to bring their attention to issues and ideas that their own students confront in real-world misconceptions, and to help move them to viewing things from a completely different perspective to promote understanding.

The primary purpose of this assignment was to force teachers to delve into the "why" of their students' misconceptions. For example, one group of teachers demonstrated the common student misconception that larger objects fall faster than

smaller objects. Other groups created stop motion videos that covered topics like friction-less environments, force and motion, recreating the perception and reality of Ben Franklin's interaction with lightning, and the sun's path of travel. By forcing the fellows to conceptualize their student's misconceptions as narrative videos, teachers would then be better equipped to address these misconceptions in the classroom.

This activity's secondary purpose was to arm teachers with an assessment strategy that could creatively assess a student's understanding of the content. To create a video that successfully highlights a misconception, a student would first have to possess a deep understanding of the content. Through this activity, teachers engaged with a common and disruptive barrier to student understanding, while simultaneously sharpening their creative assessment skills.

16.6.4 Summative Assessments

Through the fellowship, teachers also completed summative assessments. These items included the ImagineIT project, an independent project that allowed fellows to address a pervasive STEM-related question in their teaching or leadership capabilities. Also, within each cohort, fellows formed subgroups called Deep Play Groups. In these interdisciplinary groups, fellows were asked to explore teaching tools or strategies in which they had a collective interest, and share their findings through various activities, including creating interactive professional development opportunities for their colleagues. Further, each cohort of fellows contributed to at least two published anthologies related to their experiences teaching in STEM. These books share reflections from our teaching fellows about what teaching means to them, differentiated lesson plans and other resources related to teaching STEM in the urban K-12 context.

16.6.5 ImagineIT

The ImagineIT assignment was one of 2-yearlong activities in which the fellows participated. It was constructed as a series of multi-staged projects that challenged them to identify and address a problem that their classroom, school, and/or teaching community faces related to STEM and technology. The goal was not to simply think about how to integrate technology into a STEM course. Instead, the objective of this project was for the teachers to identify a real-world problem that would allow them to take a radical action in their teaching context that they believed would be both beneficial and transformative to their practice.

We asked teachers to *imagine* an aspect of their STEM content that involved some pedagogical problem that they wished to address. For example, some of the challenges teachers named and chose to address through this project included how

to make students see that science and math were implicit parts of their own lives and how to get parents more connected to STEM so students, parents, and teachers can create a STEM environment in their school community. Based on these goals, fellows created videos that allowed them to think about their big ideas from different perspectives and new ones, as well as to communicate their big ideas to target audiences (i.e., colleagues, administrators, students, and parents). We have noted how real world and cross-disciplinary teaching and intellectual risk taking or trying new things is essential to creative teaching, so in many ways this assignment wove together several of these concepts.

During the fall semester of the academic year for each cohort, fellows were charged with developing and facilitating two focus groups (one with their colleagues and one with their students) so fellows could brainstorm with each group and receive feedback about their planned intervention. A few interventions that fellows tried resulted in professional innovations in their practice, such as creating a school garden for teaching biological and nutritional concepts and developing a makerspace that included circuitry and coding tools, as well as a 3-D printer for students to explore STEM concepts. At each step, fellows were asked to reflect on the process and make decisions about how to proceed as informed by the feedback they received from instructors or from insights the readings provided. In the spring semester, the fellows put their ideas into action by implementing them in their teaching and then reflecting and providing written reports on results.

16.6.6   Deep Play Groups

As mentioned, Koehler et al. (2011) describe deep play as engagement with rich problems of pedagogy, technology, and content and their inter-relationships. Deep-play is a creative process for seeking to construct new ways of seeing the world and using technology to develop creative pedagogical approaches and solutions to disciplinary and or administrative challenges that impact their teaching practice. The cohort members had a wide range of interests for which they wanted to learn more. It is difficult, if not impossible, for us as instructors to meet each and every one of these interests and needs. The Deep Play groups were a way for fellows to interact around of topics of shared interest as they worked to explore and solve a problem in a risk-free, playful manner. In other words, these groups were interdisciplinary teams within each cohort, which focused on developing a better understanding of a specific topic related to teaching and learning in the STEM disciplines.

Teams of five were created based on mutual interest in their topics. The topics they chose to explore included 3-D printing in the classroom, gamification, genius hour, and project-based learning in the classroom. Group members then undertook a series of activities that allowed for a deep-dive exploration into the topic with their colleagues. One of these activities involved a book review in which each team hosted a webcast to review books related to their topic and share the ways (if any) the book connected to their ImagineIT project or teaching context. This group also

planned an interactive professional development activity around this topic that could be implemented in their schools. Further, these teachers curated content that was connected to their topic and distributed this information through social media.

16.6.7 Book Publications

Each year, fellows published books exploring their teaching practice. During the third cohort, the fellows created two books within the summer. The first was *A Teacher's Quick and Dirty Guide to Cosmos*, which offers STEM teachers a new lens for evaluating the original classic by Carl Sagan. By the end of this semester, they also created *Amazing STEM*, which highlights master lesson each teacher developed and implemented, and then enacted for their cohort peers. Their final publication titled *This I Believe* reveals the teachers reflecting on their experience in the program and sharing revisions to their ideas about teaching and learning over time.

16.6.8 Bringing It All Together

Our overall aim for these assignments was to immerse these teachers in their own creativity by offering opportunities to take risks and try new things, to engage with digital media in news ways, and to create, play, and build learning experiences for their cohort. All of these experiences and challenges were grounded in real-world, interdisciplinary approaches to STEM. By creating a philosophy based in Dewian principles that also spoke to creative engagement as central to the STEM teaching and learning experiences of this large group of fellows, we aimed to promote learning in new ways that would carry over from their new mindset and beliefs into their teaching practice.

16.7 Findings

To describe these fellows' creative learning outcomes, we provide demographic data, data collection procedures, measurement information, and some key findings from our ongoing research with the MSUrbanSTEM project. We also provide some implications of our research findings on broader factors such as teacher efficacy and student learning and achievement. This section reflects our effort to form a picture of the development of creative mindsets and practices for this particular group of urban STEM teachers.

16.7.1 Participants

The study data include the responses of 124 STEM teachers in a large urban school district who were enrolled in three separate cohorts (years) of the MSUrbanSTEM program (25 teachers were part of the year 1 cohort, 49 in year 2, and 50 in year 3). These teachers were accepted into this program after being selected based on their essay responses, letters of recommendation, leadership, and past teaching experience.

In terms of demographics, 81 (65%) of the teachers were female and 43 (35%) were male. Also, 56 (45%) identified as White, 30 (24%) African American, 16 (13%) Hispanic/Latino, 12 (10%) Asian, and 9 (7%) as multi-ethnic. While 59 (47%) taught at the middle school level, 37 (30%) taught high school and 11 (9%) taught elementary; additionally, 13 (11%) taught at the elementary and middle school levels, with 4 (3%) at middle and high school levels. Finally, 56 (45%) taught science, 55 (44%) taught math, 13 (11%) taught identified other subjects (engineering, technology, and combinations). Among them was a STEM program coordinator, assistant principal, and instructor of teachers.

16.7.2 Examining Changes in Beliefs About Creativity and TPACK

In order to assess if the participating MSUrbanSTEM teachers showed any changes in their skills or creative beliefs as STEM educators, we asked them to complete the Teacher Creativity Scale (TCS) and the Technological Pedagogical Content Knowledge (TPACK) surveys, which are explained further in this section. Data collection consisted of several procedural steps. The survey measures were administered to participants at three time points: prior to the first meeting of the year (July), 6 months later (December), and at the end of the year (May).

16.7.2.1 Looking at Changes in Beliefs about Creativity

The TCS is a ten item, self-report survey that measures teachers' beliefs about their ability to be flexible and creative in their classroom practices. Survey questions are answered on a five-point Likert scale from strongly disagree to strongly agree. MSUrbanSTEM team members created the teacher creativity scale in 2015 (during the implementation of the first cohort to assess if teachers' creative approach to teaching and thinking was impacted by program participation. The items in the scale speak to elements that indicate creativity like risk taking behavior and ability to find alternate paths to reach one's goal (Henriksen & Mishra, 2015; Peg, 2010).

The TCS consists of two subscales: creative resilience (CR) and teacher creativity (TC), which is in Table 16.1. An exploratory factor analysis was conducted in

Table 16.1 TCS [Teacher Creativity Scale] (Seals, Mishra, Henricksen, & Mehta, 2015)

#	Questions/item	Subscale
1	I am a creative person	–
2	I can come up with a lot of ideas when faced with a problem	CR
3	I am open to new ideas and experiences	CR
4	I see failure as a serious setback (reverse coded)	CR
5	I am a creative teacher	TC
6	Teaching creatively is easy for me	TC
7	I am extremely willing to try new things in my classroom	TC
8	I am good at imagining new ideas to engage my students	TC
9	I feel comfortable teaching my subject matter from multiple angles	TC
10	I am extremely comfortable with deviating from a prepared teaching plan	TC

Items 2 and 3 were omitted due to poor factor loadings and reliability
CR creative resilience, and *TC* teacher creativity

order to validate the relationship among the items. Reliability measures of the TCS were good ($\alpha = 0.783$). Six of the items (items 5–10) loaded heavily onto construct one with a good reliability ($\alpha = 0.745$. Since the scale was created after the launch of cohort 1, creativity data could only be collected for cohorts two and three ($n = 99$).

For this chapter, we used the survey responses to conduct a one-way repeated measures ANOVA to test the null hypothesis that there is no change in creativity over the 1-year period of participating in the MSUrbanSTEM project ($N = 70$). Findings show that there was significant growth in creativity from July to May $F(2, 68) = 50.78$, $p < .001$. Post hoc results for creativity over time indicate a significant difference among all three points: time one 95% CI [2.90, 3.46], time two [3.74, 4.06] and time three [3.94, 4.22]. Table 16.2 has the average scores across the three time points, showing how teachers grew in TCS and TC across the three time points. Moreover, growth also proved significant in teaching creativity over time $F(2, 68) = 42.81$, $p < .001$. This indicates that the teachers' approach to their pedagogy and content may have changed due to their involvement. Specifically, participating teacher fellows in the MSUrbanSTEM project increased their self-perception as creative teacher educators.

16.7.2.2 Examining Changes in TPACK

The TPACK survey seeks to measures the ability of teachers to integrate successfully content, pedagogy, and technology in their teaching (Mishra & Koehler, 2006). Teacher TPACK is measured by way of a 47-item self-report survey; questions are answered on a five-point Likert scale from strongly disagree to strongly agree.

Table 16.2 Means from creativity and TPACK survey responses

			Cohorts by year		
			1	2	3
			Mean	Mean	Mean
TPACK	Time	July	3.91	3.82	3.77
		Dec.	4.36	4.09	4.18
		May	4.49	4.31	4.33
TCS	Time	July		1.65	3.70
		Dec.		3.00	3.89
		May		3.03	4.05
TC	Time	July		1.46	3.83
		Dec.		3.98	4.04
		May		4.17	4.20

Average responses over 1 year for three cohorts showing growth in creativity and TPACK during teaching fellows' year of participation within the MSUrbanSTEM program (cohort 1 did not complete the Creativity survey). TCS includes the mean of all ten items from the teacher creativity scale, while TC includes the mean of items 5–10

Reliability measure of the TPACK was strong ($\alpha = .946$). On the survey, items making up the TPACK scale were clustered together by these constructs: technological knowledge (TK, 7 items, $\alpha = 9.33$), content knowledge (CK, 12 items, $\alpha = 8.57$), pedagogical knowledge (PK, 7 items, $\alpha = 8.84$), pedagogical content knowledge (PCK, 4 items, $\alpha = 6.63$), technological content knowledge (TCK, 4 items, $\alpha = 7.94$), technological pedagogical knowledge (TPK, 5 items, $\alpha = 8.02$), and technological pedagogical content knowledge (TPCK, 8 items, $\alpha = 8.82$). TPACK data were collected from teachers (n = 124) in all three cohorts.

We conducted a one-way repeated measures ANOVA to evaluate the null hypothesis that there was no change in their perception of TPACK over time (N = 91). Findings show that there is growth in TPACK over their year of involvement in the MSUrbanSTEM program (July to May) $F(2, 89) = 62.81$, $p < .001$. Post hoc results for TPACK over time show a significant difference among all three points: time one 95% CI [3.71, 3.90], time two [4.14, 4.32] and time three [4.28, 4.48]. This indicates that the teachers' approach to their pedagogy and content changed due to their program participation.

16.7.3   Summary of Findings

Given these changes in teacher self-beliefs, the teachers' approach to their classroom practices has become more open minded and flexible about trying novel and different methods to deliver class content. Further, the growth in TPACK indicates that confidence levels had increased, along with feeling comfortable with one's knowledge of STEM content and ability to integrate successfully technology into one's pedagogical practices. This type of thinking requires teachers to be creative so

that classroom technology has purpose and they can innovatively integrate technological devices into their activities. The program goal was to support teachers in this direction, giving them opportunities to use technology innovatively to create multimodal learning environments for their students.

All forms of teacher knowledge are involved in student learning and student evaluation (Mishra & Koehler, 2006), and the quality and variety of teacher practices can influence student achievement (Rockoff, 2004). Moreover, general teacher self-perception of competence is correlated to student achievement, especially in math and science (Muijs & Reynolds, 2002), suggesting that an efficacy-enhancing development program may directly impact student achievement.

16.8   Conclusions

Urban settings often present a complex and challenging environment for teaching, as teachers face contextual and systemic pressures that include the socio-economics of poverty (Milner, 2012). Given all such challenges, urban teachers in struggling contexts need more support and professional development aimed at guiding students and supporting their learning. Unfortunately, in such settings teaching and learning often slides toward lower-order skills and rote learning. Yet, it is the higher-order skills like creativity that could aid student success in academics and in life. In this chapter, we have considered the importance of bolstering creativity for teachers and students in these contexts, with a specific focus on STEM disciplines as areas that are often not seen as creative, but which are ripe with opportunities to teach and learn in both novel and effective ways.

The case of teacher professional development that we have presented through the MSUrbanSTEM program with CPS aimed at inspiring more innovation and creativity for urban teachers. Through the types of learning experiences crafted for these cohorts of teaching fellow, we have aimed to build their capacities to engage students creatively in STEM learning with project-based and experiential learning experiences that are connected to the real-world and informed by the urban context. In seeking to understand what the impact was upon such teachers, we investigated the perceptions that each cohort member had of his or her own creative teaching abilities as well as understanding of TPACK. Based on our findings, it was clear that each cohort of MSUrbanSTEM teachers saw significant growth for both of these constructs. Importantly, their perceptions of their own creative abilities as teachers and their TPACK, based on a year's involvement in this professional development program, can be said to have transformed.

While we have noted that some existing creativity research and scholarship has been somewhat distanced from classroom or teaching practices, there are still some important connections to be made. For example, a core component of creativity is having an openness and orientation to the new and engaging in intellectual risk taking (Glover & Sautter, 1977). There is a natural degree of resistance to uncertainty,

novelty, and risk-taking for many people, particularly in challenging situations. But these are also habits of mind that can be developed through opportunities to change behaviors and practices that promote such a mindset (Costa & Kallick, 2009). Further, we have noted how some research (e.g., Henriksen & Mishra, 2015) illustrates how creative teachers support their practice through real-world connections, cross-disciplinary teaching, and intellectual risk taking. Through the kinds of professional development opportunities that we have described from the MSUrbanSTEM program, we aimed to enhance as well as expand such creative practices and beliefs in these teachers. The analysis of data we have reported demonstrates positive and promising findings. So, as we look ahead to the future of creative teaching in challenging settings, we hope that the pedagogies and approaches we described through a long-term program may be helpful for further creative professional development for teachers of STEM and other areas.

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Chapter 17
Who Stands for What Is Right? Teachers' Creative Capacity and Change Agency in the Struggle for Educational Quality

Marilyn J. Narey

Abstract Freedom, opportunity, equality, and justice—these ideals are education's promise to people seeking to improve their lives and worlds. Yet, many learners are caught up in inequitable instructional systems and difficult socio-cultural, economic, or political circumstances. For students in these challenging contexts, teachers are the potential frontline activists in ensuring access to educational quality. The question is, how are we preparing teachers to live up to such expectations for social justice advocacy and change? In this chapter, I confront teacher education's struggle to develop teacher change agents: teachers who are willing and able to take a stance for equity and opportunity in their school communities. Observing that creativity is the impetus for change, I propose that understanding teachers' creative capacities in the context of engaging with and influencing their environment can inform teacher education for social justice. To this end, I explore the construct of teacher as change agent. I also highlight studies of teachers' creativity featuring theories of creativity, critical reflective practice, and educational quality aligned with constructs of leadership, social justice, and the notion of "change agent." Applying an analytical tool of 22 creative capacities derived from my conceptual analysis of social and psychological theories of creativity, I illuminate how presence of these capacities facilitated acts of social responsibility, and how their absence hindered such acts. The results offer insights that inform teacher education for social justice.

17.1 Introduction

I am a teacher who stands for what is right .... (Freire, 1998, p. 94)

The dream of equity and opportunity made possible through public education has yet to be realized across our global society. As inequality persists throughout the varied aspects of our lives (Mills & Ballantyne, 2016; Noguera, 2017), teachers are frequently viewed as the expected change agents (Bourn, 2016). Envisaged as front-

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313

line activists by the broader education community, educators are called upon not only to challenge inequitable instructional systems, but to also advocate for learners in difficult socio-cultural, economic, or political circumstances.

Yet, most teachers believe they have little power to affect the hierarchical systems in which they work (Sleeter, Torres & Laughlin, 2004) and often see little connection to the world outside their classrooms. In truth, teachers actually have few opportunities to implement change in environments where prescriptive curricula remain subject to rigorous accountability or where teacher agency is often appropriated as a "slogan to support school based reform" (Priestley, Edwards, Priestley, & Miller, 2012, p. 193). Further, some teachers, content with the status quo, do not see the need for change, while others fear loss of position or status if they are perceived to oppose inequities that have become ingrained as accepted norms. Thus, working in the real worlds of schools, a vast majority of inservice teachers are more likely acquiesce to discriminatory, exclusionary, and undemocratic policies and practices than to publicly stand up for what they believe is right (Soo Hoo, 2004).

Within this educational milieu, teacher educators who embrace socially or politically situated notions of teacher agency have implemented a variety of programmatic and curricular initiatives to develop a transformative teaching force. Despite these efforts, few leaders for social justice have emerged from among the graduates of these programs once they are ensconced in their public school classrooms. Who, then, stands for what is right? What more can teacher education do to develop the advocates and activists we so often call for but rarely see?

In this chapter, I explore the construct of teacher as change agent and confront teacher education's struggle to develop teachers who are willing and able to take a stance for equity and opportunity in their schools and communities. Advancing the notion of change as creative thought and action, I argue that teachers must access creative capacities such as openness, problem defining ability, curiosity, and courage in order to see the need for change, generate ideas for change, and enact change. Teacher education programs largely have neglected creativity development as integral to preservice and inservice curricula and coursework (Abdallah, 1996; Segall, 2002) thereby seeming to overlook the understanding that creativity is the very essence of transformative pedagogy.

Drawing from critiques offered by scholars who contend that teacher education for social justice in the United States and elsewhere has failed to produce teacher-change agents, I discuss commonly employed teacher education program foci. Then, calling for a paradigm shift to reframe the problem as teacher education's lack of attention to the development of creativity, I provide a synopsis of my research of teacher creativity, with highlights from my cross case comparison of inservice teachers. The juxtapositions of theories of creativity, critical reflective practice, and educational quality aligned with constructs of leadership, social justice, and the notion of change-agent in these cases work to illuminate the critical role of creativity in teaching within a social justice framework. Finally, I conclude with discussion of how viewing the notion of educating teachers as change-agents through the lens

of creativity development adds a new dimension to the discourse of teacher education for social justice advocacy and change.

Of further note, while much of this chapter discussion centers upon teachers and teacher education in the United States, international efforts to integrate social justice principles in teacher education policy over the past 30 years signals a worldwide interest in the topic (Mills & Ballantyne, 2016). As Vass (2017) notes, the growing diversity of classrooms in Australia is indicative of the global trend that has extended social justice concerns. Teacher educators across the globe who seek to challenge conditions that deny quality education to any persons can find relevancy herein of teachers as change agents.

17.2 Construct of Teacher as Change Agent

Most references to "change agent" in the teacher education literature appear to be linked to issues related to social justice (Marchel, Shields & Winter, 2011). Yet, the construct is subject to a range of interpretations within the field of education as well as in the public mindset. In this section of the chapter, I briefly explore two commonly held perceptions of the construct of teacher change agent: "superhero teacher" and "teacher leader," and, then, outline the perspective taken.

17.2.1 Teacher as Change Agent: The Illusive "Teacher Superhero"

Teacher change agents have been memorialized in films: Jamie Escalante in *Stand and Deliver*, LuAnne Johnson in *Dangerous Minds*, and Erin Gruwell in *Freedom Writers.* Such exceptional teachers who challenge the odds for social justice capture the public imagination. But, some scholars take issue with superhero definitions of leadership (McBeth, 2008). They are critical of "the overused image of educational leaders who, on their own, can make everything right for all student populations regardless of the challenges put in their path, merely by sheer will and moral fortitude" (Capper & Young, 2014, p. 162). Qualities observed in such superhero teachers can inform teacher development, but the superhero-teacher conceptualization alone will not move most teachers to even envision themselves as change agents, let alone become one. As Geoffery Canada, president of the Harlem Children's Zone, poignantly discusses in the documentary *Waiting for Superman*, for most learners, no superheroes are coming to fight for social justice in their communities.

While not achieving the notoriety of being the subject of film, some teachers achieve hero-like status within their communities for winning grants to gain funding for their schools and classrooms. Although these actions of outstanding teachers are worthy of praise, Fitzgerald and Savage (2014) draw attention to issues with this

kind of teacher celebrity wherein media and market work to intensify "adoption of methodologies of privileged leadership in education which [are] symptomatic of the retreat of public education for the public good" (p. 57). While these teacher change agents may garner awards from corporations or philanthropies that bring resources to disadvantaged populations, ties to externally driven marketplace agendas must be weighed against critical social justice concerns—who really profits and can other injustices be inadvertently promoted through such funding to needy communities? Critical consciousness demands the teacher's ability not only to act for change, but to also to understand the complexities and critically reflect upon the results of their actions.

17.2.2 Varied Views of Teacher Leadership for Change

A second common perception of the construct of teacher change agent is noted with the term *teacher leader*. Teacher leaders as change agents have always been present in our society, however, the complexity and challenge of the twenty-first century have precipitated the emergence of a formal recognition of "teacher leadership," and teacher education has responded by establishing leadership studies and programs to support the growing interest (Clemson-Ingram & Fessler, 1997). The early literature on educational leadership was targeted to administrators and offered scant attention to teacher leaders (Murphy, 2005). So, over recent decades, scholars began to define teachers' newly acknowledged role with such definitions as York-Barr and Duke's (2004): "Teacher leadership is the process by which teachers, individually or collectively, influence their colleagues, principals, and other members of school communities to improve teaching and learning practices with the aim of increased student learning and achievement" (p. 288).

In this representative definition, the connection to social justice seems vague and the influence of teachers is limited to student "achievement." Teacher leadership on behalf of students will have minimal impact unless it is also coordinated with the wider social context (Berkovich, 2014). As Blackmore (2006) contends, if leadership is viewed in a social justice frame, we must look beyond what is good for the individual learner to ask what makes a good society. Further, Groundwater-Smith and Sachs (2002) argue that in order to bring about change, large numbers of the educational community will need to become activists in the broader society.

Seemingly to this end, some leadership models are specifically lauded as transformational due to the democratic inclusion of teachers and others in the school community (Huber, 2004; Schleicher, 2012). However, critics note issues of power, resources, multiple interpretations, and lack of support that work to undermine the potential of these models to provide teachers with any real voice for change (Corrigan, 2013). As Reitzug (2010) contends, most schools "neither function as democracies nor do they prepare students for democracy" (p. 321). Anderson (2008) entirely rebuts the notion of teacher leaders bringing about significant change, claiming, "transformational leadership by teachers is almost unknown" (p. 8).

Katyal and Evers (2014) add, "there is little empirical work that provides guidelines for showing how teachers are to be change agents in the grander scheme of societal change affecting schools" (p. 42). Further, in the United States, accountability measures that make teachers fearful of losing their jobs or status has made it less likely for teachers to stand up and question educational reforms (Anderson, 2009; Kumashiro, 2012).

Recent decades of ongoing educational reform in the US have had further implications to the interpretation of teacher as change agent. In a view that many regard as antithetical to the historical/philosophical underpinnings of the construct of teacher agency, in recent decades, the term "change agent" appears to have been (mis)appropriated to describe teachers who are recruited and trained as leaders to assist in implementing externally devised educational reforms within their institutions (Lattimer, 2012).

17.3 Teacher Agency Within the Frame of Teaching for Social Justice

Moving beyond these superhero perspectives and co-opted notions of "teacher leadership," we look at teacher agency within the frame of teaching for social justice. Mthethwa-Sommers (2014) underscores, "Social justice education theories maintain that schools should serve as sites of democracy with all its inherent ideological, cultural, religious, and social diversity, and should serve to work toward social justice, a significant signpost of democracy" (p. 10). Working within this view, I argue that our approach as teacher educators must demonstrate our own critical consciousness. We need to ensure that in the process of developing teachers as change agents, we are not indoctrinating them to a defined "change," but rather seek ways of developing and supporting those creative capacities that will empower them to make critically reflective choices. This stance is based upon my perspective that (1) creative capacities are the essence of change in a democracy, (2) all teachers can access such capacities, and (3) teacher education must acknowledge the role of creativity in teacher agency for social justice.

To this end, O'Sullivan's (2008) brief overview of Freirian theory of consciousness is useful to understanding teacher agency within the frame of teaching for social justice. O'Sullivan points out, "teachers can and must play a role as social change agents both within the school and, indeed, beyond" (p. 97). He goes on to differentiate among (1) *naïve consciousness*, (2) *conventional consciousness* (O'Sullivan's term for Freire's superstitious consciousness), and (3) *critical consciousness.*

Teachers who show *naïve consciousness*, or as he proposes, "unconsciousness," are unable to imagine social change as they unquestionably accept the status quo with no consideration of other possibilities.

O'Sullivan goes on to explain teachers at the next level who perhaps can see the need for change, but are unable to formulate ideas for change or are unwilling or afraid to enact change. He explains that teachers at the

> *conventional level of consciousness* recognize that many of our institutions, including schools, corporations, government ministries, and the media, are the products of human endeavor, but they also accept the permanence of these socially constructed institutions in their present form even though any institution that has been created by humans can be modified or abolished by humans. (p. 104)

Finally, teachers at the *critical conscious level* will recognize that teaching/learning is never politically neutral. O'Sullivan emphasizes Freire's understanding of this level: "At no point does Freire deny the importance of educators being professionally and technically competent; he does, however, ask them to remember on whose behalf they are exercising this competence …" (p. 105).

17.4   Efforts to Develop Teachers as Change Agents

Having considered perspectives of teaching in a democracy and Freirian theory of consciousness, we next examine teacher education's efforts to develop teacher agency. Teacher educators face numerous challenges in attempting to develop programs in teaching for social justice. Some wonder how novices, who often experience difficulty viewing themselves as teachers, can envision becoming change agents (Saunders, 2012). Others express concern that candidates' perceptions of social justice work are limited to community service initiatives rather than focused upon identifying and eliminating oppression in the day-to-day spaces of our school communities (Katssarou, Picower, & Stovall, 2010). Many realize that even for experienced teachers, there is scant capacity for implementing change in environments where prescriptive curricula remain subject to rigorous accountability, and where teacher agency is often appropriated as a "slogan to support school based reform" (Priestley et al., 2012, p. 193).

We might further note that promoting social justice as a goal of teacher education policy is not without controversy. In 2006, The National Council for Accreditation of Teacher Education (NCATE), the profession's mechanism to help establish high quality teacher preparation in the United States, dropped "social justice" (Heybach, 2009). The concern was that the term could alienate stakeholders who did not believe that advocacy should be the role of teachers and replaced it with language centered on awareness and valuing of diversity: a move that many criticize as insufficient (Burns & Miller, 2017). Of further concern, the broad range of teacher evaluation methods endorsed by accrediting bodies (i.e., the Council for Accreditation of Educator preparation that replaced NCATE in the US) determine the qualities of future generations of teachers (Harris, Ingle, & Rutledge, 2014). Social justice advocates must ask how the evaluations used by these accreditation agencies relate to issues of social responsibility.

Despite these challenges, the teacher education community has initiated a number of practices to promote social justice. These have achieved varying reviews from scholars and researchers. In the next sections, I provide brief overviews of two common ways that teacher education attempts to develop educators who lead for social justice: (1) establishing social justice curricula and (2) promoting reflective practice. Noting that these efforts have not generated the desired goals, I suggest that teacher education has ignored the creative aspects inherent in both of these approaches. I propose the need to attend to teachers' creativity development for social justice advocacy and change.

17.5   Problems with Teaching Social Justice

Over past decades, numerous teacher education programs have implemented course-work and residency programs to teach explicitly social justice that have raised some students' awareness of the social/political aspects of teaching. Yet, teacher education has failed to develop the comprehensive strategies necessary to integrate social justice into their teaching practice within their schools and communities (SooHoo, 2004; Zeichner, 2016).

Some researchers cite the problem of fragmented curriculum in preservice teacher education and point to the need for a unified vision that focuses on social justice (McDonald & Zeichner, 2009; Ritchie, Cone, An, & Bullock, 2013). Others believe that teachers' increased understanding of families, communities, and history is warranted (Moriarity & Bennett, 2016) or call for more collaboration among communities and universities (Zeichner, 2016). Field placements and service learning offer potential for developing preservice teachers' advocacy, yet, mere exposure to social concerns of a population does not raise critical consciousness. As research by Tinkler et al. (2014) reveal, field placements and service projects can also work to reinforce stereotypes that work to encourage a charity-oriented attitude and deficit view of oppressed populations rather than activism for change.

17.6   Problems with Teaching Reflective Practice

In addition to explicitly teaching social justice through courses and fieldwork, the reflective practitioner model has become a central feature of many teacher education programs (Usher, Byant & Johnston, 1997). Reflective practice is a transformative process that enhances professional effectiveness by facilitating the preservice teachers' capacity to develop clearer perceptions, avoid hasty judgments, exercise self-direction, experiment, and achieve flexibility (Osterman & Kottkamp, 2004; Rogers, 2001). Yet, as Lasley and Matczynski (1995) note, reflective practice is commonly misunderstood and inappropriately implemented. Zeichner (1993) contends that schools of education not only have failed to develop reflective

practitioners, but that some programs may be inadvertently promoting reflection in a manner that serves to "further solidify and justify teaching practices that are harmful to children" (p. 6). Zeichner outlines four ways in which the concept of reflective practice has been misemployed in pre-service teacher education:

- Merely using it to "fine tune" externally formulated knowledge
- Looking only at the means of instruction, rather than the ethical and philosophical underpinnings of the ends
- Neglect of any consideration of influences of the social conditions of schooling upon the teacher's situation
- Tendency to view reflection as a solitary activity rather than as a social practice.

Bartolome (2004) admonishes teacher educators to move beyond the belief that blindly replicating a technique or program will result in producing teachers who use reflective practice to improve educational quality for their future students. Reflective practice is a creative process of critically responding to problems encountered in the broad educational context. Yet, reflection is practiced frequently as a simple assessment of how well a particular teaching strategy was enacted. Despite the potential of reflection to bring about teachers' critical consciousness, as with explicit social justice courses and fieldwork, teacher education has struggled to develop teacher agency.

17.7   What's Missing?

Teacher education's efforts to develop teachers as change agents for social justice are falling short of expectations. So, what's missing? If we study the embodiment of the construct—teachers who are actually interacting with their environment to bring about change—we discover that teacher education has overlooked the creative capacities necessary to becoming a teacher change agent. Knowledge of social injustice is not enough. Practicing reflective techniques is not enough. Teachers must be able to *see the need for change*, to *generate ideas for change*, and develop the capacities to *enact change*; and to do this, they need capacities associated with creativity (Narey, 2014).

Next, I focus on the embodiment of teachers as change agents and teachers' transformational practice in the context of creativity. After laying out the theoretical/conceptual background, I demonstrate this conceptual understanding through highlights from a cross-case comparison drawn from my earlier investigations. This discussion illuminates how the presence or absence of creative capacities facilitated or inhibited inservice teachers' interactions with, and influence upon the environment. Their reported interactions offer indication of critical reflection and action that demonstrates creativity for social justice advocacy and change.

17.8   Conceptual Framework: Three Dimensions of the Phenomenon

As part of my early investigation of educational quality in teaching and learning, I conducted a conceptual analysis of social and psychological theories of creativity and reflective practice (Narey, 2008). The results of my conceptual analysis suggested a strong theoretical linkage between the constructs (creativity and reflective practice).

Three dimensions emerged as relevant to the phenomenon of transformational teacher practices in pursuit of educational quality: seeing the need for change, generating ideas for change, and enacting change. These three dimensions are articulated across Joas' (1996) creativity of action theory, Runco's (2004) theory of personal creativity, and Dewey's (1933) and Schön's (1983, 1987) work with reflective practice in education.

Joas (1996) offers a sociological perspective of this phenomenon of transformational teaching practice. He delineates three dimensions of creativity: seeing past pre-reflective impulses and perceptions, non-teleological intentionality, and a questioning of symbolic boundaries. Similar dimensions are articulated in the psychology literature in Runco's (2004) theory of personal creativity as transformational capacity, intentionality, and discretion. Formulating the groundwork for reflective practice in the educational literature, Dewey (1933) has described these same three elements as open-mindedness, whole-heartedness, and responsibility. Drawn from the organizational learning literature, Schön's (1987) discussion of single and double loop learning acknowledges a less explicitly defined, albeit relatively corresponding, set of aspects that influence a person's reflective practicum: governing variables for action, action strategies, and consequences.

Table 17.1 demonstrates the correlation of these dimensions across these theories of creativity and reflective practice. Each of the dimensions is described further in the sections that follow.

17.8.1   Seeing the Need for Change

The dimension of seeing the need for change is explained in Joas' (1996) creativity of action theory as being able to look beyond pre-reflective impulses or perceptions. Runco (2004) calls this transformational capacity and describes it as the ability to interpret or construct new meaning. For Dewey (1933) this dimension is open-mindedness. He explains this as an active desire to listen to more than one side. It requires an attention to facts regardless of their source, consideration of alternative possibilities, and recognition of a possibility of error in strong-held personal beliefs. Further, he believes that open-mindedness encourages a cultivation of curiosity and spontaneous reaching out for the new. This dimension is implied in Schön's (1987) discussion of single and double loop learning. He proposes an expansion of the governing variables (widening one's perspective) when something goes wrong rather than merely look for another strategy within that pool.

Table 17.1 Theoretical support across three dimensions of the phenomenon (Narey, 2008)

Three dimensions of the phenomenon as identified in sociological and psychological theories of creativity and reflective practice				
		Seeing the need for change	Formulating ideas for change	Enacting Change
Sociological (creativity of action theory)	JOAS	A different attitude toward prereflective impulses and perceptions	Non-teleological intentionality	A different attitude to the symbolic boundaries
Psychological(theory of personal creativity)	RUNCO	Transformational capacity (ability to interpret or construct new meaning)	Intentionality	Discretion
Reflective practice	DEWEY	Open-mindedness	Whole-heartedness	Responsibility
Reflective practice (based upon theory of action—Argyris and Schon 1974)	SCHON	Governing variables for action (theories-in-use vs. espoused theories)	Action strategies	Consequences

17.8.2   Formulating Ideas for Change

Joas (1996) specifies the non-teleological character of this dimension of formulating ideas for change. He clarifies that intentional action is not goal-oriented action; rather, it is a bridging between our impulses and environment: "Intentionality itself, then, consists in a self-reflective control which we exercise over our current behavior" (p. 158). Runco (2004) puts forth that intentionality is the willingness to invest time and effort in formulating, evaluating, and revising ideas for change. Dewey's (1933) construct of whole-heartedness, or enthusiasm as he describes it, is a teacher's passionate absorption of "throw[ing] himself into it" (p. 31) that embodies this dimension. Schön's (1987) discussion of double loop learning promotes it as he underscores the need to creatively modify and go beyond taken for granted strategies.

17.8.3   Enacting Change

This third dimension of the phenomenon, enacting change, is reflected in Joas' (1996) creativity of action theory as questioning symbolic boundaries. He explains this as one's means of responding to the contradictory, competing environmental expectations based upon an understanding of self; humans draw boundaries around themselves as well as open them up. It is a values-based judgment. Runco's (2004) theory of personal creativity is brought into this third dimension with his concept of discretion. Discretion is a matter of judgment and choice of when and when not to

transform experience into a meaningful interpretation. Dewey's (1933) discussion of responsibility that he describes as the need to consider the consequences of a projected action and the willingness to commit to the consequences serves as this third dimension of *enacting change*. As Rodgers (2002) underscores "for Dewey, reflection must include action … reflection that does not lead to action falls short of being responsible" (p. 855). Schön's (1987) notion of double loop learning involves action that results from critically scrutinizing goals, values, plans and rules.

17.8.4   Theoretical Linkages Across the Literature

Further theoretical linkages were found across the literature. In the psychology literature, systems approaches to the study of creativity also acknowledge that the individual does not exist in a vacuum. It is important to supplement the theories highlighted in the previous section with Harrington's (1990) ecology of creativity theory (also from the psychology literature) that deals with the functional interrelationships of creative ecosystems: the external systems (physical environment, competing roles, resources) as well as individual personal characteristics relevant to meeting the challenges to creativity (vulnerability to social demands, self-confidence, flexibility). Harrington's ecology of creativity supports Joas' (1996) view that "goal-setting, body control and the formation of boundaries between subject and environment can no longer be regarded as everyday self-evident truths" (p. 195) and a theory of action must recognize the conditional nature of these assumptions.

These theoretical linkages align with concepts of critical reflection (Larivee, 2000; van Manen, 1977) that link reflective practice to context and social justice concerns as well as to Freirian theory of consciousness discussed at the outset of this chapter. Additionally, theoretical support to clarify perspectives of educational quality advanced in this chapter is found in Fenstermacher and Richardson's (2000) elements of good teaching. I offer a summary of these here to provide further understanding of the role of teachers' creativity in social justice advocacy and change.

van Manen's (1977) organizational structure of reflective thought is frequently used to critique reflective practice (Hatton & Smith, 1995). In his taxonomy, reflection is categorized as technical (focused on the technique or strategy, concerned with means, asks "how"), practical (focused on the learner, questions the ends, asks "why?"), or critical (links to social/political, asks "should?"). Fenstermacher and Richardson's (2000) elements of good teaching are characterized as logical acts (defining, demonstrating, explaining, correcting and interpreting—appraised by standards internal to act), psychological acts (motivating, encouraging, rewarding, punishing, planning and evaluating—appraised relative to persons comprising relationship), and moral acts (exhibiting traits such as honesty, courage, tolerance, compassion, respect, and fairness—appraised primarily by standards internal to the actor) and are in alignment with van Manen's structure of reflective thought.

17.8.5   A Lens, Not a Checklist

As we consider these three dimensions of the phenomenon that I have identified across the theories, we should refrain from viewing *seeing the need for change*, *generating ideas for change*, and *enacting change* as stages, or even as isolated states of being. For, although each theorist distinguishes among the dimensions, the scholars in their respective theories also underscore the interrelationship or reciprocity among these aspects. Viewing the phenomenon through the change agent lens, we can see how these dimensions work in this manner. As Priestley et al. (2012) write, "agency is a matter of personal capacity to act, combined with the contingencies of the environment within which such action occurs. Further an individual may exercise more or less agency at various times and in different setting" (p. 196). Thus, we see how the capacity for teacher agency may draw upon the dimensions of seeing the need for change and formulating ideas for change, while the teacher's actual engagement with the environment is a conscious decision within the third dimension, enacting change.

17.8.6   Multiple Creative Capacities Distributed Among Three Dimensions

In my original conceptual analysis (Narey, 2008) I identified 22 creative capacities distributed among the three dimensions. I have subsequently used these findings (22 capacities) as an analytic tool in my ongoing research of teaching and learning. A sample of the analysis is represented in the visual display in Table 17.2 and a brief explanation of the capacities included in each of the three dimensions follows. Per the analysis on this Table 17.2 sample display, interview data were coded and indicated for each participant within that study and will be illustrated through excerpts in final sections of this chapter.

The first dimension is *seeing the need for change.* Teachers must be open to alternate views. Therefore, they need creative capacities of *openness, curiosity, knowledge, problem finding, problem defining, questioning the status quo, tolerance of ambiguity, functional freedom*, and *stimulus freedom.* Zeichner and Liston (1996) point out that in every school there is a way of doing things, a "collective code" for what constitutes reality: "As long as things proceed along without major disruption, this reality is perceived as unproblematic and serves as a barrier to recognizing and experimenting with alternative viewpoints" (p. 9). Teachers need to step outside themselves and their beliefs "in order to let the perspectives of others filter in" (Delpit, 1995, p. xvi).

The second dimension, formulating ideas for change, must accompany recognizing the need for change. Here teachers must draw upon creative capacities of *flexibility, fluency, originality, persistence, enthusiasm, multi-modality of thought,* and the *ability to deal with complexity/disorder.* Finally, in order for teachers to stand for what is right, they demonstrate the third dimension, *enacting change*, which includes

Table 17.2 Definitions of 22 creative capacities in visual display of data from selected study (Narey, 2014)

For each capacity, the 14 participants (A-N) are coded in bold font if capacity was evidenced in interview data. It should be noted that creative capacities noted were only those that could be supported by the interview data it does not suggest that the participant does not possess the ability, only that it was not evident in the collected data

Seeing the need for change:

Problem finding ability: sensitivity to existence of problems, emerging from personal curiosity or desire to "make better"

A	**B**	**C**	**D**	**E**	**F**	**G**
H	**I**	**J**	**K**	**L**	**M**	**N**

Problem defining ability: ability to formulate a problem

A	B	**C**	D	E	F	**G**
H	I	J	K	L	**M**	N

Questioning status quo: ability to see beyond and challenge current norms

A	B	**C**	D	E	**F**	G
H	**I**	J	**K**	**L**	**M**	N

Tolerance of ambiguity: ability to function without clear direction

A	**B**	**C**	**D**	**E**	**F**	**G**
H	**I**	J	**K**	**L**	**M**	N

Knowledge/expertise/competence: understandings within the domain of teaching

A	**B**	**C**	**D**	**E**	**F**	**G**
H	**I**	**J**	**K**	**L**	**M**	N

Functional freedom: ability to redefine established functions, see possibilities beyond typical use

A	B	**C**	D	**E**	F	G
H	I	J	K	L	M	N

Stimulus freedom: ability to bend rules to meet needs, does not assume existence of rules; ability to "think "out of the box"

A	B	**C**	D	**E**	F	G
H	I	J	**K**	**L**	**M**	N

Openness: ability to positively embrace new experiences

A	B	C	D	**E**	F	**G**
H	**I**	J	**K**	**L**	M	N

Ability to deal with complexity/disorder: tolerance of, or proclivity to, complexity or "mess;" the ability to impose own sense of order

A	**B**	**C**	**D**	**E**	F	**G**
H	**I**	**J**	**K**	**L**	**M**	N

Generating ideas for change:

Fluency: ability to generate ideas

A	**B**	**C**	D	**E**	**F**	**G**
H	**I**	**J**	**K**	**L**	**M**	N

Originality: ability to depart from prevailing norms

A	**B**	**C**	**D**	**E**	**F**	**G**
H	**I**	**J**	**K**	**L**	**M**	N

Flexibility: ability to positively accept and/or bring about change; capacity to see the whole

A	**B**	**C**	**D**	**E**	**F**	**G**
H	**I**	**J**	**K**	**L**	**M**	N

Persistence/perseverance: willingness to persist despite prolonged frustration or substantial effort

A	**B**	**C**	**D**	**E**	**F**	**G**
H	**I**	**J**	**K**	**L**	**M**	N

Curiosity: ability to wonder

A	B	C	D	E	F	**G**
H	I	J	K	L	M	N

Enthusiasm/interest: ability to be excited about an idea

A	B	**C**	D	**E**	F	**G**
H	**I**	J	**K**	**L**	**M**	N

Multi-modality of thought: ability to fluidly engage in diverse modes of thought (visualization, audition and use of metaphor)

A	B	**C**	D	E	F	**G**
H	**I**	J	**K**	L	**M**	N

Enacting Change:

Risk-taking: willingness to accept possible failure

A	B	**C**	D	**E**	F	**G**
H	**I**	J	**K**	**L**	**M**	N

Table 17.2 (continued)

For each capacity, the 14 participants (A-N) are coded in bold font if capacity was evidenced in interview data. It should be noted that creative capacities noted were only those that could be supported by the interview data it does not suggest that the participant does not possess the ability, only that it was not evident in the collected data

Courage: the ability to continue in the face of great difficulty or opposition	**A**	B	**C**	D	E	F	**G**
	H	I	J	**K**	**L**	M	N
Ego strength: ability to tap inner security to withstand questioning or threatening social pressures	**A**	B	**C**	D	E	F	**G**
	H	I	J	**K**	**L**	M	N
Ability to sell ideas: practical skill of convincing or persuading others of value of one's ideas	**A**	B	**C**	D	E	F	**G**
	H	I	J	**K**	**L**	**M**	N
Commitment: ability to be devoted to goal or deeply care,	**A**	**B**	**C**	**D**	**E**	**F**	**G**
	H	**I**	**J**	K	**L**	**M**	N
Passion: to be "driven" by an internal desire	**A**	B	**C**	D	E	F	**G**
	H	I	J	**K**	L	M	N

creative capacities of *commitment, ego-strength, passion, risk-taking, courage,* and the *ability to sell ideas.*

17.9   Examining Creative Capacities in Inservice Teachers' Reports of Practice

In this section, I present excerpts from four data sets drawn from my earlier investigations in a cross case comparison (Narey, 2014) in order to advance understanding of how these 22 creative capacities may be noted in inservice teachers' reports on practice as indications of social justice advocacy and change.

17.9.1   *Research Background for the Discussion of Highlighted Cases*

To determine the four data sets used in the cross-case comparison (Narey, 2014), I chose two representative cases of teacher participants with high percentage of demonstrated creative capacities and two low (see Table 17.2). Additionally, I attempted to balance the selections about years of experience and teaching level when encountering more than one choice. Findings of my cross-case comparison included resulting analyses of participants' creative capacities relative to van Manen's taxonomy of reflective thought, the three dimensions of the phenomenon: seeing the need for change, generating ideas for change and enacting change, and environmental interaction and influence. (This last item was related to Ferstenmacher and Richardson's (2000) elements of good teaching and views of change agent/social justice.)

Each of the participants (n = 4) whose case I selected for the cross-case comparison had completed a written critical incident survey in phase one of my earlier investigation (n = 80). Per Flanagan's (1954) methodology, this critical incident survey asked respondents to identify and describe problems encountered in professional practice: one to which they believed to have effectively responded and one that they were unable to resolve. Utilizing Isaksen, Puccio, and Treffinger's (1993) ecological approach to creativity research, in the larger investigation, I examined the natural interactions among these functions and factors relative to teacher creativity, teacher quality, and reflective practice utilizing their five-dimension model. This includes personal orientation, situational outlook, task, focus of study, and outcome. Additionally, participants whose cases were revisited for the comparison had participated in the three* 60–90 min follow-up face-to-face interviews in phase 2 (n = 14) of the original study. (* Seidman's (1998) three-interview structure includes establishing context, focus on participant's life history; reconstructing experience; and allowing for reflection and meaning organized around the phenomenon under study. In this case, the participant's use of personal creativity in professional practice was the focus. Additional data sources that were collected during the interviews in phase 2 of the larger study (n = 14) included participants' completion of a personal orientation survey, the description of their creativity through metaphor, and a visual representation of their creativity in practice. Interview data were subjected to typological analysis (Hatch, 2002). Patterns, relationships and themes were presented in the form of visual displays (tables of participants' quotes, charts, and graphs) and vignettes (Seidman, 1998).

For the cross-case comparison of the four cases of difference (Narey, 2014), I returned to these original data for further analysis and illustration of the phenomenon. I frequently revisited the original audiotapes and transcription to "consult data not in the display and add it to the text [narrative] for further clarity" (Miles, Huberman, & Saldana, 2013, p. 117). I then subjected the data to further analysis relative to social justice, leadership, and change. The following excerpts from my cross case comparison (Narey) illuminate the creative capacities observed in inservice teachers' reports of practice. The findings offer insights into the embodiment of teacher as change agent.

17.10   Madison and Faith

Next, I present excerpts from the two cases Madison and Faith (pseudonyms) that were representative of the higher percentage of creative capacities.

17.10.1   Madison

Madison, who holds a certification in Early Childhood and Special Education, teaches Kindergarten in an urban public elementary school where 97% of the student population is African-American and 98% are at the poverty level. As may be

noted in the visual display of data (Table 17.2) Madison was found to have made statements that supported the assignment of 20 of the 22 creative capacities or 90%.

In this first excerpt, Madison's description of her efforts to get dental care for her Kindergarten children demonstrates numerous creative capacities. Within the dimension *seeing the need for change*, we note especially evidence of three creative capacities. These include *problem-finding ability:* sensitivity to the existence of a problem emerging from her desire to make things better for her students; *problem-defining ability:* ability to understand that she could shape the problem as one of grade vs. age; and *stimulus freedom:* ability to bend rules, think out of the box. Several capacities fall in the category of formulating ideas for change, particularly, *originality:* coming up with a unique way to accomplish, beyond prevailing norm; *fluency*: ability to generate several ideas (talk personally to dentist, go to mother's home for signature, only put age, not grade on form): and, of course, as even the dentist points out, *persistence:* not giving up. Finally, in the enacting change dimension, we see a strong *passion* and *ability to sell ideas.* The creative capacities within this third dimension of enacting change were critical in prompting her to choose to engage with her environment: necessary for teacher agency for advocacy.

> We have this special program where this retired dentist comes in to paint their back molars with a sealant … it's a federal program and they only do it for 1st and 2nd graders. Well, I have Kindergarten kids—their teeth are rotting out. … I convinced the dentist that if I went to the child's house and got the mother to sign the paper, he would take care of hers, too. I wouldn't take 'no' for an answer. 'In another year her teeth will be gone. She's the right age for the program, we don't have to put the grade on the form.' He's like, 'Oh you're a persistent little thing aren't you?' I'm like, 'yeah.' My babies need it. It turned out that the dentist did three Kindergarten kids because they were in such need.

In a second example, we see evidence of similar creative capacities as Madison attempts to deal with underlying issues of community involvement in school programs. Instead of blaming the community for not participating, she saw that transportation might be an issue:

> We were having a hard time with our PTO people coming, so I thought, why don't we offer to get a bus for them? I called the bus company and they're like,
> "well, it's $125.00." "I'm like, oh, come on. This is after school. Can't we negotiate? How about if we pay you $85.00?"

These two examples demonstrate Madison's understanding that educational quality is not limited by the walls of her classroom. Madison's awareness of the socio-political context appears to be as valuable to her students as is her knowledge of content and pedagogy. She recognizes that her students' health issues have an impact on their ability to learn. She believes that parent organizations are important to the school community. Students, classroom, community, and world are interconnected as she simultaneously sees the need for, formulates ideas for, and enacts change on multiple fronts.

At times, her colleagues frown upon this above-and-beyond effort. In the next example, we see Madison draw upon her creative capacity of *ego strength* (ability to withstand social pressure):

> I came from a school where everybody did extra things, stayed late. When I came here, my grade level team wasn't interested. They didn't want me to do these things either. They talked behind my back, they said I was brown-nosing … but I do these things for my kids.

Her *passion* and *commitment* to "her kids" are creative capacities that contribute to her efforts to bring about change. However, Madison's ability to see the need for change, does not always translate into being able to bring about change:

> But it's frustrating because … . They're looking at a test score …. This kid could have just seen something really bad happen the night before … Daddy … sent to rehab. Grandma dying of cancer…. How is that child going to do well on that test when their little mind is on that? … I couldn't re-give that test in May when their life was kind of back to normal… I was able to get Behavioral Health to work with their Gramma to help them. But, I couldn't document that on their test score, so I was called in on the carpet and asked why did I have two kids who scored below basic and showed no growth.

Here, Madison has used her creative capacities of *ability to deal with complexity* and *problem-defining* to wade through the "mess" of challenging realities in order to define an aspect of the problem she could change. Thus, she focused in on finding assistance for Grandma that, at least was some support for the children through the difficult time.

These examples are only a few of the frequent instances in the data where we see Madison's practical and critical reflective thought (van Manen, 1977) and critical consciousness (O'Sullivan, 2008).

17.10.2   Faith

Faith, a veteran educator in a district just outside the city, teaches middle school students from both ends of the economic spectrum. Although she is the visual arts teacher, she is also assigned a character education course. Faith has applied for and been awarded numerous grants for projects that she has undertaken with her students during her 20 years in the district. In the analysis of the data (Table 17.2) from the larger investigation, Faith was found to have made statements that supported the assignment of 21 of the 22 creative capacities or 95%.

In this first excerpt, Faith explained how she and her colleagues are asked for their input on district surveys, but rarely, do they see their responses enacted: "We keep answering, but we end up getting what they [the district administrators] deem is important at the time." Although many of her fellow teachers had given up investing time on the surveys, Faith believed that it was important to share her ideas, whether or not they were enacted *(persistence).* She saw the need for change in her district and had formulated many ideas for change, thus, she recalled being excited when chosen by her principal to represent her district at a local forum of business groups as one of five speakers on the pros and cons encountered in education.

In this specific situation (participating in the forum), she demonstrated several creative capacities in her attempt to influence the local community:

Risk-taking:	I was afraid because I was the last speaker. ... We were to speak on the pros and cons of education today. No one else mentioned any cons. I started to become a bit unnerved because everyone seemed to do PR for their school district. I wanted to talk about the challenges in education, not praise my district for what we did to raise test scores.
Questioning the status quo:	We've had families where, for an entire week, they slept in a car … how can we measure that? How can those business people think that we can compare their end product with our end product when we have so many variables that they don't have to deal with?
Courage:	If we really want to make positive changes in education, we cannot stand up there and say that we are implementing these practices and they are working ... can't say that we're doing these things and leave the problems in the fine print ....
Ability to sell ideas:	I received compliments from business people in the audience.... Some said, 'you really got us thinking.'"

In this example, we also see aligned with these creative capacities, the evidence of Faith's critical reflection (van Manen, 1977) and critical consciousness (O'Sullivan, 2008).

In a second example, Faith blames herself for her inability to meet a child's needs, despite lack of an aide, time to meet regularly with the special education teacher, or the child's obvious inappropriate placement. To quote:

> One youngster would cry and I would have absolutely no understanding of why. I had to try to adapt the lessons to what he was able to do but he couldn't cut with scissors—this was a 6th or 7th grade class. He could not draw. He was all the way back to the scribbling stage. When I was able to talk to the special education teacher she told me just try to make the student feel comfortable and let him finger paint. That didn't seem right. For seven weeks in the class I did not feel personally that I was doing enough … many times I was just protecting him from teasing and just keeping him busy.

Here, we see Faith's sensitivity to the existence of problems and desire to make the situation better (*problem-finding ability*) and her dissatisfaction with just allowing the student to finger paint (*questioning of the status quo* and *commitment*). Although she believes that she was not successful in meeting the needs of this particular student, we see evidence of practical reflection (van Manen, 1977). Additionally, her report shows her attitude goes beyond Freirean theory's conventional consciousness (O'Sullivan, 2008) by not accepting that nothing can be done for her student (Tables 17.1 and 17.2).

17.11   Dierdre and Ann

Next, I discuss two cases that are representative of the lowest percentage of creative capacities, Dierdre and Ann (pseudonyms).

17.11.1   Dierdre

At the time of the interviews, Deirdre was completing her 3rd year as an eighth grade math teacher in a district where 30% of the students received free/reduced lunch. She coaches and is involved in after-school tutoring and other student activities, but states that she does this primarily for the extra income.

In contrast to the previous cases (Faith and Madison), Dierdre only spoke about activities that she performed in her classroom, rather than the broader community. She sees a need for change: she wants to improve classroom learning, make it better *(problem-finding)*. However, in her attempts to define the problem, she talks about changing her techniques and strategies, then when the problem persists, she often attributes the problem to the students. In this way, Dierdre is like many teachers who have not reached higher levels of reflective practice (Osterman & Kottkamp, 2004). Diedre describes her students: "A lot of the time they're so lazy ... there's some kids that just won't want to do anything that you have planned" and "They just weren't interested in doing anything. Even whenever I'd try to tell them, 'your grade is going to suffer because of this'."

Although Dierdre is a bright and knowledgeable young teacher who describes numerous instances indicating good teaching pedagogy, her underlying response to learner willingness and effort does not appear to utilize the creative capacities of *openness* or more developed *problem-defining ability*. Unlike Faith or Madison, who demonstrate *persistence* in defining the problem in a way that they can respond in some manner, she seems to have stopped searching. There is no evidence that she is driven by *curiosity*, or the *passion* that was evident in the cases of Faith and Madison. Rather, although it is relatively early in her teaching career, it looks like she may already have given up. She says, "You can give them [students] a word problem and they don't even read it. 'I don't know how to do this,' they say. 'You didn't even read the problem,' I answer. They just don't want to work." She also revealed,

> Whenever I began my career, I thought that all the kids were going to love what I did. Everything's going to go exactly how you imagined it in your head and then you try to do it with the kids and they have so many questions or they don't get it.

Concerning levels of reflective thought (van Manen, 1977), Dierdre's level of reflection is only technical: she has reflected only on teaching strategies. She does not question whether the strategies were appropriate for the individual learners (practical reflection), rather, she finds fault with the learners who negatively to her

strategies. The only discussion of the environment beyond her immediate classroom was expressed in her frustration of testing:

> The students hate school even more because, rather than work on anything interesting, school is all about the test. I think it's good that they have tests that say that you should be at this point, but then they keep moving it up so even if we get to the point where we should have been, we are already behind. … It just seems impossible to me.

It is unclear if Dirdre's perspective is an indication of Freirian theory's naïve consciousness or conventional consciousness. Regardless, it does not appear that she has made any demonstration of "teacher as change agent" in the larger sense of social justice or political action. Although she complains, she accepts the tests and time on test prep without question.

In further contrast with the previous cases of Faith and Madison, Dierdre did not even demonstrate agency in her own classroom. As she talks about the problem of limited supplies, she does not indicate that she is aware that she can do anything other than purchase these herself. She says, "If you want projects, we don't have the paper. I don't have any poster paper and I don't have the money to go out and buy poster paper. I have 60 kids. Limited supplies." Here, she does not employ the numerous creative capacities to define the problem in a way that she could generate ideas for (e.g., writing grants, soliciting community, etc.) in order to enact change in the way that was seen in Madison's case.

17.11.2   Ann

Ann is a veteran teacher who teaches 12th grade English in a middle-income, working-class suburban community. Along with Dierdre, Ann was found to be among the group of participants who demonstrated fewer creative capacities (see Table 17.2). It is clear from the data that both Dierdre and Ann care about their instruction. They want students to learn. Their creative/reflective efforts center on "how can I teach this better?" *(problem-finding)*. Ann talks about the curriculum requirements of a research paper as "one thing that I've struggled with that I have not perfected yet …." She explains, "sometimes [I put] little post-it-notes 'Change this.' 'Story is boring.' Or, 'this works.'" Like Dierdre, Ann's *problem-defining* capacity is centered on her teaching strategies. However, unlike Dierdre, there is evidence of *persistence* in her continued notes for improvement and she does not attribute the problem to her learners.

Ann's discussion about teaching writing demonstrates that teaching is often shaped by the status quo: "I try to give them opportunities to write in different ways but they need to understand when they are taking these standardized tests … they need to follow rules." Like Dierdre, Ann's level of reflective thought is focused upon the technical problems of teaching and no reference to individual students was noted in either of these cases. In contrast, Madison and Faith consistently mentioned individual students by name and detail. Although, since Madison is a Kindergarten

teacher, it could be possible that she was more engaged with one group of students that she is with the entire school day, as opposed to Ann and Dierdre who are teaching several sections of students. Yet, Faith is also at the secondary level with large numbers of students. Therefore, it is unlikely that the low level of reflection can be entirely attributed to Dierdre and Ann's teaching situations.

In regards to teacher agency, Ann has accepted testing as status quo and seems unquestioning of other possibilities. She appears to be at Freire's naïve level of consciousness with minimal connectedness between her classroom and the environment. She states this explicitly in response to a question about factors that influence her creativity in teaching: "I don't see that administration or government policies having much influence." Yet, as her statements in the previous excerpts indicate, her teaching is shaped clearly by testing policies.

Similar to Dierdre's case, Ann also does not see a role for herself in influencing even the school environment by seeking grants or other options, stating, "I'd like to do more writing with my students, but we only have 24 computers in the lab and by the end of the day half of them aren't working." Building upon the larger investigation, the presentation of the cases of Faith and Madison in contrast with those of Dierdre and Ann serves to illustrate how the presence or absence of creative capacities relates to teacher agency. In these cases of difference, a higher percentage of creative capacities correlated with participants' engagement in complex levels of reflective thought (van Manen, 1977) and levels of social consciousness (O'Sullivan, 2008). Alternately, lower percentages of creative capacities appeared to correlate with technical reflection and limited social consciousness.

17.12   Empowering Teachers to Stand for What Is Right

If we are to empower teachers to stand for what is right, we must prepare them to deal with the many complexities and contradictions of society and education. Duffy (2002) posits that by teaching particular ideologies or, methods, teacher educators inadvertently encourage pre-service teachers to become followers rather than creative professionals. Thus, if we want leaders for social justice, teacher educators need to show teachers how to use creatively the contradictions they encounter. As Runco (2017) argues, "creative use of contradictions is not in the elimination of the contradiction but in the creative interpretation of the contradiction" (p. 85). Creative interpretation involves seeing the need to change, formulating ideas for change, and enacting change. As may be noted in my cross case comparison of inservice teachers, Madison and Faith neither denied or avoided the contradictions of practice, but rather, in line with Runco's argument, they creatively re-interpreted contradictions as opportunities.

Further, throughout I have revealed a range of contradictions in teacher education's efforts to develop teachers as change agents. Noting Mills and Ballantyne's

(2016) proposal that social justice development has overlooked the need for "critically exploring the pedagogies and philosophies espoused by teacher educators" (p. 275), this chapter encourages teacher educators to reinterpret contractions of teaching for social justice as opportunities to examine if and/or how they are developing teachers' creative capacities. Viewing the notion of educating "teachers as change-agents" through the lens of creativity development can bring about new generations of teachers who are empowered to echo Freire's (1998) words as they proclaim, "I am a teacher who stands for what is right" (p. 94).

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Chapter 18
The Case for Slow Curriculum: Creative Subversion and the Curriculum Mind

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Abstract This chapter examines the constructs of time as it pertains to creativity in teacher education. In particular, we propose the practice of "slow curriculum" as a means to support the conditions for creative expression by students and teachers. Like the slow food movement, a slow curriculum contests an industrial system that privileges efficiency and markets over holistic alternatives that encourage creativity and well-being. As classroom teachers feel the pressure of market-based dictums, the tendency to privilege outcomes over processes limit opportunities for creative expression for teachers and students. The authors present three approaches for implementing slow curriculum and offer recommendations for curriculum planning that encourages creative works in the classroom: the adoption of curriculum mindedness, creative subversion, and improvisational teaching. Each of these strategies is presented as working in tandem to support a slow curriculum movement for preservice and practicing teachers.

> Making the simple complicated is commonplace; making the complicated simple, awesomely simple, that's creativity. (Charles Mingus, 1977, cited in Bertagnolli & Rakham, 1982, p. 182)

18.1 Introduction

In this chapter, we examine the construct of time as it pertains to creativity in teacher education and implications for how creativity is manifest in K-12 classrooms. In particular, we propose the practice of *slow curriculum* as a means to support the conditions for creative expression by students and teachers. Like the slow food

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movement (Petrini, 2004), a slow curriculum contests an industrial system which privileges speed, efficiency, and markets over holistic alternatives that encourage creativity and well-being. In a packed curriculum that leaves few moments for student reflection and creative works, we are concerned with the ways in which time is experienced by teachers and students. In an effort to pause the clock to allow time for creative inquiry and expression, we present three models—curriculum-mindedness, creative subversion, and creative lesson planning—for curriculum approaches that show promise to this end.

18.1.1   Re-framing Creativity as a Process

None of us would deny that creativity is a desirable aim to strive for in any teaching and learning environment. Creative works are a pleasure to behold, give rise to further ideas, and enhance the human experience. Yet, why is creative expression so elusive in our classrooms? Anecdotally, we (the authors) are noticing a decline in what we would describe as creative expression in our classes of undergraduate students in the United States—most of whom aspire to be teachers themselves. Our students want to know how to do something "correctly" and are reluctant to take risks. Can we blame them? Their livelihoods are at stake. They've seen their parents struggle through the Great Recession and now the burden of economic stability is on their shoulders. Add to this a lifetime of testing and standardized curricula that leave little room for imagination. (The No Child Left Behind Act [NCLB] of 2001 was signed into law when our students were children starting kindergarten.) It's no wonder students' proclivity for creative work is shackled. In their review of the literature on teachers' perceptions of creativity, Mullet, Willerson, Lamb, and Kettler (2016) found that preservice and practicing teachers lack the confidence to support creativity in their classrooms. These teachers report that they feel unable to recognize creative works; moreover, they often associated creativity only with the arts.

A problem in society involves the way we've come to frame creativity as a value. Educators and policymakers alike point to the Partnership for 21st Century Learning (P21) (2008), an organization populated mainly by technology companies, as justification for implementing creativity in their curriculum. According to the P21's report, "Many of the fastest-growing jobs and emerging industries rely on workers' creative capacity—the ability to think unconventionally, question the herd, imagine new scenarios and produce astonishing work" (p. 10).

We can see that the premise of this framework is to promote economic growth and to infuse technology in the classroom (see Sawchuk, 2009). Creativity is looked at as a way to stimulate economic recovery (Jones & Warren, 2016). Yet, the positioning of creative practice may very well be its demise as much of this work is turned to bureaucratic management of outputs. As Jones and Warren (2016) note, "In a neoliberal economy that fetishizes creativity as the key to unlocking growth, the way rhythm is being deployed to manage the creative economy is, in short, killing the goose that lays the golden eggs" (p. 287).

It may behoove those who are interested in fostering creative environs for our students to separate the link between economic productivity and creativity. We are concerned this phenomenon is being perpetuated in those many classrooms whose teachers don't think of themselves as creative. As authors, prefer to value creativity for creativity's sake. We recognize that opportunities to see creativity in action require attention on a limited resource: time. In a nutshell, we see creativity as a process, not an outcome, and the process as unpredictable, not predictable.

18.1.2 Capriciousness of Creative Muses

Because of capricious nature of creative muses, it is questionable as to whether anyone can delineate a formula that leads to creativity in the classroom. While teachers might establish classroom conditions favorable to creative works, little is understood about how creativity ultimately materializes (e.g., Amabile, 2017; Barrantes-Vidal, 2004; Kozbelt, Beghetto & Runco, 2010; Kasof, 1995). For example, Harnad (2007) presented a critique of creative methodology and used Pasteur's dictum as a premise for better understanding what conditions best lead to creative outcomes: "Chance favors the prepared mind." In other words, creativity stems from preparation, and preparation, while necessary, needs a spark of the unexpected, the novel ingredient, for creativity to occur. As Harnad explains:

> Although there are some heuristic methods that one can attempt (such as trial-and-error induction and analogy), the best strategy one can adopt to maximize the likelihood of creativity is to maximize preparation. Maximization is not the same as a guarantee, however; although it is not magical, creativity will always remain mysterious because of the essential rule of unexpectedness and unpredictability in its defining conditions. (p. 137)

Thus, it follows that curiosity and risk-taking are essential but insufficient ingredients for creative works to be accomplished. For, people also need time to practice and persist in their creative endeavors.

18.2 Slow Curriculum

"Slow food" was a concept that sprang from protests against the opening of a McDonald's restaurant in Piazza di Spagna, Italy (Suro, 1986). The slow food ideology has since expanded to become a multinational movement that advocates for ecologically sustainable and socially conscious food practices (Petrini, Watson, and Slow Food (Organization), 2001). Where slow food symbolizes a challenge to the industrialized food complex, slow curriculum similarly entails resistance to time constraints and market pressures that achievement-oriented and competitive schooling practices across the globe have come to be (Au & Ferrare, 2015; Stromquist, 2002).

Since 1988, New Zealand education reform has placed increasing emphasis on the economic objectives of efficiency, standardization, and consumer choice in educational policy (Court and O'Neill, 2011). Reportedly following trends in the United Kingdom, the United States, and Australia, New Zealand adopted National Standards in 2010, contributing to a shift in classroom practice over time that privileged literacy and numeracy over other key areas of the New Zealand Curriculum (Irwin, 2018). The newlyelected government has promised to abolish the national standards in order to prioritize learners at the center and to promote culturally and socially responsive educational environments focused on a broad and varied curriculum. Additionally, in a move to reverse the trend of encroaching privatization, the Labour Party has promised to repeal legislation that allows for charter schools (New Zealand Labour Party, 2018).

In the United States, the influence of Milton Friedman's economic principles have directly influenced privatization efforts in the form of voucher programs, charter schools, and for-profit education institutions, as well as policies that support these efforts under the auspices of the NCLB and, more recently, the Race to the Top grant program in 2009 (Hursh, 2007; Onosko, 2011). Slow food highlights the unique qualities of local and traditional cuisine. Likewise, a slow curriculum model can be seen as a way to spotlight individual learners and their communities as resources. For example, the place-based education (see Gruenewald & Smith, 2008; Sobel, 2013) model uses local heritage and geography as the curriculum to promote inquiry through service projects and ecological principles.

As slow food seeks to awaken the senses and teach an appreciation for subtle taste, a slow curriculum is an opportunity to teachers for pausing and taking note of "micromoments" of creativity. Beghetto (2009) defines *micromoments* as "brief, surprising moments of creative potential that emerge in everyday routines, habits, and planned experiences" (p. 5). Teachers' abilities to pause for and allow creative micromoments require a certain level of perceptivity of novelty and the creative potential within the anomalies. Seeing students in one's classroom not as a homogenous group but as individuals each capable of inventiveness and artful contribution is essential.

Furthermore, slow curriculum acknowledges the true cost of an educational system that promotes competition and profit when what is needed is care. Caring for human beings and the environment extends to aesthetic expression and pleasure (Noddings, 2012). The mechanized tempo of industrial capitalism dismisses the culturally constructed tempos of creativity, emotion, domesticity, and biology that connect people, spaces, and histories (Freeman, 2010). Slow curriculum nurtures relationships and connections between and among people, places, and time periods. In addition, slow curriculum validates the lived realities of all students and creates conditions for teachers and students to become agents of creativity. As agendas, they are envisioning and advocating for educational policies and practices that provide alternatives centered on improving conditions in schools, neighborhoods, and communities within a transglobal world. Finally, slow curriculum aims to illuminate opportunities for creative inquiry, rather than emphasize competition and production of measurable outcomes.

The living relationships that shape school culture are influenced by what is valued in teaching and learning within a particular space and time. A slow curriculum movement, like slow food, constitutes a commitment to intentional and mindful connection to cultures, struggles, histories, and literacies. What is valued is global consciousness, creativity, and citizenship through "professional study." Taubman (2014) distinguishes professional study from professional development; rather than satisfying an external directive (which is not conducive to creative works), unlike professional development professional study engages teachers and learners in interdisciplinary thought and perennial curricular questions. Such study furthers what we describe as curriculum mindedness, as next addressed.

18.3 Curriculum Mindedness

By *curriculum mindedness*, we mean teachers' abilities to think about curriculum broadly, and we use the commonplaces described by Schwab (1973) as a framework for understanding the interaction between and among students, teachers, subject matter, and the local social contexts (Schwab, 1973). Each of these domains offers something powerful to a curriculum. As the commonplaces represent a plurality and the widest representation of those who can address the concerns of the curriculum, they are useful for examining how a curriculum is experienced. (See Mullen, 2017, for an explanation and illustration of Schwab's commonplaces in a qualitative study of teachers' views of ethical learning and leading.) As Schwab argues, a slight of any one of these commonplaces results in an incomplete and problematic curriculum. The ways in which creativity is nurtured might be seen in the interaction between and among these commonplaces. We argue that increasingly controlled and standardized curricula largely defined by linear notions of time is a slight of the commonplaces, in effect displacing the potential of student as curriculum maker. When this happens, the result is a compromising not only of the curriculum cycle but also the autonomy and agency for creative works to be nurtured.

Central to our argument is the idea that mechanistic and quantitative views of time undermine what philosopher Henri Bergson referred to as duration or "a creativity whereby a new and unpredictable entity appears at each and every moment" (Linstead & Mullarkey, 2003, p. 6). While duration is "history, experience, and anticipation," which cannot be easily distinguished from one another, "spatialized time consists of segments which preserve nothing in themselves of any previous segment" (p. 6). Spatialized time is disconnected, used in mechanical and deterministic ways, and is homogenous. To illustrate this idea Freeman (2010) posits, "Manipulations of time convert historically specific regimes of asymmetrical power into seemingly ordinary bodily tempos and routines, which in turn organize the value of meaning and time" (p. 3). Time constraints on teachers, students, and curriculum sanction hidden rhythms or "forms of temporal experience that seem natural to those whom they privilege" (Freeman, p. 3).

When such regimes predetermine what counts as knowledge and what is worth knowing with respect to how time is organized and for what purposes, the resources students bring to school are undervalued and often dismissed. For students whose knowledge systems and ways of being are peripheral to White, middle class ways of knowing, spatialized time in school can lead to a series of decontextualized skill sets that are neither meaningful nor liberating (Paris & Alim, 2017). Concurrently, teachers are restricted to a classroom culture that fails to validate and draw upon what their students know and can do, leading to a greater focus on classroom management, deficit thinking, and intervention targeted at underachievement (Delpit, 2012).

18.3.1   Time Binds Creativity

Time binds what teachers believe is possible. Interactions, materials, and events are often shaped by the culture of the school setting. If, for instance, the "read aloud" in the elementary classroom is pushed to the perimeter to provide more time for the supposed real rigor of reading, lack of "instructional" time is the excuse for why literature is nearly absent from the content of the curriculum. Time also binds curriculum mindedness in that it defines achievement in terms of readiness, promotion, and predictions of progress. From 1-min measures to proposed legislation to retain students who are "underachieving," time places constraints on what teachers can do but also what they might imagine is possible. Time as a predictor of progress solidifies deficit perspectives for children who haven't reached the benchmark before time is up. Time as a measure of readiness dismisses differential access and opportunity (Ladson-Billings, 2006). Time as a deadline for retention ignores the person and punishes the struggling reader. Time all at once limits agency and determines trajectories. In this worldview, time can be measured and controlled, and progress is predictable.

In the classroom, the teacher becomes a timekeeper who regulates and covers curriculum in the time allotted. In contrast, the curriculum maker responds to the ebb and flow of the classroom's rhythms whereby ideas, histories, discourses, and cultures are being connected and in concert with students. Thus, a timekeeper is less able to attend to the creative micromoments than a curriculum maker might be. Further, those of us who study such matters recognize that creativity requires an incubation period. When teachers concern themselves with curriculum that is limited to the coverage of subject matter in a given number of minutes the "timeless time of creativity is frequently squeezed out to make room for more visible, calculable activities focused on outputs" (Jones & Warren, 2016, p. 294). Alternatively, a teacher that considers curriculum broadly, i.e. one that is curricularly minded, recognizes that the subject matter is only one component of the commonplaces that make up the curriculum. Thus, emphases on subject matter coverage results in only a flimsy understanding of concepts as well as an inhospitable landscape for creativity.

Translating content in meaningful ways for students requires an eclectic approach to curriculum making. This calls for attending to questions that address how subject

matter converges with teaching, learning, and social context. As Dewey and Bentley (1946) argue, the social and the individual are not distinct. With this understanding comes a need to consider social-individual *transaction*—the reciprocal and symbiotic relationship between knowing and doing (as in, with creative works), not to be confused with *interaction* which implies that one affects the other. In other words, to create a curriculum that allows for creativity, the relationship among the commonplaces within a curriculum needs to be understood as transactional where the students, teacher, the subject-matter, and the social context are all influenced by and engaged with each other.

Curriculum mindedness means being attentive to the deliberative processes of curriculum. Such consideration moves one from the knowledge and understanding that theoretical inquiry provides to a decision that needs to be made within a particular educational context (Huebner, 1976; Null, 2011). The teacher, for example, accomplishes this through the eclectic, that is, taking up educational questions and examining them by adopting multiple perspectives (Schwab, 1971). The practical arts are a means by which we determine tangible characteristics of the educational situation (such as the physical landscape of the classroom or students' moods) and act on our understanding of these characteristics to determine a plan of action. As Null wrote,

> Lab-based researchers are not so much interested in questions like 'Should we do this or that …' but rather questions like 'What is the nature of this object?'… Questions of a 'What should we do?" variety deal with states of affairs, not states of mind. (p. 26)

Curriculum matters, then, should deal with states of affairs and a partnership of the curricular commonplaces. What is understood to be true in the areas in which curriculum is enacted is as important as a deep and honest consideration of whose knowledge counts.

18.3.2 Ecology of Schooling

Obviously, schools are the spaces where most curriculum matters are enacted as well as where student and teachers spend a substantial amount of their waking life. If we are concerned with ways we can enhance creative practices, it helps to remember that schools are ecological institutions. Eisner's (1992) ecology of schooling delineates significant dimensions of schooling that make up the ecology of schools: the intentional, the structural, the curricular, the pedagogical, and the evaluative. Within this ecology, the ways in which teachers and students think about and use time for creative works fits most logically within the structural dimension. Eisner identifies this as the organization of time, space, and people within the school's ecology. However, because time is both a quantitative and qualitative concept, an inclusion of time within the other dimensions of the school ecology adds an additional layer of analysis worthy of our attention. Practices that slow the curriculum to a pace that allows for creative works to be accomplished in the teaching and learning environment can be seen in small acts of creative subversion, which we discuss later.

The ways that days in school and subjects are divided by number of minutes reflect how much of what we do as teachers is contrived. These artificial boundaries limit what teachers can perceive as to what is possible within a period. For example, we might say, "There is no time for reading aloud" or "There is no time for art." But, how are we spending the time we do have? In their comprehensive review of literature on time research, Duncheon and Tierney (2013) presented three perspectives of time: temporal time, socially constructed time, and virtual time. Each of these orientations has implications for how creativity is nurtured, experienced, and manifested in the curricular ethos of the classroom. In particular, we are intrigued by the notion of virtual time, which refers to the ways in which time is disrupted and subsumed by digital technology.

Arguably, digital technology might be a leading culprit in the collapse of our available time. And yet, ironically, it may be within this virtual time that teachers and students have a greater degree of control to slow the curriculum. Digital technologies blur the boundaries that traditionally exist in a clock-bound world and, if used thoughtfully, may lend themselves to the sharing of ideas and other collaborative and creative works in virtual time. However, one caveat to this line of inquiry is that digital technologies also have the great potential for subsuming all other mediums at the expense of diverse forms of creative expression in the classroom. We suggest that teacher education programs would serve preservice teachers well by including a critical examination of time as a crucial step in the development of creativity, within the teacher education curriculum.

Teachers barely out of their apprenticeship of observation in their preparation programs (Lortie, 1976/2007) and only a couple of years at most spent in their university classes with deep consideration of curriculum and the creative potential within, need opportunities to think deeply and critically about curriculum and creativity. This really should be happening prior to graduates embarking on their 1st year in the classroom. Given the tendency of new teachers to mimic norms and seek prescriptive antidotes to curriculum problems (Tanner & Tanner, 2007), it is all the more important to model ways in which we can slow the curriculum to sustain creative moments. The artful (and curricularly minded) teacher understands when something needs more time—that is improvisation. Improvisation requires practice and much of this practice needs to occur well before the teacher hits the proverbial stage. Eisner (2002) further noted, "Teaching is an art in that teachers, like painters, composers, actresses, and dancers make judgments based largely on qualities that unfold during the course of action" (p. 155). When a teacher is "curricularly" minded, the judgments s/he makes are informed by the distinct rhythms of the classroom environment.

18.4 Creative Subversion

A second approach we put forward as an example of slow curriculum is *creative subversion*. This term has been used in many theoretical and disciplinary contexts such as health care reform (Launer, 2015), cultural studies (Danielson, 2009), and

qualitative inquiry (Cisneros-Puebla, 2018), as well as education studies (James, 2018; Kohl, 2006; Marsland & Seaton, 1993). We describe creative subversion as an act that disrupts the constraints of the official curriculum in subtle but meaningful ways. A creatively subversive teacher understands the structure of the curriculum and knows when to follow this structure with fidelity and when to adapt it. It is an act of improvisation. Sawyer (2004) refers to teaching as an improvisational performance in which the flow of collaborative interactions between and among all actors (teachers and students) is a co-constructed creative improvisational process. He argues that teachers must engage in disciplined improvisation within the existing systems and frameworks of schools. In an age of increased standardization and testing, disciplined improvisation is necessary to engage in creative subversion that leads to meaningful change. Similarly, Gee (2012) suggests performances that are recognized as meaningful in a particular Discourse allow for individual creativity and agency. If disciplined improvisation is recognized as meaningful within the Discourse of what constitutes "good teaching," teachers may be more likely to take new risks to subvert practices that constrain and restrict what their students know and can do. For teachers, disciplined improvisation may allow them to subvert restrictive professional obligations within prescribed frameworks in creative ways. Such actions can lead to increased agency and individual autonomy for themselves and the students they teach.

Agency for teachers and students is critical to achieving what Gutierrez, Rymes, and Larson (1995) name a "third space." This is when both teacher and student shape the culture, discourses, and activities of classrooms. This is also when the *script* (i.e., the dominant and dominating language, such as of the teacher) and *counterscript* (i.e., resistance to dominant/ dominating language, such as of the teacher) of teacher and students merge. Gutierrez et al. refer to the teacher's script as highly rigid and monologic, reflecting the dominant cultural values of the school. While some students comply with the teacher's script, other students choose to resist and form their own counterscript in response to their knowledge being displaced by the teacher's script. When teachers recognize and validate the counterscript of students,

> … the possibility of contesting a larger societal, or transcendent, script emerges. By departing from their own scripts, teacher and students let go, slightly, of their defensive hold on their exclusive cultures, and the interaction between their scripts creates a third space for unscripted improvisation, where the traditionally binary nature of the student and teacher script is disrupted. (Gutierrez et al., 1995, p. 453)

In the third space, there may be new opportunities for students and teachers to reshape themselves in ways that shift their positions relative to one another. For example, through creative subversion they may try on new identities and shed old ones by contesting the materials, lesson structures, and roles privileged within a predetermined schedule dictated by spatialized time, mechanistic routine, and teaching practices that limit the knowledge available to students and teachers promoted by the dominant or transcendent script.

Creative subversion might be illustrated in the ethnographic work of Holland, Lachicotti, Skinner, and Cain (1998). They illuminate how a Nepalese woman of a lower caste went to great lengths to attend a research interview that took place in a house (on the second floor balcony) in a rural community of Nepal. A norm in Nepal is that people of lower castes are typically not permitted to enter the homes owned by the higher caste. Debra Skinner, one of the researchers, had become accustomed to inviting members of various castes to her home for interviews. On one occasion, a woman of the lower Sunar caste, considered "untouchable," scaled the vertical wall of Debra's house to attend the interview, complying with the hegemonic discourses of caste present in her community, but through a radical act. By scaling the wall, the woman resisted the restraints of a caste system that otherwise would not have permitted her to participate in the interview, while complying with not entering the house.

Holland et al. (1998) suggest that her impressive feat of scaling the side of a two-story house was not simply that the woman was propelled by the cultural principles of caste or the subject-positioning of a constructivist position. Instead, when faced with a problem, she engaged in an impressive improvisation. These authors argued, "Such improvisations are the openings by which change comes about from generation to generation. They constitute the environment or landscape in which the experience of the next generation 'sediments,' falls out, into expectation and disposition" (p. 18). With respect to our argument, improvisation is critical if teachers are to engage as agents of change in systems dominated by restrictive notions of time, knowledge, and curriculum. Not unlike the apprenticeship of observation (Lortie, 1976/2007), preservice teachers may come to understand creatively subversive teaching first by experiencing it as students in primary, secondary, and higher education.

With this example, we don't mean to suggest that the oppression of the caste system in Nepal is easily compared to the act of creatively subversive teaching. Rather, we are referring to the usefulness of improvisation as an opening for change. If preservice teachers are to be creatively subversive, they must engage in improvisations that transform the subject positions and cultural resources afforded them in the space and time of school. Metaphorically speaking, they must climb the house to transform the conditions of classrooms dominated by the dulling routine of schedules and standardized curricula.

18.4.1 Renata: Creatively Subversive Teaching

To illustrate relative to schooling, we turn to our vignette of a student teacher, Renata, who is entering her 1st week of lead student teaching. Jacobs (second author) served as Renata's student teaching supervisor and also taught the language arts and reading methods course completed before her student teaching experience. Renata struggled to find meaning in the phonics lessons she was required to teach a second grade classroom. Although she had been encouraged by her mentor teacher to be playful with the content, the language and procedures of the phonics lessons

were largely scripted. Renata's artful, playful, and theatrical approach to teaching was limited by the required script. As the lesson progressed, Renata's intonation was the most noticeable aspect of creative subversion. She would adjust her voice and instruct using deep and high tones, giving "sing-song" directions coupled with kinetic claps and movement. Her objective was to keep children engaged with skill instruction that was otherwise devoid of meaning.

After several 1-min timed readings designed to prepare children for reading tests, Renata told the second grade children in this small group they should read the way they talk and she role-played a conversation with one of them. When one of the children asked if she should try to beat her "words per minute," Renata responded that she need not worry about time and that the idea was for them to read with expression, like the way they talk. Even so, when the timer chimed, two children jumped as if they were startled by the sound.

Following the lesson, in a post-lesson conference with Jacobs, Renata revealed how difficult it had been to make the lesson engaging with young students whom she worried were bored. She felt constricted by the lesson script and didn't realize how much she was enacting her own artistic sensibility to contest the mundane routines of this particular classroom. Even so, she noted that the decodable text the children were required to read made little sense to her and that it was proving somewhat difficult to use. She wondered whether there was any point to reading this type of text if it is meaningless, but conceded that it did provide the short vowel sounds the children needed to recognize quickly. In this lesson, Renata was both creatively subversive and compliant with the professional expectations, managing this problem through disciplined improvisation.

If teachers like Renata engage in disciplined improvisation, the sociocultural community of the classroom might be shaped to recognize, value, and invite individual as well as cultural sources of creativity that foster educational equity for all students (Eisner, 1994). Holland et al. (1998) think that "Improvisation can become the basis for a reformed subjectivity" (p. 18). When subject positions change, so do the identities and agency situated within them. Renata understood that the scripted lesson she was required to teach must involve disciplined improvisation in order to encourage student engagement and agency. We argue that Renata's agency was also constrained by the lesson, positioning her as subordinate to the prescribed lesson (or program). When Renata shifted the material conditions of the lesson through intonation, playful language, and rhythm, she reclaimed a degree of teacher agency by challenging the dominant script through creatively subversive teaching. When Renata suggested to the child who was concerned with words per minute to forego worrying about time, she was contesting the material conditions of the lesson from timed readings to constructing meaning in text. These actions were arguably opening up agentic opportunities to the children, including those who felt startled by the sound of the timer. Renata's creatively subversive actions not only shifted the material conditions of the lesson but also may potentially have shifted the agency and identities she was negotiating with her students through improvisation. When Renata invited the children to read like they talk, she was challenging a routine of privileging speed and accuracy over meaning.

For some children, this may have opened up the possibility of engaging as a reader in new and meaningful ways within the constraints of significant time pressure. For children who identified as a reader in terms of their score on "words per minute," Renata's disciplined improvisation may have shifted the conditions of the lesson as she contested assessment criteria that positioned young children as "fast" or "slow" readers and suggested the possibility of engaging as readers who make sense of text. Renata's effort and willingness to be creatively subversive may have the potential to bring about change over time in how students engage in lessons and see themselves as readers.

18.4.2   Dialogue as Creative Subversion

Another form creative subversion takes is the ways classroom dialogue is orchestrated. Dialogue provides entrée to learning (Murphy, Wilkinson, Soter, Hennessey, & Alexander, 2009). The relationship between knowledge and expressions of it through dialogue that is part of creative subversion is seen when students engage with a topic with deep care and attention. However, when we as teachers do much of the talking in classrooms, which is common (see Applebee, Langer, Nystrand, & Gamoran, 2003; Treffinger & Isaksen, 2001; Wagner, Ossa Parra, & Proctor, 2017), we are diminishing the possibilities for students to practice deductive reasoning and the creative expression of ideas. For clarification, we are selectively using the term "dialogue" to describe the verbal exploration of ideas as opposed to "discussion" which is a presentation and defense of views. As Senge (2006) writes, "In dialogue, different views are presented as a means toward discovering a new view. In a discussion, decisions are made" (p. 247).

We propose the use of jazz as a metaphor for what creative dialogue might sound like in a classroom as well as to demonstrate its use as a form of creative subversion. To do this, we might consider the conversants (the teacher and students) as parts of a jazz ensemble. Jazz is characterized by improvisation, interaction, and collaboration. Little emphasis is placed on the composer or performer (Giddins, 1998). As musicologist Ingrid Monson (1996) wrote, "When [jazz musicians] compare performance in the ensemble to 'conversation,' they refer to a specific genre of musical talk that requires listening carefully to the other participants" (p. 85).

In classroom dialogue that resembles a jazz ensemble, teachers can jump in with their own instrument or simply opt to listen as an audience. The key is to not overshadow or dominate the dialogue but rather to share in the experience. It might involve dialogue that moves among students passes back and forth, circulates, and is entirely democratic in its attention to maintaining the integrity of the individual the group's aims. There is syncopation, a deviation from the standard question, response, question, response beat of a discussion. And there is *swing,* when nonverbal participants tap along with attention and are seduced to join the conversation. There is spontaneity when participants find themselves improvising in a thoughtful groove, encountering unexpected turns in their understanding of a claim. Yet, in

spite of all the great ideas that come out of these conversations between students, the underlying structure of classroom dialogue is of utmost importance. As we mentioned earlier, creativity requires practice and persistence. While jazz works organically, sometimes frenetically, it still stems from the parameters of this genre of music.

Poetry serves as another apt example of creative subversion. It offers opportunities for reflection and soulful exploration and serves as a model for how students can manage powerful emotions. Not only that, but poetry disrupts writing conventions to produce meaning. However, the teaching of poetry only represents a marginalized sliver of the language arts curriculum. Over a decade ago it was reported that teachers feel reluctant to incorporate poetry in their teaching repertoire (Cremin, Bearne, Mottram, & Goodwin, 2008). And Myhill and Wilson (2013) found in their analysis of teachers' perceptions of creativity in poetry writing that educators were often inclined to "play it safe" when it came to the implementation of creative writing because they had not fully developed a deep understanding of the genre. Poetry demands an "unlearning" of the rules of standard writing. Myhill and Wilson describe this unlearning as subversive.

Subversion can also play a role when confronting policy initiatives that threaten autonomy (and thus creativity) in the classroom. Some teachers mediate or adapt these policies through creative subversion. Renata's language play with her students transformed an otherwise prescriptive and contrived lesson into a creative process by which children played with sounds in words. For Renata, creatively subverting the restrictive boundaries of the phonics lesson to engage meaningfully with her students while complying with professional responsibilities was a tension she noted in her post-lesson conference reflection with Jacobs. The presence of her student teaching supervisor in the classroom may have influenced Renata's attention to this tension. Theoretical discussions in Renata's teacher preparation courses with Jacobs regularly interrogated and challenged the practice of teaching reading as a decontextualized and technical task, including the timed purpose of the prescribed lesson she was required to teach. When teachers do not understand or notice the tension between complying with standardized curricula and creating conditions for meaningful and engaged learning, they may be less likely to respond in ways that maximize the potential for creativity and agency in themselves and their students. In this sense, a critical aspect of curriculum mindfulness involves teachers attending to the tension between conformity and improvisation in order to teach in creatively subversive ways that lead to transformative learning in school.

18.4.3   Reclaiming the Art of Teaching

The art of teaching is largely threatened, particularly at the elementary level, by the dulling routine of programmed curricula that dictates to teachers what they should do and when (Allington & Pearson, 2011; Goodman, 2014). Pearson (2007) refers to this as the "McDonaldization of teaching" (p. 154). Efficiency, predictability, and

control influence the mundane routines of classrooms, leaving little room for the imagination and improvisation. Also limited are fertile avenues for engagement, learning, and growth for teachers and students alike. Creative subversion becomes a necessary disposition to reclaim the art of teaching in this score-obsessed era of standardized curriculum.

The novice teacher in particular is likely to struggle to be recognized as a "good teacher" (i.e. compliant, hardworking) while attempting to reconcile this identity with what s/he has learned in her preservice program that may contest the "one-size fits all" approach ubiquitous today in K-12 classrooms. Increasingly, primary school teachers in the US, the UK, and Australia, have been subjected to the capitalistic logic of mandated reading programs and assessments designed to raise the achievement of children the most at risk for failure in reading as early as the 1st year of school (Schmidt, Jacobs, & Meyer, 2017). Universal screeners, standardized lesson sequences, and linear approaches to teaching reading have made it overwhelmingly difficult to engage in the disciplined improvisation we suggest is necessary for creative subversion. Novice teachers are not likely to know how to make the kinds of judgments Eisner (2002) suggested are based on the actions that unfold before them without a sense of themselves as curriculum makers. They are much more likely to doubt and question their preparation if they are not given opportunities to creatively connect the curricular commonplaces and, particularly, use time more imaginatively for teaching the curriculum. When the novice teacher is surprised by the wide gulf between teacher education and K-12 education, Eisner explains that the educational imagination becomes shackled.

18.5   Improvisational Teaching

A third approach to slow curriculum is seen in the ways teachers create and unveil lessons. Teaching, when done well, is a creative act (Simplicio, 2000); yet, lesson planning, an essential, often central task in schools, is rarely viewed by teachers as pleasurable (Uhrmacher, 2009). Uhrmacher, Conrad, and Moroye (2013) advocate for an approach to lesson planning that attends to teacher and students' senses and enjoyment which they call perceptual lesson planning or CRISPA. The acronym CRISPA stands for connections, risk-taking, imagination, sensory experience, perceptivity, and active engagement. They describe this approach to lesson planning as perceptual in that the teacher perceives the commonplaces of the curriculum and makes decisions about how to unfold the lesson with the intention to not only address official or stated curriculum objectives, but also to invite creativity in the experience of the lesson and enjoyment. This model underscores just such an aesthetic approach to lesson planning (Moroye & Uhrmacher, 2009). For instance, in the creation of a lesson plan, a teacher might experiment with various fonts and images to impart the tone for which s/he is seeking in the classroom. Her plan might include sidebars that reflect the teacher's questions for reflection or other
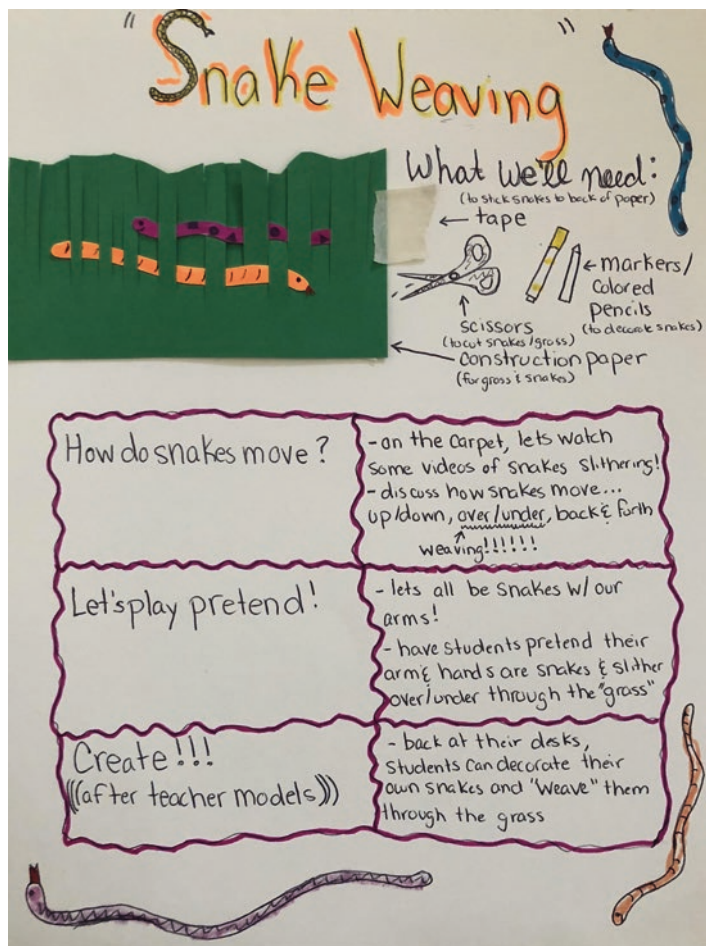
Fig. 18.1 Creative lesson planning: elementary teacher lesson planning sample

considerations (see Fig. 18.1). The final product functions less as a technical and procedural protocol and more like a cross between a storyboard and stage directions (see Uhrmacher, 2009).

18.5.1   Mindful Practice

Another way in which lesson planning invites creativity is to build in opportunities for mindful practice. By *mindful practice*, we mean teaching that is cognizant of classroom surroundings and subtle changes in the tempo of teaching and learning. We include in this description Greene's (1995) notion of "wide-awakeness,"

described as an "awareness of what it is to be in this world" (p. 35). Such awareness necessitates curiosity and, she noted, a "furious" nature that is released when encountering the arts. We understand from Langer (1997) that mindful teachers are more concerned with process than the product, which, according to Craft (2003), happens to be a feature of creativity.

Lesson planning with attention on mindfulness might incorporate *educational criticism and connoisseurship* (abbreviated as *educational criticism*) as a teaching practice. Long ago, Eisner (1991) presented educational criticism as a mode of qualitative inquiry and evaluation. We have discovered that the techniques (which we describe later) used with this approach lend themselves to a creative environment. This process allows the teacher to become fully attentive to subtle qualities that permeate the classroom, such as one might see in the "complementary curriculum" which Moroye (2009) describes as the "kinds of experiences teachers provide for students, as well as the 'pedagogical premises and practices' that result from the teachers' beliefs" (p. 791). To explain how educational criticism might be used in teaching and learning, we first offer a brief overview of the process.

A connoisseur is one who deeply understands the qualities of an object, such as a painting, or phenomenon, like an ocean current. We can also extend the notion of connoisseurship to a teacher's knowledge of a topic within the subject matter, provided that it is deeply understood. Connoisseurship can exist privately in the mind and experience of an individual; appreciation for various qualities with the scope of the connoisseur's interest may never be revealed to others. However, the critic is a connoisseur who articulates these qualities to an audience, allowing others to experience the object or event of interest with a nuanced, if surrogate, eye. When a teacher provides an assessment of student work that is substantive, informed, and contextual, s/he is performing the role of critic. The critic first describes objective characteristics of something in detail and then provides to another an interpretation and evaluation of these details. In other words, what is happening according to Eisner (1991) is the critic is capturing and presenting for the audience a sense for the subtle and complex nature of the object or event of interest.

The educational criticism process includes four stages: description, interpretation, evaluation, and thematics. *Description* involves a precise, rich, and detailed account of the object or phenomenon that allows others to 'see' what the critic is conveying. Interpretation makes meaning of the situation or object described. *Interpretation* means to makes meaning of the situation or object described. The interpretation provides context for the description and addresses the intentions of those who are involved in the making of the object or participants in a phenomenon. *Evaluation* involves the making of a value judgment about the nature of the object or phenomenon. And finally, *thematics* refers to the generalized conclusion the critic offers as a result of identifying the recurring messages (or themes). This generalized conclusion, which Eisner describes as a "pervasive quality" (p. 104) transcends a particular context and informs our understanding of other, similar contexts (Eisner, 1991).

To apply this process to a lesson, a teacher and his or her students would describe the entity of concern, such as an artifact, part of text, or perhaps even the physical

surroundings in such a way that others who are absent might "see" the activity being described. The description contains textures and sounds and allows others to make sense of artifact, text, or surroundings being described. Then, teachers and students (i.e. critics) consult relevant primary and secondary sources and their own experience and expertise to illuminate what the subject of attention means to them. The evaluative component of this classroom exercise is an appraisal of the observed phenomenon and thus, the students offer a value-statement or judgment about the phenomenon being observed with particular attention to what is "of value" in this particular context. Finally, the class can engage in an uncovering of the themes that connect the specific phenomenon to a larger context by articulating the common traits of the subject of their study.

In becoming educational critics, teachers can better see themselves as worthy of artistic judgment. For example, the teacher may want students to develop a mindful appreciation of a poem and ask for a detailed description of what the poet is *doing* with words, cadence, and structure. Encountering a poem first by describing it in objective terms allows the audience to forge a more intimate understanding of how the facets of the poem work in part and as a whole. From there, students can use their description as well as other funds of knowledge for making meaning of the subtle cues of a poem. The evaluation of a student's consideration of a poem's meaning would include asking "What is of value, here?" and, relying on one's experiences and sensibilities to make a judgment. Finally, students identify the thematics. Planning a learning experience with educational criticism as the aim lends itself to a mindful classroom because such criticism offers a loose but manageable structure within which creative inquiry can thrive.

18.5.2   Educational Criticism

Kauper (first author) incorporates educational criticism as a classroom practice in her educational foundations course for preservice teachers by having students create sculptures of their educational philosophies. After exploring various ideologies of educational practice (e.g. rational humanism, cognitive pluralism, existentialism, etc.), students are asked to write personal statements that reveal their beliefs about teaching and learning as informed by the theorists to whom they've been introduced. The first drafts of these statements are invariably lacking in clear connections between the self and the deeper implications of the ideologies. To deepen these personal connections, students are given modeling clay and other materials to create a representation of their philosophy in three-dimensional form. Initially students respond with incredulousness ("I'm not an artist!) and they tentatively poking at the materials: clay, yarn, coils of wire, and other objects distributed around the tables in the room. In time, students find themselves absorbed in the task of creation.

After the sculptures are created (see Figs. 18.2 and 18.3), students title these and they set them up as a gallery walk. Students mill around the room, taking in the art

Fig. 18.2 "Structured interaction": educational philosophy sculpture

Fig. 18.3 "A foot up": educational philosophy sculpture

forms that hold within them the secrets of the student-artists' philosophical orientations. Afterwards, the class engages in a critique of the sculptures using description, interpretation, and evaluation while the artist takes note. The critiques serve as the bridge to the next drafts of the educational philosophy papers these students are writing. Kauper's students report afterwards that this experience helps them see their writing in new ways. They are able to understand that much better both the possibilities and limitations of their ideas because of this exercise in creation and criticism.

18.6 Final Reflection

Educators who practice and persist in their creative teaching craft are artists. We agree with Graham's (2008) description of the intentions of the artist-teacher, which we apply to any teacher of any subject matter:

> As education is turned toward predication, mechanistic rationality, and measurement, the exploratory vision of art education becomes more vital. The art teacher embraces ambiguity, surprise, imagination and idiosyncratic outcomes. The artist teacher is looking for an occasion to disrupt the superficial topic, to connect learning to the lives of students. (p. 32)

If we privilege the improvisational elements of teaching, we model for our students ways to unlearn consciously the lessons they have been taught within the hidden curriculum of clock-bound time. Preservice teachers can work within the time constraints associated with curriculum while contesting the arbitrary ways in which time binds if given opportunities to develop curriculum mindedness in the teacher preparation classroom. Beyond teaching the curriculum, pre-service teachers develop a critical sense of how time is organized and who benefits from this arrangement in schools and who may be at a disadvantage. Time spent as preservice teachers has to involve critique and interpretation of existing curriculum. Once in their own classroom, they will then be better able to question the standardization of time, materials, and assessments that diminish creative potential and marginalize students who do not meet the curriculum standards set by external forces, freeing the educational imagination to thrive in critical ways. What follows is a classroom environment that encourages student improvisation and creative expression.

Finally, we encourage others to think about the curriculum in this manner as slow curriculum. Slow curriculum enables those who teach preservice teachers (i.e., teacher educators) to notice the points in which curriculum lacks synchronicity with preservice teachers' experiences and, most importantly, the students they will teach 1 day. Noticing how time is spent in classrooms and creating ways to use the time teachers and students have together *well* invites a learning space that promotes the persistence and practice needed for creative expression.

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Chapter 19
Embodying *Macbeth*: Incantation, Visualization, Improvisation, and Characterization

Mary Beth Cancienne

Abstract This chapter discusses the author's teaching of English methods to students who will themselves teach students how to study Shakespeare's play *Macbeth*. Drawing from a Shakespeare toolkit for educators, this creativity scholar explains the six-step process based on drama pedagogy strategies used in her high school English methods course. The drama activities, known as Role Work, are titled Ensemble-building, Battlefield Visualization, Slow-motion Battle-Group Improvisation, Word Carpet Guided Tour, Writing in a Role, and Role on a Wall. The Ensemble-building Activity speaks to the role of superstition and the Three Witches' incantations. The Battlefield Visualization, Improvisation, Word Carpet Guided Tour and Writing in a Role activities speak to dialogic meaning-making where students co-construct a battlefield scene by listening, speaking, and reflecting. The Role on the Wall activity speaks to depicting Macbeth's character in a visual way. The strategies are explained and included are guiding questions and tables to scaffold instruction as well as English candidates' pictures, writing samples, and responses to the strategies. The Common Core State Standards are addressed and ideas for a culminating project. In conjunction with the process-based drama strategies, described are a three-step approach involving action, thought, and writing, with class discussion of the activities. By entering the play's action through motion and emotion, students can experience characters' thoughts and feelings.

Empty Places
Frost bejeweled lips so blue
frozen in disturbing silence,
Rust and grit of angry earth,
charred flesh strewn like pennies,
the metallic taste of fear,
the fog of labored breathing.
The salt of death rattles
swirling in a sea of dead bodies.
Why are they here like this?

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There is no reason for them to be here?
What cause is great enough? What fight
is great enough when there are
warm hearts, pots of soup,
and empty places at tables begging for peace. (Stacy, 2017)

19.1   Empathy in Action

An English methods graduate student wrote this poem after I guided her and her classmates through a process-based drama strategy used to set the stage for William Shakespeare's *Macbeth*. In the play's context, the process-based drama pedagogy is a highly effective teaching methodology that places the students in the shoes of the characters and enables them to understand better the characters' actions, feelings, and motives. Furthermore, the students engage in dialogic meaning-making as they co-construct ideas through drama with their classmates. In addition, process-based drama pedagogy is a pre-writing strategy for enhancing students' word choice skills and student voice and translates their imaginative movements, thoughts, and words into powerful, written language. Finally, process-based drama pedagogy is a method of parlaying reading into writing along with speaking, listening, viewing and thinking. Thus, making for a dynamic, innovative English Language Arts curriculum.

Although I have taught the play, *Macbeth*, to English candidates working toward their Masters of Teaching and license to teach in the state of Virginia for five years, in this paper I only focus on the students that I taught in the fall of 2017. The course that I am referring to is titled, English Language Arts Teaching Methods for 9th–12th Grade. The two sections were composed of a total of 19 students, 2 male students and 17 female students. Sixteen students were Caucasian along with one female Black student. Pseudonyms are given to replace the names of students in the English methods graduate course and are used to identify student work in this paper.

In *Macbeth, Act 1, Scene II,* an important battle sets the stage for the play. On a heath in Scotland during the eleventh century, Macbeth and Banquo fight valiantly for King Duncan against the Norwegian army. The introductory battlefield lesson explained in my chapter provides a dramatized reenactment to help students not only imagine war but also understand that Macbeth and Banquo have just left a battle before encountering the Three Witches. The Witches offer Macbeth the first of three prophecies: that he will become king of Scotland. Concerning exposition and plot development, examining Macbeth and Banquo's roles in battle and departure from the battlefield is important for students to consider before the exchange with the Three Witches.

Without an in-depth exploration of the reality that Macbeth and Banquo have just left a battle, the students may not fully grasp the impact of Macbeth's state of mind when he encounters the Three Witches. For example, Bossler (1947) states, "In the medieval and Renaissance world fighting was a major part of all thought. One of the

human reactions to it, and one that Shakespeare must have known well, was the inevitable let down following a surfeit" (p. 436). Bossler (1947) asserts that Macbeth who fought excessively suffered from battle fatigue. For the purpose of brevity, I focus exclusively on the first three scenes of Act I. This sets the stage for my English methods graduate students to address this essential question of the play: To what extent does Macbeth's walking off a battlefield with his friend Banquo—immediately after fighting a battle and encountering the Three Witches on his way home—affect his decision to alter his profound transformation of thought and action to ensure that the prophecies of the Three Witches manifest?

19.2   Process-Based Drama Pedagogy

Dawson and Lee (2018) define *process-based drama* as "active and dramatic approaches to engage students in academic, affective, and aesthetic learning through dialogic meaning-making in all areas of the curriculum" (p. 17). For students, the aim of process-based drama is to help them through an interactive exchange of ideas and through building upon each other's ideas (Dawson & Lee, 2018) better comprehend, describe, interpret, infer, question, examine, support, empathize and write about a character and its relationship to elements of literature such as setting, plot, or theme. This instructional strategy involving creative drama allows the students to place themselves in the shoes of a fictional character, experience what it could be like to be that character, and thus connect to the human condition. Process-based drama pedagogy helps students embody a character's actions, thoughts, motivations, desires, and conflicts. By embodying the internal forces influencing a character, students can then have a deeper awareness of the consequences of the character's actions. This pedagogy is similar to the method-acting approach used by actors to achieve complete identification with the characters they will represent on stage. However, there is an important distinction between acting and process-based drama pedagogy. Process-based drama's intention is to engage students in a process for the purpose of learning and acting or drama's intention is to achieve complete character identification for the purpose of performance.

Many professors have written about drama-based pedagogy and teach teacher candidates and in-service teachers how to incorporate it in their classrooms (e.g., Edminston & McKibben, 2011; Lee, Cawthon, & Dawson, 2013; Norris, 2016). Heathcote (1995) and Bolton (1979) are generally credited with having founded this educational practice in the 1970s. The lesson I use in my high school English methods course was inspired by a conference presentation on teaching Shakespeare (Edminston, Sharp, Ballinger, Sampson, & Hall, 2012). Jessica Sharp, a high school teacher in Ohio, USA, led the session with her professor, Brian Edmiston at Ohio State University (OSU). She was a teacher-participant in the Stand Up for Shakespeare partnership between OSU and the Royal Shakespeare Company

(RSC). The process-based drama strategy I next examine combines ideas gleaned from Sharp's presentation with two other sources: a book for teaching *Shakespeare* (Royal Shakespeare Company, 2010) and movement-based teaching methods (Cancienne, 2013, 2016, 2017; Cancienne & Megibow, 2001; Mullen & Cancienne, 2003) I have been practicing for more than 20 years and studying over time.

19.3   Pedagogy into Action

I use six process-based drama activities to introduce my students to *Macbeth*. In particular, these drama activities are all Role Work strategies. Role Work, identified by Dawson and Lee (2018), are process-based drama strategies that invite students "to think, dialogue, problem-solve, and act either as themselves or as someone else in response to a set of imagined circumstances" (p. 223). To differentiate one activity from another, the Role Work activities are titled Ensemble-building, Battlefield Visualization, Slow-motion Battle-Group Improvisation, Word Carpet Guided Tour, Writing in a Role, and Role on a Wall. In naming these strategies I drew from three drama based texts (Dawson & Lee, 2018; Neelands & Goode, 2015; Royal Shakespeare Company, 2010).

These process-based drama activities begin with an overview of the major events of the play. Further, the activities are used as prompts; these help students visualize and engage in an improvisational battle scene, write descriptively and emotionally to imagine Macbeth's and Banquo's experiences on the battlefield before they encounter the Three Witches, and conjecture about the relationships between Macbeth and Banquo and between Macbeth and the Three Witches. Word Carpet is the most in-depth strategy of those I discuss. This activity, which draws upon the previous ones, requires students to use their senses to write "thick" descriptive words and phrases as well as use voice to communicate mood and emotion for describing the battlefield scene. Finally, the students synthesize all three experiences (Visualization, Improvisational Battle Scene, and the Word Carpet Guided Tour) to write a descriptive piece of what Macbeth and Banquo experienced on the battlefield.

This six-part, process-based drama activity also provides the students with an aesthetic learning experience to understand the plot: the rise and fall of Macbeth. Students using their senses and imagination will explore, infer, reflect, and question why a powerful, valiant, war hero, as he is seen at the beginning of the play, degenerates by means of self-torture from fear (Firkins, 1910) by the end of the play. The activities encourage students to make connections between the way that Shakespeare structures Act I—specifically, the events that lead to and include the inciting incident—Macbeth and Banquo's encounter with the Three Witches—and determine if his choices make the play clear, convincing, and engaging.

These initial engagement activities help students to grapple with these questions: What is the role of superstition in the play, given that the Three Witches appear in

Act I, Scene I, when they conspire to meet Macbeth? To what extent does the battle in Act I, Scene II make Macbeth's decision to consider the Three Witches prophecies believable to an audience? If there were no battle, how would encountering the Three Witches change the plot? Would the play be as clear, convincing, and engaging? As the play progresses, students will investigate other questions, such as how ambition and power can corrupt individuals. What happens to Macbeth once he stops fighting for his country and starts fighting for himself and his wife to take the throne? What psychological consequences does Macbeth face after he kills King Duncan, for whom who he has fought and sought to honor?

19.4   Embodiment (Motion and Emotion)

Based on my teaching experiences, I firmly believe that hooking students at the beginning of *Macbeth* through the process-based activities helps motivate and connect them to Macbeth and Banquo and the Three Witches in ways that sitting and reading the play do not. The Ensemble-building, Battlefield Visualization (guided imagery), Slow-Motion Improvisational Battle, Word Carpet Guided Tour, Writing-in-a-Role, and Role-on-the-Wall activities connect the students physically and emotionally to the characters that they embody. The role the body plays in shaping the mind's ability to learn through drama can't be overlooked. This is why I ask students to play themselves as they battle with Macbeth and Banquo; in that way, they experience something of the heightened tension of warfare and the feeling of departing once it subsides. By entering the play's action through motion and emotion, they can experience the characters' thoughts and feelings in a more immediate sense than if they simply read quietly. In addition, I find that the language of the play, which can be difficult to interpret, can be accessed more easily while moving and/or speaking the lines.

To embody a character in the context of a situation is to understand his or her relationships, motivations, dilemmas, and choices. Not only does embodying a character help the students internalize the character, but it also makes the character's conflict (internal and external) apparent and sometimes more relatable to students' lives. In addition, the process helps these adult learners use their imaginations to connect the motion (action and events) to the emotion (thoughts and feelings of the characters). After they re-enact the Improvisational Battle Scene, they may be lying on the floor out of breath or powering over a peer with armor and sword. As they slowly move to their desks, they encounter the Three Witches. After I teach the six-part process with the initial scenes featuring Macbeth, they can better identify with him and more fully connect with his story. In addition, while they engage through drama-based activities, they also move between the immediate—that is, acting out the scenes—and the more detached—that is, reading the text, questioning what they have read, and writing about what they have gleaned.

19.5   Common Core State Standards (CCSS)

One of the standards from the CCSS (2018) for 11th and 112th-grade instruction centers on having students analyze the impact of an author's choices on his order, development of a story or drama. Where studying Macbeth is concerned, addressing this standard in relation to the exposition means that students will analyze Shakespeare's choices, including where he begins the story (Act I, Scene I, with the meeting of the Three Witches) and how he introduces and develops the characters. After my students read Act I, Scene II, I ask them these questions: In the opening scene of the battle, how does Shakespeare characterize Macbeth? Does Shakespeare's initial presentation of Macbeth seem convincing?

It is essential that the students understand the exposition (Act I) of *Macbeth* before addressing another common core state standard. The one to which I refer that prompts them to analyze and evaluate the effectiveness of Shakespeare's exposition on the play's overall meaning and aesthetic impact (CCSS, 2018). Process-based drama instruction prepares participants to internalize the impact of the battle on Macbeth as he walks home and encounters the Three Witches (RSC, 2010). Without this realization, the students could overlook the meeting of the Three Witches, the battle scene, and Macbeth's mental state when he comes upon the Three Witches after the battle (Bossler, 1947). While the Three Witches posit visions and warn of future catastrophe, they do not determine Macbeth's fate (Barnet, 1963; Firkins, 1910; Noone, 2010). The supernatural and its relationship with the nature world and its power over or not over human decision-making is an important question to ask students during the exposition of the play. I now turn to the six process-based drama activities to explain and illustrate each phase.

19.6   Ensemble-Building: Superstition and the Three Witches

Act I
Scene I. [An open place].
Thunder and lightning. Enter the three Witches
FIRST WITCH
When shall we three meet again?
In thunder, lightning, or in rain?
SECOND WITCH
When the hurlyburly's done,
When the battle's lost and won.
THIRD WITCH
That will be ere the set of sun.
FIRST WITCH
Where the place?
SECOND WITCH
Upon the heath.
THIRD WITCH
There to meet with Macbeth …

All
Fair is foul, and foul is fair;
Hover through the fog and filthy air. (Barnet, 1963, p. 1233)

Act I, Scene I, opens with the Three Witches showing their powers of prophecy. Common Elizabethan lore held that witches used special chants and omens, "fair is foul, and foul is fair" (Barnet, 1963, p. 1233) to predict the future, control the weather, and cast spells. Based on the NCTE presentation mentioned, I begin my Macbeth workshop with an Ensemble-building game. All desks are placed against the wall to create an open space in the middle of the classroom for students to work, move, and perform. During the workshop, students alternate between moving in the middle of the classroom and returning to their desks to write and discuss. Discussions are conducted as pairs, in small groups, or as a whole class.

Students begin the workshop by standing in a circle in the middle (of the room). I tell the students that an Elizabethan audience believed in superstitions—for example, witches who could control the weather, predict the future, and cast evil spells on humans. Before the class begins a close study of Act I, Scene I in which we first "meet" the Three Witches, I use an activity or Ensemble-building game so they can get more of a sense of the role of superstition in Elizabethan times called the "sun shines on all those who … and the darkness fall on all those who" (Edminston et al., 2012, p. 1). The game goes as follows: As I read sentences that begin with those phrases, the students cross the circle and find a new spot if they agree with the statement or stand still if they disagree with the statement. Students react to these statements:

The sun shines on all those who like stories.
The darkness falls on all those who like stories of war.
The sun shines on all those who would visit a castle.
The darkness falls on all those who would visit a castle where there was a murder.
The sun shines on all those who would like to eat at a banquet.
The darkness falls on all those who would eat at a banquet where a ghost appeared.
The sun shines on all those who believe in witches.
The darkness falls on all those who believe what a witch says. (Edminston et al., p. 1)

The Ensemble-building game prepares students for the major events that unfold throughout the course of *Macbeth*: warfare, multiple murders, a ghost who appears at a banquet, three witches who foretell prophecies, and more. In addition, the "sun shines and the darkness falls" game introduces key thematic elements, including the natural versus supernatural world, unreal versus reality, good versus evil, and fate versus free will. Furthermore, the Ensemble-building game allows for difference and inclusion in the sense that students are asked to listen and respect each other's ideas and opinions (RSC, 2010). In the four years that I have been using this game, my classes have had mixed reactions. Some students don't move at first and wait to see what their peers will do. Yet others move each time I read a sentence. There are

those who seem to catch on after I read three statements and consciously choose to move or stand. This activity puts my groups in an uncertain frame of mind. It Instilled in them a sense of unease about what they are supposed to do and think, and that lack of certainty is a fitting prelude to their reading of Scene I. In this place of ambiguity shown through the language in the Ensemble-building game the theme of superstition continues as they are introduced to Act I, Scene I, where they will meet the Three Witches for the first time.

As students remain in their circle, I post the beginning lines from Act I, Scene I (shown above) on the overhead screen. They practice reciting the lines a minimum of three times. First, I guide them to speak the lines in unison. Then I prompt them to recite the Three Witches' chant in unison while bending and straightening their knees to the beat of the chant. Finally, they move slowly counterclockwise (left foot over right foot) while chanting the words and holding hands. I recommend varying the ways in which lines are spoken. One variation is to have them create freeze frames. A freeze frame is when a group creates a physical image; in this case, shown in Fig. 19.1, the freeze frame represents a frozen moment in time. The picture shows me using a technique called spotlighting. I asked the small groups to freeze, then I asked one of them to answer the following questions while the others observed. Once the group of three pose as the Three Witches I asked them, what is your name? What time of day is it? What is the weather like now? What are you chanting? What is in your cauldron? What were you getting ready to tell your sister? Can you return to your chant while I am here? The picture captures the group creating a freeze frame of the Three Witches.

Fig. 19.1 Freeze frame of the three witches

19.7 The Tragedy of Macbeth

Once students have performed the excerpt of Act I, Scene I several times and played with variations of performing the scene, they journal their response to these prompts: What is the significance of the thunder and lightning in an open place? What information do we get from the Three Witches' chant? What did you learn about them as you performed the chant? What effect does the chant have on you? The witches tell us that the next time we see them, Macbeth will have lost and won a battle on a heath at the set of sun. What do the rhythm and words of the chant reveal about the witches? Why do the witches use words like "lost and won" and "fair and foul?" Once the discussion has ended, the students turn to the next activity, which features Macbeth, Banquo, and the soldiers on the battlefield.

19.7.1 Visualizing and Fighting on the Battlefield

The following are instructions to the teacher who works with the students. In beginning our work on Act I, Scene II, I provide props—swords, shields and armor—and ask students to stand around the room as if they are arrayed for battle. I show a picture of a heath and state that this was the setting of the battle between Scotland and Norway. Then I ask students to close their eyes and visualize the setting as I read the first part of the visualization battle scene prompt. The first of two parts of the visualization battle scene prompt follows (Fig. 19.2):

> The great armies of Scotland and Norway were ready on the barren heath. The wind whistled across the empty space between them. It was bitterly cold. Their fingers were frozen, gripping their weapons, waiting. Their breath made clouds as it condensed in the air. They listened. A moment of dreadful silence fell as they held their breath, every muscle tensed, ready. Waiting for the battle cry. Then, King Duncan of Scotland let out a great roar. (RSC, 2010, p. 23)

Fig. 19.2 The slow-motion improvisational battle scene

Opening their eyes, the slow-motion improvisation battle scene begins. I recommend fighting in slow motion without touching. The teacher may choose to beat a drum slowly or clap her hands ten times as her class performs their battle moves in slow motion, with props but without touching each other. Once the last move has finished, students will freeze in their final poses. I then read the second part of the visualization battle scene prompt:

> As the smoke of battle cleared, the exhausted soldiers slowly started to be aware of what was happening around them. Across the battlefield, they saw the injured and dying, friends and enemies alike, bleeding onto the cold earth. They felt the icy wind blow through them, as they took in the scene. They could see, hear, smell, taste, and touch the aftermath of battle. (RSC Toolkit for Teachers, 2010, p. 23)

Leaving the battlefield, the students slowly walk away from the scene of action, returning to their desks to write and reflect on these questions: What emotions are you feeling as you leave the battlefield? What might be Macbeth's thoughts as he realizes that he won the war and exits the battlefield?

Following this exercise, I ask students to imagine themselves on the heath at the end of the battle. Using large index cards and colorful thick markers, I have them write one or two words or short phrases to describe the scene as they walked off the battlefield. If writing from the perspective of one who has just left a battle is too emotional to do, I say that they may choose to write from the perspective of a visitor going to the scene once the battle has ended. If students are not comfortable writing from the perspective of a soldier, they can adopt the role of tourist/visitor and write as an observer of an event. This perspective fits with the Word Carpet activity that I next introduce, as each student will participate in a guided tour as part of the activity. I allow 10 min for my class to finish writing words on the index cards. Below is a simple chart I have used as a guide for writing descriptions based on the five senses. The teacher may join in writing sensory words on index cards and adding them to form a Word Carpet.

Classes may benefit from using Table 19.1. I recommend having students first list or write what *their* partner said during the battlefield tour in addition to brainstorming

Table 19.1 Word Carpet: Macbeth in Battle, Act 1, Scene 2

See	Hear	Smell	Taste	Touch

Table 19.2 Word Carpet sensory words placed on the floor in the round

Skin	Glimmer	Iron	Wind	Eerie
Sharp	Gasps	Weapons	Howl	Cries
Salt	Groans	Trembling	Sweat	Stench
Slicing	Flesh	Whimpers	Ice	Rattle
Shivering	Limbs	Dew	Sobbing	Chill
Shouts	Moans	Grass	Weeping	Decay
Silence	Blood	Dirt	Carnage	Death
Screams	Twisted	Birds	Tears	Lips
Shuttering	Frost	Armor	Tongue	Metal

Table 19.3 Word Carpet phrases placed on the floor in the round

Scattered carcasses	Bloody waterfall	Howl of the wind
Dismembered body parts	Salty blood, sweat, and tears	Eerie silence
Metallic taste of blood	Shattered weapons	Death rattle
Delirious cries	Frosted blue lips	Twisted, tattered flesh
Blood-soaked dirt	Frost-bitten skin	Sharp saws of ravens
Blood curling screams	Blood-soaked armor	A shuttering icy gasp
Glimmer of metal in torchlight	Iron taste of blood on your tongue	Bodies strewn across the heath

their own sensory words. Once all members have brainstormed, I guide them to complete the chart, asking, students what could the soldiers see, hear, smell, taste, and touch at the end of the battle? What could observers see, hear, smell, taste, or touch as they toured the battlefield after the battle?

Table 19.2 shows examples of the sensory words that the students wrote on the index cards.

Table 19.3 shows examples of sensory word phrases that students wrote on the index cards (Fig. 19.3).

19.7.2   Word Carpet Guided Tour

The word carpet tour is a collaborative visualization and verbalization (listening and speaking) strategy. It invites students to apply knowledge, explore multiple viewpoints, and co-construct ideas with their classmates through dialogic meaning-making.

Once they have placed their words on the carpet in the round, I have my students walk in pairs outside the circle. Taking turns, they describe the battlefield using language from the word carpet. The activity is explained as Student A giving a visual tour of the battlefield to Student B who has his or her eyes closed. Student A

Fig. 19.3 The Word Carpet Guided Tour

places a hand on Student B's shoulder. After Student A leads a tour, students switch roles and student B leads. They may use their smart phones to record the tour. I say this:

> Imagine being a soldier engaged in the battle or someone who arrives at the battlefield just after the fighting has ended. In a first-person account, describe the scene using the sensory details suggested by the word carpet tour and your partner's narrative. Identify the character, how she or he felt witnessing the scene, and what the character does next. (RSC, 2010) (10 minutes for the exercise)

19.8   Writing in a Role Student Writing Samples

Writing in a Role is when students are asked to engage in pre-writing or reflective writing just after Role Work. Writing in a Role is a strategy that I have created to go along with the other five strategies that I identify in this paper. Role work is a strategy in which students will "think, dialogue, problem-solve, and act either as themselves or as someone else in response to a set of imagined circumstances" (Dawson & Lee, 2018, p. 343). Writing in a Role student writing samples based on the Word Carpet Guided Tour of the battle are taken from my students' writing in two sections of the English methods course and shown below. A student who wrote from the perspective of a soldier on the battlefield reads as follows:

> I hear metal clanging all around me. Men fall to their knees–moaning, shouting, and crying. The sharp metallic taste of blood and salty smell of sweat blends together and fills the air.

The smell almost overpowers the cold blasting from all directions making it even harder to breathe in the contaminated air. There are bodies—more bodies than people, and the bitterness of it all is too much to grasp in the chaos of the horrific battlefield. (Megan, 2017)

A second student wrote from the perspective of a soldier leaving the battlefield:

I slowly rise and examine my surroundings. I no longer feel like a soldier. I don't even feel like a man, for if this is what it means to be a man, I no longer want to be one. The piercing shrieks penetrate the ringing in my ears as I pick my way through the mounds of mangled bodies. I'm desperate for a familiar face but see nothing but anger and confusion. Suddenly, the whimpers and delirious cries give way to a disturbing silence. Quiet grows over the sea of bodies. I begin to sweat as I notice the horrible clash of the charred bodies against the beautiful landscape. (Katherine, 2017)

From the perspective of a soldier leaving the battlefield, third student wrote:

As I moved across the blood-soaked dirt, I couldn't help but notice the disturbing silence. Hundreds of unmoving mounds and lonely limbs littered the frozen earth. I taste blood on my tongue, be it mine or my enemies I don't know. The only scent breathing through my frozen nostrils is that of burning, decaying flesh. Occasionally, the silence is broken by a cawing crow or a hopeless moan for help. Regardless of who was victorious today, there are only losers. (Cary, 2017)

19.8.1 Visiting the Battlefield After the Battle

Two students wrote from the perspective of visitors touring the scene once the battle has ended. Example 1 follows:

Walking up to the battlefield, I smelled it before I saw or heard any of the cries. The pungent smell of blood and metallic filled the air. Next, I could hear screams and sighs of men's last breath as their exposed bodies silenced forever. The visual of the battlefield is almost indescribable. Splattered blood filled the circumference of the area. I began to feel nauseous as I heard cries and moans and stepped over pieces of bodies. It was more of a sea of dead bodies than a sea of fighting soldiers. Tears filled my eyes as the feeling of hopelessness and devastation drew in me. I saw frosted grass stained pink as I sighed and heard ringing in my ears. (Nicole, 2018)

This is example 2:

Traumatized. Guilt-ridden. Tears of regret and sorrow. Too many were slain for fruitless endeavors. As I sludge my way through the bloodied snow, I see faces of brothers, friends, husbands, and fathers … enemies. I do not know these men, yet I am the one that sees them at their most vulnerable – splattered across the ground. Some gurgling with blood pouring out of their bodies. Silence surrounds me. Goosebumps crawling out over my skin, I hear the sound of grown men whimpering and begging for mercy to be released to death—the pleas fill my ears. I am but one man. I will never escape what I have done here. How much hopelessness and fear I have created? How much blood have I poured? I sit as the smell of blood and decay burns my nose. (Sarah, 2017)

This Writing in a Role activity has two writing purposes. First, students rehearse voice in writing. Graves (1996) defines voice as style, tone, and so much more: "Voice is rhythm and beat, inflection and emphasis, volume and pause; it's the

emotional content of the writing, it is energy and force; it is the presence of an individual writer speaking to an individual reader" (p. 36). Second, it translates the soldier's experience (dramatized by the students) into physical descriptions, sensory details, and imagery associated with battle to "show" instead of "tell" about warfare. Teaching the value of voice and vivid word choice in writing is essential to helping students' writing become focused, persuasive, and more engaging. The CCSS (2018) require demonstration of writing mastery by expressing one's ideas clearly through vivid description.

As the student writing examples above illustrate, the process-based drama instruction helps achieve both voice (style, tone, and emotion) and vivid description that creates a dominant impression: English candidates described physical scenes of despair and sadness in which "men fall to their knees—moaning," "I begin to sweat," and "tears filled my eyes." In accordance, they use their voice and imagination to feel what the soldiers might have felt at battle by asking "How much blood have I poured?" and more. Teaching students how to write in ways that show rather than simply tell is essential to the development of their skills and voice as narrative writers.

19.8.2   *Characterization of Macbeth: Role on the Wall*

Characterization is the process by which the author reveals a character's personality. Characters are developed through direct and indirect means. The author may communicate directly through third-person statements about a character or use indirect methods, such as by revealing a character's thoughts as well as his or her words, interactions, deeds, or appearance.

In Act I, Scene II, once the battle has ended, we read lines about Macbeth on the battlefield. This is our first glimpse into how we, the audience, will begin to characterize Macbeth. One way to track Macbeth's personality directly and indirectly throughout the play is through the "Role on the Wall" activity (RSC, 2010). For the purpose of visually documenting Macbeth's character, we will use Role on the Wall to make sense of his rise to power in Act I and fall from power by Act V. Classes get their first introduction to Macbeth through a description of him in Act I, Scene II (excerpted below). In this scene the Captain (Barnet, 1963) reports (using direct characterization) to King Duncan that Macbeth was a brave soldier.

> For brave Macbeth—well he deserves that name,
> Disdaining Fortune, with his brandished steel
> Which smoked with bloody execution,
> Like valour's minion carved out his passage
> Till he faced the slave,
> Till he unseamed him from then nave to the th'chops
> And fixed his head upon our battlements. (RSC, 2010, p. 24)

After students read these lines, I ask, "What single word would you use to describe Macbeth?" (RSC, 2010) They write their word on the post-it note and place it on
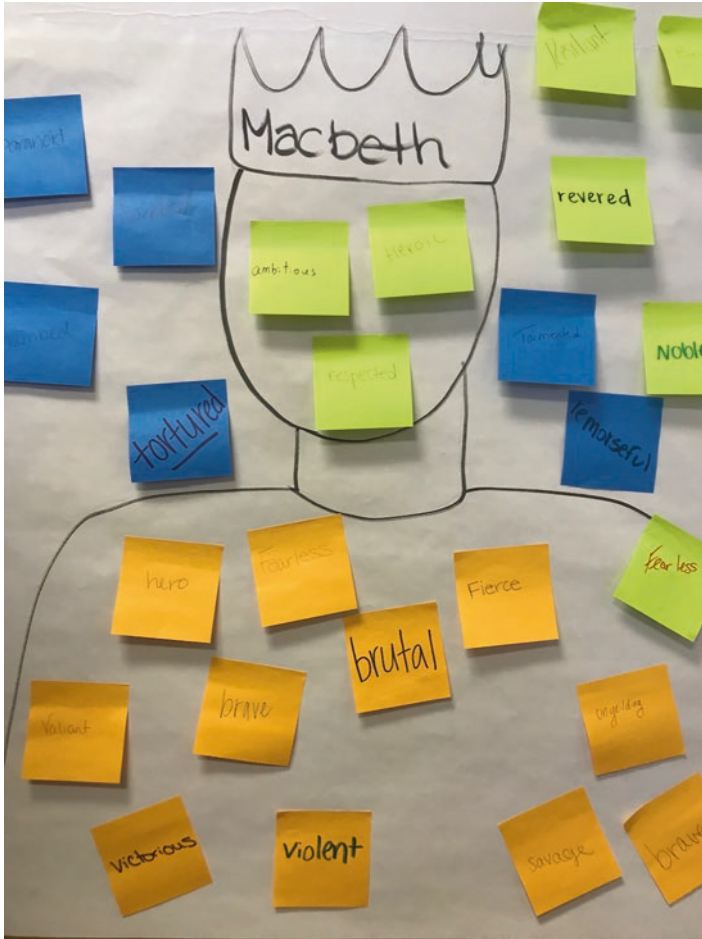
Fig. 19.4 Role on a Wall

the wall. At the end of the play, students will have a minimum of ten Role on the Wall descriptions of Macbeth at ten different points in the play. They can draw from all of the words written about Macbeth's character and synthesize this information to write a character analysis, argue a position paper on theme, tackle any other writing assignment for which Macbeth's character can be used as evidence. Figure 19.4 is photograph of this Role on the Wall activity for which Table 19.4 provides examples.

After the Role on the Wall activity, I transition students to the next scene, Act I, Scene III, in which the witches meet Macbeth on the heath at sunset. Students speculate about who the witches are and what they might represent based on textual clues in Act I, Scene III.

Table 19.4 Role on the Wall examples

Hero	Brave	Violent	Fearless	Victorious
Valiant	Ambitious	Fierce	Respected	Savage
Brutal	Unyielding	Revered	Tormented	Tormented

19.8.3 Macbeth Meets the Three Witches

As we turn to the pivotal scene of Macbeth's encounter with the Three Witches, I remind the class that he and Banquo have just left the battlefield and are on their way home. Students are prompted to describe what the two men might be feeling. Do they feel powerful, exhausted, physically injured, thankful to be alive, are or they in an emotionally heightened state? Then they draw upon the Word Carpet activity and the Slow-motion Improvisational Battle Scene to reflect on these questions: What is the nature of the relationship between Macbeth and Banquo? How long have they known each other? Did they meet in King Duncan's court? How do Macbeth and Banquo's states of mind affect the way they enter the next scene?

As they leave the battlefield and walk home, Macbeth and Banquo encounter the three witches, just as planned by the witches in Act I, Scene I.

> Act I, Scene III (excerpted from RSC, 2010, p. 30)
> **Section Two**
> Enter Macbeth and Banquo.
> MACBETH: So foul and fair a day I have not seen.
> BANQUO: What are these,
> That look not like the inhabitants o'the earth,
> And yet are on't?
> MACBETH: Speak if you can: What are you?
> **Section Three**
> FIRST WITCH: All hail, Macbeth: hail to thee, Thane of Glamis!
> SECOND WITCH: All hail, Macbeth: hail to theee, Thane of Cawdor!
> THIRD WITCH: All hail, Macbeth: that shalt be king hereafter!
> **Section Four**
> BANQUO: Speak then to me, wo neither beg not fear Your favours not your hate.
> FIRST WITCH: Lesser than Macbeth, and greater.
> SECOND WITCH: Not so happy, yet much happier
> THIRD WITCH: Thou shalt get kings, though thou be none.
> ALL: Banquo and Macbeth, all hail!
> **Section Five**
> *The Witches vanish.*
> MACBETH: Your children shall be kings.
> BANQUO: You shall be king.

In Act I, Scene III, the witches deliver three prophecies. I ask a series of questions based on what my students may have gathered from Act I, Scene I and III. I invite them to predict what these prophecies hold for Macbeth and Banquo, and ask who are the witches and what do they represent? Are they Macbeth's conscience? Can

they tell the future or do they warn of a possible catastrophic future? Are they are representation of the audiences desire for protection (Noone, 2010)? Does/will the nature of Macbeth and Banquo's relationship change because of the encounter with the witches? Is Banquo as mesmerized by the witches as Macbeth? Why or why not? Based on what Shakespeare has shown about the character Macbeth, how likely is it that Macbeth now has thoughts of becoming king? Considering the history of the play, how likely is it that Macbeth has already had thoughts of becoming king? Students can use the Internet to find information on the history of the play or consult articles and books that discuss the history of *Macbeth* (Barnet, 1963). Scholars commonly agree that Shakespeare knew much more about Macbeth than he choose to reveal to us in the play. In tune with this idea, it is assumed that Macbeth thought of murder before the meeting with the Three Witches (e.g., Firkins, 1910).

19.9   Digging Deep in Act I

In these high school English methods courses, my students often ask me about my life teaching literature, writing, oral language, and research. They want to know how I begin. New teachers, like the students themselves, may be vulnerable in studying literary works, particularly ones written in a vernacular different from present-day English. Just as a student on the first day of *Macbeth* may question how fully she or he can come to understand Elizabethan drama, a beginning teacher questions how well she can engage students and encourage them to "fall into" the world of the play. My recommendation to beginning teachers is to start by having their students actively and collaboratively participate in the process of digging deeply into the text (i.e., context and subtext) and its particular uses of language, setting, character, and conflict (Dewey, 1959; Greene, 1995; Hooks, 1994; Langer, 2011). I believe that if we engage students through physical action (drama), critical questioning, and reflective writing they can more readily imagine themselves as the characters in the play and more easily empathize with them—even the evil and violent ones.

Process-based drama pedagogy provides an immediate experience for students. They can be moved from simply talking about setting to arriving at a deeper understanding of what drives characters and their thoughts, actions, and relationships with other characters. By stepping into the play's action through physical activities, groups of students can experience the wonder of a play and its layers of meaning. Using first a reader response and interpretive community method, and then moving into a formalistic and critical analysis method is what I recommend, among other methods in the field (see Milner, Milner, & Mitchell, 2012). By focusing on Act I as a means of helping students "situate" themselves in the play, I provide them with a useful foundation for their work on the remaining four acts.

19.10 Responses to the English Methods Workshop

Many English methods students tell me that the Macbeth workshop (3 h) is one of the most significant learning experiences of the course. However, very few students wrote about it on the end of the year course evaluations. Of the 19 students who were in the course in the Fall of 2017, four of the 19 students wrote that the Macbeth workshop was their most significant learning experience on the end of the year course evaluations. For example, one of the four students wrote, "LOVED, LOVED, LOVED the Macbeth workshop."

Without asking for feedback a first-year teacher who was a student in my English methods course in 2016 provided useful feedback in an email in 2017 on this introductory lesson to teaching *Macbeth*: "I did the battlefield carpet walk, and it worked exceptionally well with my more artistic class that tends to take more risks. My quieter class did not enjoy it, but they made the connection now that we are tracking the motif of blood."

Returning to my English methods students who participated in the *Macbeth* workshop in the fall of 2017, I emailed 5 of the 19 students 5 months after the Macbeth workshop and asked them these questions: How did the beginning activity (the "sun shines on all those who … and the darkness falls on all those who") make you feel as a participant in an activity on superstition during Elizabethan times? How did the Word Carpet activity tap your imagination? Did it help you to use more vivid word choice as well as voice? Did the Role on the Wall activity provide insight into Macbeth's character in Act I? I also gave the option of not answering these questions and instead just provide a general response to the workshop. Of the six students who were questioned through email, five responded favorably to the workshop by providing general responses; one student emailed with a particularly telling example, quoted in full:

The Macbeth workshop successfully brings students into the scenes of the play. By placing them into the Elizabethan time period, thinking from the perspective of the Three Witches and by fighting for Scotland through the perspective of the soldiers, students are able to understand the complexity of Macbeth on a personal level. First, the "sun shines on all those who … and the darkness falls on all those who" activity might be the most interesting activity as a student. By using Elizabethan superstitions that are commonly heard today, students are able to feel excited about the phrases that are familiar to them, and recall their experience with the superstition itself. This creates a connection between the student and Macbeth, allowing him to have a deeper understanding of the historical context of play.

In addition, the Word Carpet activity serves to impart simultaneously vivid word choice while also placing students in the middle of a gruesome battlefield. By having students reflect on battlefield language they may have seen and heard elsewhere, they are able to recognize the atrocity and pain that comes from Macbeth's war scene. Also, by having students recite the language to each other, a virtual tour is created, bringing them into the scar-ridden scene. Together, this activity provides a safe and comfortable means to practice using sensory language in a new and maybe unfamiliar way.

Finally, the Role on the Wall activity creates a visual for students to analyze Macbeth, without realizing they are analyzing him. By pinpointing language that characterizes Macbeth in the first scene, and then comparing that with a description from the end of the play, stu-

dents are able to recognize the mental, physical, and emotional shift Macbeth takes. From a student's perspective, this activity effectively draws out the dynamic characteristics of Macbeth, painting a visual of Macbeth in Act I versus Macbeth in Act V. From a teacher's perspective, the Role on the Wall allows students to scaffold the art of analysis by questioning the "how" and "why" of Macbeth's change. Overall, this activity functions as new and improved compare-and-contrast activity of the dynamic aspects of Macbeth.

This English method student reported that her lasting appreciation for how process-based drama pedagogy taps into her experiences in three important ways. First, the student reported that she empathized with Macbeth. Second, she reported having learned to discern connections between herself and the world of the play—the setting and time of the action and the characters who inhabit the world. Finally, she recalled that the activities helped her use vivid language in her writing.

Given that students are developing as readers and writers, teachers should use strategies that tap the imagination and scaffold learning opportunities that move students from action to ideas and words and then to writing. I hope that by participating in process-based drama methods, students will advance in their writing skills and use their imaginations to inspire and energize them as writers. I believe that process-based drama pedagogy is not only an effective technique to use when teaching plays, but also a fitting approach for helping students develop as writers (Esposito, 2016; Moffett, 1981; Probst, 2004; Spolin, 1986; Wilhelm, 2008).

19.11   Making Sense of It All Through Multi-genre Writing

In this chapter, I have discussed how I teach English methods to students beginning study of *Macbeth* (Act I, Scenes I, II, and III). They will themselves teach middle and high school students. As shown, I am dedicated to teaching embodied methods of learning in a teacher education preparatory program. In many teacher education programs, students read neuroscience research and educational research on the importance of using kinesthetic, embodied way of learning and teaching. However, since our students more than likely were not taught to use process based drama pedagogy and embodied methodologies in their own high school English Language Arts experience as a method of learning, it is essential that English methods instructor today model and facilitate embodied, drama based learning.

I end my class with my three-step approach involving action, thought, and writing and how I ignite discussion based on the three activities. Drawing on the Role Work for a final literature-centered writing assignment, I gave students choices. For example, they could select a central theme around which to complete a multi-genre project (Romano, 2000) or submit a writing portfolio. Themes commonly associated with *Macbeth* include ambition, appearance versus reality, betrayal and deceit, corruption and power, fate and free will, kingship, natural and supernatural forces, good versus evil, and paranoia and fear. Without undermining the importance of the Three Witches in Act I, the sometimes overlooked battle scene in Act I actually galvanizes the actions detailed in the rest of the play. The battle scene establishes

Macbeth's identity as a war hero valiantly fighting for Scotland (Firkins, 1910). Taken together, the battle scene and the first encounter with the Three Witches propel his rise and fall. If the students cannot make connections among the first three scenes in Act I, they will likely have difficulty grasping the fuller significance of Macbeth's actions, choices, and relationships.

I strongly believe that the hook—those activities that a teacher uses to begin teaching the play—determines a student's sense of a play's impact and broader meaning as a literary work. Process-based drama pedagogy is a proven method for entering, exploring, and expanding the understanding of *Macbeth,* the play's relevance to our lives, and its connection to history.

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Chapter 20
Role of Creativity in Educational Systems and the Change Process

Check for updates

Daniel Fasko, Jr. and Mary G. Rizza

Abstract Creativity informs learning and instruction. In turn, creative thought positively influences systemic change in schools. Good teachers are also creative teachers. Creative teachers instill in their students both creative skills and dispositions, regardless of the educational environmental pressures. With the greater emphasis on accountability and testing in schools, creative thinking does not seem to have a role in current educational reform movements. However, there are educational initiatives that have positive effects on teaching and learning. One such example is the Partnership for 21st Century Skills that specifies skills students need to succeed. Moreover, educational systems are inherently stifling to creativity and thus the demand for creative thinkers can be expected to increase to meet the demands of innovation. Change in schools is often fueled by the need to improve student progress in specific areas, such as math and English/language arts. We contend that the ultimate goal of the change process should be to provide institutional support to develop a more creative workplace. The importance of change that encourages mutual support and a sense of community with a redistributed power structure is valued in this chapter. Implications for educational policy, practice, and research bring the discussion to an end.

20.1 Introduction

The purpose of this chapter is to demonstrate how there has been a shift in education away from creativity and creative thinking and that it is just such a perspective that most readily helps to inform change. Learning and instruction that promotes creativity can be in and of itself the goal for good pedagogy but it also helps to promote a more creative environment in schools which can then lead to both student and teacher productivity. It is out contention that teachers who are more creative will promote a more creative student body that is more successful on those measures

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used to drive change in schools. It will also be shown that the methods used for change in schools are not dissimilar to those emphasized in creative processes and that a resurgence in the interest of creativity in schools may help promote change in many more.

20.2   Creativity and the Creative Process

Creativity is typically defined in terms of theoretical perspectives, personality traits, and practical skills. One such definition that will help guide this chapter is Cropley's (1999) who proposes that *creativity* is "an aspect of thinking, as a personality constellation (i.e., pattern), and as an interaction between thinking, personal properties, and motivation" (p. 511). Understanding creativity from a multidimensional perspective, as Cropley posits, allows for the broadening of applications beyond artistic expression into the realm of the practical as promoted in schools. Applying creativity theory to the classroom is not a new idea. The literature is replete with programs and theories that combine thought with production. A creative product's importance is also a key component whose significance is viewed from within the social context. Creation of a product or service is central to the creative process in the educational environment. Mayesky (2003) supports the conception that creativity is witnessed in thinking, acting, and generating something that others view as original. Thus, creativity is a trait that can be expressed by those in a variety of fields of study and by persons young and old. Creativity can be seen both in the lessons created by teachers and in the responses of their students. When we look at the products of creative expression beyond traditional formats, that is, in the arts, then the concept of the creativity as a trait is, arguably, easier to understand. From our view, creativity is a way of thinking that influences how we process information and formulate answers in everyday tasks. Creativity is also witnessed in the methods and processes used to produce creative products. Creative people tend to think and act in ways that extend beyond the tangible into the realm of the unexpected and novel. The creative teacher is one who thinks differently about the act of learning and helps student look beyond the obvious.

While creativity can be cultivated by anyone, some see it as an advanced ability. A traditional view called the 4 Ps of creativity identifies qualities in person, process, product, and press (or environment) as factors of creativity. This idea suggests that creative thought requires aptitude, process skills, and an environment that values its expression. This perspective sees creativity as a disposition is often seen as an innate trait but can also be understood as an area that can be learned or enhanced. In fact, Simonton (1995) proposed that the 4P framework was incomplete, when discussing creativity research, subsequently proposing a fifth P, persuasion. According to Runco and Kim (2017), the central idea of this attribute "is that highly creative people or products change the way that others think" (p. 4). Infusing creativity in the classroom is a concept that has been relegated to special programs like those created for gifted students or in the arts, but we propose that it is a necessary component to

the teaching and learning process in all classrooms. Teachers who are creative can persuade students in ways that extend learning and influence growth beyond the immediate learning experience.

Traditionally, discussion of creativity in school has been in relation to advanced learners and encouraging talent development. Renzulli (1977, 2016) first discussed creativity as a trait to be developed along with other skills. The idea is that creative production should be considered for all tasks in the classroom as the coalescence of ability, experience, and novelty of thought. To be creative is to work in ways not usual for a field of study or expectation for the task. Creativity, as Renzulli contends, is a thinking skill that should be applied to all content areas and fields.

The degree to which one applies creative potential can be categorized, for example, in small ways like an inspiration (Mini "c") or as everyday activity (Little "c"). Creators who may change a discipline (Big "C") or professional creators (Pro "C") are thought to be working with creativity depending on magnitude of impact assumed (Beghetto & Kaufman, 2007). Looking at the creative product from this perspective allows for students to be considered creative. Potential is the key to looking at student creativity; creative teachers understand the influence of early experiences on the creative process and growth in creative thinking.

Some theories focus beyond the process/product view and look at creativity in terms of the factors that support creative thinking. Sternberg and Lubart (1995) propose an investment theory of creativity. As such, people make a decision about how to express their creativity by weighing the risks and benefits of such an investment. In this view, the expression of creativity is highly dependent upon motivation and environmental supports. In educational terms, the investment comes from the environment that encourages a creative attitude and provides outlets for creativity that the individual values. Key is the development of skills, in addition to knowledge, thinking styles, and personality attributes. In sum, regardless of the creativity theory to which one subscribes, the key to fostering creativity in the classroom are creative activities. These stretch beyond specific task training and encourage student creativity from a metacognitive perspective that influences input of new information, organization of existing knowledge, and expression of ideas.

20.3   Fostering Creativity in the Classroom

As discussed previously, creativity training is not a new concept in education. Our simple Google search of the term *creative curriculum* in 2018 resulted in over 139 million results. We know it exists, but to what extent is creativity encouraged in the curriculum that is taught in schools every day? The answer to this question is somewhat rhetorical, depending on the school and teacher. Creativity, like any other skill taught in school, can be infused into every activity by adding specific tasks that promote inductive and deductive thinking. For example, brainstorming is a common practice that has its roots in creativity training. Each time teachers ask students an open-ended question or one that requires a decision, they are encouraging creativity.

Some tasks like creative problem solving and what else (that mirrors SCAMPER) have become part of adult training programs, but in actuality these have their origins in creativity curriculum for use with students.

An example of such a program is Creative Problem Solving [CPS] (see Isaksen, Dorval, & Treffinger, 2000). Another example is SCAMPER, which stands for Substitute, Combine, Adapt, Modify, magnify, or minify, Put to other uses, Eliminate, and Reverse or rearrange (see Eberle, 1996; Glenn, 1997). Traditional views of creativity training center on specific skill acquisition, thinking skills, and problem solving. Children may be naturally creative, but, as in any field of study, progression to expertise requires practice and learning. This is true for teachers as well. That being said, Csikszentmihalyi (1996) states that "[i]t is easier to enhance creativity by changing conditions in the environment than trying to make people think more creatively" (p. 1). Thus, it would behoove all stakeholders to provide equitable resources in order to enhance the creative learning environments for our K-12 schools. In this way, teachers will be better equipped to facilitate the creative abilities of our students.

20.4 Teaching and Learning

Understanding the role of creativity in learning requires a review of teacher education. Successful teaching requires a blending of knowledge and skills in both content and pedagogy. It is our contention that good teachers are also creative teachers. Creative teachers instill in their students creative skills and dispositions and they are able to do so regardless of educational environmental pressures. Unfortunately, creative thinking does not seem to have a role in current educational reform movements. In some cases, accountability and creativity seem at odds philosophically; as such, teachers must use all of their skills and develop new ones to create a harmonious match between accountability and creativity.

20.4.1 Teaching as Art and Science

Teaching has long been considered both an art and a science (Woolfolk, 2016). The science of teaching seems to get the most press these days with the emphasis on raising test scores on state mandated test, and progress monitoring. Teaching as art is much more subtle in its influence, requiring individuals to be in touch with their intuitive side and personal creativity (Piirto, 2011; Slavin, 2015; Woolfolk, 2016).

Scientific thought and empirical evidence drive what techniques are used in the classroom, but it is the teacher who chooses which techniques will work with their teaching style. Even when the curriculum is dictated by districts, there is still choice for teachers over how information gets delivered (e.g., cooperative learning, guided discovery). Regardless of how strict an evaluation system is for teachers, we believe

that they can still find ways to express personal creativity. Defining creativity in the teaching profession is similar to curriculum. Teachers who are creative will design lessons and activities that promote these skills and dispositions. Just like students, teachers can learn to be more creative in their teaching style, but this takes practice and motivation. As Sternberg and Lubart (1995) contend, the teacher has to invest the time in learning the new skill or incorporating the untested technique in order to see return on creative investment, which, in most cases, is student achievement and growth. This notion of creativity training for teachers was suggested about 20 years earlier by Mohan (1973).

Mohan (1973) surveyed 180 graduate students and seniors in teacher education programs to see if there was a need for a creativity course in pre- and in-service teacher preparation. He reported that (a) 94% of the students expressed a need for such a course, (b) 93% thought the course would be useful, (c) 83% believed teachers who received creativity training would be more effective, (d) 90% said they would want to take this course, and (e) 68% stated that they would take the course (as cited in Fasko, 2000–2001). In a similar study, Maloney (1992) found that through phenomenological interviewing six teachers from pre-school through secondary schools participating in college coursework that included creativity training had higher self-esteem and a feeling of empowerment for themselves and their fellow teachers to effect change in the classroom and school community. (See Seidman (2006) for further details of phenomenological interviewing.) These teachers in the 1992 study stated further that it is important for administrators to provide resources for professional development on creativity for themselves so they could better facilitate creativity in their students. (We searched for more current studies, but this did not turn out to be particularly fruitful or illuminating. That is, we found some interesting research in countries other than the US, which is our focus; however, most of these studies are not relevant to pre- or in-service teachers. If the research did include pre- and/or in-service teachers, it was conducted in K-12 schools, which is in contrast to the Mohan (1973) and Maloney (1992) studies that were conducted at the university level.)

20.5   Student Education Goals

Dynamics that affect creativity and creative thinking in the schools have a basis in current and past educational reform movements, some of which promote and some detract from the discussion. For example, Sawyer (2004) noted that since the reform movements of the 1990s school districts have employed "scripted curricula" where teachers become "script readers" (p. 12). Unfortunately, this type of curricula and approach to it hinders teachers' creativity in the classroom. While Sawyer reported that scripted curricula improves test scores, as he himself pointed out these tests tend to assess lower-order skills that just require the regurgitating of facts. At issue here, writes Sawyer, is "centralized efforts to make practice uniform and decentralized initiatives to engage teachers in local participatory solutions" (p. 18). He does

contend, though, that school districts will need to provide for professional development for both teachers and administrators in order for them to become "creative designers." When teachers contribute to curriculum development, they become creative curricula designers, as Brown and Edelson (2001) pointed out 3 years earlier.

Initiatives that propose to standardize the curriculum, such as the Common Core State Standards (CCSS), or that seek to tie funding to standardized achievement, such as No Child Left Behind, seem at odds with teaching as an art. Such standards end up as guidelines for administrators, teachers, and parents to ensure that students are prepared for future success and that there is agreement on what how that success is defined.

Trying to accomplish a national curriculum has proven problematic, which has not gone unnoticed by critics. The focus of the CCSS (National School Boards Association Center for Public Education, 2013) is on standardized teaching and learning to ensure the creation of a workforce that is uniformly prepared to succeed. Unfortunately, implementing these Standards requires some sort of formalized assessment with stakes attached. In addition to being poor indicators of learning, standardized testing has come under fire for promoting an inferior approach to teaching. Accusations of teaching to the test and dumbing down of curriculum to meet the least common denominator abound (Baer & Garrett, 2010). However, these researchers point out that teaching both content and creative thinking are important. Unfortunately, the ramifications of such accusations of dumbing down the curriculum to support accountability testing are magnified when one considers the impact on state funding in the United States posed by this high-stakes testing environment. Some educational researchers have gone as far as to describe harmful influences of private testing corporations on autonomy over creative teaching and learning in schools not only with the overemphasis on test scores but also the external control over curriculum and the public education narrative (e.g., Mullen, 2017).

Educational initiatives that do not pose such deleterious effects on teaching and learning are worth describing. According to the Partnership for 21st Century Skills (P21; 2011), skills students need to succeed in their careers, school, and life go beyond core academic subjects, technology skills, and life skills. We are referring to learning and innovation skills. The role of creativity as it relates to innovation is clearly identified within the P21 skills. Learning to think critically and creatively, working creatively with others, and implementing innovation are among the co-cognitive skills described. This clear direction toward the advancement of creative skills is not lost in the global community. Additionally, the National Center on Education and the Economy (NCEE, 2007) has suggested changes to curricula nationwide:

> [people] will have to be comfortable with ideas and … be creative and innovative … and have the flexibility to adapt quickly to frequent changes in the labor market as the shifts in the economy become ever faster and more dramatic. (Executive Summary, p. 8)

Thus, creativity and creative thinking are essential for society's welfare but, unfortunately, curriculum reform has not moved forward, thus preventing American education from keeping up with global change (Fairweather & Cramond, 2010).

The Every Student Succeeds Act (ESSA, 2015) also affects creativity in K-12 schools in the United States. The focus of this U.S. legislation is on promoting a "high-quality, well-rounded education for every student while ensuring critical protections and equity of opportunity for all students." ESSA was developed to ensure that "all students, including children with disabilities, English learners, and other historically underserved groups, graduate high school ready for college or a career." (ESSA may also influence stakeholders to attend to equity of resources available to school districts (Cook-Harvey, Darling-Hammond, Lam, Mercer, & Roc, 2016). That is, as Cook-Harvey et al. state,

> State plans must describe how the state will ensure that all children receive high-quality education and close achievement gaps, provide additional educational assistance to individual students who need help, identify and implement strategies to strengthen academic programs, and improve school conditions for learning. (p. 14)

As can be seen by this statement, the focus of this influential legislation was on equity of resources and little attention was paid in it to the promotion of creativity. In our experience teaching in-service teachers, most of them can attest, no student succeeds in an atmosphere devoid of creative thought.

In a survey of educators of students in K through post-secondary education and their parents in the United States, United Kingdom, Germany, and Australia, it was reported that educational systems hinder creativity despite the need for creative thinkers to drive innovation in a global society (Berland, 2013). Among the results of this study, both parents and educators from the U.S. (the country we focus on) reported that creativity is an important skill that should be developed in students. More specifically, for the item "Fostering Creativity in Education Today will Fuel the Economies of the Future," 90% of parents and 87% of educators agreed this is important, which means what to you, exactly? Parents and educators also indicated that the three greatest barriers to teaching creativity were "[a]n education system that is too reliant on testing and assessment," "a lack of resources," and "educators restricted from straying outside the curriculum" (p. 7). This finding is appalling to us because creativity greatly influences our lives, as seen from accomplishments in the arts and sciences and creative thinking skills, such as divergent thinking, that are necessary for our technology-based global economies (Scott, Leritz, & Mumford, 2004).

So, a question that arises is, what can be done to stimulate creativity in the American education systems? The three most important steps to enhance creativity in the schools, as reported by educator Berland (2013) is to "provide tools and training that enable [them] to teach creativity," to "make creativity something that is integrated to the curriculum," and to "reduce mandates that hinder creativity" (p. 14). In addition, Davies, Jindal-Snape, Collier, Digby, Hay, and Howe (2013) suggest that partnering with local community groups could strengthen creativity in our public schools. We contend that including creativity within educational reform movements that impact school districts will also help to foster change that is meaningful for teachers and students.

20.6   The Change Process

Systematic change involves a set of key considerations in order for successful implementation of school improvement. Change in schools is often fueled by the need to improve in specific areas. As we have discussed, often the goal of change is to improve test scores or to prove proficiencies with regard to state curriculum standards. We contend that the ultimate goal of the change process should be to provide institutional support to develop a more creative workplace.

Therefore, looking at change from a systematic perspective that includes leadership at all levels is the first step to establishing a more creative workplace and workforce of educators who embody a more creative perspective. The final goal then is to foster an atmosphere that encourages creativity within the environment will enhance proposed initiatives from an organic perspective that can enhance the lives of staff and students alike.

Coppieters (2005) contends that school change must transcend traditional views that rely on deterministic and simplistic goals. Schools are complex organizations that are accountable to multiple stakeholders who define success in different ways. Further, schools are organizational learning systems with complex relationships that are nonlinear, containing many feedback loops. Using this view of school organizations, the link to creative problem-solving methods makes sense for change initiatives when one considers that the ultimate vision can be to alter the process from seeking one solution to many, varied, and unusual outcomes.

20.7   Seeking Clarity on Change

We begin this section with the premise that change in schools must take into account not just the outcomes being sought (i.e., increase in achievement, test scores, or other quantitative measures), but must focus on daily experiences in the classroom. While we recognize the argument that initiatives which link funding to standardized testing are having a negative effect on schools and instruction, we seek to move the discussion forward to find ways to return the focus to creating environments that foster learning for learning sake (Hagopian, 2014; Ravitch, 2010; Sternberg, 2012). By recognizing the creative prerequisites inherent in the change process, (i.e. looking at variables from multiple perspectives), we purport that a cultural shift will occur that supports good teaching and positive achievement growth for students. No longer can educators be complacent about the fact that standardized testing does not measure what is important about learning. Performance on high-stakes tests do little to advance our position in a global economy and may actually be holding back students in areas like technology and scientific innovation. As Hursh (2008) puts it, the classroom should once again be a place where we can assess what we know without the fear of punishment and misrepresentation of schools as places of failure.

Defining school improvement is a somewhat difficult task, as most practitioners and experts in the field prefer to use their own unique set of parameters. Adelman and Taylor (2007) call for a change in the mentality that looks at change as a cultural shift rather than project based. Further, Adelman and Taylor link logic models to the change process and identify five key components that are purported to change the culture of school through change. Through a series of questions, school improvement must include (1) creation of a clear vision or rationale, (2) identification of resources that must be deployed or re-deployed, (3) examination of the general functions, tasks, and phases of implementation plans, (4) identification of the infrastructure and strategies to implement the plan, and (5) evaluation of outcomes to determine formative and summative indicators.

A closer look at the components in this list reveals an important connection to creativity theory. Such a strategy, as Adelman and Taylor outline, is very similar to the process used in CPS whereby there is understanding of the challenge, followed by generating ideas, which carries over to preparing for action. Each task involves a deeper investigation of the challenge that examines data, frames problems, develops solutions, and builds acceptance for action. No matter what the goal, either problem solving or identifying goals for change, whenever we bring together groups of professionals we should seek to engage them in purposeful activity that results in action. Acknowledging the connection to creative thinking can help to enhance the generation of ideas and overall development of solutions.

Likewise, Murphy (2013) sets forth seven points called "building material for school improvement" (p. 258). These are quality instruction, curriculum, personalized learning environments for students, professional learning environments for teachers, learning centered leadership, learning centered linkages to the school community, and monitoring of progress and performance accountability. Undergirding this theory of improvement is something called academic press and supportive culture. Like all change models, the final goal is large-scale implementation of an intervention that is carefully defined, planned and supported by all. Such models emphasize the importance of change that encourages mutual support and a sense of community with a redistributed power structure. A focus on creative thinking can also enhance the process of change by acknowledging that everyone has a role to play in the change process. The emphasis must be on creative skills and dispositions, not on roles and job titles. Additionally, by acknowledging that teachers and staff are also learners in the process, the focus can return to the idea that teacher growth entails more than sporadic professional development and training. Teachers are recognized and encouraged to be life-long learners and may view change as an ongoing process to be valued.

Wrigley (2013) calls for a change in focus from a school effectiveness perspective to school improvement that looks more holistically at school culture as the agent of change. He further purports that, regardless of the terminology used, such as effectiveness or improvement, schools exist within a political structure that values outcomes in the form of test scores and standards based assessment. It is this top-down perspective that holds schools back from effecting change that matters, particularly when poverty is a factor in underachievement. Because Wrigley takes a

social justice perspective that calls for an overhaul of school reform, points made are valid when looking at any school change. The examination of culture and how it influences teaching and learning is an essential aspect of any change initiative, but Wrigley reminds us that culture is more than consensus building among stakeholders. Culture involves tacit messages that are conveyed and assumptions that influence our activities. Changing experiences in the classroom so they more authentically connect students and teachers should be the goal of education.

Such change processes are also often viewed as a logical process of review and evaluation. Within the literature on change intervention, there is a high emphasis on creating consensus among stakeholders (Murphy, 2013). Adelman and Taylor (2007) call consensus building creating readiness for systematic change, contending that successful change begins with bringing together stakeholders and enhancing the culture of change. Green and Cypress (2009) describe a plan for change that begins with an exploration of school culture by looking at shared beliefs, values, and expectations of faculty and administration prior to identifying areas in need of remediation. While the final decision was about student achievement, the introspective process led to a different set of interventions than would have resulted from a top-down process. The focus on the individual's role in school culture ensued in a view of achievement that addressed specific needs of the students, not the curricular expectations of the school. Eventually, all change must be generalized and institutionalized, however, it is our contention that this does not have to be the first step in the process. Rather, by altering the process to a more holistic view of how to approach the change process, we will both change ourselves and the process by which schools change. In support of this notion of the holistic view of education, Society (1995) states that "Education for creativity refers to the entire person and the whole of personal development" (p. 156).

Rosenberg (2012) looked at change from the perspective of instruction brought together coaches and teachers to implement a literacy program to turn around an underperforming school in Oakland California. While the project saw only small gains the first year, assessment data were used formatively and the project received continued support from the state of California. In an extensive review of school initiatives, Smylie and Perry (2005) make the case that school change is ineffective in promoting improvement in instructional outcomes without attention to teacher factors (e.g., motivation, knowledge, skills).

Using the concept of professional capital, Hargreaves and Fullan (2012) argue convincingly for teacher preparation as the single most influential factor for change. They advocate for teachers to become active participants in their own careers as professionals who are in control of their own destinies and who are ultimately the driving force for instructional excellence. The shift from change to growth is an important one for professionalism. School leaders should be less imposing of their power and more supportive of teacher autonomy. Rather than view professional development as an accountability issue, it should be embraced as a support for professional advancement. All too often, professional development becomes more focused on basic skills that supports entry level stakeholders will little differentia-

tion for advanced users. Allowing teachers to choose their pathways for professional development that are individualized according to their strengths and interests and makes a stronger case for accountability to learning. Interestingly, Kisa and Correnti (2015) found that professional development in school reform efforts generally results in uneven change either because teachers lack the requisite knowledge of the initiative or there is low acceptance for the initiative. When teachers are removed from the decision-making process involving their own development, little buy-in can be expected. When teachers are provided proper support and guidance in areas they deem important, they should be successful.

The key for some schools is to look at change from an instructional perspective rather than organizational restructuring. Professional development opportunities are often used as a method for introducing change initiatives to teachers. Using resources more creatively, particularly those provided to teachers has been proven effective in effecting change (Antonovich, Jones, & Hoffman, 2012; Rosenberg, 2012). Therefore, we contend that using professional development which fosters creativity as a skill for teachers first, then as a skill to be taught students will have a better impact on change because it helps to create a culture that values the very skill that defines change—creativity.

When we invite teachers to be more creative in their personal styles, we may see a change in how they organize their classrooms and provide instruction to students. As we have discussed before, it is the art of teaching that must be considered. In interviews of eight creative teachers ranging from elementary to secondary school, who were either finalists or winners of the National Teacher of the Year award from 2000 to 2010, Henrikson and Mishra (2013) found that they identified personal traits, such as being open-minded, as being the most influential variable in their teaching practices. In addition, they had a sense of their own creative spirit and understood how that helped to inform their practices and recognition for their creativity. Henrikson and Mishra also suggest that administrators provide time and space for teachers to collaborate and share ideas from their classrooms. It would be essential, then, for administrators to allow teachers to experiment with these new ideas in the classroom.

Berland (2013) found that educational systems in the United States are inherently stifling to creativity and that the demand for creative thinkers coming out of educational systems will increase in the future to meet the demands of innovation. The goals of creative problem solving are not different from those required for educational reform in that both require inductive and deductive processes for developing solutions and coming to consensus. Traditional views of systematic change concentrate efforts on problem solving that are summative in nature but what is needed is the encouragement of a culture of reflection fueled by a creativity perspective. Problem solving and consensus building often begin with a problem statement that must somehow be fixed. Such a deductive model is useful in finding sources for the problem and thus addressing gaps.

We contend that looking at change from an inductive perspective may help organizations address change from a more organic and thus productive point of view. If the ultimate goal is to define creativity in terms of measurable outcomes, then we

contend that those outcomes include the skills that truly matter in today's society, such as problem solving. Educators must resist the complacency instilled by yet another call for change or the degradation of being defined by our failures and stand up for what is right for students. Educators in universities must give teachers the opportunity to become masters of their craft shaking off the cobwebs of a scripted curriculum and exploring being facilitators of creative learning.

20.8 Conclusion

So, one might ask how creativity affects students, teachers, administrators, and change in school. In general, the focus on educating children and training teachers is on fostering creativity, but it is often not recognized as a beneficial skill for administrators who are trying to effect systematic change. Although widely accepted as a key component of innovation and of twenty-first century skills, creativity continues to be underserved as a technique in the curriculum. School reform efforts instead look to what is wrong with schools and how to increase test scores in an effort to "fix" those that are failing. Although teachers and parents express concern, administrators buckle under the pressure from legislatures who think they have solved the education crisis from their offices on the hill.

We contend that there are benefits for teachers and districts to focusing on creativity in school. In fact, as early as 2009 Kaufman (2016) reported that students showed decline in the development of their creativity when schools did not value creativity in their curricula. Further, creativity is often ignored in the process of change because of the inaccurate focus on test scores and standardized achievement measures. The real benefit is on infusing creative thinking within every aspect of the school day; as such, creativity should be a natural expectation for all students and teachers. If we allow teachers to get back to the craft of teaching and create opportunities for students that foster critical thinking and concepts like fluency, flexibility, elaboration, and originality we may just see an increase in student achievement. Students would be actually using the information they learn in novel and productive ways.

20.8.1 Implications for Policy

There needs to be a unified system whereby the focus on creativity within the curriculum is mirrored in the policy statements that influence change at the district level. If creative thinking is to be enhanced, then all stakeholders need to promote it (e.g., school districts providing ongoing professional development for teachers and administrators). Systemic change involves social, political, and cultural commitment (Adelman & Taylor, 2017). In fact, Nehring, Charner-Laird, and Szczesiul (2017) state that

At all points of entry into the system—from the legislature to the Department of Education [in any state], from professional development to schools of education, from the classroom to the district office, we need to reimagine excellence and ask ourselves what a system looks like when it fosters excellence redefined in all schools. (p. 42)

Although the review of the literature by Davies et al. (2013) was conducted in Scotland, several of their findings are relevant to the United States. For example, they recommend the following:

1. To provide resources to facilitate the establishment of partnerships with the arts and other community groups.
2. To make available support for teachers' professional development on creativity.
3. To support teachers' use of environments beyond the school walls. (p. 89)

20.8.2   Implications for Practice

As indicated throughout, we believe that teachers in K-12 schools can enhance the creativity of students. However, schools need adequate funding and resources for teacher training and curriculum reform. For example, Piirto (2011) developed 13 techniques to enhance creativity in students; however, many of these such as providing musical instruments or field trips to museums and so forth require investing resources that some, if not many, public school districts cannot afford because of funding cuts from their respective states. An important recommendation from the Davies et al. (2013) review also relates to practice, that is, developing and valuing classroom creative environments, which should be relaxed and free from fear (Torrance, 1962). In all likelihood, such conditions would increase students' creative activities and behaviors.

20.8.3   Implications for Research

More research is needed to support the connection of creativity with change policies. The dearth of support from the literature points to a need for further studies in this area. In addition, Davies et al. (2013) recommend research in creative environments, as such:

1. Consider the influence of creative learning environments on students' academic achievement, motivation, and socio-emotional skills.
2. Conduct cross-sectional and longitudinal studies to identify the influence of creative environments in schools.
3. Investigate effects of organizational ethos and supports for teachers who employ creative activities in the classroom.
4. Identify some of the best of including creativity in cross-cultural contexts (pp. 89–90).

Harrington (1999) notes that the value one's social system places on creativity influences the allocation of resources. Following from this, it would be fruitful to study what influences social and cultural systems have that already have in place value for creative endeavors. In relation to Harrington's suggestion, Runco and Kim (2013) state it is important to understand how society's values influence creative behavior. Additionally, another direction for research is in the realm of personality and attributes, in particular the concept of persuasion, which is noted by Simonton (1995). In this regard, Runco and Kim state that "highly creative people or products change the way that others think" (p. 4).

20.9 Call to Action

More than 50 years ago, Guilford (1967) stated, "creativity is the key to education in its fullest sense and to the solution of mankind's most serious problems" (p. 13). By extension, then, school systems need to provide the resources to effect change in our students' creativity. Moreover, Csikszentmihalyi (1996) felt that creativity is central to having a meaningful life. Thus, it is imperative that all stakeholders make systemic efforts to provide environments that support creativity for the benefit of our students because they are the future innovators of our society. For example, creativity could be fostered through community and business partnerships (Piirto, 2011). In sum, if we want to prepare our future generations to succeed in the twenty-first century, all stakeholders must collaborate to provide the resources and environment to accomplish this endeavor.

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Chapter 21
Political Examples of a Dark Side of Creativity and the Impact on Education

Mark A. Runco

Abstract This chapter explores the impact of politics on creativity. It begins by distinguishing creative potential from creative achievement. Creative potential is the ideal target for the educational system. The problem is that, although there are reliable indicators and predictors of creative potential, there is always uncertainty with a prediction. Political decisions often concern how to invest resources, and predictions may be seen as risky investments. Education for creative potential requires tolerance (e.g., risk tolerance, tolerance of ambiguity) and a long-term perspective. In addition, creative potential may take some time to mature to the point that it leads to creative action, but political decisions are often focused on short-run outcomes. Yet it is the investment in potential that will eventually lead to the greatest impact on the largest number of students, and then on society. Also explored in this chapter is the important role of tolerance, which is related to creativity in various ways but is anathema in the current political climate of the USA. Under discussion is how conservative thinking is typically contrary to creativity and how creativity benefits from various kinds of openness. "Spin" and the reliance on alternative facts, so common in politics, are symptomatic of the dark side of creativity. Educational implications are noted throughout.

21.1 Introduction

Creativity—one of the most important topics in the social and behavioral sciences—has many benefits for individuals, organizations, and society as a whole. And because it is directly related to progress, adaptation, advance, and innovation, it is becoming more and more important. That is because the world is becoming more and more complex (e.g., the information explosion and the amazingly rapid changes in technology), and creativity supports the adaptations and adjustments that are

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necessary to keep up and remain healthy. Creativity certainly should be supported by educational systems, teachers, and the curriculum.

Given its broad importance, it can be no surprise that there are numerous attempts to understand creativity and to maximize it. Understanding and the fulfillment of potentials both require a grasp of underlying mechanisms, for otherwise there is weak description rather than an explanation that allows efficient optimization. This is one reason science is critical. Science provides methods to ensure that explanations are valid and reliable. Educators have a moral obligation to draw from scientific views of creativity, for otherwise they are using untested and potentially harmful methods.

Fortunately, great strides have been made in the past 40 years towards a useful and accurate explanation of creativity. Indeed, the literature is replete with studies of culture, family background, personal influences (e.g., cognition, affect, attitude, personality, motivation). And, in the past 10 years, genetics and the neurosciences have been brought into explanations of the origins and processes underlying creativity. One area that has received relatively little attention in the creativity research is politics. This is a bit of a surprise, and a disappointment, given how much influence politics exerts on what is viewed as creative and on which resources are invested in creativity. The view that "educators have a moral obligation" really also applies at least as well to politicians. In fact, their obligation is greater, given that their decisions determine which options are available to educators. Sadly, recent political moves have contributed greatly to the current state of affairs, which can only be described as education under duress. The present chapter explores the various ways that politics influences education and, in turn, creativity.

21.2   Creative Potential as Educational Objective

Most analyses indicate that contemporary education is not supporting creativity, or at least is not doing it anywhere near as well as it should. This view may depend on the concept of *creative potential*. This is the appropriate target for efforts to support creativity. Yet potential is not studied nearly as much as manifest creativity. Creativity may be manifested in actual products, for example, and there are quite a few investigations of products (e.g., Amabile, 1982; Besemer & O'Quin, 1999; Runco, 1989). These may be relatively mundane products such as collages, sketches, or poems, but creativity research has also examined products that represent high level achievements, such as patents or inventions (Huber, 1998; Runco, Acar, Campbell, Jaeger, McCain, & Gentile 2016), publications or citations (Garfield, 2006; Rushton, Murray, & Paunonen, 1983), and influential works of art (Lindauer, 1992). The product approach to creativity is quite attractive because it allows objectivity: you can count products. In that light the preference for products in the creativity research parallels the trend towards objective standardized measures in education. They may not focus on the most important skills for students, but they do allow unambiguous assessments.

There are fewer studies of creative potential precisely because it is difficult to study potential in an objective fashion. Potential is by definition not manifest; it must be inferred from that which is expressed and manifest. That creates problems because, although there are reliable indicators and predictors of creative potential, there is always uncertainty with a prediction. It is, after all, an estimation of an unknown future. This is relevant to the current discussion because political decisions often concern how to invest resources, and predictions may be seen as risky investments. They require tolerance (e.g., risk tolerance, tolerance of ambiguity) and usually a long-term perspective. Creative potential may take some time to mature to the point that it leads to creative action, but political decisions are often focused on short-run outcomes. Yet it is the investment in potential that will eventually lead to more "bang for the buck." Helson (1987), Lau et al. (2013), and Runco (2016) have each attempted to study creative potential in an objective fashion. Most of the following discussion focuses on creative potential rather than productivity precisely because that is where we can have the greatest impact on the greatest number of students.

21.3   How Well Are Schools Doing?

Education is under duress, and as a result are not what they should and could be. Schools may be under performing in various ways, but some evidence points specifically to creativity. In fact, schools are often criticized for ignoring or even inhibiting students' creativity. Early work by Holland (1961) and Wallach and Wing (1969) implied that students express more creativity when outside of school, compared to when they are in school. That implies that they have creative potential that is not supported or allowed expression when at school. This "creativity gap" has also been demonstrated in two recent studies. In one, Runco et al. (2016) were interested in how creative potentials were distributed around the United States. This may sound like an odd research question, but in actuality number of studies have suggested that certain aspects of creativity are localized. If the reasons for this are identified, they could be used broadly to encourage the fulfillment of creative potentials.

Florida (2004) offered evidence about such localization, suggesting that certain cities in the United States have the tolerance, technology, and talent to attract and support a "creative class" of people. Importantly, this creative class represents careers—engineers, researchers, designers, architects, and other productive professions—where creativity, or at least the production of ideas and new concepts, is common. Florida's analyses confirm that some cities have particular high ratios of these professions. Runco et al. (2016) were concerned with these findings because they depended on profession as indicator of creativity, so they used indicators of creative potential instead. They found a somewhat different distribution across the United States, compared to Florida's (2004) reports. Runco et al. (2016) also replicated previous findings indicating that students report more creativity when they

were outside of school, compared to when they were in school. This is consistent with the idea that students have creative potentials, and in some situations (e.g., when outside of school) they are able to express their creativity, but in other situations (e.g., inside of school) they are not able to express their creativity.

A second investigation confirmed that students tend to express more of their creative potential when they are outside of school, rather than in school (Runco, Acar, & Caiyirdig, 2017). This investigation also determined that there were differences among disciplines, with some areas, such as art and music, having larger discrepancies between curricular and extracurricular creativity than others, including technology. This may be explained by the fact that domains differ in terms of how much factual knowledge is required, given that schools do a good job of conveying factual information. Another explanation, at least for technological creativity, was that schools can well support students with the necessary apparatus and hardware. Runco et al. (2017) also found that the difference between curricular and extracurricular creativity was moderated by certain things, including students' perceptions of how well the school supported creativity. This line of research, which goes back to Holland (1961), suggests that students have unused potential. Ideally, education would be supporting that potential, and political decisions would allow educators to do so. Next, I go into detail about why the educational system is failing to do just that.

21.4   Tolerance Key for Creativity

One problem can be understood by going deeper into the role of tolerance. Recall here that tolerance is one of the "three Ts" used in explanations of geographic distributions of the creative class. Tolerance is a key concept for the present discussion because it is unambiguously tied to politics, education, and creativity. Tolerance is a part of the creative process in that creativity depends on originality (Runco & Jaeger, 2012), and originality is risky (Rubenson & Runco, 1992). This risk can be explained by considering a hypothetical classroom, with two dozen or so students, and one teacher. The teacher may ask a question, and hopefully some questions posed are open-ended rather than answered by memory and facts alone. Open-ended questions are probably best if an educator wants to provide students with opportunities to practice creative thinking.

If and when the teacher poses an open ended question, students may each think of different answers and responses. Some of these might be highly original. If they are original, they are uncommon and unconventional. That is how originality is operationalized, as something that is novel or at least rare. There is more to creativity than originality (Runco & Jaeger, 2012), but originality is a prerequisite. When a student's idea is uncommon, there is a risk in sharing it. He or she will not be able to foresee what the other students will think about that idea. If it was a conventional idea, it would be easy to foresee what they would think (e.g., "oh yeah, that makes sense"). But original ideas do not allow a student, nor anyone, to predict what the

reaction will be, precisely because these ideas are uncommon and original. In this sense, sharing original ideas requires some *risk tolerance*.

Other evidence for the claim that the creative process requires tolerance in an intrapersonal sense has been given by creators who have reported that some of their own original ideas are frightening (Rothenberg, 1990). This may reflect the fact that original ideas are sometimes on or even outside the boundary of normalcy. Original ideas may be less socialized and less censored than most of our thoughts, and the creative person may wonder, "where did that come from?" "Am I normal?" "How on earth did I think of that?"

Tolerance plays several important roles in the creative process, and thus it should be encouraged by educators. In fact, educators must both encourage it in students but also practice it themselves. This maybe be difficult. For one thing, there is quite a bit of standardization in contemporary education, which means that things are structured and there is not much room to explore unplanned topics. While an educator may hear an original possibility, shared by a student, one very often must move on with the lesson plan without fully appreciating the original idea.

Importantly, the teacher who hears an original idea but has no time to explore it can either dismiss it, and thus convey the idea that originality is not appreciated, or can acknowledge the value of the original idea, compliment the student, and then move on. The latter is preferable for it will reward the originality that is a part of all creativity, rather than punish or extinguish it. This is why *modeling* is included in recommendations to teachers if they wish to support creativity (Runco, 2014).

Tolerance is also clearly associated with politics. As a matter of fact, the situation just described in the classroom involves the sharing of a new idea, and, broadly speaking, new ideas are also influenced by political orientations. Simply put, the conservative orientation (and conservative political "party") is largely against new ideas. You might say they are intolerant of them. That may sound like a generalization, but actually this is precisely how dictionaries define "conservatism," as the preference for the status quo and a dislike for change. In that light, conservative values are contrary to the new ideas and originality that are vital for creativity.

There is evidence for this definition of conservatism. In one relevant investigation, McCann (2011) used data from the 2000 to 2004 U.S. Presidential elections. He categorized each of the 50 states based on their voting Republican or Democrat. Then he examined the relationship of this categorization with the number of Patents granted to each state. Statistical analyses indicated that the Republican states were granted significantly fewer patents than Democratic states. Runco et al. (2017) reported similar findings, with Republicans again being granted fewer Patents than Democrats, and they used the 2016 Presidential election data.

Very importantly, at least from a statistical point of view, was that Runco et al. (2017) categorized U.S. counties—instead of states—as Republican or Democratic. Thus, they had over 3000 data points (counties) instead of a mere 50 (states). This implies that the 2017 analyses were more statistically powerful, or robust and trustworthy. Certainly some caution must be exercised because, no doubt, some patents were granted to Republicans living in "Blue" states. This sort of thing happens when large aggregate data sets are used in research. There may a trend and central

tendency, but there is also dispersion and variation, so the findings may usually but not always apply. In addition, patents are really surrogates for creativity, and patents no doubt require more than creativity (e.g., knowledge of the patent process). Then again, patents represent a real world indicator of creativity, rather than a mere test score. No wonder quite a few studies use patents to study creativity and invention (Huber, 1998; Simonton, 2012).

Therefore, it is reasonable to consider rigidly conservative thinking, as well as intolerance, to be threats to creativity. To the degree that they are a reflection of any prevalent political orientation, education for creativity will be difficult, to say the least. You might say that conservative thinking and intolerance contribute directly to the current situation where education is under duress.

21.5   Openness and Diversity for Creativity

Tolerance is only one of the core characteristics of creativity (Runco, 2014) that is also related to education and politics. Openness is actually the most commonly supported personality correlate of creativity (e.g., Feist & Barron, 2003), and it too is influenced by politics in various ways. Consider again the current political climate in the USA where immigration is being attacked. Many policymakers (especially in the Conservative party) are displaying what is essentially the opposite of openness—even though America is made up of immigrants and, until recently, was proud of it. This is exemplified by the plaque on the base of the Statue of Liberty which reads, "Give me your tired, your poor, your huddled masses yearning to breathe free, the wretched refuse of your teeming shore … send these, the homeless, tempest-tossed to me, I lift my lamp beside the golden door."

Openness of this kind is easy to relate to the tolerance just mentioned. It is also easy to relate to originality in the sense that an individual (or organization) must be open to change to appreciate it. Individuals and organizations must be open to alternatives as well. Evidence for this can be found in the research on the attitudes that influence divergent thinking (e.g., Basadur, 1994; Basadur, Runco, & Vega, 2000). Indeed, the attitude that seems to best support creative thinking is "openness to divergence." Openness probably also contributes to creativity in that it ensures that the individual does not rely on assumptions, habit, and routine but is instead willing to question what has worked in the past in order to move forward with something new.

Much of what is being explored here is predicated on the idea that political values somehow trickle down to inter- and intrapersonal processes that are a part of the creative process. The descriptor "trickle down" may be a poor choice of words, given that this sort of thing is resoundingly ineffective economically, but for some reason supported by the current White House. Yet trickle down does describe how the values that are tied to certain political decisions and policies do in fact influence a wide range of micro-decisions, including those made by administrators and by educators. This kind of trickle-down, from macro-level political and economic

decisions to classroom decision making, can be explained in terms of the values underlying both political policy and (all of those) micro-decisions.

Recall here the hypothetical teacher, previously mentioned, who may appreciate a student's original thinking. That teacher will appreciate original thinking only if he or she values creativity. Values lead to a very large number of decisions, both macro (political and economic) and micro (on the level of classrooms and individuals). In some sense, this is the broadest problem contributing to an educational system that does not adequately support creativity. Conservative values—which prefer the status quo rather than change and which are intolerant of new ideas—are influencing political policies that in turn determine the degree to which educators can support students' creative potentials.

21.6   The Science of Creativity

Given that values play such an important role—and in fact explain how politics influence education and creativity—it is no surprise that there are other concerns, in addition to what has been noted about tolerance and openness. One very general influence of politics on education, and thereby the fulfillment of creative potential, involves respect (and disrespect) for science. There has been a science of creativity for at least 60 years. This work is scientific, and thus objective. It involves peer review (quality control) and is often tested for its reliability and validity. Many results are replicated, and if they do not hold up, they are rejected. Results of scientific research differ from opinions and speculations. Indeed, science has specific controls to ensure that opinions are kept at bay, as much as possible. The problem is that current political policies do not respect scientific findings. As a matter of fact recent trends in the USA have allowed opinion to influence education, much to the detriment of our students. Science has been attacked by the White House, for example, and a number of politicians have "denied science" or equated its findings with opinion. Many conservative politicians have perpetuated their own fake news, claiming that it is as valuable as scientific research.

Sometimes political and educational decisions simply ignore the available scientific data. For example, data exist about what schools should do to support education. A four-volume compilation of research on education for creativity was recently released (Runco, 2017b), just to name one extensive example. But the science of creativity, like all science, is currently under attack. These attacks are surprising, given how useful, if not essential, it is to have correct information when making decisions. And still, science is under attack. The U.S. Environmental Protection Agency is actively denying climate change, among other things, and the Department of Education is making changes that are contrary to what good science dictates (Hefling, 2017). Much of the science denial seems to be associated with profit. There is, as an example, a movement to allow private schools to receive tax dollars, which translates to huge profits for these schools and those who own them. It is not clear how this particular change would impact creative potentials, but the point here

is that the current political situation is not using reliable information for making decisions about the educational system.

A related problem involves "spin" and the distortion of the truth. Spin has been a *modus operandus* of U.S. politics for quite some time, but it has reached new heights. Consider the "alternative facts" so often used by the current Trump White House to compete with actual science. Alternative facts are statements expressed as proven truths but are in actuality entirely untrue or at least not supported by objective data. The problem with spin and alternative facts is that they both hide reliable information and, worse yet, perpetuate untruths as if they were facts. It can be very difficult to determine what is the truth, hidden or distorted by the spin, unless one invests time into checking sources or an expert. An objective expert, that is.

Consider next a report from Pfattheicher and Schindler (2016) that investigated "the associations between holding favorable views of potential Democratic or Republican candidates for the US presidency 2016 and seeing profoundness in bullshit statements." The term *bullshit* was defined as "communicative expression that lacks content, logic, or truth from the perspective of natural science." There is actually a Bullshit Receptivity scale (BSR) that reliably assesses the profoundness of bullshit claims. The BSR presents verbal claims that are syntactically correct but are in fact vacuous. This research used the BSR and collected favorability ratings of Hillary Clinton, Martin O'Malley, and Bernie Sanders and favorability ratings of Ted Cruz, Marco Rubio, and Donald Trump. The respondents also received a self-report measure of political conservatism/liberalism. Analyses showed that the favorable ratings of Cruz, Rubio, and Trump (all Republican candidates for President in 2016) were positively correlated with the belief that bullshit statements were profound. The implication is that many conservative voters fail to see bullshit for what it is, vacuous, and instead view it as profound. Much the same probably applies to "spin."

It is quite possible that publicists and policymakers who are the best at spin are highly creative. Creativity may help politicians compose spin and develop alternative facts in the same way that lying can be creative (Walczyk, Runco, Tripp, & Smith, 2006). Indeed, spin and alternative facts can be original and effective, at least from the politician's point of view, where effectiveness is determined by swaying the voters. In addition, the connection to creative lying in turn implies that creative political spin may be a facet of *the dark side of creativity*. This area of the creativity research is receiving more and more attention, and for good reason.

The term, *the dark side*, was coined by McLaren (1993) in a special issue of the *Creativity Research Journal*, devoted to creativity in the moral domain (guest edited by Howard Gruber and Doris Wallace). That publication contained over a dozen articles exploring how morality and creativity were related to one another. Several articles (e.g., Haste, 1993) considered implications for education. More recent investigations of the dark side have used the term *malevolent creativity*, contrasting it with benevolent creativity. Interestingly, some illustrations in this area have been involved in politics, including Gandhi and Schindler (the German who helped so many Jews escape from the Nazis).

A fairly recent proposal about morals and creativity with implications for education was presented by Sternberg (2017). He developed an educational model labeled *Active Concerned Citizenship and Ethical Leadership*, the goal of which is to identify educational targets and methods that are badly needed to battle alternative facts, spin, lying, and the other political problems of the contemporary political landscape. Sternberg holds a view much like that outlined in the present chapter, with strong concerns about the current administration in the White House, with deep misgivings over the harm being done to education, creativity, innovation (also see Runco, 2017a).

21.7   Crises and Conclusions

I have explored various ways that politics influence education and creativity. A number of examples given herein are based on the current state of affairs in the United States, but there is some indication that the same political issues plague many countries. There is a fierce Left versus Right conflict in the USA, and apparently the same is true elsewhere as well. Sadly, many of the problems raised may characterize more than one nation.

A premise of this chapter is that politics have an impact on education and creativity via decisions about resources. Note how many times I mentioned resources. Resources may be monetary, as is the case when an administration allocates money to (i.e., invests in) particular practices (e.g., standardized assessments), but resources may also be quite personal and involve teachers themselves. Time, attention, and even energy are resources, and these may be allocated to tolerance and openness, and thus the support of creative potential—or not.

A recent article in the *Los Angeles Times* implies something quite relevant about energy and tolerance. Abacarian (2018) wrote,

> The right to free expression is meaningful only if we are willing to protect the most disgusting and offensive statements. … Even if you love the American flag, for example, you must understand that someone who does not cannot be arrested or prosecuted for burning it. (para. 1)

The point is that we may appreciate freedom, but it may *not* be the easiest way to go through life. Effort may be necessary to accept the fact that others use freedom in ways that differ from our own.

An interesting parallel can be seen in the classroom, for much of the same logic applies to a teacher who wants to encourage creative thinking by students. An educator may value creativity and create opportunities to practice creative thinking, but students may very well use those opportunities to offer ideas that the teacher does not like or ideas with which he or she disagrees. Authentic freedom allows people to go in all kinds of diverse, divergent directions. Creativity allows it as well! Educators may need to invest some effort into tolerating ideas that are unexpected or even appear to be undesirable if freedom and creativity are to be supported. It

may not be easy, but in the long run it will be worth it. Creative potentials are likely to be fulfilled to the benefit of students and society as a whole.

Another premise of this chapter is that educators should target latent creative *potential* in the classroom. Most educators will no doubt accept this premise, but there is an important difference between the view I am presenting and another perspective from *Creativity Under Duress in Education: Resistive Theories, Practices, and Actions*. In particular, there is discussion of a creativity crisis (Kim & Chae's Chap. 12; this volume; see also Kim, 2011; Runco, 2011). Kim (2011) defined *creativity crisis* in terms of decreased scores on a test of divergent thinking. My earlier article proposed that these findings were, although disconcerting, insufficient to warrant a "crisis." I did admit there was a crisis; the crisis I described reflects pressures to conform that are prevalent on the Internet. These are troubling because creativity is essentially the opposite of conformity, yet social media puts huge emphasis on "what is trending," "likes," and other instances of groupthink and conformity. These may very well undermine the individuality and originality that are vital to creative thinking, and apparently they are being manipulated via hacking and Internet propaganda.

Such problems with the Internet deserve to be treated as a crisis because of the magnitude: the Internet is everywhere, so even a small amount of pressure towards conformity is a huge problem—a crisis. That being said I must acknowledge the amazing efforts being displayed by many young adults in the USA to combat the outdated gun laws. Perhaps my concerns about conformity on social media are unwarranted, or perhaps these particular youth are tech-savvy enough to stay online and resist pressures to conform, in effect asserting their independent thinking. Certainly they are to be appreciated for their efforts to support an authentic democracy and the freedom of speech.

There is another crisis resulting from political pressures, creating the situation where education is under duress. The crisis is, in this light, political and extrinsic. It is a highly unfortunate "press" on creative potentials. Unlike that other chapter I just cited (i.e., Kim & Chae, Chap. 12 in this volume; also Kim, 2011), I do not see a crisis when we look at creative potential, but I do see one when we look at the lack of support for creative potential. Recall here that various studies have compared curricular and extracurricular creative activity (Holland, 1961; Runco, 2017a; Runco et al., 2016) and confirmed that students still have creative potential. They express it, outside of school—they are just unable to express it in school. Why? In part because of the current political climate which does not recognize sound objective data showing the value of tolerance, openness, diversity, and divergence. This must change. Creative potentials will only be fulfilled once we elect public servants who model and make decisions that invest resources in creativity and thus the tolerance, openness, diversity, and divergence that allow creativity to be expressed.

Politics may influence education and creativity in direct and specific ways, as is the case when certain policies determine which resources are given to educators and

how these must be allocated. Politics may also influence education and creativity in a general fashion, as is suggested by my discussion about values. Each political perspective and party holds particular values. Of course there is variation within parties. Not all Republicans are equally conservative, and not all Democrats equally liberal. Furthermore, the situation is not dichotomous. There is, for example, an Independent party in the USA, and many people who register as Republican or Democrat do not hold all of the values of any one party. Hence some of the discussion about conservatives and liberals, and about the Left and the Right, relies on generalizations and ignores the gradations and intermediate views. Still, even when dichotomies are used, as was the case in the research showing that patents were negatively related to Conservative voting, there are disturbing tendencies.

I use that adjective "disturbing" when describing the current state of affairs in U.S. politics because this is not just an apples and oranges problem. Not all political views are not equally good and equally bad. At present, one orientation favoring tolerance supports innovation, and one does not. One side appreciates facts and science, and the other seems to be afraid of facts and science. In fact, one side seems to be biased, which sounds like a value judgment, but it is consistent with the fact that many conservatives are against immigration and diversity, when data show these to be good things for the economy and for the overall potential for creativity and thus innovation. From this perspective, "bias" implies that individuals or institutions (including political parties) are *not* open to objective data and reliable information. Their biases keep them from tolerating compelling alternatives.

With all of the reasons to be concerned about the political situation in the United States, it is clear that this nation's educational system is under duress. The current political milieu is ignoring quite a bit of scientific research on creativity and largely failing to support it. The recommendation is probably obvious: Without a doubt we need to apply what we know from the science of creativity to solve the political (and subsequent educational) problems that currently plague much of the world. It is, in the end, our job to lift our lamps "beside the golden door."

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Chapter 22
Coda

Carol A. Mullen

Abstract Many creativity researchers and arts scholars in education from around the world have joined forces to offer an intriguing, provocative, research-based creative endeavor. Creativity stems from curiosity and involves problem solving, brainstorming, collaborating, and analyzing to achieve innovation. We have described theories, practices, and strategies related to such creative acts and processes, extending to programs, applications, and recommendations.

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Many creativity researchers and arts scholars in education from around the world have joined forces to offer an intriguing, provocative, research-based creative endeavor. Creativity stems from curiosity and involves problem solving, brainstorming, collaborating, and analyzing to achieve innovation. We have described theories, practices, and strategies related to such creative acts and processes, extending to programs, applications, and recommendations.

We have also articulated pedagogies for taking creativity and the arts to the next level in global education. Specifically, we address crisis and resistance dynamics that affect 21st-century learning environments and creative processes. Our classroom-centric lens extends to schools, universities, organizations, and the public domain. Regarding the creative reflective process and expression of creativity, some of us have been explicit about issues of social justice, communal empowerment, and political action in propelling creative agency. Creativity is *not* an apolitical experience, so we convey a political sense of urgency about dynamics that affect creativity and its welcoming potential for realizing human agency. Because the creative process engages power and politics, even if tacitly, we have ventured counterscripts for empowering creative experiences within educational places. We are part of this liberation; in fact, some of us create political artwork and curriculum, generate political prose, and belong to social movements.

To orient our chapter writing, we all puzzled over a twofold question that served to organize the dialogue—is creativity under duress in education, and what are some resistive theories, practices, and actions? Examining our responses, you'll discover quite the range. Some of us direct attention to the severe limitations being placed on creativity within micro contexts by macro values and pressures (e.g., to compete internationally and domestically with high test scores). Other contributors argue that our paradigms of creative research and artful inquiry are narrow, so we need to reinvent for the sustainability of our disciplines. Still others ponder turning organizations into creative ecologies of collaboration and multi- and transdisciplinarity committed to human survival, growth, and transcendence.

Keeping in mind such profound and wide-ranging dynamics, the contributors reach beyond creative processes, strategies, and programs to address today's deep educational dilemmas. In fact, the dilemmas that all too commonly emerge from institutional constraints, high-stakes testing, attitudinal resistance, and more are part of the tempo of creative work and engagement. For this reason, we have brought to the fore limitations and possibilities, threats and solutions, entangled in creative research and practice. As such, our writing is at times unsettling.

22.1 Creativity Frameworks: Part I

Theory-building around creativity frameworks of theory and action in education is a theme. In this book section, Mullen creatively synthesizes highly influential models of creativity, whereas Beghetto attests that creativity can and does thrive in conditions of constraint and uncertainty. Doyle discusses creativity frameworks,

models, and meanings with respect to their evolution. Glăveanu's research team offers a sociocultural approach to creativity, learning, and technology.

Two chapters look to the future: McDermott pursues neoliberalism in an age where exploitation calls for greater social agency and creative practice. To Harris and de Bruin, educational gaps signal the need for more interdisciplinary whole-school creative ecologies.

22.2   Research Investigations: Part II

Research investigations into creativity and education are also important to this volume. Baer expresses concerns with domain generality in creativity research and what this tendency toward abstraction neglects at the level of practice. Gabora and Unrau offer constructive dialogue about creative engagement and mindfulness in creativity research. Baruak and Paulus illustrate collaborative creativity and optimal performances involving novel ideas within the professions.

The Five-Point Star model is Burnett and Smith's pathway for integrating creativity into curriculum. Snowber approaches creativity artistically as a source of embodied knowing and the body as a guiding principle for releasing the creative. Advancing a research-based model of creativity uniting climates, attitudes, and thinking, Kim and Chae support creative pedagogies and students' creativity development. Eason's research team describes an empirically tested collaborative–dialogic model of insight for use in practice.

22.3   Real-Life Applications: Part III

Tested applications of creativity theory in real-world practice characterize a third contribution to this book. Ahmadi and coauthors tackle the problem that creativity has yet to be well implemented in classrooms even though creativity is a 21st-century competency expected of graduates. Cropley and Patston explain that in order for creativity to become a systematic part of education, creativity models need to be differentiated and dynamic. Horton's team features an urban program for K–12 educators who learn to innovate through experiential curriculum.

Teacher education programs, Narey contends, are not producing change agents with demonstrable creative capacities, so she offers a social justice framework and tools for working with teacher candidates and advancing educational quality. Kauper and Jacobs make a case for slow curriculum and introduce creative pedagogic approaches (e.g., creative subversion). Drawing upon teacher candidates' responses, Cancienne narrates how drama-based pedagogy can propel collaborative and creative activity in the classroom.

Finally, while Fasko and Rizza advocate for systemic efforts to develop learning environments that support student creativity, despite accountability burdens, while Runco examines the dark side of creativity. He deconstructs macro/micro political contexts that affect students' creative learning in classrooms, and directs readers' attention to the future. "Forcing" attention on unsettling issues that are associated more dramatically with creativity raises the question, in my mind at least, what more can we all do to alleviate undue stresses on the creative process in schools and support creative education in its robust forms?

22.4   Invoking Questioning

Having read our chapters, questions probably spring to mind. Which ideas about creativity in education have value for you and your life? How might these spark inquiries of your own? Which concepts, practices, and applications of creativity and the arts do you think add to the existing literature in education or even propose new areas of inquiry? What would you add or even change about our studies of creativity and the arts?

You've encountered a number of models, programs, and strategies for benefitting creative thought and practice, strengthened by investigations and, in some cases, applications. Which might you implement, and why and how? Considering the larger contexts of sociocultural, political, and environmental dynamics that impact creative education, which chapters best guide your decision-making or problem-solving? Why might that be? What global trends involving creativity and the arts are influencing where you study, work, or create? What predictions might you have for creativity within your domain and field? And what might you contribute to the dynamism of creativity or the arts in helping to make education more alive, human life more meaningful, and the world more socially just?

I now ask, what's in a question mark? *Creativity Under Duress in Education?* is about resisting crisis through creative education. *Duress* is articulated with a question mark. My call for chapter proposals (circulated in 2017) invited prospective authors to think and write on their own terms. Possibly, the chapters would have turned out less exploratory, engaging, personal, and nuanced if the book's title had been phrased as a declarative, punctuated with a period. For the lens of resistance, my aim was to invoke questioning vis-à-vis theories, practices, and actions. Opening up channels for resistance, debate, and interrogation, as well as beliefs, values, and stances, was the hoped-for effect of the subtitle's phrasing. As suggested with this subtitle, resistance was expected to go beyond ideology to advance theories, practices, and actions.

I sought chapters that would treat creativity under duress in education as a subject of inquiry, even debate. At the heart of punctuating the main title with a question mark was my thinking, why predispose authors and readers, worldwide, to an unequivocal position on creativity? For one thing, education on the global front is complex and shifting. Much remains unknown from one country to the next, and even our own localities. As Beghetto (2017) observes,

> Educational settings provide a particularly promising, yet challenging context for exploring creative phenomena. Creativity, viewed from an educational perspective, represents a mercurial construct. It is difficult to pin down, constantly changing, and highly unpredictable. (p. 350)

In addition, the notion of *crisis* is itself debatable. From where does it originate, and what are its sources? As we know, the public believes that education is a societal tragedy—a perennial sore spot upon many nations. Associating public education with a crisis has justified the reform schemes of multi-conglomerates and their sponsors to "fix" school systems. Before you know it, these fix-its have infiltrated classrooms with expensive prepackaged curriculum, materials, and assessments over which teachers have very little say (Mullen, 2016). From this angle, critics Berliner and Glass (2014) expose (as their book title signals) "50 myths and lies that threaten America's public schools":

> The mythical failure of public education has been … perpetuated in large part by political and economic interests that stand to gain from the destruction of the traditional system. There is an intentional misrepresentation of facts through a rapidly expanding variety of organizations and media that reach deep into the psyche of the nation's citizenry. (p. 4).

This widespread myth is taken up in our chapters: "Schools are wasting their time trying to teach problem solving, creativity, and general thinking skills; they would be better off teaching the facts students need to succeed in school and … life" (Berliner & Glass, 2014, p. 238). A myth we debunk is that creativity and creative problem-solving cannot be taught. Going beyond argumentation to investigation and demonstration of creative models and processes, we show creativity in action through authentic inquiry, engagement, and collaboration. Culturally relevant pedagogy and team-based synergy are examples of creative fuel we describe.

As contributors, we also question ways of seeing that miseducate about ideas and processes of creativity. A longstanding, ongoing debate in education involves fundamentally misguided theoretical assumptions that influence creativity research, teaching, curriculum, and programs. Of note, some of the authors identify these myths and misconceptions and deconstruct them, such as the belief that one must "think outside the box" in order to be creative. In reality, learning environments are chock-full of constraints that creators absorb in the creative process.

22.5   Naming Challenges to Creativity

As the world changes, it is vital to account for forces of authority, control, and restraint that influence the development and implementation of creativity. These inform the very articulation of creativity, as well as its development, implementation, and assessment. Testing regimes and market economies are among those entities sponsoring creativity and innovation in multiple forms within public education (Mullen, 2016). From the East to the West, moneymaking testing regimes yield profits for business and industry. Global economies subject the public education

sector to the transactions of a market and its economic controls and competitive values. A trend forecasted for creativity research is "business innovation and entrepreneurship," Sawyer (2017) notes, predicting "creativity studies will increasingly focus on business innovation" (p. 354).

Much of the struggle for schools these days resides in the pressures of workforce demands and high-stakes testing. Just as students are expected to attain high ratings on competitive standardized tests, so are teachers expected to ensure this outcome. With control of curriculum to varying degrees coming from states/provinces as well, less attention is being given to creativity and innovation, let alone assessments of these higher-order thinking skills.

Alternative assessments, typically diagnostic and formative, take teachers' time. Multiple measures of students' work performed in authentic circumstances include multi-staged projects, product development, and skills demonstration. Valuing problems that students find meaningful promotes their creative and critical thinking. Contemporary creative classrooms—at all grade levels and across institutional types—are collaborative and dialogic, building upon the real, imaginary, simulated, or theoretical.

A related challenge is that we are seeing less and less of inquiry-based learning in classrooms (Berliner & Glass, 2014). Yet, children are creative, problem-solving beings who conduct imaginative play and naturally express curiosity about the world (e.g., Craft, Cremin, Burnard, Dragovic, & Chappell, 2012). Hallmarks of creative collaborative classrooms are, we share, students' risk-taking and learning from mistakes in highly supportive environments. In these, learning tends to be initiatsed as structured inquiry moving to controlled inquiry, guided inquiry, and finally free inquiry. Teachers provide the scaffolds for agency over learning through which their students gain the necessary knowledge and skills; responsibility is gradually released to learners as they feel more confident and capable (Zemelman, Daniels, & Hyde, 2012).

Another challenge centers on mistaken beliefs about creativity and the arts—part of the mythical narrative of public education. "Calling out" this cultural problem, we have metaphorically swept away cobwebs, making room for fresh outlooks. Cobweb clearing, a metaphor for being on the path of conscious awareness, is a commitment we share.

22.6   Parting Words

Such intriguing ideas and dynamics were explored within these pages. Our theories revolve around contextual findings and outcomes, as well as proven methods of research and practice. Readers will make their own connections and derive value for their creative and artistic pursuits.

Finally, an entrenched challenge to creativity and the arts is our own institutional silos, disciplines, and traditions, as well as mindsets. As someone living in the middle of the creativity and arts communities to which I belong as a contributor, I was

keen to produce an academic interface to enrich perspectives and insights. A new movement in support of a pedagogy of solidarity and possibility can evolve from this initial effort should the talented creativity and arts-based communities intentionally collaborate, mentor and sponsor one another, and in other ways pursue their shared interests. Such purposeful interactivity could enable a renewal of the paradigms and benefit the (re)crossings of new generations of scholars and practitioners.

While the arts-based and creativity paradigms do have distinguishing histories and features, observe the resonances as you read. Note the shared value of originality and richness in educational research, curriculum, and pedagogy, as well as investment in creativity theory, investigation, and application that naturally convey overlap. This volume's synthesis of distinct paradigms creates something new, an unprecedented intersection of possibilities for educational study of creativity and art. My desire is for this legacy-building to not only enhance the robustness, inclusivity, and sustainability of our disciplines but also to benefit the world.

On a parting note, we are united in a common cause—to present a bridge between draconian contexts of assessment and explosive creativity in diverse places. Apostles of art and creativity, the authors are all champions of hope, inspiration, and freedom. A key contribution of this volume is our validation and promotion of creativity and art for anyone seeking innovative ways to profoundly improve learning and transform education. In tackling the seemingly irreconcilable issues of creativity and accountability in K–12 institutions, higher education, and policy circles, we offer a message that is both cautionary and inspiring.

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