



Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

de Bruin, LR

Title:

Apprenticing for Creativity in the Improvisation Lesson: A Qualitative Enquiry

Date:

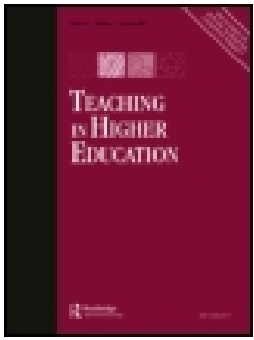
2018-01-01

Citation:

de Bruin, L. R. (2018). Apprenticing for Creativity in the Improvisation Lesson: A Qualitative Enquiry. TEACHING IN HIGHER EDUCATION, 23 (1), pp.84-103. <https://doi.org/10.1080/13562517.2017.1359157>.

Persistent Link:

<https://hdl.handle.net/11343/311654>



Apprenticing for creativity in the improvisation lesson: a qualitative enquiry

Leon R. de Bruin

To cite this article: Leon R. de Bruin (2017): Apprenticing for creativity in the improvisation lesson: a qualitative enquiry, Teaching in Higher Education, DOI: [10.1080/13562517.2017.1359157](https://doi.org/10.1080/13562517.2017.1359157)

To link to this article: <http://dx.doi.org/10.1080/13562517.2017.1359157>



Published online: 03 Aug 2017.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)



Apprenticing for creativity in the improvisation lesson: a qualitative enquiry

Leon R. de Bruin^{a,b}

^aFaculty of Education, Monash University, Melbourne, VIC, Australia; ^bAmcaro Way, Clayton, VIC, Australia

ABSTRACT

Effective teacher-student learning relationships can propel students to advanced ways of knowing and acting. In much arts based higher education learning, dynamic and fluid interplay of cognitive, meta-cognitive and aspirational aims and goals are prevalent and passed to students in a learning relationship that can be described as a cognitive apprenticeship. Interpretative phenomenological analysis is used to explore four conservatoire teachers and their musical improvisation students. Investigating in the lesson experiences reveal pedagogical applications of modeling, scaffolding, coaching, reflection and developing mastery and expertise in students. A cognitive apprenticeship model can provide a framework for teachers to understand how to develop increased student control, ownership of learning, and contextually situated instructional strategies that brings cognitive and creative thinking, action and reflection to the forefront of learning and teaching. The study reveals how educators can develop trajectories of learning and problem-solving concepts that draw students into a culture of expert practice.

ARTICLE HISTORY

Received 21 September 2016
Accepted 22 June 2017

KEYWORDS

Cognitive apprenticeship;
improvisation; creativity;
learning trajectories;
phenomenology

Introduction

The learning relationship between teacher and student is a distinctive and effective approach to inculcating skills and knowledge needed for improvisation. The one-to-one-lesson has been described as an 'indispensable, intense and intricate' learning environment that facilitates the exchange of ideas, concepts and information (Gaunt 2008, 230) and brings student and teacher together in an enculturative environment that nurtures creative mindsets, dispositions and procedures. The instrumental lesson is a site of negotiated and dynamic behaviors and interactions, where learning is intrinsically social and communicative (Rogoff 1995). Socio-cultural theory posits that learning and development is enacted through the interactions between teachers and learners, and that these interactions reflect the cultural and social practices of the communities in which educational institutions exist (Daniels 2001; Lave and Wenger 1991; Mercer 2000). In learning to improvise, sensory-motor, audiative, strategic and imaginative processes are developed (de Bruin 2015; Pressing 1988) and made malleable with knowledge of stylistic constraints and affordances and idiosyncratic dispositions within musical

CONTACT Leon R. de Bruin  Leon.debruin@monash.edu

 Supplemental data for this article can be accessed here <https://doi.org/10.1080/13562517.2017.1359157>.

© 2017 Informa UK Limited, trading as Taylor & Francis Group

communities that develop an individual's personal creativities and voice (Berliner 1994; Berkowitz 2009; Burnard 2012; Kenny 2014).

Higher education environments situate learning where innovation and creativity is encouraged (Laurillard 2002) and students are actively engaged in higher-order thinking and knowledge creation, rather than passive reception of given knowledge (Klein et al. 2007; Niu and Sternberg 2003). Understandings about an expert level musician's abilities in solving problems, accomplishing tasks (Chaffin and Lemieux 2004; Ericsson 2014), and adapting cognitive processes for maturing learners' demands (Geeves et al. 2014) has prompted researchers to distinguish amongst the concepts and procedures associated with inculcating expertise and various types of strategic knowledge. Notwithstanding the brilliance of individual improvisers throughout history, the assertion that 'artistic innovations are not made by isolated geniuses, but are usually based on the lessons of teachers and the collaboration of colleagues' focuses inquiry on the skills and techniques utilized by teachers in creative music-making (Galenson 2006, 66).

The ways in which learning and creativity emerge from joint effort has piqued scholarly investigation into teaching partnerships, apprenticeship-like methods and teacher-student collaborations (Farrell 2003; Sawyer 2008). Investigating classroom interactions contributes importantly to our understanding and harnessing of the processes by which teachers and students construct knowledge (Alexander 2008; Hennessy, Mercer, and Warwick 2011; Mercer and Howe 2012; Rojas-Drummond et al. 2010). Research posits ongoing detailed instructional approaches within constructivist, problem-based, experiential, and inquiry-based learning processes that offer effective and positive teaching practices and instructional methods (Kirschner, Sweller, and Clark 2006; Rojas-Drummond et al. 2003).

The teaching and learning of jazz and improvisation is a complex and practice-centred activity (Baker 1989; Kratus 1995; Prouty 2008), where a positive interpersonal learning relationship can allow the educator to provide a holistic educational experience (Den Brok, Brekelmans, and Wubbels 2004). Educators that foster a dynamic and creative environment for intellectual exploration can 'provide emotional support ... such as developing, encouraging, and maturing their protégés' self-esteem and self-motivation' (Erdem and Aytemur 2008, 56) and shape student strategies, practices and 'structures that constitute a human cognitive architecture' (Kirschner, Sweller, and Clark 2006, 76). In addition to acquiring skills and attributes that establish skill and cognition student performers also absorb learning cultures from their experiences that define self-image and professional identity. Such activities require the exercising of ability, consistency, trustworthiness, reliability, fairness as well as expertise (Erdem and Aytemur 2008; Wadee et al. 2010). The teacher carefully and strategically utilizes varied learning techniques and activities that facilitate students themselves becoming experts (Ezzat and Maly 2012). The teaching of improvisation involves a dynamic and fluid interplay of pedagogical applications that model, scaffold, coach, articulate, encourage reflective processes, exploration, and ultimately fade expert guidance as the student demonstrates their expertise. The way teachers utilize such pedagogical tools and techniques, as well as interpersonal negotiation and interplay can reflect an engaging, exploratory and creatively driven improvisatory process.

This study explores the co-operative nature of teacher-student interaction and the role of collaboration in developing learning processes, investigating the teaching techniques improviser-educators utilize in developing mastery, expertise and creativity in advancing students of improvisation. Effective teaching or mentorship can foster a holistic learning

relationship that can ‘increase self-confidence, self-esteem, and independent thinking’ in students (Harrison and Hong 2004, 502). Analyzing learning and teaching behaviors of four improvisation educators and their students, the study focuses on the role ongoing learning relationships can have in inculcating knowledge and skills in university level jazz and improvisation students. Notable voices in higher education research such as Renshaw (2013), Sawyer (2004) and Grainger, Barnes, and Scoffham (2004) urge that research should focus on observing the way teachers support learners on different tasks, within varying social formats in different cultural contexts. The ways educators craft, strategise and enculturate students through dynamic learning trajectories is a significant aspect of maximizing developmental progress in learners. Ongoing interpersonal learning of this kind can impart educator/ professional understandings beyond theoretical groundings of knowledge, and nurture dispositions to creativity and personal inquiry into creative practices – aspects of learning becoming a universal requirement across domains, and specific to musical expression through improvisation. Effective application, monitoring, and tutelage can produce a holistic and dynamic imparting of knowledge, culture and creativities within the improvisation paradigm that can be attributed to a learning relationship known as a cognitive apprenticeship. To better understand the breadth and depth of cognitive apprenticeship, an overview of its theoretical basis and strategies will be discussed. Understandings of learning trajectories utilized by teachers and their utilization in fostering improvisation and creativity are further explored.

Cognitive apprenticeship

The employment of Cognitive Apprenticeship Theory (Collins 2006; Collins, Brown, and Newman 1989) as a theoretical underpinning is an appropriate way to understand the teaching and learning experience of participants whose learning undergoes negotiation, interaction and support from a significant mentor or teacher. Cognitive apprenticeship is a combination of two terms from different areas that was developed on constructivist approaches to learning and supported by situated cognition theory and the theory of modeling (Bandura 1986) in which understandings of cognition are based in the processes of knowledge acquisition. Apprenticeship is the interaction between an expert and a learner, in which the expert assists the learner to become a master of skills through ‘modeling, scaffolding, fading and coaching’ (Collins, Brown, and Holum 1991, 2).

The utilization of cognitive apprenticeship structure in teaching and learning brings with it special and unique benefits for students and the teacher practitioners. Cognitive Apprenticeship Theory (CAT) had a strong basis in school-to-work learning and uses elements of apprenticeship to create an authentic work environment (Berryman 1991; Brown, Collins, and Duguid 1989; Collins, Brown, and Holum 1991). According to CAT, a student learns through association and collaboration with a master who provides advice and expertise. This process has the potential to bring to the student increased control and ownership of learning (Guzdial and Kehoe 1998) and supports an immersive learning environment that can be productive in fostering ‘a microworld, an activity system of situated learning in an authentic work setting, where learning is more likely to be clearly contextually situated’ (Lave and Wenger 1991), as opposed to scientific, or schooled learning (Vygotsky 1980).

A key observation about cognitive apprenticeship concerns the situated, social context in which learning takes place. Apprenticeship derives many cognitively important characteristics from learners being embedded through having continual access to models of expertise-in-use against which to refine their understanding of complex skills (Collins, Brown, and Holum 1991; Scardamalia and Bereiter 1983). The value of thinking and articulating strategies and self-reflection is essential in unpacking and identifying just what that entails (Ritchart, Church, and Morrison 2011).

Cognitive apprenticeship as applied to the student-teacher dynamic requires that thinking must be brought to the surface ‘to make it visible, whether it’s in reading, writing, [or] problem-solving’, suggesting ‘the teacher’s thinking must be made visible to the student and the student’s thinking must be made visible to the teacher’ (Collins, Brown, and Holum 1991, 3). There are different types of knowledge required for a teacher to impart expertise; knowledge of the domain (concepts, facts, procedures), heuristic strategies (techniques and approaches for accomplishing tasks), and control of learning strategies. Collins, Brown, and Newman (1989) define six teaching methods that can be categorized into three groups. Modeling, coaching and scaffolding are core to cognitive apprenticeship, ‘designed to help students acquire an integrated set of cognitive and meta-cognitive skills through processes of observation and of guided and supported practices’ (Collins, Brown, and Newman 1989, 18). Articulation and reflection are methods that help the student to focus observations of expert problem solving, and gain access and control of their own problem-solving strategies. Exploration aims at encouraging learner autonomy by defining or formulating problems to be solved, utilizing expert problem-solving processes. The other way that exploration is engendered is by the intentional fading by the teacher-mentor. Fading is posited as a significant aspect of CAT (Scardamalia and Bereiter 1985; Schoenfeld 1985) and is an important element in this study.

These strategies offer various ways in which dynamic interplay between teacher and student can occur. Congruent amongst these instructional strategies is the possibility and need for student initiation, in asserting and demonstrating acquired knowledge and skills. Modeling, coaching, scaffolding, exploration and fading are initiated by the teacher, whereas articulation and reflection begin with the teacher, but involve the shifting of roles as the learner becomes more confident and adept (Nethsinghe and Southcott 2015).

Learning trajectories

Teachers can organize goals, developmental sequences and activities specifically designed to enhance learning, development and levels of thinking in students. Implemented as an ordered network of constructs, teachers activate student learning and engagement via activities, tasks, and various forms of interaction and evaluation that advances thinking and concepts, moving ‘informal ideas through successive refinements of representation, articulation, and reflection, towards increasingly complex concepts over time’ (Confrey et al. 2009, 347).

Structuring learning through a cognitive apprenticeship model facilitates teacher-student *mediation*, whereby stimuli are intentionally and overtly introduced into problem solving activities, such as when teachers discuss through conversation or demonstrate through performance expert creativity, or introduce a specific theoretical model

(Wertsch 2007). Cognitive apprenticeship is a thoughtful enculturation of knowledge and culture that within the realm of improvisation and wider arts practices brings together spontaneous expert performative exemplars, and creative conceptualizations that can be transformed into structures in students' individual meaning-making. The processes of exploring different experiences are important in the students' meaning-making, and through a variance of situated experiences develop new senses of meaning (Lave and Wenger 1991; Wells 1999). The traversing of students through a cognitive apprenticeship model provides strategies as trajectories or pathways of learning rather than mere developmental processes, that consider the multidimensionality, diversity, and the embodied and personal nature of learning. Thus, paths of acting and thinking in different contexts within an ongoing learning relationship promote the mediational interactions embedded in these contexts, how they are negotiated, and the meaning-making that is constructed as a result of these teacher-student interconnections (Wittek and Habib 2013).

Creativity

Musical creativity, like all fields of human creativity emerges in and from social practices. It is part of being human (Csikszentmihalyi 1996) and very much part of being a learner and a teacher (Freire 2005; McWilliam 2007). Research acknowledges assemblages of learning involves individuals and social groupings, the distributed relations that exist between each other (Glaveanu 2014; McWilliams and Plucker 2014), and the opportunities such distributions play on the enhancement of nurturing learning trajectories. From a social-cognitive perspective, creativity can additionally be viewed as a set of relations that are actualized through dynamic transactions among individuals, environments, and social cultural relations (Gutiérrez and Rogoff 2003).

Creativity is a multifaceted concept that draws on mental processes such as originality, fluency, fluidity (Guilford 1959) imagination, purposefulness, and intrinsic value to the creator (Mumford and Gustafson 1988; Simonton 2003). Advancing Guilford's work (Guilford 1959), and significant in improvisational musical expression, Dellas and Gaier (1970) suggest that creativity is the ability to use imagination, insight and intellect, as well as feeling and emotion, in order to move an idea from its present state to an alternate, previously unexplored state. An improvisers creativity is manifested through both divergent and convergent thinking – utilizing learned and pre-explored vocabulary and processes, with the spontaneous in the moment dynamics of collaborative interaction (Amabile 1996; Barak 2009; Howard-Jones 2002). Divergent thinking allows the exploration of a large number of possible ideas or alternatives, and convergent thinking helps analyse the different ideas and choose the best, most appropriate problem-solving 'in the moment' action. Creative processes thus require the integration of both kinds of thinking: divergence in generating a range of ideas, and convergence in sharpening focus and narrowing down and synthesizing ideas and information immediately (Barak 2009). Improvisers problem-solving capabilities elicit one lucid musical answer from many possibilities by developing the ability to utilize 'in the moment' reflexes infused with learned, creative and collaborative referents (Pressing 1988; Johnson-Laird 2002). Learning to improvise, and the dispositions to developing ones' personal, individualized way of expressing are shaped by enculturation from teachers, peers, and the environments in which they create (de Bruin 2017; Berliner 1994; Monson 1996; Lewis 2002). As an ongoing learning

relationship cognitive apprenticeship affords teacher practice beyond simply teaching creatively, instilling processes and attitudes that enact and develop possibilities to creative thinking (Craft 2008).

Improvisation

Central to this study is the learning of musical improvisation – gaining mastery over the process of creating something new that involves motor-sensory, audiative, strategic and imaginative skills and abilities (de Bruin 2015; Pressing 1988). improvisation coalesces the complex interplay of learned musical vocabularies as pre-established referents and styles, with a personalized creative insight (Berkowitz 2009; Berliner 1994; Pressing 1988). Improvisers elicit spontaneous creative responses as a cogent musical dialogue that complements the musical content and immediacy of the musical collective at hand, reacting to purely self-generated impulses, or improvising collectively through stylistic constraints and affordances (Pressing 1988; Sawyer 2000, 2003). Within the improvisation paradigm creativities are apparent in the recall of learned devices, the malleability and transformability of melody, harmonic progression, rhythm and tone, as well as in the communicative, interactive processes and spontaneous expression involved in dialogic responding within a dynamic interactive ensemble. Nurturing an ongoing learning relationship that cultivates creativity requires specific classroom designs and teacher behaviors. Students must be active participants and collaborators in the learning, and it is the teacher's role as facilitator and fellow contributor who joins with students in a process of alleviating risk averse dispositions, and nurturing knowledge building growth mindsets that develop creative possibilities (Scardamalia and Bereiter 2006; Sawyer 2004, de Bruin 2017).

Methodology

For this study, a qualitative inquiry was a most appropriate method for analyzing the educational processes of participants in the act of learning, observing dynamic and fluid experiences of the teacher and student in undertaking a 'complex, nuanced process of sense and meaning-making' (Smith, Flowers & Larkin 2009, 191). Collective case studies facilitate the examination of a 'phenomenon, population, or general condition' (Stake 2000, 437) and can analyze theories not only 'set within real-world context' (Yin 2009, 18), but also 'for refining theory and suggesting complexities for further investigation' (Denzin and Lincoln 2003, 156). Observing learning and teaching processes in the one-to-one lesson can reveal similarities, differences, and 'natural co-variations of happenings' (Stake 2000, 22) that reflect 'the idiosyncratic more than the pervasive' (Stake 2000, 24). Recruited through teacher/student noticeboards within two conservatoria this case study involved the observation of four educators and their students. The requisite stipulations of (1) being an improviser/educator for at least 20 years, (2) That the learning relationship had been constant for at least 9 months, and that both educator and student agreed to participate in the study.

Data collection

The videoing of the lessons and separate semi-structured interviews of both teacher and student provided a richness of description and detailed information that articulates

nuanced micro-learning emergent in the lesson ‘*in situ*’, as well as offering reflective, detailed self-analysis in interviews after the lesson. Observation through ‘this intersection of two frames of meaning’ (Giddens 1984, 374) via video and reflection can enhance data credibility (Yin 2003) and extends a visual and textual double hermeneutic of understanding (Foucault 1980). The researcher, as a professional improviser and educator can deeply understand and interpret as an emic insider the learning and teaching processes observed. A schedule of questions engaged in the interviews is provided in table 1 and further, detailed questions are provided in appendix 1.

Table 1: An interview schedule was utilized to guide discussions in a semi-structured format.

The interview schedule included these questions:

- What are the things you learn that you value the most?
- Discuss the balance of input/discussion/playing between you and the teacher?
- Explain the learning that extends between your teacher and yourself.
- Does what you learn shape your thoughts about improvisation?
- What does creativity mean to you?
- How does the one-to-one lesson compare with other aspects of the course?
- What does your teacher do that shapes your playing and thinking about playing the most?
- How do you develop creativity?
- What strategies do you use to impart knowledge to students?

Integral to the analytic process, rigor and trustworthiness was assured through feedback or member checking and triangulation between the videoed lesson, reflection of student and reflection of teacher that constituted the three elements of data (Bradbury-Jones, Irvine, and Sambrook 2010). Persistent observation, bias and control between interviews ensured the suspension of assumptions (bracketing) (Lincoln and Guba 1985).

Data analysis

A four-step coding procedure firstly familiarized and organized video and audio transcripts into learning incidents. The acquiring of data from multiple sources is used as a strategy of enhancing credibility (Yin 2009); a convergence of data contributing to the understanding of the whole phenomenon. A second process of ‘abstraction and interpretation’ (Spencer et al. 2014, 279) analyzed data for general themes, meanings and key phrases. These key incidents/phrases were extracted and drawn up in a table of preliminary interpretations from which emergent themes were grouped together and placed into hierarchical trees revealing ‘distinctive categories of experience’ of teacher intent (Nixon et al. 2013, 217). Incident units were categorized and linked to explicit correlations in the cognitive apprenticeship model. This categorization was further substantiated through validity and checking by an independent researcher who verified the coding of categories and affirmed specific learning categories.

Eligibility criteria set for the study were (1) the teacher-practitioner was an expert of 20 years’ experience; (2) the student was of tertiary level; (3) a teacher-student relationship of over 6 months had been established preceding the study; and (4) informed consent from

both student and teacher prior to the lesson/interview was granted. Interviews were recorded electronically and transcribed for analysis within 48 h.

The data are presented as separate categories within the organizational framework of the cognitive apprenticeship model; that is, Modeling, Scaffolding, Coaching, Articulation, Reflection, Exploration, and Fading. The lessons and interviews demonstrated the at times complex interplay of various elements of the model, representing the fluid and dynamic event that is teaching and learning. The categories are supported by both direct quotations from the transcripts and emergent in the interpretative phenomenological analysis (Larkin, Watts, and Clifton 2006; Smith and Osborn 2008). Interview data is presented with teachers denoted as 'T' and students as 'S'. For clarity the separate learning and teaching episodes are organized as T1 and S1; T2 and S2; and so forth.

Findings

Exploration of students' perceptions in depth, produced a unique finding as both student and teacher participants frequently justified their views in terms of a learning relationship, the evolving nature of it and the complexity of learning and teaching strategies utilized. Data provides clear evidence of the cognitive model present in exchanges and used as a framework for advancing learning. Universally apparent in these teaching episodes was teacher intent to re-calibrate and acclimatize the learner to a more advanced intensity of skilled thought and action. Observing cognitive apprenticeship reveals modeling, scaffolding and coaching as dominant and explicit forms of instructional technique, whereas reflection, articulation and exploration were largely engaged through more nuanced and episodic occurrences within the lesson.

Modeling

Modeling, the student observation, imitation and absorption of a conceptual model of requisite processes demonstrated by the expert is effective in offering exemplars of materials such as scales or chords, melodic devices and problem-solving answers. Through modeling the teacher can also inculcate ways of thinking and acting that nurture creative dispositions, risk-taking and the exploring of problem-finding processes. Critical for the success of reciprocal teaching is that teachers model expert strategies in a shared problem context. Crucially students experience learning and thinking in the context that they will soon undergo the same task. Subsequent attempts and difficulties are engaged with new knowledge and knowing of the task. Students can later critically reflect on change and understand the differences from learning. This following interaction exemplifies such a modeling episode:.

T1 I will play this 9-note chord structure, repeat it back to me
 S1 (plays)
 T1 The next structure is this one, repeat this after me
 S1 (plays)
 T1 Now play the first, and then second like this (demonstrates)
 S1 (plays)
 T1 Now I add a note, repeat it back
 S1 (plays)

- T1 now add an additional note, you pick which one, and select where
 S1 (plays several attempts before consolidating the idea)
 T1 Now start thinking about stretching things out, elongate the phrase and dwell on some notes, and move faster through others
 S1 (plays several attempts)
 T1 Now answer these phrases that I play
 S1 Student and teacher exchange ideas, the student completing the musical sentence by imitating rhythms, speed and tone of that demonstrated by the teacher.
 T1 Now, departing the given structure and notes, just use what you hear and exchange melodic ideas with me
 S1 student and teacher play and exchange melodies, the teacher leading by changing parameters of sound and rhythm, the student imitating some qualities, but creatively improvising on others

Significantly modeling can facilitate a recalibration of cognition that establishes a trajectory of inquiry, learning and meaning making. Demonstrative interaction can advance ways of thinking and expressing like an expert. Modeling in this example exposes the learner to a variety of approaches through which analogical and metaphorical thinking is challenged. The teacher in this case enhances creativity by immersion in immediate and spontaneous dialogic exploration, offering unusual, unexpected examples that may push students outside the realm of what they consider ‘normal’ or ‘correct’. The teacher models diversifying experiences that initially engages in divergent thinking but quickly moves to divergence and creative interplay. Modeling can nurture ‘highly unusual and unexpected events ... that push individuals outside the realm of ‘normality’ (Ritter et al., 2012, 961). The student’s reflection of this learning incident made a profound impression:

- S1 That was a groundbreaking moment, as it made me aware of the different ways I can be creative with a simple initial idea, and develop different strategies. I can see how my understanding of practice should evolve from simple reciting of materials to actually devising ways of developing the materials in my own personal ways.

Development of cognitive flexibility can often lead to creativity and ‘the ability to break old cognitive patterns, overcome functional fixedness, and thus, make novel (creative) associations between concepts’. These diversifying experiences can lead to increased cognitive flexibility and the ability to combine disparate ideas in interesting ways. Active, not passive or vicarious, engagement with new and novel experiences can allow students to question the way they organize experiential knowledge and encourage possibility thinking.

Scaffolding

Scaffolding is a style of instruction that provides students with instructional approaches and intellectual support in mastering a process or activity that offers pathways of thinking, learning and executing action. Crucial in developing success in student outcomes, scaffolding decomposes tasks to ‘do-able’ chunks that help students by being able to perceive precisely how to go about the task. Scaffolding can move students away from naïve generalizations about their experiences toward more sophisticated nuances, demonstrated in this scaffolded interaction:

T2 Play through these chords like this (demonstrates).

S2 (plays)

T2 Now, try faster and repeat the last sequence (demonstrates).

S2 (plays several times to get comfortable)

T2 Ok, now we can add some constraints, some stipulations to that – make the first note and the highest note longer, and the last note must be short.

S2 (plays through several times) I have the feel for that now.

T2 Now, what are some ideas we can do to make this exercise a malleable piece of material? We can stretch it, or make it faster and more compact, we can play it backwards, invert it. Try playing it backwards.

S2 (several attempts to establish fluidity) Got it

T2 Now can subtly change it by adding one note, one other color, like this (demonstrates). You try that.

S2 (Plays several times)

T2 Now, let's add one other note – you think carefully about which one, and where. And then play it.

S2 Deliberates and then plays, slowly at first but more assertive over iterative practice.

T2 This is a way of developing creative thinking on simple ideas. Think of ways of changing an initial idea, and these strategies become significant approaches to developing creative practice. From these simple ideas, more complex ones can evolve, and from these, compositional ideas can develop.

The teacher engages the student in an activity that explores the impact of constraint on processual thinking. By gradually altering specific clauses to the task, the student develops creative thinking as the teacher makes implicit the exploration of malleability of ideas through problem-solving. Immersing in a zone of proximal development, the teacher helps the student overcome a cognitive impasse in learning and assist the student attain an independence of thinking, strategizing and experience creative process. Through thoughtful scaffolding the teacher camouflages creative thinking within other generic capabilities (in this case motor sensory), hidden in desired skills and attributes under the guise of problem-solving, critical thinking or communication. By making the processes of learning structured, visible, and attainable scaffolding removes the cloak of invisibility that often conceals creative processes.

Coaching

Coaching involves the process of the expert observing the student's performance by offering hints and suggesting new tasks, and is a nuanced and personal teaching approach that develops and motivates student behavior and dispositions. Hattie (2009) urges the importance of clear direction in teaching, explicating meaning in accurate direction, how it is conveyed and delivered during the lesson. This dialogue is an example of an enthusiastic coaching situation:

T3 Through this phrase, you play quite busy at the beginning, and less towards the end. Are you aware of that?

S3 That seems to be the way I approach this kind of phrase.

T3 This may be an ingrained way of finding your solution, so try selecting only 3 notes at the beginning and middle, and get busier to the end, so that the note selections must set up and lead directly into the next phrase.

- S3 (plays) sorry, I'm still doing it the wrong way.
 T3 It takes time to shake that habit. Repeat this exercise.
 S3 (Plays several times) ... starting to get it
 T3 That's it, keep going. When we start, it's like traveling down a small dirt road, but the more we explore and develop ideas, the melodic opportunities open up like a super-highway ... keep going!
 S3 Continues to play
 T3 Yes, that's it, you hear the different ideas now – part of developing a creative mindset is to develop problems that need working out, otherwise you're just rehearsing the same old answer and approach. Continue to work on this, and apply differing constraints – limit the notes you use makes the selections more significant, and you will find better notes and manipulate rhythms and melody in a more interesting way. That's how we become creative, by knowing and understanding our choices.

In this example the teacher directs focus of activity on micro-procedural aspects of creative thinking, coaxing convergent and divergent ideas. Through a mindful, engaging activity the teacher recalibrates student actions that can become dispositions, attitudes and embedded behaviors. The teacher in this instance coaches the student to develop divergent thinking by problem-solving in the moment musical elaborations. The teacher also coaches through positive appraisal and formative assessment and feedback that in turn shapes further attempts. Students – and teachers who understand that intelligence and creativity are dynamic constructs are more apt to conceptualize their own critical thinking and strategize trajectories in developing creativity. Blackwell, Trzesniewski, and Dweck (2007) posit the need for students to understand the difference between perceiving achievement via a fixed view of intelligence, and those who consider it malleable. Those demonstrating a 'growth mindset' – a belief that individual efforts increase intelligence, outperformed students who had a 'fixed mind-set'; believing that intelligence was an unchangeable construct. Similarly, creativity can be understood through a 'growth mind-set', and coaching is a significant facilitator of this advancement in student's creative outcomes.

Articulation

Articulation is the clear verbal expression of knowledge, reasoning, or problem-solving processes from the student who utilizes the ability to explain thought processes of creating and critical thinking upon evolving abilities. Students can both make understanding visible through speech, as well as realizing learned behaviors, languages and skills through self-reflection. Articulating learning brings tacit processes into the open where it can be further freed from contextual binding and further developed in different contexts. This student puts into words what they feel is emergent in their playing:

- T4 So how do you feel your abilities and attitudes have changed?
 S4 I've constantly pushed myself to take risks melodically and rhythmically. Inhabiting this performance space beyond any comfort zone has allowed me to be bold, make mistakes, but also find lightbulb moments the make some learning moments resonate – not all, but certainly more and more over the past two months have resulted in my finding and feeling what works, and therefore rewarded in my perseverance with the strategies I have developed, and how these crafting of choices enhance my personal voice.

Dialogue between teacher and student can guide and shape interactive efforts, particularly if the student is articulating their inner thoughts of processural learning. This student expresses the synchronization between what is heard in the mind and what is elicited through the fingers:.

S3 I feel I'm getting a more intimate nuance in my fingers. What I hear is finally starting to be accurately realized in performance. I am able to trust my intuition much better now. That trust changes the way I play dramatically – I feel I can assert myself, my personality with more conviction than the reticent way I played before.

Improvising is a complex task, and developing strategies are a key component of mastery where one melodic line is extricated from numerous possibilities. The student above articulates beyond mere 'knowledge telling', focusing on strategy development and the verbalizing of processes in a reflective manner with the teacher acting as dialogic partner. In the example above, articulation evinces further enhancement in the ways students and teachers can make learning visible and attainable, dialogically and instrumentally articulating developing attributes, voice and honing a personal aesthetic to creative choice making.

Reflection

Reflection is a cognitive and affective process that enables a student to compare their own problem-solving processes with those of a peer or an expert, with a developing internal cognitive model of expertise. Reflection underlines the ability of learners to compare their own developmental progress and facilitate 'self-teaching' (Jorgensen 2004), and is enhanced by the use of various techniques for reproducing or 'replaying' (in improvisation, in a cognitive sense rather than re-iterative) the performances of both expert and novice for comparison. The level of detail for a replay may vary depending on the student's stage of learning, but usually some form of 'abstracted replay', in which the critical features of expert and student performance are highlighted (Collins and Brown 1988). Methods to encourage reflection might consist of recording students as they think out loud and then replaying the discussion for comparison with the thinking of experts and other students, or promote reflection using post-mortem analysis (Schoenfeld 1983), as in this example:.

T2 So how do you think you responded to the challenge that time?

S2 I'm still trying to cram in too many notes too quickly. I lose the thread of the interplay, the musical conversation by saying too much.

T2 Yeah, you're still regurgitating notes and scales instead of thinking more of complementing the musical moment. What are you going to do to develop this aspect of your playing?

S2 I've really got to pace myself – as you say, tell an interesting story with twists and turns rather than a boring freeway. I need to listen more, and act in a more performance oriented way. I was doing that much better last lesson – I think building that consistent mentally relaxed yet focused attitude really takes time.

In this example the collaborative learning relationship allows the teacher and student to extensively revisit the problem-solving process, discussing problem solving methods along with alternative strategies and evolve a more sophisticated cognitive architecture through

which the student can hone specific goals with actualization of current abilities, as well as overall reasoning processes. Close relationships allow for open and frank discussion of limited, developing and sometimes failing abilities that within a cognitive apprenticeship allows for unguided truths and evaluations to be expressed, yet within a caring association that structures long-term and ongoing care, concern and vested interest in improvement. Reflection can be utilized in a more nuanced way by investigating more localized cognition and problem-solving, and be used as a means of getting ‘inside’ the students mind, such as in this example:.

T3 How do you think you developed that melodic idea?

S3 I feel I’m getting the style much more closely aligned with your demonstration, and im hitting the right notes where the chords change that make it harmonically correct.

T3 How do you feel your thinking is different now?

S3 I’m able to consider a depth of knowledge of the longer structure, not just becoming preoccupied with the micro moments-letting them flow more, that’s a difference between your playing and mine.

In this instance the teacher directs reflection on revisiting thought processes, through which the students discusses the integration of new understandings that trigger creativity, as well as comparison with hypothesized teacher thinking. This reflective practice allows co-investigative reflection, whereby teacher and student jointly trying to figure out what the student was thinking in various timeframes of the task, how this is evolving over time, and how this can be progressively recalibrated. Revisiting strategic as well as tactical levels of problem-solving, the student can self-monitor correction and creative output. Used in conjunction with an abstracted replay, attention can be focused on critical decisions or actions and further trajectories of learning.

Exploration

Exploration as a method of teaching involves setting general goals for students and then encouraging them to focus on particular sub-goals of interest to them. Exploration encourages students to be inquisitive learners in exploring a domain productively and can provide an enculturation of learning where creative strategies, dispositions and ultimately personally inspired goals take shape in student thinking. Teachers can model, coach and scaffold exploring and cognitively situate a learner’s awareness of possibilities – and reflections on learning. Teachers can change student’s assumptions about the nature of expert problem solving. Even accomplished improvisers stumble and flounder, and witnessing these struggles helps students realize that exploring new ideas and working out strategies is neither unique to them, nor a sign of incompetence. This interaction demonstrates exploration of possibilities, and the interconnectedness with coaching in this instance:

T2 I would like you to respond to these chords I play, just using your hearing.

S2 (plays) I really flailed at that.

T2 So try again, work with what sounded good and what didn’t.

S2 (plays) That seemed better, I sound different, this thinking is pushing me into new places. My thinking is more with the fingers and the instrument rather than a known construct like a scale or chord.

- T2 So continue to explore that feeling that works. Start to combine your known processes with this new experience, back your judgement and take a risk. What do you think will happen if you fail – will the walls come tumbling down? No, you're just going to learn to make wiser choices, be informed by these experiences and engage in a smarter way.
- S2 I sounded really awkward, I see the value of being challenged by these experiences, and how they have opened up a cache of ideas I can explore and work on.

As in this example, teaching for exploration can cognitively situate mindsets beyond imitative, copied responses – and indeed challenge teaching beyond rote techniques, giving space to foster a learning environment where exploratory behavior and actions can inspire emergent creativity, strategic processes and personal voice. Exploration in this instance empowers the student to negotiate new skills, experiences, to take risks and perhaps consider failure as an option through which deep learning can occur and positively impact learning and self-awareness of ability. Wider thinking and more creative actions can cultivate personally nuanced thinking in students. Teachers that create a stimulating sanctuary can help students build strengths, find solutions and achieve ongoing success.

Fading

Fading involves the slow intentional removal of teacher support mechanisms, counterbalanced with the student's assumption and growing self-assertion of skills and abilities. Fading can occur in various ways and manifests in the pedagogical adjustments of modeling, coaching and scaffolding. Of significance in fading is the shift in relationship and power as the teacher nurtures the creation of an independent learner that is consolidated over time. This example demonstrates fading by the teacher:

- S1 improvises over a chord structure
- T1 OK, some interesting choices you made
- S1 I am thinking about development unfolding over several progressions of the structure.
- T1 explain that for me
- S1 well, I am using simple ideas and developing them and in a way intertwining them, they mesh together, but not before I am able to create some tension, and the combining of them releases that tension.
- T1 So tell me how this has evolved your thinking
- S1 Well, I am confident in my ideas, and confident in the flow of them
- T1 So what in your mind is making this more successful for you?
- S1 I am more relaxed, I have abilities and processes that can play with these ideas and develop them into good ideas, I don't trip over myself, or clutter the space, and I can develop these ideas in a collaborative situation with the band at a higher level, and more consistently. I feel I am able to listen more and not be so closed off – I am open to spontaneous interplay more. Through the tasks you've made me respond to, I've had to step up and respond in different ways. That has also made me trust my instincts, and I am a more confident player because of that.

This dialogic interaction reveals assertive language and emergent authority in the student as the teacher fades influence. The subtle use of the teachers more neutral questioning (and tone captured in the recordings) allows the student to advocate and submit their reasoned thoughts more confidently. Occurring within modeling, coaching or

reflective discussions, fading provides an environment where a student's critical thinking and confidence can be optimized, and where the teachers own knowledge does not limit what is to be learned by the student. As in the example above, fading allows the student to develop their own conceptions and processes and assert their own personal voice.

Learning and teaching can produce complex moments of various strategies of cognitive apprenticeship. These learning episodes capture this complexity, the interconnectedness of various strategies, and the improvisational manner teachers negotiate pedagogical adjustments and refinements in eliciting the best learning outcome in each moment.

Discussion and conclusion

A cognitive apprenticeship model offers a frame for teachers to think about how to impart highly collaborative and dialogic transmission, understanding and practical skills and knowledge, and inculcate explicit factual, strategic and procedural knowledge largely tacitly understood. Teachers enacted learning trajectories for their students, and interpreting these trajectories through a cognitive apprenticeship reveals various fine-grained developments of zones of proximal development via modeling, coaching, scaffolding, reflection and exploration. This study shows that such a learning apprenticeship provides a cognitive development continuum upon which teachers examine and negotiate demands, results and formative feedback not solely in relation to content following the logic of the domain, but as relations between tasks and students that follow the logic of the learner. In doing so, a cognitive apprenticeship model enhances trajectories of cognition, shared action and experience as an ongoing interactional process.

This study reveals how cognitive apprenticeship is not a packaged formula for instruction, but rather a diverse and holistic engagement of student processes and actions where teacher modeling scaffolding and coaching can nurture independent thought, reflection, exploration and promote motivated, creative dispositions. A cognitive apprenticeship maintains a learning relationship where teacher's actions support learners' development of abilities, and adopt critical thinking by understanding paradoxes 'and not be overwhelmed by complexity, ambiguity, uncertainty or difference' (Andreotti 2011, 395). The exploration and analysis of these selected teacher-student lesson interactions offers insights into the processes, thoughts and complexity of engaging teaching practice, engaging students in observing, discovering and inventing strategies in context.

This study reveals how effective teaching utilizes expressing priorities, sequences, and conceptual links between pertinent topics and instructional experiences. Teachers' understanding of how the perhaps idiosyncratic logic of the learner progresses over time, allowing the teacher to craft highly personalized tuition of students. This study also identifies the teacher as expert practitioner and teacher. Within music, students seek the pursuit of learning specific to favored styles and vocabulary, and personal voice. This places an onus on the educator in expertly approaching teaching with a holistic understanding that places the students motivations and desires as the dominant catalyst for learning. Effective teaching in this way can facilitate students' purposeful learning and explicitly invites students to themselves be creative pedagogues by engaging in understandings of learning events that are often considered an intuitive phenomenon. Teachers who use cognitive apprenticeship theory can successfully teach and strategize for the importance and

the place of creativity, emergent creative thinking and brings learning out from beneath the cover of more analytic ways of thinking, making this tacit phenomenon explicit.

This dual focus on situated learning and developing of expertise can inform teachers to question and improve the explication of tangible skills and implicit knowledge in students. This study can inform educators of the thoughts, motivations, strengths and frailties manifested in higher education students, and in creative arts/improvisation students in particular. It can offer a re-evaluation of ways in which higher education teachers engage students in learning and the apprenticing of creativity in a caring and focused learning environment. Cognitive apprenticeship can re-calibrate the way teachers:

- Identify processes and make them authentic and visible
- Differentiates for individualized learning
- Provides instruction that provokes thought and action
- Fades an educators influence via promoting and reinforcing student abilities, knowledge, student confidence and intellect.
- reinforces a culture of expert practice.

Drawing students into a culture of expert practice involves teaching them how to think more like experts. Cognitive apprenticeship evolves a highly effective teacher-student learning relationship that nurtures independent thinking, problem-solving and creativity. By marrying effective teaching pedagogies in a learning paradigm that also shapes positive dispositions and attitudes to learning, cognitive apprenticeship can help shape more innovative learning and teaching practice, and offer ways of redesigning teaching and learning. It provides structures for respectful, social and holistic learning where students acquire expertise and robust problem solving skills that support independent life-long learning.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This article was supported by a Monash University Post graduate Publication Award .

References

- Alexander, R. 2008. "Culture, Dialogue and Learning: Notes on an Emerging Pedagogy." In *Exploring Talk in School*, edited by N. Mercer and S. Hodgkinson, 91–114. London, UK: Sage Publications.
- Amabile, T. M. 1996. *Creativity in Context: Update To the Social Psychology of Creativity*. Boulder, CO: Westview.
- Andreotti, V. 2011. "Towards Decoloniality and Diversity in Global Citizenship Education." *Globalisation, Societies and Education* 9 (3–4): 381–397.
- Baker, D. 1989. *David Baker's Jazz Pedagogy: A Comprehensive Method of Jazz Education for Teacher and Student*. Van Nuys, CA: Alfred Publishing.
- Bandura, A. 1986. *Social Foundations of Thoughts and Actions: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall.

- Barak, M. 2009. "Idea Focusing Versus Idea Generating: A Course for Teachers on Inventive Problem Solving." *Innovations in Education and Teaching International* 46 (4): 345–356.
- Berkowitz, A. 2009. "Cognition in Improvisation: The Art and Science of Spontaneous Musical Performance." Ph.D. diss., Harvard University.
- Berliner, P. F. 1994. *Thinking in Jazz: The Infinite art of Improvisation*. Chicago, IL: University of Chicago Press.
- Berryman, S. E. 1991. "Designing Effective Learning Environments: Cognitive Apprenticeship Model." Institute on Education and the Economy, Brief #1. www.tc.comumbria.edu/-iee/briefs/BRIEF1.HTM.
- Blackwell, L. S., K. H. Trzesniewski, and C. S. Dweck. 2007. "Implicit Theories of Intelligence Predict Achievement Across an Adolescent Transition: A Longitudinal Study and an Intervention." *Child Development* 78 (1): 246–263.
- Bradbury-Jones, C., F. Irvine, and S. Sambrook. 2010. "Phenomenology and Participant Feedback: Convention or Contention?" *Nurse Researcher* 17 (2): 25–33.
- Brown, J. S., A. Collins, and P. Duguid. 1989. "Situated Cognition and the Culture of Learning." *Educational Researcher* 18 (1): 32–42.
- Burnard, P. 2012. *Musical Creativities in Practice*. Oxford, UK: Oxford University Press.
- Chaffin, R., and A. F. Lemieux. 2004. "General Perspectives on Achieving Musical Excellence." In *Musical Excellence; Strategies and Techniques to Enhance Performance*, edited by A. Willamon, 19–39. Oxford, UK: Oxford University Press.
- Collins, A. 2006. "Cognitive Apprenticeship." In *The Cambridge Handbook of the Learning Sciences*, edited by R. S. Sawyer, 47–60. Cambridge, UK: Cambridge University Press.
- Collins, A., and J. S. Brown. 1988. *The Computer as a Tool for Learning Through Reflection*. 1–18. New York, NY: Springer.
- Collins, A., J. S. Brown, and A. Holum. 1991. "Cognitive Apprenticeship: Making Thinking Visible." *American Educator* 15 (3): 6–11.
- Collins, A., J. S. Brown, and S. E. Newman. 1989. "Cognitive Apprenticeship: Teaching the Crafts of Reading, Writing and Mathematics." In *Knowing, Learning, and Instruction: Essays in Honor of Robert Glaser*, edited by L. B. Resnick, 453–494. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Confrey, J., A. Maloney, K. Nguyen, G. Mojica, and M. Myers. 2009. "Equipartitioning/Splitting as a Foundation of Rational Number Reasoning Using Learning Trajectories." In *Proceedings of the 33rd Conference of the International Group for the Psychology of Mathematics Education*, 345–353. Thessaloniki, Greece.
- Craft, A. 2008. "Tensions in Creativity and Education." In *Creativity, Wisdom, and Trusteeship: Exploring the Role of Education*, edited by G. Claxton, A. Craft and H. Gardner, 16–34. Thousand Oaks, CA: Corwin Press.
- Csikszentmihalyi, M. 1996. *Creativity: Flow and the Psychology of Discovery and Invention*. New York, NY: Harper Perennial.
- Daniels, H. 2001. *Vygotsky and Pedagogy*. London, UK: Routledge.
- de Bruin, L. R. 2015. "Theory and Practice in Idea Generation and Creativity in Jazz Improvisation." *Australian Journal of Music Education* 2: 91–115. <http://search.informit.com.au/documentSummary;dn=998936352073430;res=IELHSS>.
- de Bruin, L. R. 2017. "Evolving Regulatory Processes used by Students and Experts in the Acquiring of Improvisational Skills: A Qualitative Study." *Journal of Research in Music Education*. (In Press).
- de Bruin, L. R. 2017. "Shaping Interpersonal Learning in the Jazz Improvisation Lesson: Observing a Dynamic Systems Approach." *International Journal of Music Education*, doi:10.1177/0255761417712318.
- Dellas, M., and E. L. Gaier. 1970. "Identification of Creativity: The Individual." *Psychological Bulletin* 73: 55–73.
- Den Brok, P., M. Brekelmans, and T. Wubbels. 2004. "Interpersonal Teacher Behaviour and Student Outcomes." *School Effectiveness and School Improvement* 15 (3–4): 407–442.
- Denzin, N. K., and Y. S. Lincoln. 2003. *Handbook of Qualitative Research*. 2nd ed. Thousand Oaks, CA: Sage Publications.

- Erdem, F., and J. O. Aytemur. 2008. "Mentoring – A Relationship Based on Trust: Qualitative Research." *Public Personnel Management* 37 (1): 55–65.
- Ericsson, K. A. 2014. *The Road to Excellence: The Acquisition of Expert Performance in the Arts and Sciences, Sports, and Games*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Ezzat, A. M., and M. R. Maly. 2012. "Building Passion Develops Meaningful Mentoring Relationships among Canadian Physiotherapists." *Physiotherapy Canada* 64 (1): 77–85..
- Farrell, M. P. 2003. *Collaborative Circles: Friendship Dynamics and Creative Work*. Chicago, IL: University of Chicago Press.
- Foucault, M. 1980. *Power/Knowledge: Selected Interviews and Other Writings, 1972–1977*. New York, NY: Pantheon.
- Freire, P. 2005. *Teachers As Cultural Workers: Letters to Those Who Dare Teach*. Translated by D. Macedo, D. Koike, and A. Oliveira. Boulder, CO: Westview Press.
- Galenson, D. W. 2006. *Old Masters and Young Geniuses: The Two Life Cycles of Artistic Creativity*. Princeton, NJ: Princeton University Press.
- Gaunt, H. 2008. "One-to-one Tuition in a Conservatoire: The Perceptions of Instrumental and Vocal Teachers." *Psychology of Music* 36 (2): 215–245.
- Geeves, A., D. J. McIlwain, J. Sutton, and W. Christensen. 2014. "To Think or Not To Think: The Apparent Paradox of Expert Skill in Music Performance." *Educational Philosophy and Theory* 46 (6): 674–691.
- Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*. Cambridge, UK: Polity Press.
- Glaveanu, V. P. 2014. *Distributed Creativity: Thinking Outside the box of the Creative Individual*. Cham, Switzerland: Springer.
- Grainger, T., J. Barnes, and S. Scoffham. 2004. "A Creative Cocktail: Creative Teaching in Initial Teacher Education." *Journal of Education for Teaching: International Research and Pedagogy* 30 (3): 243–253.
- Guilford, J. P. 1959. "Traits of Creativity." In *Creativity*, edited by P. E. Vernon, 167–188. New York, NY: Penguin Books.
- Gutiérrez, K. D., and B. Rogoff. 2003. "Cultural Ways of Learning: Individual Traits or Repertoires of Practice." *Educational Researcher* 32 (5): 19–25.
- Guzdial, M., and C. Kehoe. 1998. "Apprenticeship-based Learning Environments: A Principled Approach to Providing Software-Realized Scaffolding Through Hypermedia." *Journal of Interactive Learning Research* 9 (1): 289–336.
- Harrison, D., and C. S. Hong. 2004. "The Role of Mentoring in Continuing Professional Development." *International Journal of Therapy and Rehabilitation* 11 (11): 502–502.
- Hattie, J. 2009. *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. New York, NY: Routledge.
- Hennessy, S., N. Mercer, and P. Warwick. 2011. "A Dialogic Inquiry Approach to Working with Teachers in Developing Classroom Dialogue." *Teachers College Record* 113 (9): 1906–1959.
- Howard-Jones, P. A. 2002. "A Dual-State Model of Creative Cognition for Supporting Strategies That Foster Creativity in the Classroom." *International Journal of Technology and Design Education* 12 (3): 215–226.
- Johnson-Laird, P. N. 2002. "How Jazz Musicians Improvise." *Music Perception: An Interdisciplinary Journal* 19 (3): 415–442.
- Jorgensen, H. 2004. "Strategies for Individual Practice." In *Musical Excellence: Strategies and Techniques to Enhance Performance*, edited by A. Williamon, 85–103. Oxford, UK: Oxford University Press.
- Kenny, A. 2014. "Practice Through Partnership: Examining the Theoretical Framework and Development of a 'Community of Musical Practice'." *International Journal of Music Education* 32 (4): 396–408.
- Kirschner, P. A., J. Sweller, and R. E. Clark. 2006. "Why Minimal Guidance During Instruction Does not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching." *Educational Psychologist* 41 (2): 75–86.

- Klein, S., R. Benjamin, R. Shavelson, and R. Bolus. 2007. "The Collegiate Learning Assessment: Facts and Fantasies." *Evaluation Review* 31 (5): 415–439.
- Kratus, J. 1995. "A Developmental Approach to Teaching Music Improvisation." *International Journal of Music Education* 26 (1): 27–38.
- Larkin, M., S. Watts, and E. Clifton. 2006. "Giving Voice and Making Sense in Interpretative Phenomenological Analysis." *Qualitative Research in Psychology* 3 (2): 102–120.
- Laurillard, D. 2002. *Rethinking University Teaching*. 2nd ed. London, UK: Routledge Falmer.
- Lave, J., and E. Wenger. 1991. *Situated Learning. Legitimate Peripheral Participation*. Cambridge, UK: Cambridge University Press.
- Lewis, G. 2002. "Improvised Music After 1950: Afrological and Eurological Perspectives." *Black Music Research Journal* (supplement 22): 215–246.
- Lincoln, Y. S., and E. G. Guba. 1985. *Naturalistic Inquiry*. Newbury Park, CA: Sage Publications.
- McWilliam, E. 2007. "Is Creativity Teachable? Conceptualising the Creativity/Pedagogy Relationship in Higher Education." Proceedings of the 30th HERDSA annual conference: enhancing higher education, theory and scholarship, Adelaide. <http://eprints.qut.edu.au/15508/1/15508.pdf>.
- McWilliams, J., and J. Plucker. 2014. "Brain Cancer, Meat Glue, and Shifting Models of Outstanding Human Behavior: Smart Contexts for the 21st Century." *Talent Development and Excellence* 6 (1): 47–55.
- Mercer, N. 2000. *Words and Minds*. London, UK: Routledge.
- Mercer, N., and C. Howe. 2012. "Explaining the Dialogic Processes of Teaching and Learning: The Value and Potential of Sociocultural Theory." *Learning, Culture and Social Interaction* 1 (1): 12–21.
- Monson, I. 1996. *Saying Something. Jazz Improvisation and Interaction*. Chicago, IL: University of Chicago Press.
- Mumford, M. D., and S. B. Gustafson. 1988. "Creativity Syndrome: Integration, Application, and Innovation." *Psychological Bulletin* 103 (1): 27–43.
- Nethsinghe, R., and J. Southcott. 2015. "A Juggling Act: Supervisor/Candidate Partnership in a Doctoral Thesis by Publication." *International Journal of Doctoral Studies* 10: 167–185.
- Niu, W., and R. Sternberg. 2003. "Societal and School Influences on Student Creativity: The Case of China." *Psychology in the Schools* 40 (1): 103–114.
- Nixon, G., K. Evans, R. G. Kalischuk, J. Solowoniuk, K. McCallum, and B. Hagen. 2013. "Female Gambling, Trauma and the Not Good Enough Self: An Interpretative Phenomenological Analysis." *International Journal of Mental Health and Addiction* 11 (1): 214–231.
- Pressing, J. 1988. "Improvisation; Methods and Models." In *Generative Processes in Music*, edited by J. Sloboda, 129–178. New York, NY: Clarendon Press.
- Prouty, K. E. 2008. "The 'Finite' Art of Improvisation: Pedagogy and Power in Jazz Education." *Critical Studies in Improvisation/Études Critiques en Improvisation* 4 (1). <http://www.criticalimprov.com/index.php/csieci/article/viewArticle/346/966recommendationsandanannotatedbibliography>.
- Renshaw, P. D. 2013. "The Social Cultural and Emotional Dimensions of Scaffolding." *Learning, Culture and Social Interaction* 2 (1): 56–60. <http://www.proquest.com.ezproxy.bu.edu>.
- Ritchart, R., M. Church, and K. Morrison. 2011. *Making Thinking Visible*. San Francisco, CA: Jossey-Banks.
- Ritter, S. M., R. I. Damian, D. K. Simonton, R. B. van Baaren, M. Strick, J. Derks, and A. Dijksterhuis. 2012. "Diversifying Experiences Enhance Cognitive Flexibility." *Journal of Experimental Social Psychology* 48 (1): 961–964.
- Rogoff, B. 1995. "Observing Sociocultural Activity on Three Planes: Participatory Appropriation, Guided Participation, and Apprenticeship." In *Sociocultural Studies of Mind*, edited by J. V. Wertsch, P. del Rio, and A. Alvarez, 139–164. Cambridge, UK: Cambridge University Press. Reprinted (2008) in K. Hall & P. Murphy (Eds.), *Pedagogy and practice: Culture and identities*. London, UK: Sage.
- Rojas-Drummond, S., K. Littleton, F. Hernández, and M. Zúñiga. 2010. "Dialogical Interactions among Peers in Collaborative Writing Contexts." In *Educational Dialogues: Understanding*

- and *Promoting Productive Interaction*, edited by K. Littleton and C. Howe, 128–148. Abingdon, UK: Routledge.
- Rojas-Drummond, S., V. Perez, M. Velez, L. Gomez, and A. Mendoza. 2003. "Talking for Reasoning among Mexican Primary School Children." *Learning and Instruction* 13 (6): 653–670.
- Sawyer, R. K. 2000. "Improvisation and the Creative Process: Dewey, Collingwood, and the Aesthetics of Spontaneity." *The Journal of Aesthetics and Art Criticism* 58 (2): 149–161.
- Sawyer, R. K. 2003. "Improvised Dialogues: Emergence and Creativity in Conversation." In *Creativity and Development*, edited by R. K. Sawyer et al., 12–60. Oxford, UK: Oxford University Press.
- Sawyer, R. K. 2004. "Creative Teaching: Collaborative Discussion as Disciplined Improvisation." *Educational Researcher* 33 (2): 12–20.
- Sawyer, K. 2008. *Group Genius: The Creative Power of Collaboration*. New York, NY: Basic Books.
- Scardamalia, M., and C. Bereiter. 1983. "The Development of Evaluative, Diagnostic, and Remedial Capabilities in Children's Composing." In *The Psychology of Written Language: A Developmental Approach*, edited by M. Martlew, 67–95. London, UK: Wiley.
- Scardamalia, M., and C. Bereiter. 1985. "Fostering the Development of Self-Regulation in Children's Knowledge Processing." In *Thinking and Learning Skills: Research and Open Questions 2*, edited by S. F. Chipman, J. W. Segal, and R. Glaser, 563–577. Hillsdale, NJ: Erlbaum.
- Scardamalia, M., and C. Bereiter. 2006. "Knowledge Building: Theory, Pedagogy, and Technology." In *Cambridge Handbook of the Learning Sciences*, edited by K. Sawyer, 97–118. Cambridge, UK: Cambridge University Press.
- Schoenfeld, A. H. 1983. Problem Solving in the Mathematics Curriculum: A Report." *The Mathematical Association of America*, MAA Notes, No. 1. <http://files.eric.ed.gov/fulltext/ED229248.pdf>.
- Schoenfeld, A. H. 1985. *Mathematical Problem Solving*. New York, NY: Academic Press.
- Simonton, D. K. 2003. "Scientific Creativity as Constrained Stochastic Behavior: the Integration of Product, Person, and Process Perspectives." *Psychological Bulletin* 129 (4): 475–494.
- Smith, J. A., and M. Osborn. 2008. "Interpretative Phenomenological Analysis." In *Qualitative Psychology: A Practical Guide to Research Methods*, edited by J. A. Smith, 53–80. London, UK: Sage Publications.
- Smith, J. A., P. Flowers, and M. Larkin. 2009. *Interpretative Phenomenological Analysis: Theory, Method and Research. An Interdisciplinary Journal*. London, UK: Sage Publications.
- Spencer, L., J. Ritchie, R. Ormston, W. O'Connor, and M. Barnard. 2014. "Analysis: Principles and Processes." In *Qualitative Research Practice: A Guide for Social Science Students and Researchers*, edited by J. Ritchie, J. Lewis, C. McNaughton Nicholls and R. Ormston, 269–293. London, UK: Sage Publications.
- Stake, R. E. 2000. "Case Studies." In *Handbook of Qualitative Research*, edited by N. K. Denzin and Y. S. Lincoln, 2nd ed., 435–454. Thousand Oaks, CA: Sage Publications.
- Vygotsky, L. S. 1980. *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.
- Wadee, A. A., M. Keane, T. T. Dietz, and D. Hay. 2010. *Effective PhD Supervision, Mentorship and Coaching*. Amsterdam, Netherlands: Rozenberg Publishers.
- Wells, C. G. 1999. *Dialogic Inquiry: Towards a Sociocultural Practice and Theory of Education*. New York, NY: Cambridge University Press.
- Wertsch, J. V. 2007. "Mediation." In *The Cambridge Companion to Vygotsky*, edited by H. Daniels, M. Cole, and J. Wertsch, 178–192. Cambridge: Cambridge University Press.
- Wittek, L., and L. Habib. 2013. "Quality Teaching and Learning as Practice Within Different Disciplinary Discourses." *International Journal of Teaching and Learning in Higher Education* 25 (3): 275–287.
- Yin, R. K. 2003. *Case Study Research: Design and Methods*. 3rd ed. London, UK: Sage Publications.
- Yin, R. K. 2009. *Case Study Research, Design and Methods*. 4th ed. Thousand Oaks, CA: Sage Publications.