

Music education and cognitive psychology

A critical perspective

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Introduction

During a conversation with a colleague, he mentioned that a trainee primary teacher had observed his year four music lesson and had asked *why I hadn't used direct instruction or revisited core vocabulary at the start of my lesson?* My friend is a well-respected authority in primary music education with many years' of experience. The question, he said, had surprised him but he had painstakingly explained to his novice colleague (training to become a general primary teacher) his principle of starting the lesson with active musical experience, rather than some kind of verbal instruction. The children had first sung a song, followed by a movement game that captured rhythmic characteristics of the song. The movement game had offered an embodied experience of rhythm patterns and was a sociable game, involving children collaborating with a partner – a game which, he added, was much enjoyed by the children. He gradually brought the lesson to a point where he could focus on the rhythmic patterns, abstract them from the activity, clapping and tapping for practice, and then convert them to simple rhythm syllables and visual symbols. This focused activity connected with and built on previous lessons and the children's gradual consolidation of musical concepts. He had suggested that the point in the lesson when he had focussed on syllables and symbols might be considered the equivalent of the direct instruction she had been expecting to see. At the end of the lesson, the rhythm patterns had then formed the foundation of an improvisation activity with handheld percussion in which the children could apply, consolidate, and extend their understanding of the rhythm elements.

Clearly my experienced friend and his novice colleague viewed the lesson through different lenses. Setting aside the obvious difference in the quantity of their experience, learning, as the novice teacher had come to understand it through her initial training, is a process of direct knowledge transfer from the teacher to the children. Thus, she had come to view the children, largely, as passive, receiving instruction from the teacher. In contrast, our experienced teacher sees learning as arising from the actions and experiences of the children

making music. His role, as he conceives it, is to foster their learning, to guide, develop, and extend it, using the children's experiences as the foundation for conceptual understanding rather than input ready-made knowledge. For the novice teacher, her recent training had emphasised knowledge as fixed and objective, made up of facts and perhaps skills as well. For her experienced colleague, musical knowing is an active process, arising from participation in musical experiences, made each time by the children, changing and flexible.

Divisive thinking

It would be easy for these two teachers to fall into criticising one another's approach, identifying one as leaning towards traditionalist (teacher centred, technique focused, outcomes based) and the other as progressive (child-centred, building understanding, having relevance). These are entrenched polar positions that have become prevalent in educational thinking; the characteristics of each often exaggerated or even caricatured in pitting one against the other (Claxton, 2021). This is the overarching 'either-or' for teachers that Dewey, nearly 100 years ago, described as the belief either that education is 'development from within' or 'formation from without' (1938, p. 23). They are hardly new dilemmas. A century later, this either/or issue continues in debates between direct instruction versus experience, knowledge-rich curriculum or discovery learning and teacher-led or child-led.

But let us imagine that these two teachers go on to have a considered discussion that we eavesdrop. They might quickly agree that rather than emphasise the divisions between their respective approaches, they recognise a continuum between the two and that every point on that continuum has a pedagogical use depending on situational factors. My colleague agrees that there may be moments in his lessons when he would adopt direct instruction if he perceives the children would benefit. He reminds his colleague that after the children had participated in embodied musical experiences of singing and moving, he had then explained the rhythm patterns, going on to convert them into a simple form of notation. Here is an important point. Rather than apply a fixed script of strategies, he judges when a teaching technique – drawn from a wide repertoire of approaches that he has accumulated during his years of experience – is the right one according to the children he is working with, the musical activity and what he hopes the children will gain. To reduce educational practice to opposites is not only to over-simplify but can have the result of replacing professional expertise, reflection, and debate with ready-made, inflexible models (Ellis, Gatti & Mansel, 2024). Formulaic techniques do not anticipate or encourage self-reflection or flexibility to situation. They can dictate what to do, but not when, why and according to what matters. The aim of such techniques is to provide solutions to complex practices. Such simplification, however, to reduce teaching to a technical process, is – as I hope will become clearer as this chapter unfolds – to impose control, a form of power:

control of the children, the educational process, of what counts as valuable to learn and of teachers' professionalism.

As the imaginary discussion between the teaching novice and my experienced friend continues, he quickly realises that explaining what he understands to be best teaching is impossible without starting to explore deeper questions of principles, purposes, and values. What does it mean for children to learn – and to learn in music? Who are we teaching? Why teach this? What is worthwhile and valuable? – or 'desirable' as the education philosopher Biesta would ask (2022, p. 100). And then what teaching might make that possible? What is it to teach and learn music musically, perform with artistry, to be creative, imaginative, and so on? And then even more expansive questions such as what is music education trying to achieve in the longer term? How might the children we teach be equipped to change society and build a better world? The responses to these many questions are complex, ambiguous, and contested. I will return to these questions in later paragraphs, but first I need to explain the source of the trainee teacher's question about direct instruction.

The push to define teaching

As I write this chapter, in the English education system, there is a push to define teaching, to identify pedagogical techniques that are supposedly most effective and even to decide that certain strategies are the only ones that effective teachers should use. Strategies such as direct instruction, knowledge chunking, retrieval practice, and a contemporary emphasis on learning as memorising currently dominate (EEF, 2021). This drive to regulate teaching practice is accompanied by efforts to enforce those regulations through ever narrower systems of accountability and inspection.

Underpinning this move to define teaching strategies is the claim that these are based on empirical evidence and therefore proven to be effective (Coe & Kime, 2019). At face value to base teaching on strategies that evidence from research studies has demonstrated are effective would seem to be a sensible and logical way to go about ensuring children learn well. Test teaching methods for effectiveness, arrive at refined understandings of how children learn, and then train all new teachers – and strongly encourage current teachers – to adopt them. As a strategy to ensure a model of teaching that could guarantee successful learning, it would appear to be straightforward, efficient, and incontrovertible.

However, the sources of evidence that currently dominate have been reduced to a narrow focus on cognitive science and, even within cognitive science, a focus on specific aspects of the learning process concerned mainly with the memorisation and reproduction of information. This overlooks a broad appreciation of the multiple psychological approaches, including many with a cognitive science orientation, that can helpfully inform the processes of learning and teaching in music education. Knowing verbal facts and theory of

music and being able to reproduce that knowledge in tests hardly constitutes an education in musical knowing. It could be argued that singing a song that had been learned in a previous lesson, demonstrating the ability to sing it with melodic and rhythmic accuracy, remembering the expressive details such as phrasing and dynamics, constitutes musical memorising and retrieval practice, if music educators are being asked to frame their teaching in those terms. To learn how to reproduce and perform music is certainly one strand of a musical education, but it is by no means the whole picture.

And beyond psychology, there are wider multi-disciplinary sources from sociology, anthropology, ethnomusicology, popular music studies, critical theory, cultural studies, childhood studies, and more, that could tell us much about how children learn music and inform the processes of teaching (Young, 2018). However, this narrowing to a selected and impoverished version of cognitive science is responsible for the current framing of teaching in a standardised model and for giving priority to how factual information can be learnt most efficiently – to the detriment of richer conceptions of the learning processes.

Evidence-based practice

My concern, then, is with so-called evidence-based practices and their reliance on a particular type of cognitive science. But in order to understand why these versions of practice have come to dominate current educational practice, we need to recognise two things that are interconnected: one, the perennial desire for reliable strategies that promise to ‘work’ (recalling my reference to Dewey earlier in this chapter) and, worryingly, as I have already alluded to, that bring teaching (and teachers and children) under systems of centralised efficiency and control (Biesta, 2007) and two, how tightly these are tied into the prevailing ideology. The current cognitive science of learning is supported by wider discourses with which it is continuous, part of multiple overlapping and reinforcing processes (Ball & Junemann, 2012). This understanding of education that emphasises a cognitivist and rational perspective of learning has come to prominence in the context of a highly managed education environment, driven by political ideology and hand-in-hand with the rise of the networked education specialists who now disseminate their own ‘brands’ of educational theory (*ibid.*). Reading the political scientist, Colin Crouch, he explains the invasion of education by shallow market values in which diverse approaches to education are pitted against one another in commercialised competition (Crouch, 2016). In this landscape of education, social media and its uptake by teachers have had a considerable influence. These different dimensions intersect and while in this chapter I hone in on one aspect, the rise of a narrow and highly rationalist view of learning based on cognitive theories, it is important to recognise that

the whole axis of education in the United Kingdom has been tilted by these interconnecting factors.

The political system – dominated by neoliberalism but now shifting even further into authoritarianism and neo-conservatism (Brown, 2023) – and its impact on education have received the majority of attention at the large-scale, structural level. What is less visible and less discussed but no less serious, are the small-scale effects of this political environment at the personal level, for individual teachers and the children they teach. Its effects have infiltrated the classroom and the teaching and learning processes, into the very identities of teachers and children. Stephen Ball, long time analyst of education policy, has written that

[The] process of neoliberalisation ... occurs not just ‘out there’ in a myriad of different practices but takes place ‘in there’ – in the way we understand education, its purpose and value, and the way we understand ourselves and others as people involved in education.

(Ball, 2003, p. 215)

Such changes, Ball goes on to explain, have brought about the formation of certain pedagogical meanings, identities, and relationships. Neoliberalism has been more than a set of policies and institutional structures but has governed ways of understanding ourselves and configuring relationships in education; between teachers and pupils, between teachers and other teachers, and between teachers and senior leaders (Ball, 2016). It is within these teacher identities and relationships, as Ball explains (*ibid.*), that priority is given to outcomes, fixed forms of knowledge inserted into children’s memories through direct instruction, retrieved through tests, assessed as right or wrong, recorded as data, children performing educational knowledge that is uniform, measured and compared, an individualising and instrumentalising of the educational process in which children become passive and obedient and the teacher the possessor of knowledge.

Moreover, the emphasis on knowledge and its direct transmission results in a specific type of content that starts to drive the curriculum. The content is spelt out in knowledge organisers, lists of music to be listened to, of terms, names of instruments and composers, notation, and basic musical skills – traditional, conservative music knowledge to be taught and assessed (DfE, 2021). Of course, teaching should include the imparting of knowledge and skills. In that respect, one of my concerns in relation to much early childhood and primary music education is that it can remain at a superficial level of lightweight, rote activities, such as large group singing, fun music games, or musical play with little attempt to develop conceptual understanding and skills. But education should also be about bringing pupils into a particular relationship with knowledge. And that is not so simple. Creativity and imagination, critical thinking

skills, or intercultural competences – which call for a particular way of engaging with musical ideas – are easily side-lined. For example, selecting a definition of crescendo in a quiz offering multiple choice answers is one thing but making artistic decisions about how a crescendo might be applied to the phrases of a song or evaluating the expressive power of a crescendo in film music, for example, is on a different level altogether. Artistic work is about provoking questions that reveal contradictions and possibilities and that require musical decision-making and aesthetic choices to be made.

Looking closer at the claim that these defined teaching techniques are based on evidence from cognitive science studies reveals that a narrow, rational evidence has come to prevail. This research evidence relies on data, statistics, numbers, and things that seemingly prove something is true. Only what is measurable is considered to have validity. This is an attempt to arrive at an evidence base that can settle difficult questions once and for all. It aims to arrive at pronouncements of the right way to teach and to close down professional exploration, reflection, and debate (see Crouch, 2016, pp. 3–5). In other words, to reiterate a key point, it is replacing the professional freedom of teachers to decide for themselves with a form of authoritarianism derived from the assumed certainty of scientific methods.

A closer look at evidence

However, a sharp-eyed scrutiny of the evidence base reveals it to be much more fragile than is implied. In order to illustrate this fragility, I look closely at cognitive load theory (CLT) – a theory that has been adopted with particular enthusiasm in recent years. I take CLT here as my example, but my primary aim is to model the process of poking and prodding at research findings and the interpretations they give rise to, a generic process that could be applied to any type of research.

CLT proposes that children learn best when the information they are being presented with is a ‘good fit’ with the mechanisms that underpin their cognition and it also assumes that understanding is contingent upon the processing capacity of our memories (Sweller, 2023). Theories that become popularised typically share some common features: they are easy to grasp, seem to make intuitive sense and hold the promise of a quick-fix to difficult problems. CLT has all those features. The theory was first introduced in the late 1980s by John Sweller (1988), but in recent years, it has been catapulted to the forefront of educational thinking. The first question to ponder is why a theory that was first conceived nearly 40 years ago is now so much in favour. This should cause us to suspect that the current zeitgeist has offered the right conditions for this theory to come to prominence, over and above other theories of learning. Theories require a conducive milieu, a particular set of conditions – social, political, economic, and institutional – that support their adoption in educational thinking.

Cognitive science attempts to study mental processes on the analogy of the mind as a kind of container, an information processor, receiving knowledge inputs, storing them, and then pulling them out again on demand. Cognitive science has certainly contributed empirical evidence to add to our understanding of aspects of learning. To dismiss cognitive science outright is not my point here. The point is to understand its limitations and how over-reliance on selected ideas can distort conceptions of learning and teaching processes. For a start, it assumes the mind operates completely detached from context, from the people and the surrounding environment and even refers to the mind, and its location in the brain, skull-bound, as if separate from the rest of the physical body (interestingly discussed by van der Schyff, Schiavio & Elliott, 2022, pp. 12–13). Even in basic biological terms to isolate, the brain runs against much of what we know about the integrated relationship between brain and body. Our brains depend on the whole body system and need to be constantly supplied with chemicals (nutritional, hormonal, medicinal, etc.) that affect functioning. Bodily functioning is, in turn, determined by environment and the social and material contexts in which we live. A view of cognition as embodied and embedded in social and material surroundings understands musical cognition not as simple processing systems of input and output, but as a more complex form of gradual sense-making (van der Schyff, Schiavio & Elliott, 2022). When three children band together in a primary school play area to recreate Queen's *We Will Rock You*, the instruments as objects, the act of playing them, the singing, the stamping of feet and other bodily movements, combine in a multi-modal, holistic dynamic experience. Rather than a disembodied, brain-based conception of the musical mind, musical knowing is, instead, conceived as both internal, embodied, and external, arising in the act of musical doing, in interaction with people and things.

Returning to CLT, a little searching soon reveals plenty of literature (open access incidentally, not hidden in obscure academic sources) that should immediately raise our doubts. First, there is much internal debate among research psychologists concerning weaknesses in their methods for studying CLT, or indeed any topic in cognitive psychology, and the reliability of their findings (see, e.g., de Jong, 2010). As is the convention in academic reporting, findings from individual studies are accompanied by discussion about possible pitfalls in the method, how the data might be interpreted and, tentatively, what the implications might be. Groups of studies are then reviewed and subject to scrutiny. Among researchers reporting their studies in academic literature, there is a never-ending process of analysis, comparison, critique, adjustment, and evolution in these fields of investigation. They never claim to arrive at definitive conclusions but new achievements eclipse older interpretations.

Cognitive load is a descriptor, coined by Sweller (1988), that attempts to capture an aspect of how the mind might work. It is an abstract concept, not an observable fact. Such abstract concepts are necessary in any disciplinary field because they assist in the process of creating shared understandings

and building theories. Indeed, my endeavours in this chapter to communicate the processes of children's learning in music rely on such abstract concepts. But as an abstract concept, there is no way of directly and accurately measuring cognitive load. Researchers can only think up tests that may provide an indicator for what they imagine cognitive load to be. Usually, participants in a study are asked to carry out a small learning task and then undertake a test that attempts to assess cognitive load. One of the usual methods is to ask a set of questions on completion of the task (Ayres, 2018). Self-reporting in response to questions is known to be a subjective and thus not always reliable source of information.

Experiments to test cognitive load are usually carried out in the controlled conditions of research laboratories. But these conditions hardly match the hurly-burly of real classroom life. As every teacher well knows, one class of children contains a widely divergent group of individuals with different levels of motivation, interest, and background experience. Yet, in a cognitive science study, these individual characteristics are smoothed over and participants in the study are treated as equal subjects. And, more often than not, studies are carried out with university students or older children because they can understand the instructions, read questionnaires, and consent to take part in studies that might involve precise and repetitive task procedures. Findings from studies with adults or older children do not automatically transfer to younger children. Thus, there is a big leap in claiming that what has been discovered from research lab conditions has direct application to the reality of the classroom.

Next, we need to look at the nature of the learning tasks. The primary studies of CLT have focussed on science, maths or similar complex, factual topics, and many of the learning activities were very short. Enthusiastic proponents of CLT quickly considered it to be a theory of learning that could be applied to all areas of the curriculum and that enthusiasm has been endorsed by policymakers and managers. Yet, as many are pointing out, the nature of learning in maths or science is quite different from subject areas such as music (Claxton, 2021, Chapter 4). Yet, these criticisms have been brushed aside and not sufficiently addressed. It is noticeable that in the few instances where CLT has been applied to music learning, the focus has been reading notation (Han, 2021; Owens & Sweller, 2008) – formal, factual content with a defined structure that lends itself to direct instruction and memorisation. The very nature of artistic music-making is that it unfolds in unpredictable and multi-layered ways and defies being reduced to facts to be learned. Keith Swanwick refers to 'significant encounters' in which "the musical experience is ... rich in possibilities and certainly not sequentially organised" or 'amenable to instruction' (1988, pp. 127–128).

The last issue to consider is publication bias. This refers to the tendency for studies that only show positive findings to be published; what Ben Goldacre has referred to as 'publish the good and bury the bad' (Goldacre, 2014).

There is no way of knowing how many studies were carried out that found no clear results or even negative effects, because it is rare for them to be disseminated. Furthermore, raw data gathered in research studies, the numbers and statistics, are explained in narratives. How that narrative is constructed is not an objective process. A study's authors can be drawn into putting a certain spin on their findings and invariably report what affirms their initial hypotheses and what they think will attract the attention of readers.

So what?

Returning to our two teachers discussing the observed lesson, this is where their identity as teachers might be troubled, where they find inconsistency between the world of education as presented to them in initial training programmes, in policies, curricula requirements, and systems of inspection and what they feel, value, and believe as teachers; Stephen Ball's teacher identity 'in there' and 'out there' that I referred to earlier (Ball, 2003).

Teachers may feel they are between a rock and a hard place. There is the official level of policy and curriculum directives, with a new layer of managerialism, consultants, and education 'experts' (Eacott, 2017) and then there is the place where music education happens, the lively meeting points between music, children, and teacher in the classroom. Music educators know music to be enriching, rewarding, exciting, and fulfilling. This is how and why they became musicians and they want the children they teach to experience music as they do. But their school's regimes and imposed requirements can create tensions. Musical learning has to be translated into lesson plans, curriculum targets, a difficult process during which authentic and intuitive musical knowing may all too easily get squashed into the wordy clutter of whole school teaching policies and the imposed requirements of school leaders. A problem, certainly, can lie in the limited information that is introduced to teachers in training and that they are expected to apply: a problem I tried to capture in my story of the novice primary school teacher. Yet if teachers do not recognise that their professional independence is at risk, they may relinquish it to external authorities. Resistance depends on having certain forms of understanding that are not routinely included in initial and continuing professional development. Are teachers interrogating the current theories of learning, their cognitive science origins, and the teaching strategies they have given rise to? Are teachers understanding how these approaches have taken shape in a particular political, social, and economic environment? Do teachers grasp the intersections of power and practices? Basic research literacy is a key skill and the reason why I have given over several paragraphs to modelling the interrogation of research. But it needs to go hand-in-hand with critical thinking and questioning. Teachers need to move beyond recognising the inherent weaknesses of cognitive research, to understanding how it has acquired and maintains its legitimacy and to recognising how these teaching strategies, the emphasis on a conservative 'knowledge-based'

curriculum and the current political environment have become entangled with one another. It is important to explore and decide what to agree with, what to oppose, and importantly, what changes to try to bring about. With the world facing multiple crises, it seems even more urgent that music education protects its domain of imagination, creativity, opening up complexity and the possibilities of meaning. What Biesta would describe as ‘productive interruptions’ (2022, pp. 36–37) is an idea that is akin to Swanwick’s ‘significant encounters’. Music education is so much more than memorising knowledge.

Alternatives

In this final section, I try to suggest some alternative directions. The recent period may have created fertile ground for a particular model of education to take root. But this present time demands that we examine the underpinning aims and values of education. The Covid pandemic disrupted education in 2020–2021 and for a short while, as Arundhati Roy proposed (2020), offered a portal through which we might step and embrace the opportunity for deeper analysis of social and political issues, how these impact on music education and for radical re-thinking (also Giroux, 2021). But rather than grasp the opportunity, the post-pandemic response has been to spring back, to double down, to make up for lost time, and to reinforce the need for even more of the same. The climate crisis brings an urgency for change in the way we think of our relation to the world in multiple ways, practically, politically, ecologically, and also, perhaps, epistemologically. There are initiatives within music education that are proposing a range of ways in which music’s effect on beliefs, emotions, mood, and social empathy might be harnessed to increase climate beneficial behaviours (e.g. Prior, 2022). Finally, education in relation to the crises of wars emphasises the need for tolerance, empathy and learning to live well with others who are different to us. All these ask us to think about those complex questions I raised earlier – what it means to be educated, what children need to know and be able to do musically, and the relationships between education, communities, and the sustainability of the planet – in other words, to live well together and with the ecosystem.

The internal world of the classroom and the current emphasis on inert, core knowledge, relying on the weak endorsement of experimental studies in cognitive science, the myopic focus on the present, cannot begin to address the crises of collective life – global and local crises of equality, democracy, war, human, and planetary thriving. It is conservative, authoritarian, reinforcing the status quo, not outward looking, ‘world viewing’, and interrupting, offering musical encounters, in order to incite children’s engagement with the world, both as it is and as they may imagine it could be.

The political theorist Wendy Brown suggests that in the current period, traditional value systems have been eroded (Brown, 2023). Value has become hollowed out in an education system that has focused on value as commensurate only with an economic value that is individualistic and competitive. Values, she suggests, have become trivialised and commercialised. Some educators may

become pessimistic, even cynical or defeatist; resigned to the way things are and acquiescing to the pressures from inspection and management systems, which, in all fairness, are strongly imposed. Some may fall in step, writing policies full of the current *edu-speak*, creating individual music education businesses and brands and setting up websites offering ready-made music knowledge organisers. Some, like my friend, have confidence and convictions born of years of experience and resist the current educational directions, retreating into their music rooms and finding delight and reward in the music-making taking place, both timetabled and extra-curricular.

There are education thinkers, including music educators, who point to some possible directions. Brad Fuller, working in Australia, calls for music educators to turn to music education philosophers such as Elliott (1995), Regelski (1998), Reimer (2003), and Bowman (2007) who address the deeper questions of value and thus counterbalance the drive towards evidence-based cognitive approaches to pedagogy that dominate (Fuller, 2022). Hess offers a model of activist music education that focuses on ‘bringing people together, expressing experiences and critical thinking’ (Hess, 2019, p. 6). The directions such music education theorists propose may seem radical, utopian even. Yet music, of all the subject areas, is the one that can take children by the hand into deeper areas of experience and envision alternatives. My friend’s clapping game between partners and improvisation activities may be a small, mundane example of musical collaboration, sociability, and creativity but these are the strong reasons why for Hesmondhalgh ‘music matters’ and his hope that musical experience might play a part in establishing ‘relations of commonality in complex modern societies’ (Hesmondhalgh, 2013, p. 9) and foster collective flourishing (Hesmondhalgh, 2013, p. 142).

So in her first ventures into music teaching, let us hope that the newly qualified teacher, emboldened by her discussions with her experienced colleague, heeds his advice, turning her back on Rosenshine’s principles of instruction and launching her lesson with a song, determined to replace ‘teaching like a champion’ (Lemov, 2021) with ‘teaching like a musician’. The children might offer suggestions for how changes in dynamics could enhance the song or where a crescendo or diminuendo would add expressive effect. They might explore possibilities, listen to different versions, and collectively decide on the version they prefer and will practise and perform.

Reflective questions

- 1 What are your personal experiences of the impact of CLT on school policy and consequently on how you teach music?
- 2 Drawing on your own experiences and understanding of CLT, are their counter arguments that you might make to those presented in this chapter?
- 3 What dimensions of musical learning and musical experience do you feel are marginalised within the present discourses and policies of education and music education?
- 4 How might you bring these dimensions into your teaching?

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