South African Journal of Childhood Education
ISSN: (Online) 2223-7682, (Print) 2223-7674

Music instruction and reading performance: Conceptual transfer in learning and development

Authors:
Azwihangwisi E. Muthivhi[1]
Samantha Kriger[1]

Affiliations:
[1]School of Education, University of Cape Town, Cape Town, South Africa

Corresponding author:
Azwihangwisi Muthivhi, azwihangwisi.muthivhi@uct.ac.za

Dates:
Received: 20 May 2017
Accepted: 11 Oct. 2018
Published: 22 May 2019

How to cite this article:
Muthivhi, A.E. & Kriger, S., 2019, 'Music instruction and reading performance: Conceptual transfer in learning and development', *South African Journal of Childhood Education* 9(1), a544. https://doi.org/10.4102/sajce.v9i1.544

Background: This article reported on the developmental consequences of music instruction in Foundation Phase level of South African school context, specifically in relation to learners' learning and acquisition of early reading abilities. Against the background of the recent upsurge in research interest on the subject of conceptual and skills transfer among primary school learners in South Africa, the article uses contemporary advances in theory to interrogate empirical research on the benefits of music instruction for successful acquisition of reading abilities.

Aim: The study aimed to interrogate the question – and resuscitate debate about – how conceptual skills in one subject discipline could transfer to benefit the learning and development of related conceptual skills in a different but related subject discipline.

Setting: The setting for the research was a boys-only public primary school located in a middle-class suburb of Cape Town, South Africa.

Methods: Document analysis and observation of reading activities and the performance records of Foundation Phase learners was carried out by the first author, and the performance of a group that was part of the school's music instruction programme was compared with that of a group that was not part of that programme.

Results: The results suggested that participation in school music instruction might benefit primary school learners' development of early reading abilities.

Conclusion: This is especially so when instructional activities are purposefully structured to benefit cognate conceptual skills, with crucial implications for policy development and the organisation of subject matter content knowledge in primary schooling in contemporary South Africa.

Keywords: education; educational psychology and pedagogy; child development; psychology of music education; primary school learning and teaching.

Introduction

In South Africa, few studies have examined the beneficial relationship that music instruction may have on elementary Foundation Phase learners' acquisition and development of reading ability. This unique area of research is particularly crucial and relevant to contemporary South African schooling, considering the significance of early reading ability on learners' overall school performance and learning efficacy. The question of whether school instruction in specific critical subject disciplines benefits children's learning and conceptual development in related subjects has a long and contentious history in developmental psychology and education. Van der Veer (1994) argues that Vygotsky and his collaborators believed that learning in specific school subjects has a generalising effect on learners' thinking and concept development, and that such learning results in conceptual transfer. That is, conceptual skills acquired in one subject discipline, such as mathematics, could benefit students' learning performance in related subject matter such as physics or linguistics. For example, the learning of Latin was assumed, within Vygotsky's research framework, to have a beneficial effect for – and hence potential for conceptual transfer to – learning within associated school subject disciplines such as mathematics.

Although the Outcomes-Based Education (OBE) policy framework – following immediately after the dawn of democratic dispensation in South Africa – was organised around principles of cross-disciplinary content knowledge termed 'learning areas', unfortunately this approach subsequently was found to be problematic and was deemed to be responsible for the persistence of poor schooling performance. It was argued, therefore, that teachers in South Africa were not ready for the advanced instructional methodologies the approach espoused. It was further

argued that the cross-disciplinary orientation to teaching and learning demanded by the multidisciplinary organisation of subject matter knowledge inadvertently rendered teachers less effective, as South African teachers had not been trained in the requisite methods for cross-disciplinary and cross-curricula pedagogy. Instead, it was argued, the schooling system needed a return to 'the basics' of content-based and disciplinary-oriented instructional framework, organised around careful specification of subject matter disciplines and their associated methodologies (Chisholm et al. 2000; Department of Basic Education 2009).

To this effect, the committee that recommended the abandonment of OBE-related cross-disciplinary orientation, and the adoption of the new framework, namely, Curriculum and Assessment Policy Statement (CAPS) in 2009, stated (Department of Basic Education 2009) that:

> The new Curriculum and Assessment Policy documents must consist of curriculum and assessment statements which are clear, succinct, unambiguous, measurable, and based on essential learning as represented by subject disciplines. Design features of OBE, especially learning outcomes and assessment standards, should not be featured in the Curriculum and Assessment Policy documents, and should become part of the General Aims of the curriculum, similar to the Critical and Developmental Outcomes. The documents should be organized around the knowledge (content, concepts and skills) to be learnt, recommended texts, recommended pedagogical approaches and assessment requirements. The latter will specify the level at which content, concepts and skills are to be taught, and how and when they should be assessed. (p. 49)

However, specific learning areas such as Life Orientation, which could possibly not easily be reduced to separate disciplines without unwittingly overloading the curriculum, continued – perhaps purely for pragmatic reasons – to retain their multidisciplinary orientation. Life Orientation, which was then referred to as Life Skills, also assumed the new nomenclature of 'subject' like all the others, and was conceptualised from the beginning as multidisciplinary, comprising sub-disciplines framed as Beginning Knowledge, Arts and Crafts, Physical Education and Health Education (Department of Basic Education 2009). The fundamental organisational principle within the current South African CAPS curriculum could be viewed, therefore, as firmly grounded on the assumption of the integrity of the subject discipline and its inherent methodologies, which, in turn, are assumed to reflect the internal logic of the discipline, espoused through the doctrine of 'conceptual progression'. Curriculum policy statements specifying disciplinary content knowledge are expressed in their clear relationship with the assessment procedures, and these statements are distinctively couched in categorical terms such as 'succinct, unambiguous, measurable, and based on essential learning as represented by subject disciplines' (Department of Basic Education 2009:49).

Although contemporary South African instructional policy framework does not seem to encourage cross-disciplinary approach in teaching, there perhaps remain good theoretical and pedagogical reasons for teachers to be aware of and encourage cross-disciplinary conceptual development on the part of their learners (Gallimore & Tharp 1991; Hedegaard 2002; van der Veer 1994). In the specific case of foundational learners' music and reading instruction, an awareness on the part of teachers, and an orientation to cross-disciplinary approach, could especially be crucial considering that children's spontaneous concepts – potentially derived from their music performances during play activities – should be useful, and may provide ready motivational grounding for mastery and acquisition of both literacy and music concepts (St. John 2006; Tomlinson 2013).

Children in South Africa – as generally in all African cultural contexts – participate in rich heritage of musical traditions from an early age (Blacking 1995; Campbell 1999). Although the nature and forms of such participation may be changing with time, the rich repertoires of musical tradition and skilled performances that ensue from their community musical practices could have beneficial effects on their learning and development if these were appropriately acknowledged and utilised within their schooling. Meanwhile, music seems to have an inherent potential for contributing towards improved reading efficacy, considering its natural connection to children's everyday spontaneous performance-related activities.

The question of how conceptual skills in one subject discipline could transfer to benefit the learning and development of related conceptual skills in different but related disciplines has long been part of debates in psychology and education, not least in research on South Africa's schooling.

Contemporary South African studies on conceptual and skills transfer

The question about transfer of cognitive and conceptual skills acquired in one domain of activity to the other, and how these skills could be exploited by teachers to benefit school learning in general, as well as conceptual skills transference from one subject area to the next, has relevance in contemporary research endeavours in South Africa's scholarships. One such study – Cockroft (2015) – explored children's ability for temporary storage and manipulation of information and how this skill – termed 'short-term memory' or 'working memory' – as well as its various components, such as verbal and visual memory aspects, could be nurtured through classroom teaching and learning processes.

Cockroft (2015) argues that reliance on working memory is a feature of early childhood cognitive processes, as the child at this stage has not yet acquired automatised skills such as alphabetic and numerical knowledge. The author further argues that working memory or short-term memory is most noticeable by the increase in the quantity of information that can be retained, increasing steadily over time with maturation until the age of about 16 years old, and that it is typically

assessed through span-like tasks in which participants engage in immediate processing while simultaneously retaining information for instant or later recall.

Difficulties with working memory, according to Cockroft (2015:9), often manifest as attention problems. Children with working memory problems, faced with challenging cognitive tasks, for example, may 'mentally wonder from the task' or struggle to cope with tasks that 'have many simultaneous processing demands'. Cockroft (2015) argues that these children could be assisted through deliberate management of working memory loads, which may involve, firstly, determining the task demands on working memory, and then breaking down the task into its smaller components, also including simplification, appropriate timing and allowing for repetition in the specific instructions relating to the task demands.

Although problems with working memory, according to Cockroft (2015), are likely to compound over time and interfere with the child's prospects of learning success, these problems can fortunately be reversed, with much of the training to improve working memory focussing on developing the 'executive control processes' to improve on capacity and prevent degradation. In conclusion, Cockroft (2015) argues that considerable evidence suggests that variability in training working memory can potentially foster greater flexibility and likelihood for transfer, specifically with regard to the transfer of skills to related tasks that require instructions in, for example, non-verbal reasoning, mathematical problem-solving and tasks involving attentional control processes.

This study clearly points to the significance of the subject of cognitive or conceptual skills transfer in South African research literature, with important implications for contemporary schooling, especially with regard to the organisation of curriculum content and subject matter knowledge. Henning (2015), nonetheless, cautions that:

> Some critics see approaches such as Cockroft's as too 'cognitive', reductionist or even 'positivist' [*sic*!], they fail to realize that it is complementary, rather than an oppositional approach to sociocultural paradigm to understanding child development and learning. Cockroft's suggestions can be located neatly within a sociocultural perspective, as they focus on the cognitive tools or skills that teachers or knowledgeable others can mediate to children to ensure that they are well equipped to engage with the world as active learners. (p. ii).

Cloete and Delport's (2015) study provides another – and more pertinent – South African research endeavour that is particularly relevant to the present research. This study addresses, as part of its interest, the question regarding possibilities for conceptual transfer of music skills and concepts to related subject disciplines such as reading and numeracy acquisition at foundational levels of young children's schooling. The authors worked with primary school teachers who wanted guidance 'with regard to the integration of music with numeracy and literary development in their young learners'. Among the skills this intervention research sought to inculcate on the part of the primary school teachers included the ability 'to use music to reinforce numeracy concepts' (Cloete & Delport 2015:92).

It is clear from the above discussion that there is significant research interest in contemporary South African scholarship regarding the subject of conceptual and cognitive skills transfer at the foundational level of formal schooling. However, research on the subject of conceptual transfer in children's school learning and cognitive or conceptual development in South Africa has not clearly and explicitly articulated a coherent conceptual and methodological framework that guides and informs its empirical research endeavour. Furthermore, the implications that these studies have on the organisation of policy and its consequent instructional practices remain scarcely explicated. The nature of the conceptual relations as well as the specific process through which the concepts are, in fact, related also remain vaguely specified. The current study is, therefore, an attempt at using a coherent framework to demonstrate possibilities for conceptual transfer across subject disciplines, modelled through music instructional activities and a pedagogic approach that sought to foster reading efficacy on the part of learners enrolled within the school's music curriculum.

The question of *transfer* in Vygotsky's sociocultural (or cultural–historical) research

The question of transfer is itself fundamental in Vygotsky's framework, and it runs through his cultural historical approach to human development. For example, human thought processes, including language and concept acquisition, originate from sociocultural practices and are mastered through the process of internalisation or transformation of processes into the personal plane of mental functioning. Therefore, the doctrine of transfer is understood within a system that explains possibilities for developmental acquisition of culturally derived forms of knowledge and skills. This position contradicts the cognitivist assumption that mental functions, concepts and skills are inherent in, and unfolding from within subjects. The concept of *transfer*, therefore, refers to both the social organisation of knowledge, such as the one involved in the internal logic of one subject discipline, and its associated developmental consequences ensuing from learning and mastery of the discipline's fundamental conceptual relations, as well as the transferability of the conceptual relations to benefit the demands of learning in separate but related subject discipline.

The formalisation of learning through schooling transforms the relations the child has to the world and to him or herself and brings about a world of conceptual relations which simultaneously establish continuity of conceptual relations between subject disciplines, which are grounded on the scientific nature of formal knowledge. At the same time, a discontinuity is introduced between everyday, spontaneous knowledge and concepts and the formal, scientific concepts

of school. It is in this relational process of learning and concept acquisition in the course of the child's development that possibilities for conceptual transfer are realised by the child. To this end, Vygotsky referred to literacy practice as a 'particular system of symbols and signs whose mastery heralds a critical turning point in the … cultural development of the child'. The process of literacy acquisition for a child, therefore, involves what Vygotsky termed 'second-order symbolism', comprising a system of graphic signs that designate verbal sounds and words that comprise spoken language. In this view, the child would relate differently to the words and sounds comprising spoken language as opposed to written text because the two forms of symbolism arise from different forms of learning and developmental activities in which the child participates (Vygotsky 1978:106).

Music learning during schooling potentially brings the spontaneous repertoires of children's everyday musical performance to their formally organised and systematic learning process within formal schooling, that is, bringing children's music activities into their conscious awareness. Consequently, children begin to learn music – within school instruction – with awareness of the rhythmic structure and melodic patterns that characterise the spontaneous songs and dances which they bring into formal learning from their everyday community participation. At the same time, reading instruction and the various forms of literacy activities in which children begin to participate introduce the written form of language with its specific peculiarities, providing a unique system of graphic representation of the spoken word and its rhythmic and melodic patterns that are simultaneously constitutive of musical expressions (St. John 2006; Tomlinson 2013).

There is, therefore, a *history* behind the learner's early learning and acquisition of the formal, scientific discipline, which is in the everyday, spontaneous activities that prepare the learner for formal learning during schooling. This happens, for example, when the learner overcomes impulsive and egocentric inclinations of pre-school years and begins to subject his or her will to others, and to the rules that regulate activities that are enacted during school learning (De la Riva & Ryan 2014; Harrison & Muthivhi 2013). It is the transformation of the rules that govern everyday, spontaneous activities into means for the regulation of own activities that naturally lead into the development and mastery of both social knowledge and knowledge of self. Vygotsky (1978) posited this relationship, firstly, as explaining learning and development broadly during spontaneous activities and, secondly, as explaining learning and development within specific context of formal schooling. The transformative relations between everyday, spontaneous knowledge and concepts and the scientific knowledge and concepts within formal schooling are explained through the innovative concept of the zone of proximal development (ZPD). As stated by Vygotsky (1978):

> Each school subject has its own specific relation to the course of child development, a relation that varies as the child goes from one stage to another. This leads us directly to a re-examination of the problem of formal discipline, that is, to the significance of each particular subject from the viewpoint of overall mental development. Clearly, the problem cannot be solved by using any one formula; extensive and highly diverse concrete research based on the concept of the zone of proximal development is necessary to resolve the issue. (p. 91)

The zone of proximal development in music instruction and reading acquisition

The concept of the ZPD can be conceptualised in two different but related ways. Firstly, it can be conceptualised through the relationship that underpins the child's participation in everyday, spontaneous activities involving role-play activities, including spontaneous forms of musical performances, on the one hand, and the child's participation in formal school activities that characterise serious learning during school years on the other hand. Secondly, the ZPD would define relationships that characterise the subject matter's conceptual organisation, including the concepts' dissemination through teaching on the one hand, and the child's progression in the acquisition and internalisation of the concepts on the other hand. The two processes should be understood as interrelated and mutually complementary – an essential point in understanding the multilayered functioning of the concept of the ZPD.

The ZPD is multilayered in that it is essentially created by the teacher's pedagogy through which he or she confronts the learner's psychological functioning (Chaiklin 2003; Gallimore & Tharp 1991; Hedegaard 1990, 1996, 2002; Wertsch 1984). The concept of ZPD can be understood as generally comprising multiple developmental trajectories in specific cultural traditions of learning and development within different societies and therefore as providing what Gallimore and Tharp (1991) have termed 'cultural zones' of development, while it can also be understood in its specific sense of application to the child's learning within formal school context as Vygotsky has, in fact, emphasised. Vygotsky defined the ZPD as:

> [*T*]he distance between the actual developmental level as determined by the independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. (Vygotsky 1978:86, emphasis in the original)

This conceptual development, according to Vygotsky, is propelled by the *guidance* of the more capable other, such as teacher or peer, but it is conceived as happening in the *proximal* distance between the child's own level of functioning *vis-a-vis* the level at which guidance through collaborative activities of pedagogical relations happens. Here is in fact the proposition for a contextual and cultural situatedness of pedagogy (cf. Lave & Wenger 1991), in its relation to psychological development and functioning within classroom teaching and learning. Meanwhile, Vygotsky's concept of the ZPD essentially connects pedagogy with the child's psychological functioning and establishes their fundamental

unity, where one relies on the other in a relationship that is uniquely qualitative and transformative (Chaiklin 2003; Hedegaard 1990; Wertsch 1984).

Furthermore, and more crucially, the conceptual relations posited through the concept of the ZPD are based on the consideration of the fundamental distinction that characterises the activities that define the child's learning and development in spontaneous, everyday contexts, *vis-a-vis* the child's learning and development within a formal school context. Vygotsky posited these conceptual relations through what he aptly termed everyday, spontaneous concepts on the one hand, and formal, scientific concepts on the other hand (Karpov 2003).

Vygotsky (1978, 1981) identified concepts that comprise all formal subject matter disciplines as 'scientific concepts', specifically to denote the special qualities that these concepts constitute, as opposed to their counterparts which he identified as everyday, spontaneous concepts. While spontaneous concepts are acquired through spontaneous activities in everyday life situations, the scientific concepts are acquired through the activities of systematic and formal learning process that characterise schooling. Furthermore, scientific concepts are considered scientific not necessarily because they constitute concepts in natural science disciplines, but, importantly, because they are organised systematically through rational, scholastic forms of engagement with knowledge and are repositories of human scholastic heritage – although, of course, presently often dominated by Western cultural traditions of scholarship. For Vygotsky, these concepts are naturally distinguishable from everyday concepts because of their systematic organisation and their specific concern with forms, generalisations and abstractions, rather than with content, specificities, immediacy and concrete situations as do the spontaneous concepts.

Today, this cultural heritage – of predominantly Western traditions of knowledge and conceptual systems – is an almost universal reality of formal schooling in many African contexts of schooling, and specifically in contemporary South Africa. Therefore, the cultural tools – in the form of the scientific concepts embedded and manifested in the social practice of school teaching and learning – would need to be made more explicit to learners through teachers' deliberate pedagogical approaches that articulate with learners' everyday concepts to create a new ZPD that sets learners on a new path of conceptual development, propelled by unique and specific conceptual relations that underpin the structural organisation of school and scientific concepts.

The significance of children's acquisition of scientific concepts during formal schooling, mediated in their ZPD, which the teacher creates through instructional activities pitched at the right levels that connect to learners' situational needs and interests, has important significance for learners' developmental trajectory. As Vygotsky has pointed out, learners' developmental path is fundamentally transformed in ways that otherwise would not be possible without formal school learning. Learners' progressive acquisition of the conceptual relations that underpin classroom instructional activities come to be driven by, and through, the conceptual relations of formal school scientific concepts which transcend contextual and empirical specificities that often characterise many traditional, content-oriented approaches to teaching–learning and instructional policy development procedures that still dominate today's schooling. That is, the conceptual relations that underpin the scientific concepts introduce new learning and developmental orientation on the part of learners, characterised by abstract, conceptual and theoretical approach to knowledge and problem-solving procedures (cf. Hedegaard 1990, 2002). The latter orientation to classroom instruction could have enormous benefits to learners in that it is oriented solely towards the mere passing of tests and scoring higher marks. Crucially, it is oriented towards the inculcation of developmentally oriented forms of learning, underpinned by the values and attitudes that naturally accrue from the unique and specific quality of engagement with, and acquisition of, abstract and theoretical concepts that characterise the specific subject matter knowledge domain.

This emphasis on the developmentally oriented form of teaching often runs, unfortunately, in contradistinction to many educational practices in the world today, including the prevailing South African instructional policy framework that gives precedence to strongly specified subject matter content knowledge and teachers' definitive role as disseminators of this knowledge, largely under the prescripts contained in the prescribed textbooks. The associated forms of assessing learners' learning and mastery of the subject matter through administration of tests and associated standardised assessment procedures have effectively resulted in the prevailing practice of 'teaching to the test'. In a statement, apparently intended to clarify the shift away from the constructivist model that was part of the organisational principles of the OBE framework that preceded the prevailing CAPS framework. The review committee proposed a model is essentially driven by, and based on, subject matter content knowledge organised on the basis of knowledge disciplines, with learners' creative and constructive activities inhering in discipline-based content knowledge (Department of Basic Education 2009):

> The intention of the National Curriculum Statement was to move towards greater emphasis on discipline-based subjects, the logic of which is derived from the subject discipline. Though all learners do engage in the construction of knowledge in terms of coming to understand certain concepts, skills and content, it has generally been accepted that these aspects *inhere within the subject*, and not in the minds of learners in the first place. (p. 24)

This approach in South Africa's policy framework, emphasising subject matter content knowledge and its transmission through discipline-based methodologies, may be viewed as privileging the transmission of tradition and heritage ingrained in the disciplinary concepts and knowledge, rather than the creative potential which learners'

engagement with concepts is likely to produce. The policy conception of teaching and learning through discipline-based subject matter content knowledge inevitably produces teacher transmission form of classroom pedagogy, and its associated passive mode of knowledge assimilation by learners who simultaneously learn to acquire knowledge and concepts without actively transforming these into personal knowledge repertoires. This approach to knowledge organisation and classroom teaching and learning stands in stark contradistinction with Vygotsky inspired developmentally oriented approaches that ground pedagogical processes on active engagement with subject matter content and its transformation into subjective knowledge, essentially connected to learners' evolving repertoires of personal conceptual and motivational dispositions (cf. Arievich & Stetsenko 2000).

The present, theoretically inspired and developmentally oriented approach to teaching subject matter content knowledge and its associated conceptual system foregrounds active engagement and relational practices of classroom instruction, oriented towards a transcendental or transformative learning and development (Hedegaard 1990; Vygotsky 1978). Therefore, the activities that characterise children's acquisition of musical performances in everyday life situations – such as during songs and dances in their communities – are viewed as providing them with grounded knowledge of culturally shaped, spontaneous forms of knowledge and learning that is part of their heritage. The teacher uses children's skills and knowledge repertoires acquired through their participation in everyday music learning activities to mediate their acquisition of formal conceptual structures and skills embedded in the activities of music instruction, thus transforming learners' spontaneous knowledge and concepts – as well as their learning and knowledge acquisition procedure – through formal instruction in school music lessons. Therefore, consistent with the original theoretical conception of the formal, scientific concepts, the nature of the conceptual structures that should underlie disciplinary content knowledge could be understood as deeply systematic and extensively generalisable, extending across the specificities of disciplinary boundaries and, therefore, establishing the internal, cross-disciplinary interconnectedness of phenomena, beyond artificial perceptual limitations (cf. Hedegaard 1990).

Joyful music versus serious reading

Reading ability imposes on learners the cognitive demands to hold two or more categories constant, namely letter-sound configurations or phonemic aspect of reading, at the same time that they keep up with the semiotic or interpretive and meaning-making aspect of reading activity. These demands should even be more extensive and potentially achieved with greater efforts on the part of foreign or additional language learners who, at the same time, may have to grapple with equivalent and even contradictory demands regarding the phonemic and semiotic (or meaningfulness) linguistic aspects related to and inherent in their first or home language; mastery of which they already would have acquired or are in the process of acquisition, at the same time that they are confronted with additional or second language learning.

Folk music, considered against the background of Vygotsky's framework – as well as the emerging field of music education inspired by this framework (see Barrett 2010) – could be viewed as a form of culturally shaped musical practice that simultaneously functions to support children's language development and mastery of the social world. As with play activities, music in everyday spontaneous activities is performed with a goal of deriving the pleasure and self-gratification that comes naturally to children in the course of their development. However, beyond self-gratification that children derive from these pleasurable activities, music contributes to children's development of language skills and social consciousness, for example.

Therefore, unlike the formal learning of reading and writing – which have the inherent potential to extend the child's knowledge of his or her language abilities at the same time that the child is introduced to the system of the formal concepts of school literacy, music instruction has the inherent potential to extend the pleasure aspect of everyday, spontaneous music performance activities at the same time that the serious formal learning and acquisition of formal concepts take place. When introduced appropriately, where meaningful connections between the spontaneous and formal aspects of music learning and development could be sustained, music instruction may potentially hold the key to the mysteries of learning motivation. The subject of motivation in and through learning is central in education and psychology today, and this also resonates with practical challenges of schooling in many parts of the world. This is especially relevant in South Africa, where the challenge of congruency between the cultural traditions and practices on the one hand, and the practices of formal school learning on the other hand, continues to stunt educational achievement and learning success.

As a result, music instruction in school may serve the critical role of connecting formal learning, on the one hand, to children's spontaneous musical performance and knowledge repertoires, on the other hand. Music could be understood as generally having an intrinsic and unique connection to the pleasure-driven motive, and as capable of producing activity that naturally leads to self-gratification normally associated with role-play activity, because both forms of children's activities have the capacity to serve as means, therefore enabling children to enter the world of adults and live in it on their own terms. In addition to its close connection to children's motives for self-gratification through pleasurable activities – a situation most pronounced in African childhood experiences – music activities generally have the advantage of readily invoking children's interests and motivation. Music instruction in school, therefore, has greater potential to promote learners' conscious awareness of the formal structure of the rhythmic and melodic structure of

performance more readily than reading instruction would achieve, and hence, enabling efficient mastery of meanings embodied by and underpinned in the symbolic structure of the notation system.

The present analysis, therefore, examines not just the inherent capacity of school music, in itself, to promote conceptual generalisation, but, and more crucially, considers the consequences of the teacher's intentional organisation of classroom instructional activities, and her teaching of music concepts and skills in ways that benefit learners' related learning and conceptual acquisition of reading and literacy skills. As a result, the current research contributes to an ongoing exploration of, and engagement with, the debate about possibilities for transfer of equivalent conceptual skills between and among related subject areas and disciplinary orientations. This research holds significant implications, not only with regard to expanding theoretical knowledge and debates about the subject of conceptual transfer across disciplines, but also with regard to the immediate problems and challenges of how to teach learners in ways that are congruent with the inherent nature of the conceptual relations that underpin children's development on the one hand, and formal school learning on the other hand.

Research process

The research process involved document review, comprising the collection of data from records of 32 learners in a boys-only school aged between 6 and 9 years. Data comprised assessment reports of learners as well as music and reading lessons in which learners had participated over a period, from Grade 1 to Grade 3. The data were obtained from two groups of 16 learners each, differentiated by participation and non-participation in the school's music instruction curriculum. The research group participated in music lessons, while the comparative group did not participate in the school's music curriculum. Both groups participated in the reading instruction curriculum, and their performance scores in reading were compared to establish possible comparative performance levels between the music learners and non-music learners.

All music learners would normally have two half-hour music lessons per week, and they were all exposed to Western classical music. The music curriculum also included playing a musical instrument, which only started from the second grade, singing in the school choir, which started halfway through the first grade, as well as being involved in all other musical activities in class. All learners were English speaking,[1] although other languages were also spoken either as home language or additional language.

Analysis of documents, including the learner performance reports and portfolio files, was aimed at identifying improvements in learners' reading ability across Grade 1, Grade 2 and Grade 3. Performance areas for literacy development and reading ability were specifically analysed, while class teachers' records in learners' portfolios, documenting any area of concern regarding learner progress in reading, and the support recommended to be provided by the 'learning support teacher', also provided crucial data for the analysis process.

Permission to conduct research was obtained from the local school authorities, whereas informed consent was obtained from parents and guardians of learners who participated in the research. Ethics approval was duly obtained from the institution within which the research was undertaken.

Reading instruction activities

Document analysis was conducted by the second author, and this involved analysing learners' reading activities comprising the reading instructional periods of 90 min per session. The observation focussed on determining the amount of reading covered during the lessons, and the organisation of instructional activities such as whole class or group teaching. Reading activities happened every school day and learners were encouraged to read aloud in groups while others listened attentively. Each learner had their own reader. During guided reading sessions, learners were grouped on the basis of ability levels. Guided reading sessions would normally last between 15 min and 25 min, with the teacher working with one group while other groups would be engaged in organised writing activities.

Shared reading involved the teacher reading text together with the learners and the teaching assistant often taking a session to model shared 'reading behaviours'. This normally happened during the early stages of reading activities when learners are still learning basic skills such as listening and responding within group reading context. By modelling how to pay attention, making eye-contact, joining in with the reading and responding to questions, for example, the teaching assistant contributed towards building basic reading skills that underpinned the actual reading activities.

Learners' basic reading skills were also facilitated through what was termed 'listening lab' stories, where they were encouraged to listen to pre-recorded readings of various stories in a special reading laboratory. Very often learners were asked basic questions after each listening activity. These questions, in the case of Grade 1 learners, were asked orally and learners were required to write down the answers to the questions as they progressed through the grades.

Reading policy for Foundation Phase learners, Grade 1 to Grade 3, specified activities to be covered during reading instruction, including letter naming fluency, initial sound fluency, phoneme segmentation and nonsense word fluency. Table 1 outlines the policy specifications for Foundation Phase reading instruction.

1. Although South Africa has 11 official languages, formal schooling in the majority of schools essentially takes place through the medium of English or Afrikaans. Therefore, although the majority of learners in Cape Town's southern suburbs, where the research school was located, would speak English at home, there would still be a significant number of learners who spoke different languages such as Afrikaans or Xhosa at home.

The reading policy specified that formal recording of learner achievement was to be done against the learning outcomes every term, using the national coding system. This coding system used levels rating codes of 1–4, as illustrated in Table 2. The rating code of 1 was awarded to learners who obtained percentile marks of 1–34, and their reading performance was deemed not to have satisfied the requirements for the specific grade outcomes. The rating code of 2 was awarded to learners obtaining percentile marks of between 35 and 49 and deemed to have only partially satisfied the requirements of the learning outcomes for the specific grade. The rating code of 3 was awarded to learners obtaining between 50 and 69 percentile marks and these learners were deemed to have satisfied the requirements of the learning outcomes for the specific grade. Learners who scored 70–100 percentile marks were awarded a rating code of 4, which was deemed to be an excellent performance, and were deemed to have exceeded the requirements of the learning outcomes for the grade.

Although the rating codes have since been amended (to a 1–7 coding system in 2011), learners who formed part of the present study were actually assessed on the 2004 policy framework. Furthermore, four sets of assessment reports for each of the four school terms per year, over a 3-year period – from Grade 1 to Grade 3 – were analysed (Table 1).

Music instruction activities

Music instruction activities included participation in formal music, which involved learning to play instruments such as violin, recorder, piano, keyboard and trumpet. The type of instrument provided to a learner depended largely on its availability, that is, whether the school had the specific instrument to lease out to the learner, or whether a learner's parent could afford to purchase the instrument in question. The opportunity to learn certain instruments also depended on availability of expert teachers, that is, whether a competent teacher was available to teach the particular instrument of a learner's choice, and whether the teacher had space available in the school timetable to contribute to teaching in the music programme. Furthermore, the learners in this specific case also had to be of a particular body size and build to handle his or her chosen instrument.

Other performing arts areas, such as singing, choir involvement and general class music, also formed part of the music programme of the school, and learners participated fully in all the activities. Each Foundation Phase class received weekly music instruction for 30 min from the music teacher. Lesson activities were in line with policy guidelines on the training of Foundation Phase learners in the performing arts subject. Learners learned to sing songs in English and were also introduced to new songs from different South African musical traditions in isiXhosa and isiZulu languages. A traditional Hebrew song was also introduced as the school also had learners from Jewish family backgrounds.

Each grade's head-teacher supplied the music teacher with a list of themes which will be covered by their classes and these themes would be integrated into music lesson activities. Special songs for assembly, which took place every Monday morning, would be practiced for Monday's performances. Learners often performed familiar songs with a slight change so they sounded a little different, so as to develop awareness of sound families. Phonological and memory skills were also developed during these activities.

Music lesson activities also introduced learners to textual representation of music performance through graphic charts or musical scores, which consisted, for example, of dots that represented steady beat and squares, as well as rectangles to represent word rhythms, or lines to represent melodic contours. Textual lesson activities were particularly meant to foster learners' abilities to connect sounds to graphemes or letters, and to connect perceptions of rhythm and pitch to graphic shapes.

Body percussion was introduced before percussion instruments, while the tapping of basic rhythms to a particular song was meant to signal the start of rhythmic concepts. The tapping of basic rhythms was also used to help students remember pronunciation of specific words in the song. The music teacher would demonstrate the pronunciation first, and then have learners repeat after him or her. This was often done by clapping hands, while learners pronounced the specific words in the text. Body percussion was also intended to reinforce learners' perception of steady beat, word rhythms and concepts such as high, low, higher and lower pitches. Percussion instruments were used mainly to aid learners in building phonemic awareness. The percussion instruments that were used included rhythm sticks, claves, guiro, woodblock, shaker eggs, triangles, finger cymbals, hand

TABLE 1: Reading activities adapted from the policy on reading.

Specific reading lessons activities	Foundation phase reading content specifications
1. Phonetic knowledge	Awareness of: • letter-sound correspondence • patterns in words • similarities and differences • rhyming and chiming words • syllabification
2. Building a sight vocabulary	Providing exposure to high frequency words in a variety of contexts
3. Picture cues	Acknowledging relevant detail, relating to own experiences
4. Reading on and back	Helping children make connections
5. Fluency and expression	Modelling or sharing reading with individuals, discussing context, dramatising, providing opportunities to read for an audience

Source: Western Cape Education Department, 2004, *Revised National Curriculum statement (RNCS) Grades R-9*, viewed 28 July 2014, from http://wced.school.za/ncs/ncs-n.html.

Note: The research reported in this paper was conducted in the years just before the 2009 transition into the current CAPS curriculum policy framework.

TABLE 2: Department of Education national coding system's progression schedule for Grades 1–3.

Rating code	Percentages	Description of competence
4	70–100	Excellent achievement
3	50–69	Satisfactory achievement
2	35–49	Partial achievement
1	1–34	Not achieved

Source: Western Cape Education Department, 2003, GET assessment guidelines and assessment requirements for 2004, *Circular: 0225/2003*, viewed 28 July 2014, from https://wcedonline.westerncape.gov.za/circulars/2003/e225_03.html.

chimes and song bells. Xylophones were introduced at a later stage to reinforce learners' perception of steady beat, word rhythms or melodic contour. Movement was added at a later stage, and it was intended to help learners organise their perceptions of musical sound in time and space.

Lastly, learners were introduced to music theory, where basic history of Western music was taught. Here, learners were introduced to various composers of classical music. They were also introduced to the various periods in musical history and the influence these composers had on the music of today. Excerpts from famous composers were listened to, and themes from their musical compositions highlighted and discussed.

Ethical considerations

Ethical clearance was obtained from the University of Cape Town, Faculty of Humanities in 2012 for the second author's research project.

Results

The intricate relations between music instruction and reading performance

> Does not the incessant pursuit of a more beautiful sound reveal paradigmatically that a main trait of human reality is to transcend itself? (Boesch 1997:183).

The results support the initial hypothesis that a strong correlation exists between learners' participation in music instruction on the one hand, and their improved performance levels in reading ability on the other hand. These results are inferred from the analysis of the performance scores of the learners who participated in the school's music curriculum, and their associated performance scores obtained during reading class assessment tasks, in comparison with the reading performance of an equivalent group of learners who were not part of the school's music curriculum (see Tables 3 and 4).

TABLE 3: Reading results of learners in the group that participated in the school's music instruction programme – The research focus or case study group.

Participant	Grade 1				Grade 2				Grade 3			
	Score 1	Score 2	Score 3	Score 4	Score 1	Score 2	Score 3	Score 4	Score 1	Score 2	Score 3	Score 4
A	3.0	4.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
B	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0	4.0	4.0
C	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0
D	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
E	2.0	2.0	3.0	3.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0	3.0
F	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0
G	3.0	3.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
H	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I	3.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	3.0	3.0	4.0	4.0
J	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
K	3.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
L	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
M	4.0	4.0	4.0	4.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0
N	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
O	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	3.0	4.0
P	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0	3.0	3.0
Average	**3.0**	**3.1**	**3.3**	**3.3**	**2.9**	**3.1**	**3.3**	**3.5**	**3.1**	**3.4**	**3.4**	**3.5**

TABLE 4: Reading results of learners in the group that did not participate in the schools' music instruction programme – The comparative group.

Participant	Grade 1				Grade 2				Grade 3			
	Score 1	Score 2	Score 3	Score 4	Score 1	Score 2	Score 3	Score 4	Score 1	Score 2	Score 3	Score 4
Q	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
R	3.0	3.0	4.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0	3.0	3.0
S	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
T	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0
U	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
V	2.0	2.0	3.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0
W	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
X	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Y	2.0	2.0	2.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0
Z	3.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0
AA	3.0	3.0	3.0	3.0	2.0	2.0	3.0	3.0	3.0	2.0	2.0	3.0
BB	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
CC	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	3.0	4.0
DD	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EE	2.0	2.0	2.0	3.0	2.0	2.0	2.0	3.0	2.0	3.0	3.0	3.0
FF	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Average	**2.5**	**2.6**	**2.8**	**2.8**	**2.6**	**2.6**	**2.8**	**3.1**	**2.9**	**2.9**	**2.8**	**3.0**

The four levels against which the assessment of learners' reading performance was scored, was based on South Africa's Department of Education's progression schedule (Table 2). This was the schedule which was in use at the time of the assessment of the performance of learners who participated in the study during the years 2010–2012 (Western Cape Education Department 2004).

The reading scores obtained from the majority of learners in the group that participated in music instruction were consistently higher at 'satisfactory' performance level (score of 3), while the reading scores for the majority of learners in the comparative group that did not participate in music lessons were at the lower rating score of 2, that is, 'partially satisfactory' performance level. The performance level for the music group was therefore at the average score of 3.2, significantly higher than the comparative average score of 2.7 for the group of learners that did not participate in music instruction classes.

Figure 1 represents the comparative performance levels across the two groups of music and non-music lessons learners, revealing the differential performance patterns between the two groups. The differential performance levels between the two groups is even more striking when we consider that only 8% of music group learners' reading performance was scored at the lower rating scores of 'not achieved' and 'partially achieved', while a significantly large figure of 32% of the non-music group was scored at the reading performance levels of 'not achieved' and 'partially achieved'.

Furthermore, over 32% of the performance of music group learners was scored at the highest performance level of 'excellent achievement', while only 8% of the rating scores of the non-music group was at the same level. Therefore, while Figure 1 reveals that around 60% of the learners' performance scores across the two groups was rated in the middle range of 'satisfactory achievement' level, their differential performance seems to be crucially manifest in, and potentially defined by, the significant shifts away from the lower level reading performance scores of 'unsatisfactory achievement', as well as the shifts towards higher level scores defining 'excellent achievement' in learners' reading performance. It is this shift, and the differential performance between the 'not achieving' and 'partially achieving', both categories overrepresented by the non-music group with 30% (as against a mere 8% in the music group), which should explain the performance differentials between the two comparative groups. Meanwhile, the shift towards excellent achievement by the music group, significantly surpassing the mere 'satisfactory achievement', with an average percentile score of 32% (as opposed to only 9% average percentile score by the non-music group) should similarly explain the performance differentials between the two comparative groups. Although learners in this elite, middle-class and historically white-only South African public school generally performed satisfactorily on average in their reading tasks performance (at the rating code of 3), the findings for the performance differentials, for the present analysis, suggests that it is the movement to a progressively higher levels of performance excellence, at the rating code of 4, that should in fact account for performance differences between the two comparative groups.

Conclusion

In conclusion, research on comparing possibilities for conceptual transfer between music learning on the one hand, and early learning and acquisition of reading ability on the other hand, should represent an innovative research trajectory in contemporary South African schooling. In this regard, the current research findings suggest that participation in music instruction could have beneficial effects on primary school learners' learning and acquisition of early reading skills. Although the relationship was established through

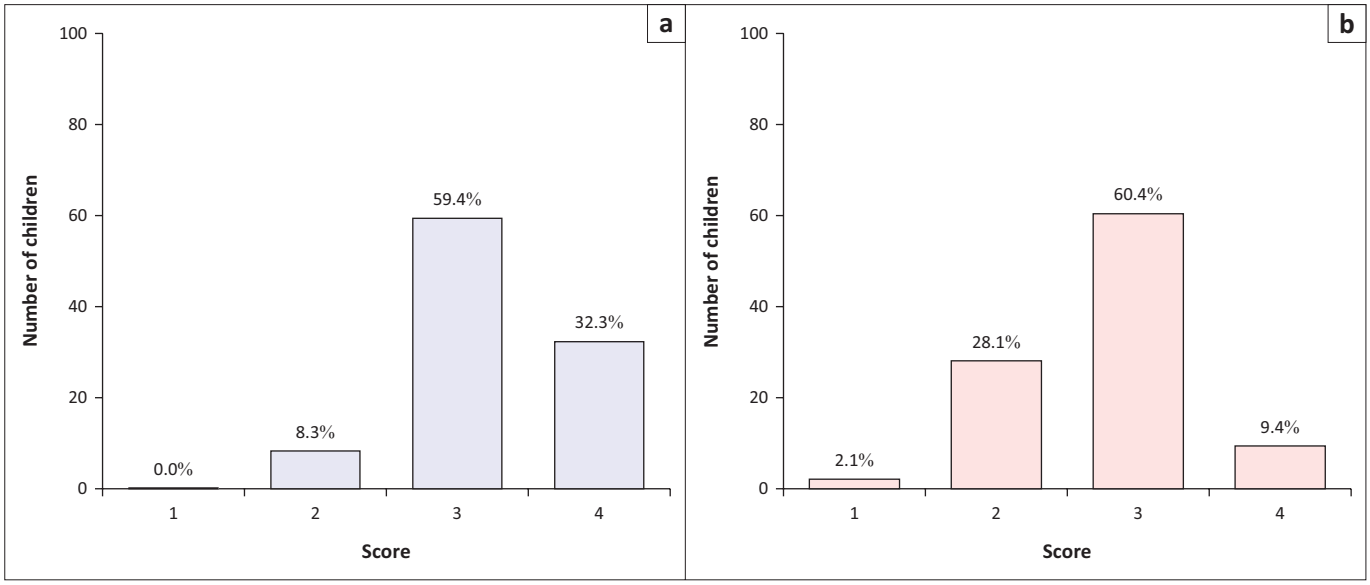

FIGURE 1: Bar graph representing reading performance scores of (a) learners in the group that participated in the music instruction programme and (b) learners in the group that did not participate in the music programme.

a comparison of performance results across learners who participated in music instruction on the one hand, and learners who did not take part in music instruction on the other hand, this relationship is not understood in a mechanical sense.

In demonstrating the relationship between learners' successful learning and acquisition of conceptual structures in one subject area of music instruction, and their successful learning and mastery of related concepts in a related subject matter area of reading or literacy lessons, the present research reveals a need within contemporary South African schooling for a systematic investigation of the essential nature of the conceptual relationships that characterise the two subject disciplines. Consequently, the present research further revealed how instruction could potentially be organised in ways that benefit possibilities for conceptual transfer on the part of learners. For example, systematic investigation of how music instruction could contribute to the development of associated conceptual skills required for effective reading on the part of learners, could address such areas as regarding the awareness of sound families, phonological and memory skills, word rhythms, ability to connect sounds to graphemes or letters, and the ability to connect perceptions of rhythm and pitch to graphic shapes. Specifically, the question of *how* the conceptual relations inherent in associated subject disciplines could be revitalised and embodied in, and through, effective and developmentally oriented instructional activities, or *how* to organise music instruction effectively so as to contribute to the developmental acquisition of reading abilities and literacy skills on the part of learners, should remain the critical focus of further research on the subject.

As in the epigraph taken from Boesch (1997:183), posited at the beginning of the 'Results' section, the conceptual relationship between music instruction and reading performance suggested by the results of this research should be understood in a transformative sense, in that the potential, and not the actual, constitutes the fundamental goal of teaching and learning. Boesch's view of the human condition, with specific regard to the cultural processes by which we construct our reality, is generally consistent with Vygotsky's (1978) concept of the ZPD, whereby the goal of teaching and learning is essentially to guide learning activities through the path what we could term 'transformative pedagogy', formal, discipline-based subject matter content into subjective knowledge forms that simultaneously transform the self.

Acknowledgements

The authors wish to thank the learners in the school where the research was conducted and their teachers for the collaboration. This research would not have been possible without their participation.

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

A.E.M. was responsible for the writing of the article, its conceptualisation and final production. S.K. was responsible for the collection of the empirical data which became the basis of the present research article.

References

Arievich, I.M. & Stetsenko, A., 2000, 'The quality of cultural tools and cognitive development: Galperin's perspective and its implications', *Human Development* 43, 69–92. https://doi.org/10.1159/000022661

Barrett, M.S., 2011, Towards a cultural psychology of music education', in M.S. Barrett (ed.), *A cultural psychology of music education*, pp. 1–16, Oxford University Press, Oxford. https://doi.org/10.1093/acprof:oso/9780199214389.003.000

Blacking, J., 1995, *Music, culture, and experience*, University of Chicago Press, Chicago, IL.

Boesch, E.E., 1997, 'The sound of the violin', in M. Cole, Y. Engestrom & O. Vasquez (eds.), *Mind, culture and activity*, pp. 165–184. Cambridge University Press, Cambridge.

Campbell, P.S., 1999, 'The many-splendored worlds of our musical children', *UPDATE* 7(14), viewed 03 June 2010, from http://upd.sagepub.com

Chaiklin, S., 2003, 'The zone of proximal development in Vygotsky's analysis of learning and instruction', in A. Kuzolin, B. Gindis, V.S. Ageyev & S.M. Miller (eds.), *Vygotsky's educational theory in cultural context*, pp. 39–63, Cambridge University Press, Cape Town.

Chisholm, L., Volmick, J., Potenza, E., Muller, J., Vinjevold, P., Malan, B. et al., 2000, *A South African curriculum for the twenty first century: Report of the review committee on Curriculum 2005,* National Department of Education, Pretoria.

Cloete, E. & Delport, A., 2015, 'Music education in the Grade R classroom: How three teachers learned in a participatory action inquiry', *South African Journal of Childhood Education* 5(1), 85–105.

Cockroft, K., 2015, 'The role of working memory in childhood education: Five questions and answers', *South African Journal of Childhood Education* 5(1), 1–18.

De la Riva, S. & Ryan, T.G., 2014, 'Effect of self-regulating behaviour on young children's academic success', *International Journal of Early Childhood Special Education (INT-JECSE)* 791, 69–96.

Department of Basic Education, 2009, *Report of the task team for the review of the implementation of the national curriculum statement,* Final Report, October 2009, South Africa, Pretoria.

Gallimore, R. & Tharp, R., 1991, 'A theory of teaching as assisted performance', in P. Light, S. Sheldon & M. Woodhead (eds.), *Learning to think*, Routledge/Open University, London.

Harrison, G. & Muthivhi, A., 2013, 'Mediating self-regulation in kindergarten classrooms: An exploratory case study of early childhood education in South Africa', *Journal of Education* 57(2), 79–102.

Hedegaard, M., 1990, 'How instruction influences children's concepts of evolution', *Mind, Culture and Activity* 3, 11–24. https://doi.org/10.1207/s15327884mca0301_3

Hedegaard, M., 2002, *Learning and child development: A cultural-historical study*, Aarhus University Press, Aarhus.

Hedegaard, M., 2005, 'The zone of proximal development as basis for instruction', in, H. Daniels (ed.), *An introduction to Vygotsky*, pp. 227–252. Routledge, London.

Henning, E., 2015, 'Editorial', *South African Journal of Childhood Education* 5(1), i–iv.

Karpov, Y.V., 2003, 'Vygotsky's doctrine of scientific concepts: Its role for contemporary education', in A. Kuzolin, B. Gindis, V.S. Ageyev & S.M. Miller (eds.), *Vygotsky's educational theory in cultural context,* Cambridge University Press, Cape Town.

Lave, J. & Wenger, E., 1991, *Situated learning: Legitimate peripheral participation,* Cambridge University Press, New York.

St. John, P.A., 2006, 'Finding and making meaning: Young children as musical collaborators', *Society for Education, Music and Psychology Research* 34(2), 238–261. https://doi.org/10.1177/0305735606061854

Tomlinson, M.M., 2013, 'Literacy and music in early childhood: Multimodal learning and design', *SAGE Open* 3(3), 1–10. https://doi.org/10.1177/2158244013502498

Van der Veer, R., 1994, 'The concept of development and the development of concepts: Education and development in Vygotsky's thinking', *European Journal of Psychology of Education* IX(4), 293–300. https://doi.org/10.1007/BF03172902

Vygotsky, L.S., 1978, *Mind in society: The development of higher psychological processes*, Harvard University Press, Cambridge, MA.

Wertsch, J.V., 1984, 'The zone of proximal development: Some conceptual issues', in B. Rogoff & J.V. Wertsch (eds.), *Children's learning in the zone of proximal development*, pp. 7–18, Josey Bass, San Francisco, CA.

Western Cape Education Department, 2003, GET assessment guidelines and assessment requirements for 2004, *Circular: 0225/2003*, viewed 28 July 2014, from https://wcedonline.westerncape.gov.za/circulars/2003/e225_03.html

Western Cape Education Department, 2004, *Revised National Curriculum statement (RNCS) Grades R*-9, viewed 28 July 2014, from http://wced.school.za/ncs/ncs-n.html