Article

Seeing the invisible: Theorising connections between informal and formal musical knowledge

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Abstract

This article explores the perceived disconnect between informal and formal musical knowledge, through a focused case study which aligned students' informal knowledge with aspects of the formal curriculum. The upper high school or senior secondary student participants had a background in the creation and performance of popular and contemporary music, and already possessed well-developed informal and aural-based learning skills. Using a latter phase of Green's (2008) informal learning research as a starting point, the students completed two written tasks: a scoring or transcription exercise, and an analysis report using the music "elements" or "concepts" framework of the syllabus. Legitimation Code Theory (LCT), was utilised in the theoretical appraisal of themes emerging from the study. Employing one LCT dimension known as *Semantics*, which explores the context-dependence and complexity of knowledge, a range of knowledge types were observed. These made visible points of connection and disconnection between the students' informal knowledge and the formal knowledge required to complete the tasks. The study highlights the limitations of informal knowledge as a sole basis for formal knowledge construction, but equally unveils points of connection between the two, important in informing teacher facilitation, and, much needed in curriculum reform.

Introduction

Over the past decade or more, practice within classroom music education has expanded considerably to include music learning from vernacular or aural learning traditions, frequently referred to as "informal" learning (Green, 2002, 2008). However, curricular and assessment practices have not tended to adapt at the same pace, resulting in an ever-present need to examine the relationship between the formal knowledge typically framed and valued in curriculum, with the informal knowledge and skills students bring with them into the classroom.

Practice in Australian music classrooms serves as a pertinent example. In the state of New South Wales (NSW) where this research was undertaken, popular musicianship has long been

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accepted in classrooms, as a curriculum for senior students with "informal" learning back-grounds has existed since the 1970s (Board of Senior School Studies, 1977). This high school syllabus known as *Music 1*, is characterised by practical learning, with a focus on music "ele-ments" or "concepts" to develop content knowledge (Board of Studies, 2009a). This course sits alongside a traditional alternative known as *Music 2*, where instruction is offered to students with established backgrounds in Western art music (or WAM). Traditional music literacy skills form the foundation for classroom learning here, with further options for advanced or exten-sion study provided (Board of Studies, 2009b). In this way, curricular structures in the present context serve to separate different kinds of learning and pedagogy as might cater to students with "informal" or "formal" learning backgrounds, rather than encourage a dialogue between the two (Carroll, 2019).

Seeking to investigate what common ground might exist between different forms of musical learning and knowledge, a research project was designed and implemented in my own class-room in Sydney, Australia (Carroll, 2017). For 10 weeks, students undertook a unit of learning addressing outcomes from both courses concurrently, providing a context in which to align different knowledge forms in the classroom. Utilising a latter phase of Green's (2008) informal learning approach as a point of departure, this paper focuses on the classroom learning experi-ences of a small group of students with well-established informal learning skills (a subset of the larger cohort), in order to examine the relationship between their existing knowledge and skills, and aspects of formal curricula reflective of both courses of study. In order to do so, the stu-dents undertook two tasks; a scoring or transcription exercise, and a written report using the music "elements" or "concepts" analysis framework. This article explores and theorises con-nections between the different forms of knowledge expressed in relation to these tasks.

Before presenting data which arose from the study and the methodology which supported it, the constituent features of *musical knowledge* need to come into closer view in relation to what Folkestad (2006) describes as a "spectrum" connecting informal and formal knowledge. To do so, Legitimation Code Theory (or LCT) will be introduced. LCT is a theoretical toolkit useful in the theorisation of knowledge practices; from the metalanguage of curriculum, through to micro level classroom interactions (Maton, 2014). Using one dimension of LCT known as *Semantics*, patterns in learning can be plotted graphically, making visible classroom knowledge practices and relationships between different knowledge forms.

Musical knowledge and Legitimation Code Theory (LCT)

Abstract, conceptual or symbolic forms of sound representation and more practical music making are typically regarded as dualistic or even oppositional forms of musical thought and expression. According to Swanwick (1994), there is a tendency to keep separate both "intuitive and analytical ways of making sense of the world" (p. 4). Elliott (1995) debunks dualism alto-gether and instead emphasises the primacy of procedural knowledge in music learning over all other forms. He states very simply: "Fundamentally, music is something that people do" (p. 39)—a philosophy encapsulated in his and Small's (1998) use of the term "musicking". Yet the premise that *doing music* leads to thinking and articulating ideas *about music* is an assumption upon which curricula in Australia and elsewhere remain founded (Board of Studies, 2009a, 2009b). All too often, however, teaching and learning separate abstract knowledge from con-crete actions or physical skills, rather than explore the complex relationship between.

Folkestad (2006), proposed a dialectic between formal and informal spheres of music-mak-ing and thinking, highlighting the "intentionality of the mind" as key to revealing potential points of connection between knowledge forms. McPhail's (2012, 2013, 2016) work employed

Bernstein's (2000) horizontal and vertical knowledge classifications. McPhail describes the "conceptual", "abstract", "coherent", "theoretical" and "formal" knowledge of *vertical discourse* as distinct from the "oral", "local", "tacit", "context-dependent" knowledge of informal or horizontal forms (2012, pp. 27–28). But to explore how these knowledge forms exist and interact within the classroom requires perhaps more than a typology or set of binary concepts. There are currently five dimensions to LCT, and in this paper I draw on the dimension known as *Semantics* which builds considerably upon Bernstein's (2000) classification of formal and informal knowledge known as vertical and horizontal discourse (Maton, 2013, 2014). Semantics involves two key concepts: *semantic gravity* (SG) and *semantic density* (SD).

Semantic gravity (SG), encapsulates the *context dependence* of meaning (Maton, 2014, p. 106). Musical knowledge strong in semantic gravity leans toward "intuitive", "situated", "tacit" and even "embodied" forms. For example, if a performer only ever plays music in a limited number of styles or genres, or always uses the same instruments, tools or learning processes, the knowledge and skills they acquire will display strong context-dependence. Such learning is extremely valuable and personal, but may not equip the learner to address music which works according to a different set of organisational principles, much less articulate how these principles operate on a conceptual level.

Semantic density (SD) on the other hand, encapsulates the degree to which *meaning is condensed* and then expressed in hierarchic, abstract, conceptual or theoretical forms (Maton, 2014, p. 129). Musical knowledge displaying strong levels of semantic density might typically be described as "theoretical" and draws upon terminology, forms of notation, and systems of analysis capable of explaining or representing multiple musical phenomena concurrently. Schenkerian theory, for example, displays strong semantic density, as it is capable of explaining common tonal patterns observed in many (if not all) works of Western art music (Brown, 2005).

Semantic gravity (SG) and semantic density (SD) are not absolutes (Maton, 2014). All music learning contains features of both on a continuum of strengths and weaknesses (indicated here by a + and/or a −). When examined concurrently and over time, the semantic concepts provide mutually beneficial ways of describing the same kinds of empirical learning phenomena, but with shifts in focus: from knowledge bound to a concrete context with fewer inherent meanings (or SG +, SD −), to increasingly complex forms with broader explanatory powers using terms, rules or symbols applicable to many learning situations (or SG −, SD+).

By placing the semantic concepts on a vertical axis, strengths and weaknesses in semantic density and semantic gravity may be mapped and plotted progressively over time, generating a semantic profile. This profile can plot teaching, learning, or both (Maton, 2013). When plotted heuristically, the semantic concepts provide keys to observing what Maton describes as "cumulative knowledge building" (2014, pp. 106–147), as changes in the relative strength and weakness of each semantic concept potentially generate wave formations connecting different forms of knowledge, as depicted by the dotted line labelled B in Figure 1.

The wave profile depicted in Figure 1 as B, contrasts with two semantic "flat lines" marked as A1 and A2. A1 depicts classroom discourse that remains at the abstract or conceptual level—perhaps a theoretical explanation of some kind which fails to connect with the student experience. A2 is an equally problematic "flat line" plotting classroom discourse which remains embedded within a practical learning encounter, failing to engage with concepts or ideas capable of speaking back to the students' immediate learning situation. The dotted line B depicts a potential "semantic wave", where classroom dialogue relates practical learning encounters with less familiar abstract or theoretical knowledge, connecting the concrete with the conceptual, enabling new creative possibilities or providing new solutions to problems over time.
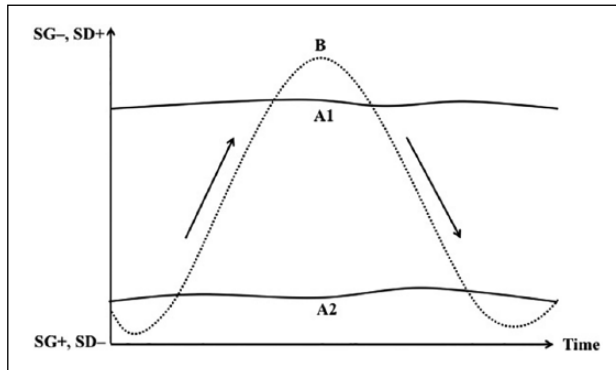
Figure 1. Three examples of semantic profiles (Maton, 2014, p. 143).

Before documenting specific examples of semantic waves generated during the course of this research investigation, an outline of the research design employed is provided.

Methodology

As the purpose of the research was exploratory in nature, qualitative research was undertaken with case study constituting the focus methodology (Stake, 1995). Research was undertaken at my own school, a small senior secondary music college catering for students aged between 16 and 18 years, enrolled for the final two years of high school. A range of data were collected with ethical consent. These included an initial student survey to investigate prior music learning and interests, video capture of classroom activity, work samples and follow up interviews. To verify and triangulate findings, teachers and students were invited to view and comment on pieces of video footage during the interviews undertaken at the end of the research period. All 10 weeks of lesson footage were transcribed and coded inductively to generate a body of emergent themes (Corbin & Strauss, 2008), with LCT employed only once a broader set of overarching thematic connections had begun to emerge.

Due care was taken to ensure that the principles of ethical research were observed and maintained throughout this study, with written consent obtained from the school, the participating teachers, parents and students before research began. Pseudonyms have been used to protect participants' anonymity during data analysis and in the presentation of findings. Although a number of work samples were collected in the course of the research, individual grades were not included in the analysis of data (Carroll, 2017).

At the beginning of the first school year, the 10-week research project was implemented with a group of newly enrolled students aged around 16 years, representing a broad range of musical skills and interests. As the research sought to expose a wide range of classroom responses, the teaching program integrated both music courses typically offered to senior students as outlined above. This also served an administrative purpose, as students and staff were often unaware of precise course suitability before enrolment, with the period of course integration thus serving to provide both students and staff time to consider and discuss longer-term options. Much of the learning was conducted in small friendship groups which the students chose themselves, providing a context in which to observe a spectrum of informal and formal responses aligned with individual student needs and interests.

The classroom project: Participants and the teaching and learning program

The topic chosen for study was Baroque music as it is listed in both course syllabi, however the teaching program was designed to facilitate a range of responses to this style context, and therefore addressed syllabus outcomes for both courses concurrently. Three phases of learning took place. The first phase was performance based (5 weeks), the second phase written (2 weeks), and the third phase offered two different task options designed to transition the students back into the separate courses of study (3 weeks). A total of five student groups and three teachers (including myself) undertook the 10 week unit, with four groups choosing to participate in research activities. The group who opted out of research participated equally in all learning and assessment activities off camera. This was possible due to the availability of separate rehearsal and learning spaces provided to each group at the school, facilitated by the teaching team. This paper is focused on data from the second phase where much of the informal knowledge generated throughout the earlier performance phase needed to be articulated and assessed formally in written form.

Using identical student groups as for Phase 1, two parallel tasks were undertaken. The first was a scoring or transcription task, with students asked to create a simple score of their earlier performance arrangement with a variety of scoring options provided. The second task was undertaken individually. As the arrangement was based on a Baroque work selected from a compilation CD that I had provided, the students were asked to make analytical comparisons between both the original work and its performed adaptation, using the "concepts" or "elements" framework. Each student was required to address only one of the six syllabus concept areas: pitch, duration, texture, tone colour, dynamics and expressive techniques, and structure. The design and rationale for the Phase 2 tasks acknowledged learning objectives from both Music 1 and Music 2 courses concurrently, that students "develop knowledge and skills *about* the concepts of music" through engaging in "learning activities" or learning experiences across multiple modes and contexts (Board of Studies, 2009a, p. 9; 2009b, p. 9; emphasis added). A range of abilities and learning orientations were acknowledged, with the scoring exercise encouraging the use of guitar tablature, chord symbols, and both graphic and staff notation. Equally, a series of broad definitions and question prompts facilitated the completion of the written reports using the syllabus concepts (Board of Studies, 2009a, 2009b; Carroll, 2017).

Due to the detail and complexity of physical, verbal, sonic, and written data generated, discussion in this article is limited to only one student group, known as the *Fugue* group (a name which will become apparent in due course).[1] Via the student survey, the students in the *Fugue* group reported established interests and skills in performing heavy metal. Their strengths lay in improvisation, songwriting, and aural-based learning (or playing by ear), with several members reporting they already performed together in a band outside of school. At the time of the research, these students claimed minimal formal or theoretical knowledge of music and limited confidence in music reading. Of the four groups involved in research, these students represented those with the most established informal learning backgrounds, and hence their learning path provided an opportunity to observe the relationship between their existing knowledge, and that required in classroom activities. Additional information from the survey relevant to the group has been presented in summary form with the use of pseudonyms in Table 1.

In order to preserve the internal chronology of classroom learning, the results are presented as an ethnography, with excerpts of lesson transcripts used to illustrate the emerging themes (Hammersley & Atkinson, 1995). Findings are presented in two parts: Part 1, relates to the Fugue group's completion of the transcription exercise, and Part 2, their completion of the

Table 1. Student survey results, Fugue group.

Student name	Gender	Intended course	Intended music major	Instruments played
Conrad	M	Music 1	Guitar/Song Writing	Guitar
Klein	M	Music 1	Guitar/Song Writing	Guitar
Blaire	M	Music 1	Guitar/Drum Kit	Guitar, Drums, Bass, Voice, Keyboard
Xavier	M	Unsure	Guitar	Guitar
Oliver	M	Music 1	Drum Kit/Song Writing	Drums
Ned	M	Music 1	Guitar/Song Writing	Guitar, Drums, Bass

written analysis. LCT Semantics concepts are then utilised to make transparent the relationships between the themes which aligned with different forms of knowledge expression over their two-week period of classroom learning.

Part 1: Findings relating to transcription

To briefly outline their progress to this point in the research, the Fugue group had selected J. S. Bach's *"Little" Fugue in G minor* (BWV 578) from the compilation CD I had provided. Unassisted, student Xavier was able to mirror by trial and error the solo melodic line heard on the organ recording with his electric guitar and then teach it to fellow group members Conrad and Klein. Accustomed to experimentation, Xavier's playing of the melody line was never limited to the notes contained on the recording, but also included distorted guitar effects, power chords[2] and rapid arpeggio patterns drawing from his prior knowledge of heavy metal music (subsequently labelled "metal", the term the students preferred). Oliver also shared a love of this style evident in drumming, which featured fast, complex bass drum rhythms to generate the thick and "heavy" sound typical of the genre. Students Blair and Ned displayed multiple instrumental skills (as outlined in Table 1), which they had acquired without formal tuition.

Over the remainder of Phase 1, the Fugue group abbreviated the original theme of the Bach fugue to four bars, and changed the key to D minor. This was done in order to accompany the melody with a series of rhythmically charged power chord riffs using drop D tuning,[3] a structure in rehearsal which the students labelled a "break-down".[4] Through a series of teaching interactions I then introduced a number of unfamiliar concepts derived from the original Bach composition, including the modulation of subject entries from tonic to dominant keys characteristic of fugue writing. The students picked up on these ideas, but incorporated them within the known syntax of metal; using homophonic textures, even phrase structures, rhythmic complexity, tonal juxtaposition, and high levels of repetition all played with characteristic distortion and virtuosic flair typical of the genre. Importantly, their communication integrated physical, verbal, and sonic gestures, with the students remaining mostly unaware of the direct relationships between the original material, and their later stylistic adaptation of it for live performance.[5]

Moving into Phase 2, my colleague Justin decided to step in to assist the boys as they were unsure how to begin the process of transcription. Justin began by asking the students to make a decision about how they would measure the lengths of sections played in their arrangement. The conversation that ensued unveiled the boys' rich understanding of their performance, not

easily expressed in words, but rather, through the use of gesture and improvised syllable patterns (such as "du", "ba", "ka" and so on) known as non-lexical vocables (Fatone, 2010; Hughes, 2000). Recorded here in full, the teaching exchange began as follows:

Justin: What I would do from here is work out what the tempo or feel is... so, the number of bars if you like that go past. (To drummer, Oliver)... Can you sing me a little bit of the time so I can hear it?... Show me the count in!... What do you do? [Oliver claps a bar of 4/4 at approx. 140 bpm]. Ok, now these could be a number of things... [Justin joins Oliver in clapping the pulse]... These [claps] could be quavers... [Justin counts to eight and demonstrates the relationship of this beat to Oliver's beat by adding a crotchet pulse against it]... Or, these could be like minims! It really depends on what else is going on. So that's determined by you guys as to what your count in actually represents... (to guitarist Conrad), So sing what you're doing...

Conrad: It just chugs.

Justin: Let's just hear it... [Justin is still clapping Oliver's earlier pulse beat. Conrad uses the spoken syllable "da" to articulate the rhythm for the break-down power chord riff against Justin's clapped pulse beat. After several repetitions, Justin joins Conrad in repeating the syllables to confirm his understanding of the pattern]. What could they be? ... [Justin isolates and repeats the syllables for just the opening bar of the riff]... What would be logical?

Oliver: Quavers.

Justin: To me it sounds like quavers... (to Oliver) Now sing me your drum feel... [Oliver used the syllables "du" and "ka" in order to differentiate the tonal qualities of the bass drum rhythm (du) from the snare drum hits (ka) on beat three of his drum pattern. As before, Justin imitates the pattern, this time confirming his recognition of the meaning behind the different syllables used by mirroring Oliver's hand gestures to ghost the snare drum hits on beat 3 of the pattern in each bar]... So you hit the snare there?... So it sounds to me like your beat is crotchets... Your count in is crotchets. If you can get a firm sense of that it's going to make life a little bit easier.

By using echoing and mirroring strategies, Justin reinforced the importance of the students' aural and kinaesthetic memories of their playing, and used these to build consensus concerning the value of durations (bars and note values). His strategy also weaved in unfamiliar rhythmic terms ("minims", "crotchets" and "quavers"), using student responses as demonstration. From there, Justin used the pulse (now consolidated as a crotchet), in order to count the number of bars for each section. A sound recording of their performance aided this process.

Next, the boys' four bar melodic subject came into focus, as it featured in most sections of the arrangement. Using a graphic step diagram, Xavier sketched out his representations, against which Justin introduced equivalent sketches of the same material using staff notation as shown in their work samples (see Figures 2–5).

Although given the choice to continue using graphic symbols, tab or other means, the students were keen to continue to use staff notation to complete the exercise. Using a template created by Justin, the boys began to piece together their score by sketching out the broader structural units in terms of bars, and then inserting the melodic material provided by Justin at the appropriate structural points. Xavier then derived the melody in A minor for the second
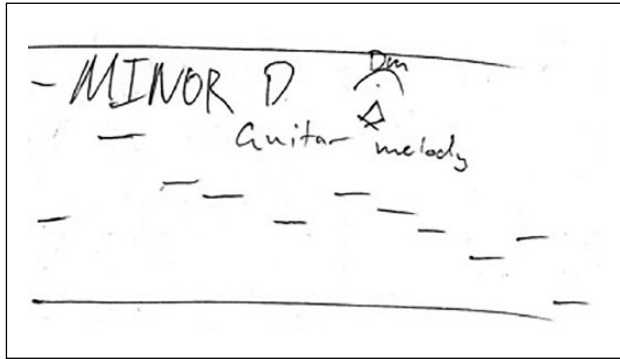
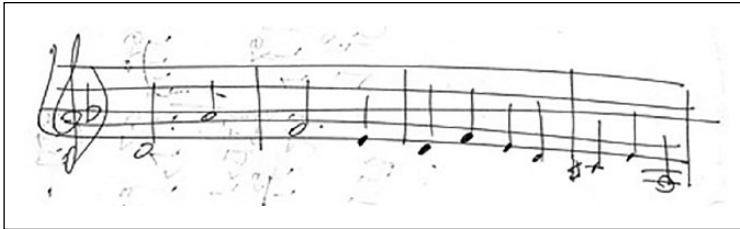**Figure 2.** Xavier's graphic fugue subject melody, bars 1–4.
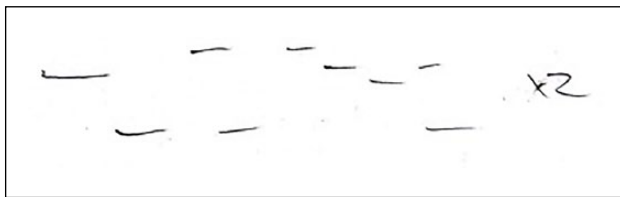

Figure 3. Justin's fugue subject, bars 1–4.

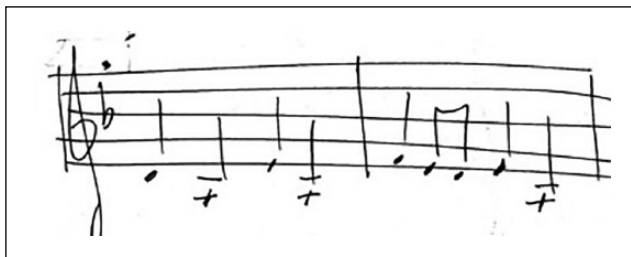**Figure 4.** Xavier's graphic fugue subject melody, bars 5–6.

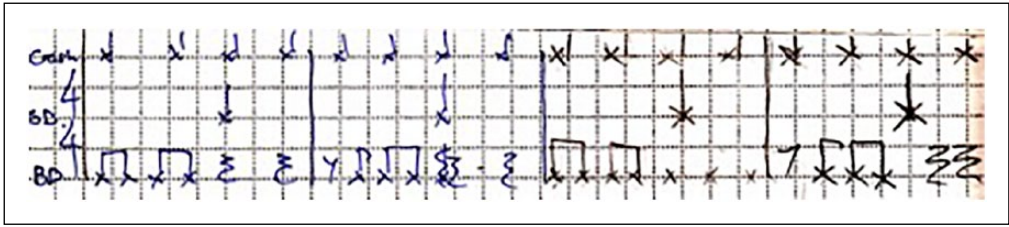**Figure 5.** Justin's fugue subject, bars 5–6.

Figure 6. Oliver's "break-down" drum riff.

Figure 7. Fugue group score excerpt initial break-down section, second phrase.

subject, by recalling the notes he had played in relation to their positions on the fretboard of his guitar. Unassisted he then notated these in the score at the correct structural points.

Deriving the accompaniment patterns worked according to a similar process, however this required a focus on rhythmic complexity rather than on pitch. Here problems began to surface as the boys' "break-down" riffs had featured syncopation. I provided some extra scaffolding for Oliver using graph paper. Using both vocables and gestures ("air" drumming), the drum pattern as shown in Figure 6 was derived.

Xavier then used Oliver's drum riff to generate the interlocking guitar and bass riffs, subdividing where necessary in order to complete the score by hand. Although containing numerous enharmonic and rhythmic inconsistencies and several incomplete passages, it is a remarkable attempt for students previously inexperienced in using staff notation. A scanned excerpt showing a portion of the original "break-down" material from the student score is provided in Figure 7.

Thematic analysis

The preceding ethnographic description outlines a number of different ways the students and teachers expressed knowledge in relation to the original performance, and the transcription of this performance using staff notation. When analysed thematically, five categories emerged in roughly this order:

1) Spoken or sung syllables (non-lexical vocables) and bodily gestures
2) Touch and the spatial layout of instruments
3) Graphic notation symbols
4) Excerpts of staff notation
5) Full scoring

Each category is explored below with the support of relevant literature and in the following section LCT Semantic concepts are utilised to unveil a series of connections between them.

1. Vocables and bodily gestures

Bowman states, "the body is an inextricable, constitutive element in music cognition" (2000, p. 48). For the Fugue group, embodied knowledge manifested in the form of non-lexical vocables (nonsense vocal syllables such as "du" and "ka"), and through physical movements or ghosting gestures (tapping, strumming, "air" drumming, etc.) mirroring the somatic experience of the Phase 1 performance. Together, the presence of the vocables and gestures worked to generate a basic form of abstraction, providing the means to itemise, verify, and translate the students' embodied knowledge prior to visual depiction.

2. Kinaesthetic knowledge

Bowman (2000) discusses the way violinists "hear music with their fingers" as evidence of the connection between tactile sensation and aural cognition (p. 55). Further, Godøy (2003) proposes the term "motor-mimesis" to explain cross-modal learning linking "sound", "visual imagery", and "sound-producing actions" (p. 318). When referenced in terms of the students' fine-motor or touch memory, the students' embodied knowledge extended to incorporate meaning associated with the spatial layout of their instruments.

In the preceding account, the boys' touch memory became the basis for labelling systems for both pitched and rhythmic riffs. Using touch memory in relation to the fretboard of his guitar, Xavier was able to work backwards from Justin's notated examples to transpose the fugue subject, and then deduce the pitch and duration patterns of the riff material in a different key. These strategies remained discrete, occurring spontaneously and never requiring further discussion. Together, they provided foundation for the students' use of graphic notation symbols, and, the introduction of staff notation in the teaching and learning sequence.

3. Graphic notation symbols

The use of graphic symbols provided a way of visually depicting the various embodied knowledge forms expressed to this point. Although remaining inconsistent in design and presentation in each case—dashes to capture pitch by Xavier, or grid diagrams to depict rhythm by Oliver—the use of graphic symbols provided a way of isolating individual riffs, melodies, and rhythms and then writing them down. When studied closely the boys' graphic diagrams reveal insights into their established analytical thinking. For example, Xavier's melodic graphs (Figures 2 and 4) show remarkable accuracy in representing like pitches within the key of D minor (the 1st, 5th, and 8th notes all use the same latitude line for the tonic note "D"). The graphs are, however, limited to pitch and phrase structure, and do not capture note lengths nor metre. Conversely, the graph constructed by Oliver and myself (Figure 6) depicted pulse and rhythm, and provided a template by which to measure subdivision in his drum line. These

representations would prove useful pedagogic tools linking embodied knowledge with short staff notation excerpts, introduced next by the teachers, but then taken up by the students.

4. Staff notation excerpts

Staff notation excerpts were introduced via the graphic representations, and each time in sketch form of individual instrumental parts. These fragments served to provide a more stable and consistent format through which to capture pitch and rhythmic understanding simultaneously. When introduced, staff notation also provided the means to visually reinforce new and known pitch and rhythmic terminology in relation to the boys' playing. This visual medium then provided a context in which to piece together all of the preceding information in the form of a larger score.

5. Scores

When aligned, fragments of staff notation became the basis for a collective score created by the group. This was possible due to the high levels of repetition used in the performance, with the students not required to transcribe the improvised material. The scores then became the basis for further discussion and comparison between both original and performed versions of the fugue, allowing the introduction and consolidation of theoretical concepts relating to texture, tonality, and so on.

When aligned, the five distinct classifications—vocables and gestures, kinaesthetic knowledge, graphic symbols, staff notation excerpts, and whole scores—reveal "cross-modal" links between aural, kinaesthetic, and visual modes of communication (Fatone, 2010, p. 397). With each presented in a general sequence, theoretical appraisal using LCT semantics reveals connections between the different forms. As each student contributed differently to the exercise, the following analysis presents a general profile only, plotting their learning progressively over time.

LCT analysis: Semantic profile for transcription

A series of transitions took place translating individual learning experiences gained in performance into a collective score representation. The basis for this was the performance, which had already involved a kind of informal analysis, without which it would have been impossible to learn and structure the musical material. However, performance knowledge had been gained cross-modally, involving the integration of a number of individual tacit skills or particulars including muscular and auditory memories associated with physical touch. Such knowledge is embedded in layers of *context dependence*, exhibiting relatively strong semantic gravity (or SG+), and was different for each ensemble member.

The first step away from this very rich but context dependent learning involved the use of non-lexical vocables and ghosting gestures, which served to represent, for the purposes of communication, ideas implicit in the performed musical event. In other words, musical actions (with stronger semantic gravity, SG+) were subsequently expressed using embodied vocables and gestures—entailing a very simple or basic form of generalisation or abstraction (or weakening of semantic gravity, SG–). Equally embedded in memory was knowledge gained in relation to physical touch and spatial layout of instruments (again stronger semantic gravity, SG+). This kinaesthetic knowledge is also situated bodily, but is capable of generating simple abstract labels in regular units of sound or "notes" exhibiting more complex or condensed
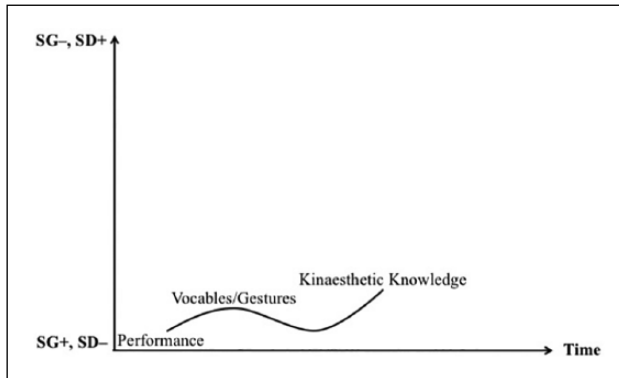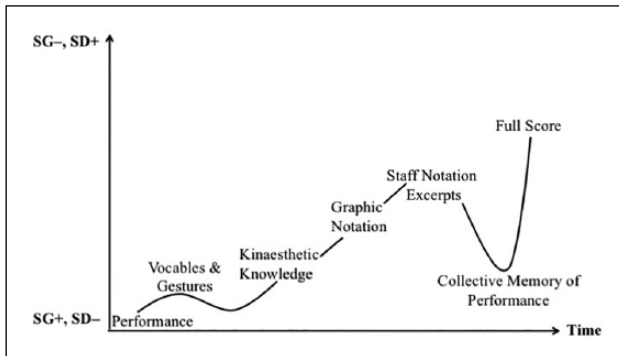
Figure 8. Fugue group initial semantic profile.

Figure 9. Fugue group semantic profile for transcription exercise.

meaning than the preceding vocables and gestures (weakening semantic gravity, SG– and strengthening semantic density, SD+). As this sequence was observed across the group (although not by all members), a series of upward waves were generated in their collective semantic profile as shown in Figure 8.

Once graphic depictions were attempted, knowledge of the performance (with stronger semantic gravity, SG+) could be expressed in increasingly abstract ways, including pitch, intervallic relationships, phrase structures, rhythmic subdivision, polyrhythms, syncopations, and so on, although these terms were not explicitly used by the students at the time. This entailed a gradual synthesis of meaning exhibiting weaker semantic density (SD–), toward more highly complex or condensed forms (or SD+). When standardised using fragments of staff notation, more meanings were condensed into single representations, capable of depicting tonality, pitch names, phrase structures, exact note durations, and subdivisions simultaneously, progressively strengthening semantic density (SD+). Compiling these excerpts into a score required each student to revisit their memory of the Phase 1 performance (still exhibiting stronger context dependence, SG+), in order to align individual scored fragments with a co-constructed score (entailing stronger and stronger semantic density, SD+). The resulting profile shows a series of upward sweeping waves generated through the expression of these knowledge types over time (see Figure 9).

Figure 9 depicts how knowledge embedded within the original performance was made transparent—pulled apart, itemised, labelled, manipulated, and systematically put back together again in more highly condensed or abstract form. From this point on, the students worked individually on written reports drawing upon all of the learning undertaken to this point in order to inform analytical comparison. In the next section I return to the classroom ethnography, which picks up where the boys began this process, again with Justin's oversight.

Part 2: Findings relating to music concepts analysis

As stated, the transcription and analysis tasks were commenced simultaneously, with a considerable degree of overlap intended between the two. With this in mind, a teaching exchange was recorded at the beginning of Phase 2 between Justin and the Fugue group concerning the syllabus concept *Structure*, as this had initiated the transcription process. To begin, Justin asked the boys to create a common list of terms to describe the sequence of sections that had structured their performance, in order to organise the layout of their score. This meant that informal terminology used in rehearsal such as "break-down" became the basis for more "official" classroom discussion—a considerable shift and one that neither party was necessarily prepared for.

Conrad was asked to read his list first and chose to use the names of the performers featured in each section of the piece, along with their musical role as the basis for his summary. Klein then contributed with the terms: "Intro, Chorus, Melody, Break-down, Harmony, Improv", revealing his identification with the piece in terms of the style and the musical features used. Similarly, Xavier's list used the terms: "Intro, Melody/Chorus, Improv, Key-change Chorus, Chorus (in original key), Outro", conveying his understanding in relation to changes in tonality and the unifying features between the sections. These lists revealed the students' understanding of the melodic subject in the arrangement as serving structural and textural roles concurrently, both unifying the sections, and featuring in the foreground melodic layer each time, much like a "chorus" would function in popular music.

Oliver's list was the most cumbersome. His terms revealed a drum-centric view of structure, with changes in tempo, feel, and dynamics added in to the discussion. Oliver's list read: "Intro, Melody/Build-up, Drop... quiet for a second and then I count in... Break-down... heavy, 2nd half of Break-down... goes half-time and then gets heavier with the melody over the top, Improv, Key Change"... at this point trailing off, as Justin had become lost in the detail, and as a consequence had moved on to discuss how the group might create a common list of structural terms.

These responses highlight how differently each of the boys had experienced learning to this point, acquiring knowledge idiosyncratically in relation to individual skills and musical contributions. To address this inconsistency, Justin then attempted to create a set of uniform terms and symbols he deemed more appropriate to the exercise. But in doing so, he introduced unfamiliar classical terms in order to modify and consolidate their lists. The following exchange illustrates how this process began:

Justin:	What is the intro?
Xavier:	Blaire comes in and then I play the melody and then it goes like straight into a break-down.
Justin (to Xavier):	So you play like an improvised or a *rubato* melody at the start?
Xavier:	Um...What's rubato mean?
Justin:	It's kind of out of time, is that what it was?

Table 2. Comparison of Justin and the Fugue group's terminology for *Structure*.

Justin's terms	Fugue group's terms
Figure A: Introduction – Rubato	Free time, Xavier plays the melody and Blaire and Ned hold the chord underneath
Figure B: First theme – Tempo 1 Half-time	Break-down, Blaire plays the melody and band plays the rhythm
Figure C: Interlude – Held Pause or Fermata	Blaire plays a solo with the melody including the next part of the song—no band
Figure D: Improvisation – Double-time	Where we improvise in double time
Figure E: Modulation – Tempo 1	Key-change melody in half-time
Figure F: Original Theme – Tempo 1	Same melody but in original key
Figure G: Coda – Original Theme with Fermata	We play the melody alone as an Outro with a held note to finish

Xavier:	[Hesitant]...I think so?
Oliver:	Is this when it's during the opening?
Xavier:	But we didn't have like a set time there...
Justin:	It was very slow was it?... [re-iterating this after one of the boys mumbles the word "slower"]
Xavier:	Yeah.

Justin continued to construct a formalised labelling system for the students by condensing and modifying their vernacular terms. However, as the transcript demonstrates, his attempts to standardise musical language also introduced foreign and stylistically disparate terminology. The comparison in Table 2 summarises the verbal exchanges unfolding from this point onwards over the next piece of lesson footage.

As Justin attempted to bring a sense of order to the boys' individual accounts, a degree of synthesis is brought to their collective discourse. At the same time, his recasting of their list superimposed unfamiliar terminology over their own, without exploring connections between the two. This situation occurred due to lack of time, but also due to the relatively weak framing of concepts terminology in syllabus documents (Board of Studies, 2009a, pp. 16–19; 2009b, pp. 15–19). Without a definitive list of terms and symbols appropriate to distinct stylistic mediums, Justin deemed those aligned with WAM more appropriate choices in the situations described. From this point, the boys worked without teacher oversight to complete the written analysis exercise, each addressing a different syllabus concept area. A sample of these reports is discussed next, with LCT semantic concepts used to support explanation of some of the challenges encountered in relation to the exercise.

Individual student reports

Each student was required to submit an individual report focusing on a single syllabus concept area, and using this, make comparison between the performance arrangement completed in Phase 1 and the original Baroque work upon which the performance had been based. Detailed written and verbal instructions were provided, as well as a list of syllabus definitions to scaffold the completion of the exercise. As the transcriptions were completed in groups, the analyses were largely undertaken outside of class time. This proved an oversight on my part, with the
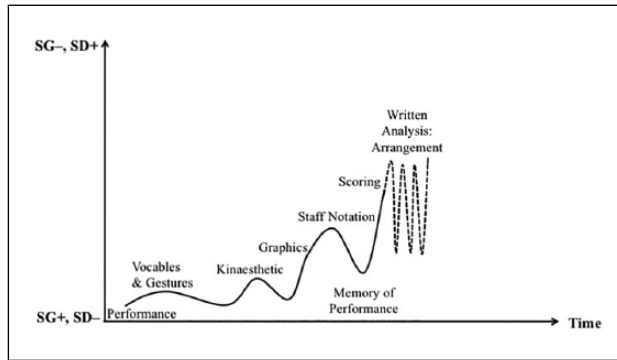
Figure 10. Fugue group semantic profile for transcription and analyses of the student arrangement.

students struggling to articulate using abstract terminology aspects of their learning undertaken thus far.

Oliver, the group's drummer, chose to address the syllabus concept *Duration*, articulating clear responses concerning the rhythmic content in the metal arrangement. He used the term "free time" (rather than Justin's suggested "rubato") to describe the introduction section, and beat divisions and feel changes in the break-down riffs using the terms "sixteenth", "eighth" and "quarter notes" (terms typical in drum pedagogy). Tempo and feel Oliver discussed as "half-time" and "double-time", supported by examples of graphic notation completed during the transcription task as demonstration. This meant that he was able to couple descriptive context dependent examples from his playing (exhibiting strong semantic gravity or SG+) with several abstract music symbols (weakening SG) and complex conceptual terms (strengthening SD) in the commentary addressing his drum line.

However, Oliver's report centred almost solely upon his accompaniment material, omitting discussion of rhythmic interplay between the ensemble. Also, he only briefly ventured to discuss the original version of the Bach Fugue, unsubstantiated by reference to the score. Using only his impressions of the recording as basis, he listed tempo changes that did not occur, but rather, were confused with surface level detail and ornamentation in the Bach fugue.

In keeping with Justin's earlier example, Conrad's discussion of the syllabus concept area *Dynamics and Expressive Techniques* employed classical Italian terms, incongruent with the boys' metal adaptation. Like Oliver, Conrad's discussion of the Bach fugue was brief, listing general observations of volume changes and expressive details unsubstantiated by clear examples. In LCT terms, Conrad's report, like Oliver's, exhibited limited semantic range reflecting more closely his experience of the performance (or SG+), rather than a critical comparison between the two versions of the fugue. Blaire's *Structure* analysis revealed similar limitations. Blaire competently fleshed out Justin's structural outline of the metal arrangement, but his consideration of the Bach Fugue lacked depth. Although Blaire showed initiative in researching the formal structure of the original work, his application of the terms "exposition", "subject", "tonic" and "counter-subject" (terms exhibiting stronger semantic density, SD+), were not supported by reference to relevant examples from the score or the recording (requiring connections to relevant specific examples, or SG+). The remaining reports from Ned, Klein, and Xavier were difficult to read, relying on guitar-centric language not clear to an outsider.
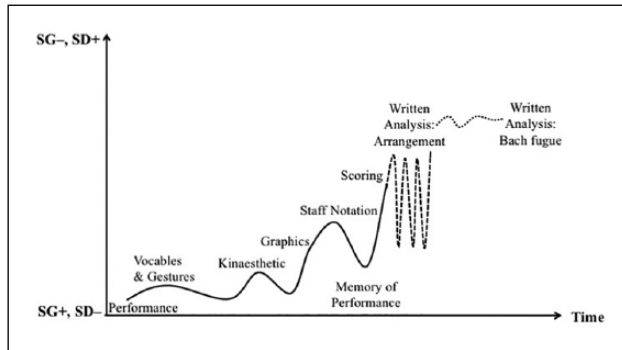
Figure 11. Fugue group semantic profile for transcription, and concepts analyses.

LCT analysis: Semantic profile for transcription and concepts analysis

In this section, a synthesis of this commentary is provided in order to link with the semantic profile generated during Part 1 in relation to transcription. Where the boys' conceptual thinking was articulated clearly, a relationship can be seen between the students' ability to bridge various learning experiences undertaken over the course of the research, and use these as the basis for written analysis—accumulating learning and coupling new terminology with old along the way. At times this occurred, particularly when incidental classroom discussion or the preceding transcription exercise had generated shared understandings of either new terms or music symbols in relation to the earlier performance. These reports thus exhibited semantic range when formal terminology and graphic symbols (encapsulating stronger semantic density, SD+) were supported by relevant illustrative commentary from the performance (utilising examples of semantic gravity, SG+). However, this combination of technical terms supported by relevant examples proved difficult for the students to express in writing, as indicated by the broken line in Figure 10.

A further challenge was that the learning had not equipped them to make critical comparisons between both student and original versions of the fugue. As ear players, their written descriptions of the organ recording had been based upon general impressions, with inaccurate, or descriptive language used. This outcome is reflected by a weak dotted flat line in Figure 11, with any attempted discussion of the Bach fugue lacking semantic range.

This finding however implies a separate set of student outcomes. The first tenuously connected all previous learning, resulting in a profile of increased semantic range, coupling abstract terms and symbols substantiated by specific description and examples (SD+ supported by SG+). The second remained more closely aligned with the boys original learning experiences, reflecting language used in conjunction with their playing and hearing, and hence, exhibiting weaker semantic range or a lower flat line (or SG+, SD–). Both outcomes are reflected in Figure 12.

The written concepts analysis exercise had been deceptively difficult. It had required a subtle coupling of formal analytical terminology (SD+) with examples from two distinct learning contexts (SG+), in order to forge critical comparison between the two. Despite the amount of time the students had been exposed to the Bach fugue, they had gained little awareness of its internal workings. The exercise had generated knowledge best described as *segmented* (Maton, 2009): as the learning undertaken on the student arrangement had remained largely context
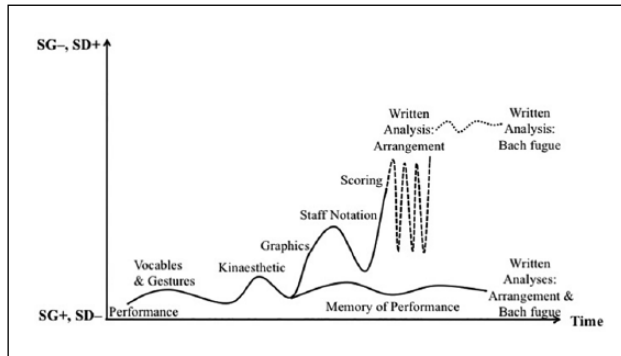
Figure 12. Fugue group complete semantic profile for transcription and concepts analyses.

dependent, and had not allowed them to address a musical work less closely aligned with their hands-on learning experiences. This is not to say that pedagogy could not have more intentionally drawn out points of connection and comparison between the two, but that formal knowledge relating to the Bach fugue had not been acquired through informal experience, and, student-led critical analysis.

Conclusion

This research revealed a series of possible connections between students' informal knowledge, and more formal knowledge forms represented by the task at hand. The first set of connections became apparent during the transcription task, where five different forms of knowledge could be observed. Analysis generated a gradual upward sweeping semantic profile, bridging knowledge already gained in the performance (exhibiting SG+, SD–) to new knowledge acquired to generate the scores (gradually SG–, SD+). Further, the transcription exercise proved the more unproblematic of the two, despite the limits imposed in conveying much of the improvised material and sonic nuances integral to aural-based musicianship. Regardless of these tensions, many of the students were eager to become proficient with staff notation as a skill previously left unaddressed in their music education, with peer and teacher collaboration providing meaningful ways to connect aural- with notation-based thinking.

Notation also provided students with useful tools with which to articulate their learning using the music concepts schema of the syllabus. However, a larger set of problems was encountered due to pedagogical oversight, the weak framing of terminology in syllabus documents, and the difficulty in using language alone to represent musical thought. Words proved too personal and style- or genre-specific in which to solely base teaching and learning, highlighting concerns with the concepts framework as a solitary tool for teaching and assessing, focal or formal. The overarching syllabus rationale that students "develop knowledge and skills *about* the concepts of music" through engaging in "learning activities" or learning experiences across multiple modes and contexts (Board of Studies, 2009a, p. 9; 2009b, p. 9; emphasis added) was brought under close examination. Acknowledging that the present scope of this study does not allow for a full range of learning experiences to be explored, it appears that hands-on music-making does not naturally enhance a students' ability to articulate abstract knowledge, with formal terminology supported by referenced musical examples (SD+, SG+) more highly valued in assessment than the students' personal reflections or vernacular terms (SG+ alone).

LCT Semantics provides a valuable theoretical lens through which to view these findings, providing useful pedagogic insights important to future research investigation and potentially to curriculum reform. Making knowledge visible appears key to meaningfully connecting formal knowledge with students' informal learning experiences and, potentially, to broadening and enriching those experiences over time. By utilising a lens that "makes visible" knowledge types, there is potential to enlarge classroom discourse to reflect more inclusively the diverse array of music making already taking place within. Rather than perpetuating a knowledge divide according to the perceived needs and capabilities of students, perhaps it is time to encourage a more deliberate dialogue between knowledge forms, and in doing so, enlarge the boundaries of what can be known and hence valued in classrooms.

Funding

Notes

1. A discussion of the whole student cohort consisting of four student groups can be found in Carroll (2017).
2. Power chords are guitar chords which omit the 3rd, creating a stark, hollow sound as the warmer 3rd degree of the chord is not present.
3. Drop D tuning is common in many styles of metal. The technique involves the guitarist or bassist re-tuning or "dropping" the lowest E string down a tone to a D, creating a power chord when the lowest three strings D, A and D, are strummed. The addition of the lower D to the chord or bass line also intensifies the "dark" sonic quality of the performance, as the very low frequency is played in rhythmic unison with the bass guitar and bass or "kick" drum.
4. The term "break-down" describes a section of music which is rhythmically charged through the use of a heavily accented half-time feel, and rhythmic unison. The term occurred frequently in learning dialogue and in association with some of the metal bands the boys reported listening to and had seen in live concerts.
5. A full account of classroom pedagogy for Phase 1 can be found in Carroll (2017), Chapters 5 and 6.

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Author biography

Christine Leanne Carroll graduated in 2017 with a PhD from the Sydney Conservatorium of Music/ The University of Sydney, Australia. Christine's research fuses discourses on informal learning, ethnomusicology and the sociology of music education to investigate the experiences of student popular musicians in classroom music education. These research interests stem from her secondary teaching experiences gained in a range of school contexts, and more recently from work in pre-service teacher training. Christine has presented her research nationally and internationally, and is an alumni member of the LCT Centre for Knowledge-Building, the University of Sydney, Australia.