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ARTICLE

The importance of threshold concepts and formative assessment in lower-secondary school group composing

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Abstract

Meyer and Land's work (among subsequent others) on threshold concepts (TCs) has been influential in numerous subjects, particularly in higher education. However, despite its growing international interest, its application into the domain of music in schools is a highly under-researched area. This article draws on the notion of TCs focusing on the context of lower-secondary school (Key Stage 3: ages 11–14) group composing. Using video-recorded and interview data from three case-study schools in the English Midlands, examples of TCs are presented and how formative assessment was, or could have been, a key process in them being crossed is discussed.

Keywords: Threshold concepts; formative assessment; group composing; Key Stage 3; lower-secondary

Introduction

The notion of threshold concepts (TCs) has received international interest in recent years. Research has concentrated more on higher education focusing on the domains of, for example, Art (Blair & Fitch, 2015), Biochemistry (Loertscher et al., 2014), Biology (Taylor, 2006), Business Curriculum (Bajada et al., 2016), Computing and Electrical Engineering Curriculum (Reeping et al., 2017), Economics (Shanahan & Meyer, 2003; Reimann, 2004; Shanahan & Meyer, 2006; Reimann & Jackson, 2006), Health Sciences (Barradell & Peseta, 2017), Paediatric Surgical Training (Blackburn & Nestel, 2014) and Teaching Prosthetics and Orthotics (Hill, 2020). Although Holland (2015) refers to TCs in the setting of primary school music (Key Stage 2: ages 7–11), this article offers new insight into TCs not only within secondary school education but also within the context of group-based composing.

Defining a threshold concept

Defining what a TC is can be problematic. According to Meyer and Land (2003), who are credited with doing the original work on TCs, it:

> can be considered as akin to a portal, opening up a new and previously inaccessible way of thinking about something. It represents a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress. (2003, p. 1)

From this initial definition, several additional characteristics have been identified to help clarify a TC (Flanagan, 2020). These characteristics are *transformative, liminality, probably irreversible, integrative, bounded, discursive, reconstitutive* and *troublesome* and are outlined in Table 1.

Table 1. Characteristics and Definitions of a Threshold Concept (TC)

Threshold concept characteristics	Definition
Transformative	Once understood, the effect creates a significant shift of perception of a subject on learning and behaviour (e.g. a transformation of personal identity, an altered view of values, feelings or attitude)
Liminality	An unstable space where learners are between extant and emergent understandings
Probably irreversible	Where the change in the individual's perspective is unlikely to be forgotten and is very unlikely to be unlearned without considerable effort
Integrative	Previously hidden relationships with something can be made
Bounded	It is possible, though not essential, that a TC can be bound within a particular discipline
Discursive	Crossing a TC can incorporate an enhanced and extended use of language
Reconstitutive	Crossing a TC may involve a shift in a learner's subjectivity, which is implied through the transformative and discursive aspects as noted above. Such reconstitution is initially more likely to be recognised by others
Troublesome	Where a concept is difficult to grasp

Table 2. Types and Definitions of Troublesome Knowledge (Perkins, 1999)

Type of troublesome knowledge	Definition
Ritual	When a learner follows but does not understand a conceptual rule
Inert	Where information is known by the learner but is rarely used and has no associated meaning
Conceptually difficult	Knowledge might involve several different pieces of information
Alien	When the information goes against what is believed in the learner's understanding
Tacit	When it can be difficult for experts in the domain to explain and communicate it to less-expert learners
Emotionally challenging	According to Cousin (2006), the learner may feel uncomfortable or it might be that the learner is not in a position emotionally to deal with the information at that particular time and this may cause difficulty in learning

The *troublesome* characteristic was based on Perkins' (1999) work which can be unpicked further into different types of knowledge which were found to be troublesome for learners. They are *ritual, inert, conceptually difficult, alien, tacit* and *emotionally challenging* and are defined in Table 2.

Despite the characteristics and definitions shown in Tables 1 and 2, Meyer and Land's TC framework has received criticism by Rowbottom (2007) and O'Donnell (2010) on the grounds that the descriptive criteria of what characterises a TC are too ambiguous. Furthermore, although Meyer and Land state that '[TCs] cannot be described as an essentialist, definitive list of characteristics' (2010, p. 205), other researchers (e.g. Rodger, Turpin, & O'Brien, 2015) suggest that all of the characteristics must be present if the concept is to be considered a TC. This is in spite of the findings of Irvine and Carmichael (2009), for example, showing that very few TCs actually met all of the characteristics.

Further problems arise when some researchers (e.g. Taylor, 2006, 2008 and Cartensen & Bernhard, 2008) assert that whether a concept is *troublesome* or not is the key criteria for

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identifying a TC. This approach to defining a TC needs serious consideration; others (e.g. Barradell, 2013) point out that:

> the implication that troublesomeness is the most critical characteristic may not always be true since it implies that anything that is conceptually challenging could be treated as a threshold concept. (2013, p. 271)

Given that the notion of TCs is an under-researched area within the field of music education we cannot conclusively agree with Rodger, Turpin, and O'Brien (2015) in that all the characteristics listed in Table 1 must be present in order for a concept to be identified as a TC. Nor do we agree with Taylor (2006, 2008), or Cartensen and Bernhard (2008) in that the *troublesome* characteristic should be the defining factor in identifying a TC. Instead, although we acknowledge that a TC can, indeed, be a moment when a learner, for example, 'get[s] stuck' (Meyer & Land, 2006, p. i) at a particular point in their learning and, therefore, requires some sort of knowledge in order to progress, we believe that a TC can involve any number of characteristics listed in Table 1. Furthermore, in relation to Meyer and Land's (2003) definition cited above, we also take the position that crossing a TC should produce an ontological change in the learner, where such new understandings can be 'assimilated into the learner's biography, becoming part of what he [or she] knows, who he [or she] is and how he [or she] feels' (Cousin, 2006, p. 135).

To illustrate our thinking further from the outset, a particularly clear and real-world example of a TC can be taken from the study of planetary science. For instance, the notion of sunrise and sunset can be considered a TC because although we may believe that this is happening, it is the Earth that rotates around the Sun not the other way around. As such, sunrise and sunset cannot be said to truly exist. From this example, although several of the TC characteristics from Table 1 might be identified (e.g. *transformative, probably irreversible, integrative, bounded*), this alternative way of thinking has the potential to make an ontological change in us in terms of how planets move and thus can affect our outlook not only in terms of day and night but also, for example, the seasons of the year.

Of course, we acknowledge that, in the day-to-day classroom, such ontological shifts are not always immediate and, for some learners, can occur over a longer period of time. Furthermore, despite the ongoing debates cited above, what research studies do not seem to consider is that some individuals may encounter more TCs within a lesson (or series of lessons) than others depending on what their previous learning experiences have been. Therefore, we suggest that formative assessment can be a powerful process to help support teachers and learners in crossing TCs as well as opening up previously inaccessible ways of thinking and learning.

Formative assessment

In the United Kingdom, the use of the term 'formative assessment' tends to be built on the work of Black and Wiliam (1998) who define it as:

> all those activities undertaken by teachers, and/or their students to modify teaching and learning activities in which they are engaged. (1998, p. 8)

We believe this is an important consideration when thinking about how TCs might be crossed because there is a wealth of research evidence to suggest that the effective use of formative assessment, where information about pupil learning is elicited and acted upon by teachers and/or learners, can have a significant impact on learning (Bloom, Hastings, & Madaus, 1971; Crooks, 1988; Black & Wiliam, 1998; Broadfoot, 1998; Assessment Reform Group, 1999; Gipps, 1999; Gardner et al., 2010; Wiliam, 2016; Andrade & Heritage, 2018). This modality of assessment practice can be said to be in contrast to 'summative assessment' where its principal purpose is to 'sum-up'

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learning (Harlen, 2007; Fautley & Colwell, 2012) by giving, for example, scores or grades to learners. Within classroom-based composing, the terms 'summative' and 'formative' can be said to have particular meanings which need to be clarified. For instance, a 'summative assessment' can refer to the submission of a finished compos*ition*, or a compositional product, whereas 'formative assessment' can relate to the ongoing process of compos*ing* which learners undergo in order to achieve the final product (Fautley, 2010). We believe that the notion of an ongoing formative process is central in helping learners cross TCs.

Formative assessment and classroom-based composing

Fautley and Savage (2008) acknowledge that, in some English secondary schools, there is pressure on teachers and learners, presumably by some senior leadership teams, to produce high levels of attainment in the form of marks or grades from assessments. As such, within music, what can happen is that the compositional product becomes the central focus of attention, leaving the composing process to be largely ignored (Leon-Guerrero, 2008). As a result of this pressure, despite the reported benefits of formative assessment, teachers have been found to neglect their formative practices (Black & Wiliam, 2003; Looney, 2009) and beliefs (Brophy, 2000) in favour of increasing the frequency of summative practices to meet data tracking purposes (Fautley, 2012; Winters, 2012). Such a top-down approach is an important consideration when thinking about both TCs and formative assessment in music because what can happen, therefore, is that although TCs might be identified to aid learners' musical progression, a greater pedagogical focus on the product – the finished compos*ition* – means that a learner, or group of learners, might not fully, if at all, cross the TC; there needs to be a pedagogic focus on the process – compos*ing* – in order to do so.

Method

Context surrounding composing in English schools

As per the National Curriculum for England, composing forms an important part of musical learning in schools (Department for Education, 2014). Within the lower-secondary setting – referred to as 'Key Stage 3' (ages 11–14) in English terminology – the study of Music is supposed to be a statutory subject in English schools at this stage (Department for Education, 2014). During Key Stage 3, composing tends to take place in small groups (usually between 2 and 5 students) and learners can draw on a variety of resources available to them including, for example, classroom instruments or, sometimes, their own instrument if they receive extra-curricular instrumental lessons. Composing is undertaken as a practical task where the piece produced is composed for the instruments that the group have at their disposal and performed by them on those instruments. Notation is not a pre-requisite for a successful compositional outcome.

Study design

Qualitative and quantitative data were taken from a larger, in-progress doctoral study investigating formative assessment during Key Stage 3 group composing. Observational data were collected from three case-study schools, labelled A-C for anonymity, by video-recording composing sessions throughout a unit of study. As School A was a pilot, only video-recorded data were collected, analysed and coded. For Schools B and C, semi-structured interviews were also conducted: one with the class teacher and the other with the group of learners who acted as the focus group for the research. For the purposes of this article, however, only observational and teacher-interview data have been considered as it was in these data that the notion of TCs was most evident.

Within this mixed-methods (Creswell & Plano Clark, 2011), case-study methodology (Yin, 2009), the researchers were non-participant observers. Ecological validity was attempted where the video-recording of composing sessions took place during each school's normal curriculum

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Table 3. Contextual Details for the Three Case-Study Schools

		Case-study A	Case-study B	Case-study C
Teacher–participants	Gender of teacher	Male	Female	Female
	Number of years teaching	10	4	27
Learner–participants	School year group	Year 9 (ages 13–14)	Year 8 (ages 12–13)	Year 7 (ages 11–12)

time; therefore, composing groups were observed in their usual, naturalist settings. Space can be a premium for many schools, and separate spaces outside of the main classroom (e.g. practice rooms) were not universally available for all learners. Collecting data from learners who were usually based in practice rooms during composing sessions was an advantage and meant, following Burnard's (2000) advice, that video-recording work could take place without the overspill from other learners' oral and musical utterances. It should be pointed out, however, that the notion of TCs was not sought after as part of the wider research study but emerged itself from the data during analysis and coding through using thematic analysis (Braun & Clarke, 2006) as an analytical method. To establish whether any TCs in group-based composing had been identified, cross references were then made to Meyer and Land's (2003) original definition (cited above), as well as the characteristics presented in Table 1. These links are unpicked further in relation to each TC identified in the Discussion section.

Participants

Case studies took place in three schools located in the English Midlands. Details are summarised in Table 3. All schools were mixed-gender and non-selective secondary schools with each of the case-study music teachers working in already established, single-person (one music teacher only) departments. Composing groups for each case-study were selected by the teachers, as was normal practice.

Composition tasks

The group composition tasks were constructed by the music teacher, as was normal practice, and units of study occurred at the time they normally would have during the school year. Table 4 shows each of the tasks learners were given.

Resources

Instruments used by learners were chosen by themselves in all cases are shown in Table 5.

Results

Following data collection, analysis and coding, examples of TCs were then identified. These are presented below. Anonymity is upheld throughout with no names given. For example, student communication is represented with an 'S'.

1: Being able to use effective learning strategies

In School A, one TC was identified at the very beginning of the composing process. The group was struggling to decide on what style they would compose their rondo form piece in (since this was free choice) as well as the initial ideas on which to build upon.

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Table 4. Composition Tasks

School	Composition task
School A	Compose a piece of music, in any style, which is clearly built around rondo form
School B	Compose a rap or song (or both) following rondo form which includes the chords C, D, F and G majors, as well as lyrics
School C	Create a short piece in ternary form based on an ostinato. At least one ostinato needs to be rhythmic and one must be melodic. Think carefully about the elements of music and how they can be used effectively

Table 5. Resources Available for Composing

	Instruments used by learners	Gender of composing group	Number of learners in the focus group
School A	• Electric guitars • Drum kit • Piano	Mixed	5 (out of a class of 30)
School B	• Keyboards • Untuned percussion • Vocal (female)	Mixed	4 (out of a class of 27)
School C	• Keyboard • Piano • Drum kit • Saxophone	Mixed	4 (out of a class of 25)

School A: During the composing session data

S4 (male): Ok, so what style we gonna do? Got any ideas?
S2 (female) and S5 (female): (together) No.
S3 (male): How about something like (♫ *hums to the other students*) . . .
S2 and S5: (together) No.
S4: No. I don't like that style.
S3: Ok, how about something jazzy?
S2: Jazz? Ergh. Can it be something more like (silence) . . .

(Students stop discussing and individually improvise on their instruments.)

S2: ♫ *Plays a rock song from YouTube on her mobile phone.*
S3: ♫ *Improvises on what he hears on his electric guitar.*
S2: No, shh (♫ *continues to play song on her mobile phone).*
S3: ♫ *Begins to improvise chords in the style.*
S3: (to S2) What do you think to that?
S2: (to S3) Yer, it's good.
S3: (to S4 on the drum-kit) Have you got a beat for that?
S4: (to S3) Yer.
S3: (to S5 on the other electric guitar) Can you play F sharp minor?
S5: (to S3) Yer (♫ *and plays the chord to S3).*
S2: (to the group) Ok, we're gonna try it together to see how it fits.

As the communication shows, the group's difficulty in being able to use effective learning strategies to help begin the composing process was, for them, a TC. At the beginning of this process, the

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learners were in, what Meyer and Land (2006, p. 16) would classify as a 'suspended state' of understanding. A state where they knew what the learning destination should be, but did not know how to get there. Through formative assessment processes, such as listening and responding to music via YouTube and discussing different genres, the learners were able to cross this threshold and begin the composing process.

School B: During the composing session data

In School B, composing lyrics proved problematic. This is shown in Table 6.

Table 6. Amount of Composing Time the Focus Group Spent on Discussing Lyrics

Composing session	Amount of composing time (%) the group spent discussing lyrics
Session 3	43
Session 4	67
Session 5	46

In the post-study focus group interview, the group stated that they found the initial starting point for writing lyrics the main issue:

> School B S2 (female): We didn't really know what we wanted to do and it's kinda hard just thinking about the lyrics, like to just sit down and do it.

The struggle of writing lyrics was also indicated by the teacher in the post-study interview:

> School B Teacher: They just didn't know what to write about. I think they were just overthinking it. That said, I don't think that was a problem because that's what you want. You want kids to struggle a little so that they find it challenging and overcome that struggle.

The teacher's utterance of 'you want kids to struggle a little so that they find it challenging and overcome that struggle' is interesting. Here, it seems that deliberately creating opportunities for TCs within the learning cycle is a valued teaching approach. That said, according to the teacher, it was evident that, for some learners, creating the space for TCs led to increased off-task behaviours and teacher intervention:

> School B Teacher: I found that groups who sort of lost their way with it [writing lyrics to include in the composition] would become off-task quickly and so I'd have to bring them back on-task and give them quite a lot of help. I found further down the line with the lessons I could take more of a back seat really and let them get on with it more.

When asked how this barrier might have been crossed the teacher believed that additional time to work and discuss in groups would help:

> School B Teacher: Well, I think giving them more time to work in groups and when they're stuck asking them to sit and talk it [the barrier] through.

One problem here is that, by giving the learners space to talk, does not necessarily mean they know *how* to begin learning discussions. Learners therefore need to be guided first on how they

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can engage in learning discussions for them to be suitably effective within the group context (Mercer & Littleton, 2007; Garnett, 2013; Alexander, 2017; Booth, 2020).

In this example, it could be argued that effective formative assessment, to support this group crossing the TC, was hindered due to the learners' lack of knowledge and understanding of how to engage in effective formative discussions around lyric writing. As such, this became an obstacle to their musical learning. So, although a composition was completed by the end of the unit of study, the *discursive* and *transformative* characteristics of the TC were not achieved. Instead, they remained in a troublesome space which, unless it was to be explored further in a future unit of work, could remain an underdeveloped area in their musical learning.

2: Knowing, and being able to play, chords

A second TC from School A became evident through observing a sequence of composing sessions. In the examples that follow the TC refers to a student ('S1'), working within a group of five other learners, who is having difficulty with knowing the notes within chords and being able to play chord sequences on the piano as part of the composition. As a result, he asks Student 3 ('S3' – a fellow pianist although he is using his electric guitar in the composition task) for support in order for him to overcome this learning barrier.

Session 1

S1 (male): (to S3) Can I just check this? *(S1 is seeking confirmation of chord sequence from S3).*
S3 (male): (to S1) Nah. Not quite.
S3: ♫ *Models chord sequence for S1 on the piano. S1 imitates what he has just been shown.*
S1: Ok, I think I've got it.

Session 2

S1: (to S3) Can I just play the same part as *[S3]* cuz I can't play these chords?
S3: (to S1) I can show you again, if you like?
S1: (to S3) Yer, ok then.
S3: ♫ *Models the chord sequence from session 1 to S1 again on the piano. S1 imitates the chord sequence back.*
S1: (to S3) Ok, I think I've got it now. Thanks.

Session 4

S1 was absent for session 3 due to a school trip. This meant that he had missed session 3 and needed to catch-up with the composing work he missed:

S1: (to S3) Ok, I can remember the first bit, can you show me the chord sequence for the new bit?
S3: ♫ *Demonstrates the new chord sequence to S1 on the piano.*
S1 and S3: ♫ S1 (on the piano) and S3 (on the electric guitar) play the chord sequence together.
S1: Ok, I think I've got it. Thanks.

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Addressing the theme of communication, it is clear that peer-to-peer modelling was an important formative strategy. Student 3 supported Student 1 to cross his individual threshold of knowing the notes in chords and being able to play chord sequence but also facilitated his valuable contribution to the group's composition by playing the piano.

3: Missed opportunities

During a sequence of five consecutive composing sessions in School C, the focus group did not appear to encounter any TCs. During the sessions, the group worked in a highly efficient way from the beginning to the end of the unit of study and created a composition which was, in the music teacher's view, of excellent quality because it had met all of the task's success criteria. To be clear, we are not suggesting that musical learning did not take place over the sequence of lessons; rather we feel it important to question whether there might have been missed opportunities where this group could have been further challenged. Creating suitable TCs, with necessary support and good formative assessment approaches, can be considered an important part of lesson-by-lesson learning transition. It is via opening up room for *liminality, integrative, discursive, troublesome and reconstitutive* approaches that a learner's ontological perspective can be impacted and a transformational shift occurs.

Discussion

In this discussion, we will highlight several key points that are important for the identification and inclusion of TCs within the context of Key Stage 3 group-based composing. Although the findings are presented through the lens of Key Stage 3 group-based composing, they can be considered to have broader applicability across different subject areas.

Based on our findings, we cannot conclusively agree with Rodger, Turpin, and O'Brien (2015) whereby all the characteristics presented in Table 1 must be present in order for a concept to be identified as a TC. Nor do we agree with Taylor (2006, 2008), or Cartensen and Bernhard (2008) in that a concept which is considered *troublesome* should be a TC's defining factor. Our findings suggest that a TC can include any number of characteristics listed in Table 1. For instance, in the TC examples presented in this article from Schools A and B, there was no evidence to suggest that either of them were *integrative* or *bounded*. However, as with Meyer and Land's (2003) original work, we take the position that a central element of crossing a TC is its capacity to produce an ontological change within the individual.

This ontological change can be facilitated by teaching and learning strategies that engage students in formative assessment. For example, within the findings of this study, the TC of *being able to use effective learning strategies* was an important point of autonomy for School A's group, something which was not readily available for the group in School B. Similarly, the TC of *knowing, and being able to play, chords* was, for 'Student 1', a TC. In this case, the ontological change allowed him to be able to make a valuable contribution to the group's work. This is something which may not have occurred should this TC not have been crossed.

We found formative assessment to be an important process for crossing TCs. For example, in School A, such processes included, for instance, listening to music via YouTube and peer–peer imitated modelling, supported with peer–peer or group-based dialogue. This was not the experience of the group in School B where the identified TC remained uncrossed. Effective formative assessment can also be initiated through establishing pupils' prior learning and can be an important strategy for teachers in identifying any pre-existing TCs *before* pupils begin a composition task. The importance teachers establishing pupils' prior learning has been discussed by Ausubel (1968) who posited:

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> If I had to reduce all of educational psychology to just one principle, I would say this: The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him [or her] accordingly. (1968, p. vi)

As well as more recently by Claxton (2021) who comments:

> teachers need to be good coaches. Like a good sports coach, teachers need to know where their learners are, and design training exercises that are achievable but challenging enough to stretch their capability … And they need to watch how their learners are doing and maybe, when necessary, offer hints or feedback. (2021, p. 21)

What we are suggesting, therefore, is that time and space should be afforded to learners to explore and engage with TCs and that teacher and learner-initiated formative assessment processes, as discussed in this article, should be actively encouraged to help individuals navigate their own, as well as group-based, TCs.

Conclusion

The findings from this study have shown that when time and space for TCs to be explored are offered to learners, new possibilities, practices and forms of learning can be generated. Some of the examples from School A and B show that when learners exist within the 'trouble', they were permitted to access new and previously inaccessible ways of thinking, learning and being a musician. Meyer and Land (2003) classify these important changes in learner perspective as *transformative*, where there is an ontological shift in perspective; *integrative*, where there is a new understanding or way of thinking; and *irreversible* where these new practices are unlikely to be forgotten, or unlearned. Part of this 'unlearning' requires a letting go of known ways of seeing, of prior views, or experiences. If learners can accept the invitation to enter into a transformative state, they can begin to reformulate meaning, their ontology and subjectivity. This can lead to new forms of discourse and understanding of being musical and becoming a musician.

However, for these processes to be enabled, teachers need to plan for TCs. This means teachers must also enter into a *troublesome* and *transformative* space where unexplored, emergent and exploratory possibilities might need facilitation. In many ways, these TC spaces could be considered 'heterotopic', counteracting hegemonic thinking as Baillie et al. (2012) note:

> … the kinds of transitions we are considering are not linear, not the learning of simple isolated concepts, they are messy, abstract transformations. The space, which describes the learning journey we speak of, as well as its destination, is more like a 'heterotopia'. Heterotopias are places and spaces, described by Michel Foucault in the text 'of other spaces' as 'non hegemonic' … a place where alternatives are considered, 'common sense' is questioned and business as usual stops for a moment. (2012, p. 2)

We believe that the examples from this study illuminate small insights into the powerful potential of this process. Although we acknowledge that, in some schools, formative assessment practices have become neglected (Brophy, 2000; Black & Wiliam, 2003; Looney, 2009) in favour of increasing summative practices to meet data tracking purposes (Fautley, 2012; Winters, 2012), we believe that more time and space should be offered within music classrooms for TCs to be explored supported by formative assessment. In particular, the opportunity for both learners and teachers to exist within the 'troublesomeness', to have space to enter discussion, to engage musically with one another and to explore their own musical identity, all have the potential to catalyse ontological shifts.

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