



Holland, David

Fostering sound-based creativity in primary schools. How to empower teachers

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Kontakt / Contact:

Dedocs

DIPF | Leibniz-Institut für Bildungsforschung und Bildungsinformation Informationszentrum (IZ) Bildung E-Mail: pedocs@dipf.de Internet: www.pedocs.de



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David Holland

Fostering Sound-Based Creativity in Primary Schools

How to Empower Teachers

Introduction

Past research has indicated that primary school teachers lack confidence in teaching music, partly due to a belief that they are not musically talented or cannot play an instrument (see Biasutti, Hennessy & de Vugt-Jansen, 2014; Seddon & Biasutti, 2008). Additionally, a crucial question when teaching music is how creative engagement with sound for pupils of all levels of experience and ability can be fostered. The research project presented in this chapter is concerned with how to effectively support teachers foster sound-based creativity in primary schools through the development of a unit of lessons and pedagogical resources.

The term sound-based music (sbm) was conceived by Leigh Landy (2007) as an umbrella term to decidedly include a range of musical practices where sound is the main unit rather than the musical note. This includes forms of electroacoustic music that usually involve real-world material, such as environmental recordings. These are edited and manipulated to different levels of abstraction using various processing tools and this type of sbm is the form referred to in this chapter. As has previously been argued in relation to experimental forms of music (Paynter, 2008), one of the key pedagogical benefits of sbm is that it facilitates creative engagement with sound for pupils of all levels of experience and ability as it does not depend on previous musical learning (Holland & Chapman, 2019; Wolf & Younie, 2019). Therefore, it might be claimed to be a democratic approach to music education where practice, or 'doing', is central. It is through such a 'praxial' approach that pupils can open up to the possibilities presented by sbm (Regelski, 2002).

The democracy and inclusivity offered by sbm could also apply to teachers, as it could be that generalist teachers have more confidence delivering sbm lessons than conventional music lessons. However, there could be other barriers that cause anxiety, such

as a lack of knowledge of sbm or the technology used for making it (Wolf & Younie, 2018). Therefore, the key aim of the project is to investigate how the early development of creative digital skills through engagement with sbm can be fostered by non-specialist primary teachers without previous knowledge of sbm or the technology involved. This overall aim can be broken down into the following objectives:

- (1) To create resources for teachers to deliver a sound-based creativity unit of lessons (without prior knowledge or experience of sound-based music.
- (2) To test these resources by working with and observing teachers in Leicestershire as they deliver the unit.
- (3) To design and deliver training for teachers to successfully teach the unit.
- (4) To investigate pupil response to the unit and test engagement levels.

In the chapter, I will provide an overview of the state of research in this field followed by a presentation of the teaching materials developed for the research project, as well as an evaluation of the empirical data collected.

Background: Sound-based Resources in Primary Schools

As noted by Wolf & Younie (2019), the national curriculum for schools in the UK offers limited reference to contemporary forms of music or music technology, meaning it is unlikely pupils will encounter sbm during their school education. However, the growing body of research from De Montfort University (DMU), which is reviewed in the following section, suggests that sbm is not difficult to appreciate by non-specialists, especially if it is accompanied by sufficient guidance and involves creative participation.

This new DMU research initiative was conducted in partnership with the Leicestershire Schools Music Service (LSMS) and funded by the Midlands4Cities Creative Economy Engagement Fellowship (CEEF) programme. A model devised by LSMS for delivering other music technology units in schools was used as a template for developing resources to support teachers to deliver lessons on sound-based creativity at primary level. This model provides the teacher with training and a range of resources (such as Powerpoint-slides, instructional videos and lesson plans) that the teacher can use to guide pupils through the unit. The project uses free software in the lessons, to enable a wide range of children to actively engage with sbm through composition. Although sbm resources have been developed at DMU as part of the EARS 2 project (Landy, 2019) for Key Stage 3 pupils (11–14-year-olds in England and Wales) and teachers, no such materials had been created for Key Stage 2 (7–11-year-olds)¹. It is this gap in resources that this project aims to address. In the UK pupils begin secondary school at the start of KS3, so it is intended that this project can begin the process of creatively learning about sbm in primary school at the end of KS2. This learning can then be continued, through the EARS 2 project (see the following section), in secondary school where pupils can start to develop a more sophisticated understanding of sbm and its associated concepts. Before introducing the lesson plans and resources designed for this research, the following section will explore the context surrounding the project in terms of the key previous research.

Key Pedagogical Research on Sound-based Music

The project outlined in this chapter builds on the EU Interfaces project (see Landy, 2019; Holland & Chapman, 2019) and other research conducted at the Music, Technology and Innovation – Institute of Sonic Creativity (MTI²) at DMU (Holland, 2016; Wolf & Younie, 2018; Wolf, 2013; Therapontos, 2013;) concerned with increasing access to sbm in pedagogical contexts. In particular, the author's PhD research (Holland, 2016) and the Interfaces project provided workshop templates from which a whole unit of lessons on sound-based creativity could be developed for Key Stage 2 pupils. Data from these projects demonstrated that pupils can find such workshops to be highly engaging and that the opportunity to be creative with sound is the key driver of this. In the following section, some of the key past initiatives and literature will be briefly outlined. This is to demonstrate how these previous projects influenced the research project with LSMS, particularly in the development of the teaching materials and in understanding the knowledge that teachers need to deliver lessons on sbm.

Interfaces and EARS2

The Interfaces project was a Creative Europe project with the key aim of bringing new music to new audiences. In the project, new music was defined as "original innovative works of music, including the sonic arts, which largely reside outside the commercial sector" (Landy, 2019, p. 225). As part of this, workshops on sound-based creativity using EARS2 (see below) were delivered by artists/specialists in educational and community settings with a wide range of age groups. A series of four workshops were delivered in some schools and these became the template for the unit of ten lessons devised with LSMS for this research which followed the Interfaces project.

¹ In England and Wales, the national curriculum is divided into different key stages that each include particular year groups. These key stages are as follows: Early Years Foundation Stage (ages 3–5), Key Stage 1 (Years 1–2, ages 5–7), Key Stage 2 (Years 3–6, ages 7–11), Key Stage 3 (Years 7–9, ages 11–14), Key Stage 4 (Years 10–11, ages 14–16).

EARS2 was first developed as part of Motje Wolf's PhD research (Wolf, 2013) and aims to introduce young people not only to the concepts and repertoire of electroacoustic music, but also to creative practice, through the use of the sbm software *Compose with Sounds* which has been developed at DMU for use in education. However, the view in this research concerning the LSMS primary unit is that once pupils have creatively experienced sbm, conceptual understanding is something that can be developed in the future when entering Key Stage 3, which was also the perspective taken in the HL2 project that built on the EARS2 initiative.

HL2 Doctoral Project

This PhD research (Holland, 2016) investigated whether engagement with sbm for Key Stage 2 pupils can be supported by creative practice through the development of heightened listening skills. Case studies were run in eight schools with 241 children, conducted from 2013 to 2015. These case studies included a series of sbm workshops exploring listening skills, recording and composition. The findings from the HL2 project suggested that the positive engagement with sbm during the workshops was driven by creative practice and that such activities were supported by heightened listening training. Along with previous projects run by the composer Duncan Chapman with the Birmingham Contemporary Music Group (Chapman & BCMG, 2013), the emphasis of the HL2 sessions on listening, recording and composing provided the foundation for the Interfaces workshops and therefore the lessons developed for this research project with LSMS.

Developing Knowledge for Teaching sbm

One key issue that emerged from EARS 2, the HL2 project and the Interfaces project was how best to support teachers with delivering lessons on sbm. In order to address this, Wolf & Younie's study in 2018 investigated if teacher packs designed for EARS2 "could bridge the gap between the teacher's current knowledge and the knowledge that was provided in the resources on sound-based music given to the teacher" (Wolf & Younie, 2018, p. 83). They conducted their study with a teacher in a secondary school using the EARS 2 lesson plans. When a minor technical problem occurred during a lesson, meaning that an example piece would not play, the teacher decided to withdraw from the teaching trial after losing confidence. After analysing the data, Wolf & Younie concluded that the teacher did not have sufficient 'subject content knowledge', which would have enabled the teacher to choose a different piece of music (ibid, p. 91). This example relates to research mentioned earlier (Biasutti et al, 2014; Seddon & Biasutti, 2008), suggesting that generalist teachers lack confidence to teach music as they do not believe they have the required knowledge. It demonstrates that a similar lack of confidence can appear in experienced music teachers when dealing with an unfamiliar form of music such as sbm. It also builds on Shulman's (1986) theory of knowledge types required for teaching.

Shulman identified seven types of knowledge that teachers need to teach effectively. Wolf & Younie identify "subject content knowledge", "pedagogic content knowledge" and "general pedagogic knowledge", as well as "technology pedagogic content knowledge" (Wolf & Younie, 2019) as being important for teaching sbm. "Subject content knowledge" refers to what a teacher needs to know about a subject to teach it, while "pedagogic content knowledge" is concerned with how to teach something. Mishra & Koehler (2006) extended Shulman's model to include subdomains related to technology, including "technology pedagogy content knowledge" (see Wolf & Younie, 2019 for a more detailed explanation of these domains in relation to sbm).

Although Wolf & Younie's work is based on a small sample, it is founded on strong theoretical foundations provided by Shulman's model that are firmly established in educational research. Building on this work, the training and resources designed for this project with LSMS aim to enable teachers to develop these different types of knowledge and also give them confidence to deliver the lessons effectively through the support of the resources. The next section will provide a more detailed overview of the resources that have been created.

Lesson Design and Teaching Resources for the LSMS Unit

As with the workshops designed for the Interfaces project, the unit designed with LSMS is divided into the themes of listening, recording and composing. As part of this, the unit also introduces pupils to examples from the sound-based repertoire to act as inspiration for their own compositions. As discussed in the previous section, the activities devised for the lessons built on previous successful projects (for example, see Holland & Chapman, 2019) but use the model adopted by LSMS. In this model, lesson plans, PowerPoint slides, instructional videos and sound examples are all provided for the teacher along with equipment including digital recorders (see Fig. 1), headphones and portable speakers.



Fig. 1: Recording devices supplied as part of the unit

This model has been successfully used by LSMS for other music technology units, such as a unit on 'Turntablism' that teaches pupils to develop their own DJ and scratching skills using turntables (see Leicestershire Music, 2021).

LESSON 3 LO: I CAN USE A DIGITAL RECORDER AND FIND A DIVERSE SELECTION OF INTERESTING SOUNDS TO RECORD

HOW TO USE THE ZOOM RECORDER

- When recording sounds, there are a few tips you can use to help make the sound recording be of a good quality.
- Watch this following video for guidance on how to use the Zoom recorders and some tips for getting good quality recordings.
- Click here to watch <u>the video</u>.



To deliver the lessons, teachers follow through the slides provided, which also include links to instructional videos and other resources (see Fig. 2). As this unit is offered to schools to help them improve and expand their music curriculum, it is important for the content to enable pupils to achieve some of the key aims of the primary music curriculum. For example, the lessons aim to develop understanding of different musical dimensions such as pitch, dynamics, duration, tempo and timbre through listening to, performing and creating music (see DfE, 2021). Ten lessons (each lasting one hour) have been designed and what follows is a brief outline of each.

Lesson 1: Listening Practice

The first lesson focuses on listening with the intention that the children will begin to open their ears to the sounds around them through elementary listening exercises. The intention is to do more than raise aural awareness; it is also intended that children will begin to make qualitative judgements about the sounds around them and understand their different qualities. Therefore, listening practice is viewed as the foundation of sound-based compositional practice. The exercises used in this lesson are influenced by the work of the Canadian composer and educator R. Murray Schafer as part of the World Soundscape Project (WSP) (see Schafer, 1986; Schafer, 1977; Cumberland, 2001).

Following some collaborative listening exercises in the classroom, a soundwalk is conducted around the school (see Fig. 3). The pupils are provided with a soundwalk instruction sheet on which they write down the sounds they hear. They are encouraged to

categorise sounds according to their characteristics (such as pitch, duration and volume), and also make qualitative judgements about the sounds that they hear.



Fig. 3: Listening on a Soundwalk

Lesson 2: Soundmapping

Lesson 2 involves the pupils going on another soundwalk but this time with the intention of developing a soundmap. In this activity the pupils develop maps of their soundwalks on shared pieces of paper where they mark particular sounds. Part of the intention of this activity is for the children to develop greater spatial awareness in relation to sound. Such attention to spatialisation is an important feature of much sound-based music. It also involves the pupils thinking about how to represent sounds according to their qualities – using words, symbols and drawings on the maps.

Lesson 3: Recording

This lesson focuses on collecting sounds and involves learning to use a simple digital recorder provided as part of the resources for the unit. It is intended that in this lesson the pupils develop their listening skills and use them to make choices about which sounds to record (see Fig. 4). They are encouraged to find sounds with a range of properties such as pitch, volume and duration.



Fig. 4: Recording metal chains outside

Lesson 4: Developing Skills in Soundplant

In lesson 4 pupils begin to work creatively with the sounds recorded in the previous lesson in the software Soundplant (http://soundplant.org). The aim of this lesson is for the children to become familiar with the functions of Soundplant in preparation for devising a collaborative performance piece in lesson 5. Soundplant allows users to drag and drop sound files onto keys assigned to the computer keyboard so that they can be played in combination. Instructional videos, that are embedded in the slides, introduce the children to the basic functions and then they are allowed time to play and experiment freely with the sounds, which previous studies have identified as important in facilitating engagement when using technology for compositional activities (Holland & Chapman, 2019; Holland, 2016; Nilsson & Folkestad, 2005; Savage & Challis, 2002). It is important to give the pupils the opportunity for exploration and experimentation, helping the pupils to develop a sense of autonomy and ownership.

Lesson 5: Conducting with Soundplant

In this lesson the pupils use their skills developed in the previous lesson to create short pieces (one to two minutes) that can be performed live in groups. This involves one member of the group conducting the others using cards with symbols on (see Fig. 5). These

cards indicate which sound to play, as well as changes in pitch or dynamics. This lesson ends with performances by the groups to the rest of the class.



Fig. 5: Using the conducting cards with Soundplant

Lesson 6 and 7 – Learning Audacity Skills

In the remainder of the unit pupils work towards devising individual fixed media pieces using the software Audacity, which is a piece of free audio editing software. In lessons 6 and 7 the pupils are shown how to do basic edits and use a range of effects such as reverse (the sound is played backwards), delay (where the sound is repeated at different intervals or volumes controlled by the user) and transposition (where the pitch of the sound is changed according to a chromatic scale). As in lesson 4, once the pupils learn these skills the emphasis is on experimentation and sharing work, meaning that while the pupils are working individually, the social aspects of learning are still important in leading development.

Lessons 8 and 9 – Developing Compositional Ideas by Drawing Sounds and Devising Scores

In these lessons, one of the aims is to equip the pupils with tools that help them develop their compositional ideas and provide models or strategies for composition. Once initial ideas have been devised, these can be given further structure through reference to example models and the development of graphic scores. The pupils are first encouraged to draw the sounds they have created and then develop graphic scores to help guide (rather than fix) the structure of their compositions. Building on the model suggested by Savage & Challis (2002), pupils are encouraged to think of composition as a recursive process of evaluation and revision. Suggestions and examples are provided to help scaffold their understanding.



Fig. 6: Examples from the drawing sounds exercise

Lesson 10 – Finishing Compositions and Sharing Work

The final lesson involves the pupils finishing their compositions. These are then shared in the class and the opportunity for peer-to-peer constructive feedback is provided.

Research Approach: Methodology

The key aim of the study was to investigate how the early development of creative digital skills through engagement with sbm can be fostered by non-specialist teachers. A subsidiary research question was:

What resources and training are needed to provide non-specialist teachers with the knowledge and confidence to deliver a whole unit of lessons on sound-based creativity?

In order to answer this question and fulfil the key aim, a mixed methods, multi-site case study approach was used to collect qualitative and some quantitative data through questionnaires, classroom observations, interviews, lesson recordings and pupils' work as well as feedback from LSMS. Mixed methods research is an approach where, rather than the researcher aligning themselves with either quantitative or qualitative approaches, methods from each paradigm can be combined in one research project (Cohen, Manion & Morrison, 2011). In this research, the multi-site case study approach meant that case studies were initially conducted in two different schools with some extra data collected from other participating schools after the COVID-19 pandemic. The advantage of using multiple case studies is that it can indicate if results might be replicated in different situations that have some common characteristics, such as UK primary schools (Yin 2009, p. 15).

The resources outlined in the previous section were developed in order to enable the teacher to have easy access to the different types of knowledge (as identified by Wolf & Younie, 2019 in reference to Shulman, 1987) needed for the teacher to effectively deliver the unit. Teachers are also given a training day where they work through each lesson with an experienced instructor and are also introduced to the technology that is used. However, guidance for this is also included in the slides, meaning the teacher has a safety net if they lose confidence during the lessons.

The unit was run in two schools during the summer and autumn terms of 2019 with data collected from 92 pupils and 3 different teachers. Two of these teachers are generalist class teachers, whereas teacher 3, who taught the unit during the autumn term of 2019 is a music teacher but with little experience of using music technology. Running the unit over these 2 terms, provided an opportunity to test the resources and gather feedback from teachers and pupils. Based on this the resources were then refined and enhanced for use in the future. The research ran until December 2019, but the unit is still being offered by LSMS (following a break due to the COVID-19 pandemic) with a number of schools running it during the spring, summer, and autumn terms of 2021. Questionnaire data was also collected from two teachers who delivered the unit in the 2021 summer term and some of their responses have been included as part of the qualitative data.

Data Collection

Three short questionnaires were given to teachers at different times during the process. The first was issued after the training, to test how confident the teachers felt before embarking on teaching the unit but after having received the training. Then questionnaires were also issued after lesson 5 and the final lesson to test how they felt during and at the end of the experience. Semi-structured interviews were also conducted with teacher in 2019 at the end of the unit for a more detailed exploration of the teachers' thoughts and feelings. In order to ensure greater rigour as part of data triangulation, lessons in 2019 were observed

by the researcher and audio recordings were made. Additionally, the pupils who took the unit in 2019 completed a questionnaire at the end to test their engagement with it.

Analysis of the Data

Thematic analysis was used to analyse the data in order to evaluate teachers' level of confidence in delivering the unit and the pupils' engagement with the lessons. Responses from the participating teachers have been very positive, indicating that the materials, training, and resources provide effective support and that the teachers would recommend the unit to other schools.

Data Collected from Teachers

All the participating teachers said in their responses to the questionnaire that they felt confident delivering the unit and would be happy to teach it again. This was the key theme identified in the teachers' responses. Additionally, there was recognition among the teachers that creativity is *'hugely important'* (teacher 2) but that there are not many opportunities for this in the current UK curriculum. Teacher 2 remarked that a key benefit of the unit is that it allows regular slots for creative activity over a period of time.

'I would certainly recommend this project to every primary school teacher, both specialist and non-specialist. Either you will learn lots about teaching digital music or if you are already technically capable, you will receive a purposeful, well thought out scheme of work in which musical skills are taught in a progressive way.'

The quote above from teacher 3, underlines her faith in the project but also identifies the type of knowledge that teachers will hope to gain by delivering this unit. The implication of this is that it is possible for teachers to acquire pedagogic content knowledge and technological pedagogical knowledge by participating in the project. Additionally, a teacher will also receive the resources and lessons, meaning that the stress of designing the lessons and activities themselves is taken away.

Teacher 4 noted this after the training:

'The training was extremely detailed and having the PowerPoints means it is going to be so easy to deliver.'

She also mentioned 'getting to try out the software' when answering a question about what was useful about the training. Therefore, it seems from these responses that it was useful to learn the necessary technological knowledge while doing the training, and that the slides meant she felt confident to deliver it without an expert in the room. This teacher's

responses in the final questionnaire indicate that she still had the same opinion at the end of the unit (this was true of all the teachers).

Teacher 1 acknowledged that it is not necessary to be a specialist in music technology (which also emerged as a significant theme in the responses) to deliver the lessons, as the required knowledge is provided in the training and through the support of the resources. Teacher 2 underlined the democratic nature of learning sbm as argued in previous research (Holland, 2016; Holland & Chapman, 2019; Wolf & Youine, 2019):

'It's usually just the musical ones who excel in instrument lessons, but this is more for everyone really.'

Teacher 3, who is a music teacher, recognized how the unit meets the requirements of the national curriculum:

'Listening skills are developed at every stage of the project and vocabulary such as pitch, dynamics, duration, texture etc., are used throughout, as pupils have to consider all of these elements of music as they are manipulating their sounds. The final outcome is a piece of original music, composed by the pupils on audacity. This ticks a large section of the National Curriculum for music.'

Pupil Responses to Questionnaire

The data from the pupil questionnaire collected at the end of unit, indicates high levels of engagement from participating pupils. Nearly 77% (n=70) of the 92 pupils surveyed indicated that they enjoyed or enjoyed very much these lessons, as is shown in the graph in Fig. 7, where 1 means did not enjoy at all and 5 means enjoyed very much.



Fig. 7: Graph of pupil responses to Question 5

Positive responses to Q8 ('Would you like to make your own Sbm composition again?'), were slightly lower (60 % responded positively) than to a similar question posed in the Interfaces and HL2 projects, although responses to Q9 ('Would you like to listen to a Sbm composition again?') were higher (83 % responded positively). The reason for many of the negative responses to Q8 seem to relate to a feeling that making a composition was too hard or complicated. Some of the feedback from both teachers and pupils suggested that the later lessons involving Audacity included too much content, meaning some pupils lost concentration. This was also noted in the lesson observations. The result of this was that there was less time in these lessons for the pupils to engage in free play and experimentation with the sounds and effects. Therefore, feelings of autonomy would have been reduced and the activities might have been interpreted as less creative. As has been shown in previous studies (Holland, 2016; Holland & Chapman, 2019; Savage & Challis, 2002), these are important factors in engagement. Since then, in order to improve engagement further, these lessons have been simplified by reducing the number of activities using Audacity in order to focus on experimenting with some core effects.

The importance of autonomy and creativity are further supported by comments 1, 2, 4, and 5 shown in Tab. 3. These were the common themes in the positive responses, as the pupils could create their own sbm pieces using sounds they had recorded, which many found highly engaging.

	Pupil comments:
Comment 1	'l liked how we could be creative and express ourselves'
Comment 2	'I have learnt a lot and I have become more creative'
Comment 3	'l learnt a new thing about music every lesson!'
Comment 4	'l like how we got to use our own sounds'
Comment 5	'You get the freedom to make your own music'

Tab. 3: Examples of pupil comments related to positive responses to Q8

Discussion and Implications

As a result of the success of the unit, LSMS are continuing to offer it to schools in Leicestershire, with the aim for the unit to be a key demonstrator project to other music hubs in the UK. The data suggests that both music teachers and generalist teachers feel the resources and training provided allow them to develop the confidence to deliver the lessons effectively and fulfil the requirements of the national curriculum. As has been argued elsewhere (Regelski, 2002), the sound-based skills fostered in this unit can promote engagement with all music and therefore can enrich the whole music curriculum. Additionally, the democratic potential of sbm, recognised in previous projects (Holland & Chapman, 2019; Wolf & Younie, 2018) has been underlined by both teacher and pupil responses. Thus, as this project provides a model for enabling teachers to conduct lessons on sbm, there is much more potential for these types of lessons to reach many more pupils. The results also support previous research discussed earlier in the article (such as Holland & Chapman, 2019; Holland, 2016; Wolf, 2013; Therapontos, 2013) that found non-specialist groups can actually engage with sbm and that enabling some degree of autonomous creative participation with sbm seems to increase engagement with it.

Although issues were identified with the complexity of the work in later lessons, these problems are being addressed through revisions to the resources. Overall, the data suggests that the unit allows teachers and pupils to simplify the process of composing sbm through participation or "doing". This means that the pupils are allowed to learn about and experience sbm from within the music. The accessible nature of the technology enables pupils of different levels of musical experience to creatively engage with sounds without having to have lots of prior knowledge. Despite the unit consisting of a series of lessons with prescribed activities, one of the intentions when designing the unit was that space should be allowed in the lessons for pupils to experiment and play with sounds. In other words, to engage with the material creatively and actively. This is to give pupils autonomy over their work and foster creativity, which are two of the factors that appear to be significant in increasing engagement with sbm (Holland, 2016). The commitment of LSMS ensures that this research project will have some legacy. Additionally, links with the EARS2 project mean that there is the possibility for learning about sbm to continue for pupils into Key Stage 3.

The relatively small sample of teachers who have taken part in the research is an obvious limitation of the study. However, the unit is being experienced by increasing numbers of teachers and pupils through the LSMS and feedback from schools continues to be very positive. The data support the argument that sbm can be taught by teachers without previous experience of this type of music as long as the right type of support and resources are provided. If, based on this evidence, more hubs are prepared to offer the unit to schools, this will also contribute greatly to the dissemination of the repertoire, practices and resources needed for sbm beyond their current, relatively narrow reach. I believe this will contribute not only to raising the profile of sbm generally, but also help to develop the listening and creative skills that complement – and are transferable to – other more conventional forms of music making included in the curriculum.

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