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MUSIC TO MEASURE: SYMBOLIC REPRESENTATION IN CHILDREN'S COMPOSITION

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ABSTRACT *Eisner maintains that the arts education community needs "empirically grounded examples of artistic thinking related to the nature of the tasks students engage in, the material with which they work, the context's norms and the cues the teachers provide to advance their students' thinking" (2000, p. 217). This paper reflects on the results of collaborative action research between teachers and university researchers in New Zealand who have been investigating how children develop and refine their ideas and related skills in music. The paper focuses specifically on the results of action research in which the impact of symbolic representation on idea development and refinement in music is examined. It raises some issues and points of tension for generalist and specialist teachers when fostering creative idea development in music.*

KEYWORDS

Music education, Symbolic representation, Primary education, Case study

BACKGROUND

This paper describes an investigation into how a sample of New Zealand primary school children set out to develop and refine their musical ideas, using symbolic representation (symbols used to represent sounds) as part of the process. Whether the use of these symbols aided or hindered the development of their sound ideas was subsequently examined. The study was part of a more comprehensive project on children's development of ideas in the arts. Development in this sense means the generation, exploration, extension and refinement of arts ideas, where both process and final product are honoured. In this research, three university researchers and 10 generalist primary school teacher-researchers collaborated over two years, to jointly identify and devise aims, methodology, analysis and related action research phases. Such collaboration corroborates a worldwide trend in educational research, which is moving away from research done *to* teachers towards working *with* teachers (Lankshear & Knobel, 2004) on questions which teachers identify as important in their practice.

The project drew on ethnographic, case study, self-study and action research traditions of educational research. In keeping with naturalistic inquiry, the project recognised that "meaning arises out of social situations and is handled through interpretive processes" (Cohen, Manion & Morrison, 2000, p. 138).

In the first phase of the project, we investigated what selected, generalist teacher-researchers had been teaching and what children had been learning in each of the arts disciplines. Hours of teachers' practices and children's responses were captured through observation, video, audio recording and interviews. Perspectives from teachers, university staff, children and school policy documents helped to build rich, triangulated, sense-making accounts of current practice (Stenhouse, 1980). The raw data were then analysed collaboratively, using a process of categorisation which was based on what appeared to support, constrain or was interesting about children's idea development. Any rituals of classroom practice that might have influenced the process were also analysed. There is a growing body of research that acknowledges that a teacher's conscious and unconscious rituals of practice impact significantly on children's learning (Nuthall, 2001). Case studies of the teachers' existing practices were then documented, highlighting central themes and issues. These provided a rich platform upon which the subsequent action research phases were based.

ACTION RESEARCH PHASE

The action research phase described in this paper centred on a Year 5 and 6 mainstream class of children in a decile 7 urban school. The research examined how these children adopted or invented symbol systems to code sound events in a soundscape. Central to this examination was the way in which they used, or did not use, these to develop and refine their work. For the purposes of this research, we defined a soundscape as a piece of music which sonically captures an event, image, mood, poem or narrative of some kind. Put another way, the children were expected to 'paint' evocatively with sound. This action research focus arose from earlier creative music making which was also based around a theme. In both process and product, the teacher considered that the children had not developed their work to the full. She had a hunch that the use of symbolic representation might aid the process of development, extension and refinement of their sound ideas; hence her choice of action research focus.

The motivational context for the soundscape was 'Winter Weather', a theme carefully selected by the teacher-researcher in the expectation that all children would have some experiential knowledge to bring to the compositional process, thus honouring their personal known worlds as a powerful impetus for learning (Efland, 2002). There was extensive class discussion related to the sound events that this theme evoked and the qualities of sound embedded within these. The class explored, shared and reflected on sounds using their voices, percussion instruments and environmental materials as sound sources.

The teacher introduced symbols as a possible way of capturing or recording their sound events as they evolved over time. Although some children had been exposed to use of music notation in private music lessons, the teacher had not taught music notation of any kind in previous classroom music lessons. Examples of conventional and graphic musical notation were explored. It was explained that symbols could be used to indicate the structure of the piece; start and stop; add dynamic variations; show contour or pitch differences, duration (length of sounds); and layers of sound (texture). Conventional notation such as bars and bar lines and rhythmic symbols were examined as well as graphic notation (icons to represent variations in sound such as wavy lines, swirls (see Photos 1 & 2). This focus on symbolic representation is endorsed in *The Arts in the New Zealand Curriculum* (2000); Achievement Objective Level 2. Seven groups of four to five children were given several sessions to develop, refine and share their soundscapes. While all children were observed in situ, the efforts of four children in a focus group were systematically tracked throughout this process. Their ongoing improvisation, discussion and symbolic representation efforts were constantly videoed. Time-coded observational notes were made by a 'teaching buddy' from the school staff, who was there to support and reflect with the teacher-researcher.

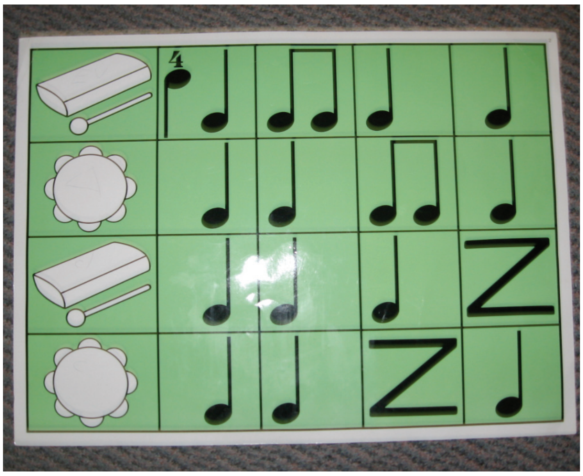


Photo 1. *Conventional musical notation*

Note focus on metrical groupings to beat (Leask & Thomas, 1988)

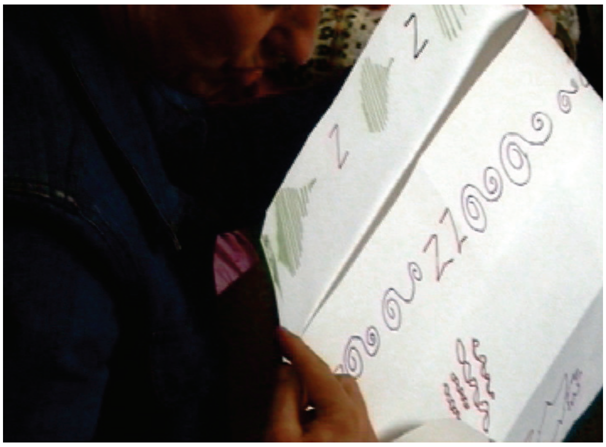


Photo 2. *Graphic symbols. Lines, dots and shapes used to represent sounds*

The focus group generated their sound ideas through repeated non-verbal improvisations showing heightened ensemble awareness of eye/body cues and listening acuity. These improvisations were interspersed with verbal discussion and, at times, heated debate and negotiation. After many repetitive improvisations, in which the children experimented with different sound qualities but not the structure of their piece, the focus group notated their work on a large sheet of paper. This involved selecting and rejecting representations to capture their sonic intentions. In order to track this process, all groups attached additional paper strips to their scores as they made adjustments (Photo 3).

Changes were made relative to the number of different instruments they could play simultaneously, dynamic variations and appropriate symbol representation for each sound. There was regular intervention from the teacher, who asked them to clarify their choice of symbols and their placement on their score. Class sharing was followed by discussion and an opportunity for more refinement.

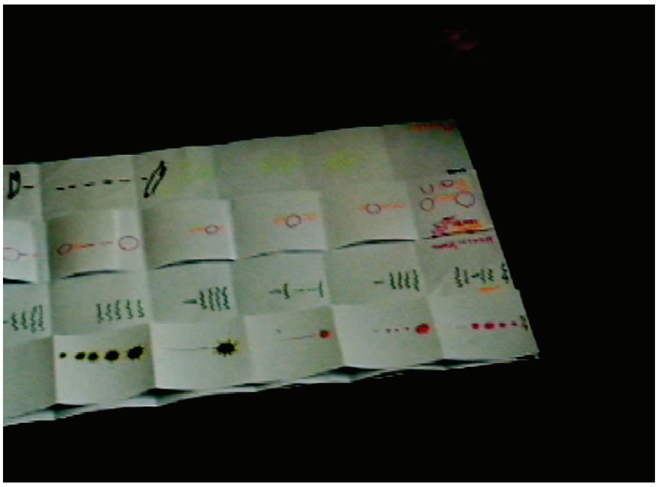


Photo 3. *Tracking changes. Overlayed strips of paper to track changes on the score*

DISCUSSION

This action research focused on the manner in which the children used symbols in their process of composing and to what degree these aided or hindered idea development. However, there appears to have been little written internationally that relates to understanding the role of symbols in performance and composition. On the other hand, a great deal has been documented about the use of symbolic notation as a means of tracking the development of musical intelligence in music (Bamberger, 1991; Barret, 1999; Davidson & Scripp, 1998; Gardner, 1983; Gromko, 1994; Gromko & Poorman, 1998). A common theme in this work is that children's invented notation provides a visible pathway for educators to understand children's musical learning and development (Barret, 1999). Furthermore, Swanwick (1999) sees symbol and sound as linked intrinsically. "Whether painting a picture, improvising music, dancing or refining a poem we translate experience into particular images, bringing these images into new relationships and articulating our thinking within systems of signs" (Swanwick, 1999, p. 8). He works on the premise that if music is a language, we should be able to use these symbols to understand development in music and meaning. Except that, like children's writing, they can often say more than they can write.

Bamberger (1991) proposed that children's invented musical notation progresses from *figural* to *formal* as their invented drawings mature. Figurative musical examples are drawings which show the way that the music goes; that is, rhythm and pitch patterns are grouped according to what goes best together and tend to be more graphic by nature. *Formal* musical drawings depict actual rhythmic duration or even standard musical notation.

As children mature, their musical representation tends to include a combination of both figurative and formal elements. Gromko and Poorman (1998) built on the work of Bamberger (1991), Davidson and Scripp (1989) and Gardner (1983), and proposed that children's use of music symbols is developmental and starts with scribbles, then moves to lines or dots to represent pitch.

In analysing the data, we were looking specifically at how the children might use symbols to develop, extend or refine their music. Because of the small sample size, it is acknowledged that there is insufficient data to draw categorical conclusions. However, the results do raise interesting issues for the teaching of music in the primary school context. While none of these issues are particularly new, the results provide much needed New Zealand data to compare with issues raised in the international literature.

As an analysis tool, 'skill theory' was used as a means of looking at the symbolic detail of the children's soundscapes. Skill theory characterises cognitive development as the skill of regulating or co-ordinating one, two, or two sets of two dimensions of a task within a domain. According to Davidson and Scripp (1989), children as young as four to five years can map discrete musical events within a phrase and by seven years they can map two relational dimensions in a phrase, such as pitch and rhythm.

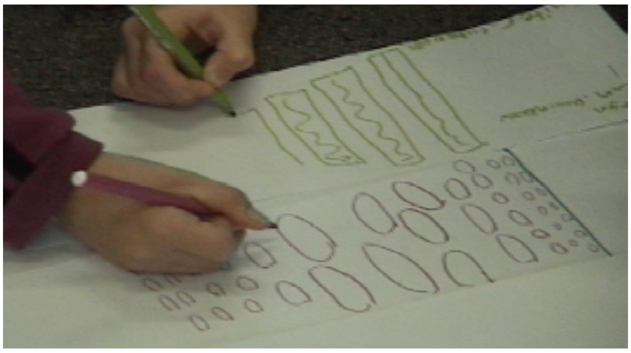


Photo 4. *Mapping at least two dimensions at once*

All groups showed clearly that they could manage at least two relational dimensions at once within any one line (Photo 4). For example, their scores showed where each individual started and stopped and also that different lines of the score represented different sound sources/or people playing. Each line often included multiple layers, indicating when a child was playing more than one instrument during the piece (Photo 5).

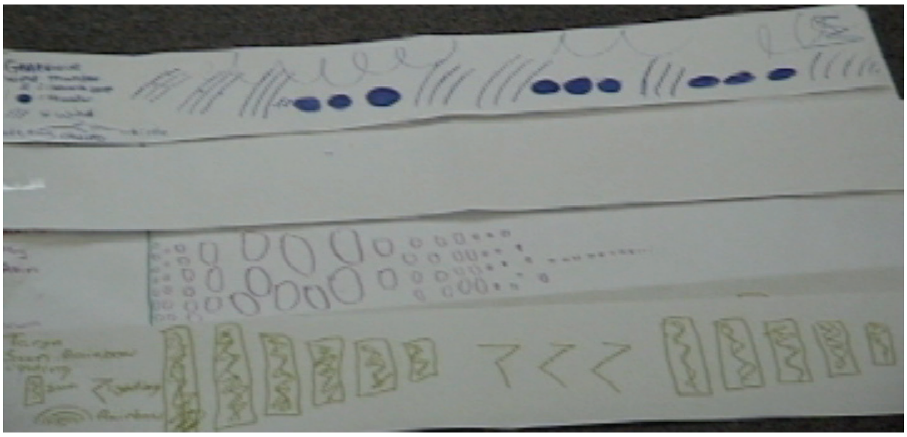


Photo 5. *Focus group score*

Note the multiple instruments on the top line; cues for starting and stopping; larger symbols = loud; smaller symbols = soft. Note the pitch alteration high to low, on the bottom line.

It was clear that the conceptual teaching relative to symbols had been absorbed to some degree. The children used symbols such as strokes or swirls to indicate how the sounds were to be played; to show how often these occurred (spaced-out or close together); and for how long the sounds were to continue. The children also showed that they were aware of dynamic variation, adjusting the size of the symbols to indicate louder or softer (Photo 5). Several showed pitch variation, which corresponds with findings of Gromko (1994), who found that pitch is generally mapped first. However, in general, the children's agenda seemed to focus more on sound quality and how frequently the sound was to occur.

All groups showed explicitly that they were able to *sequence* sound events symbolically, capturing changing chunks of sound as they occurred in relationship to each other *within each line* of the score. The symbols used by the focus group were very graphic in representation. For example, 'sunshine' played on chimes was represented by graduated chime bars; and 'thunder and lightening' were represented by strokes and heavy round repeated blobs, matching to the bouncing of a large rubber ball and chimes respectively. While these symbols acted as cues for sonic events to occur in the sequence, they did not match in figurative detail to the exact number of sounds required *within* a chunk. For example, 'rain' (tapped out on a hand drum) was symbolised by multiple ovals stacked together (Photo 5 line 3). However, these represented the quality of sound to be played only, not the exact number of taps to be played consistently, in each rendition. Photo 6 shows clearly this chunking of symbols.

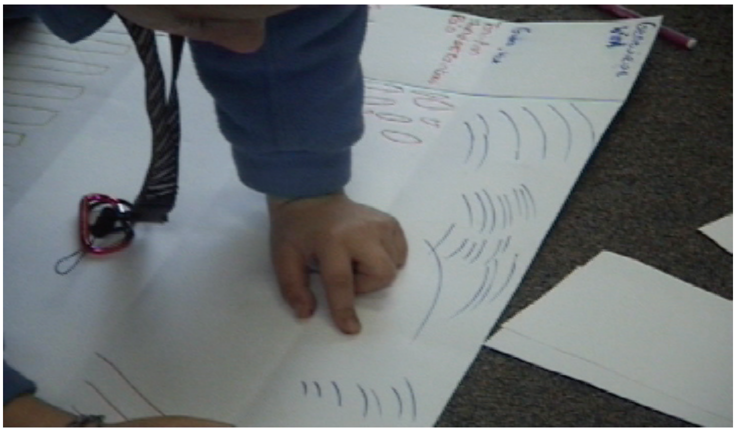


Photo 6. *Chunking of symbols. Representation of clusters of sound*

This chunking of sonic events may indicate that novice composition is rooted more in the holistic elements of music, such as form, texture or qualities such as mood, style or affective intent, rather than minutae of detail such as exact rhythmic groupings or the like. This concurs with Wiggins (2003) who found that children's conversations and actions in composition are more likely to reflect an holistic vision of the work in progress: "They think in chunks of sound"… just as verbal thought takes place in verbal ideas, not single words" (p. 150). Clearly, this group's developmental path was embedded more in the *figural* stage of symbolic use (Bamberger, 1991). However, other groups showed that they were more capable of representing musical minutae.

The focus group's score showed no recognition of the temporal inter-relationship between each line operating on the score. That is, each child wrote her own line, but where she started or stopped did not necessarily match with the actual, sonic events portrayed on the other lines (Photo 7). This group appeared to be perfectly comfortable with this sound/symbol mismatch as they played from the score, only becoming aware of the discrepancy when they discussed the score with the teacher.

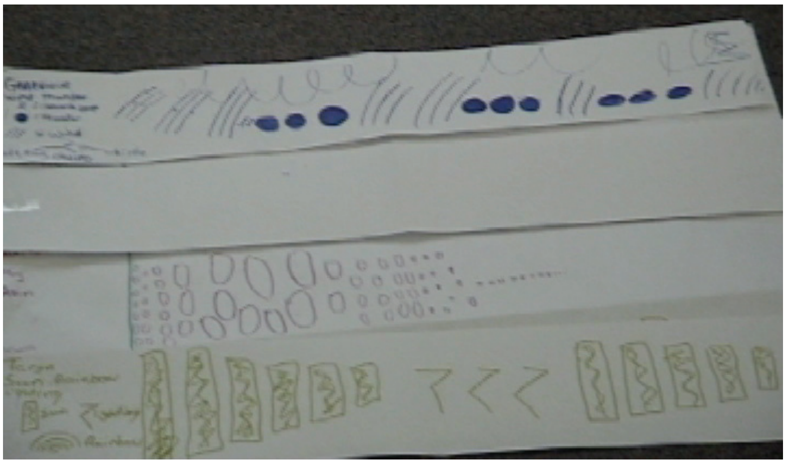


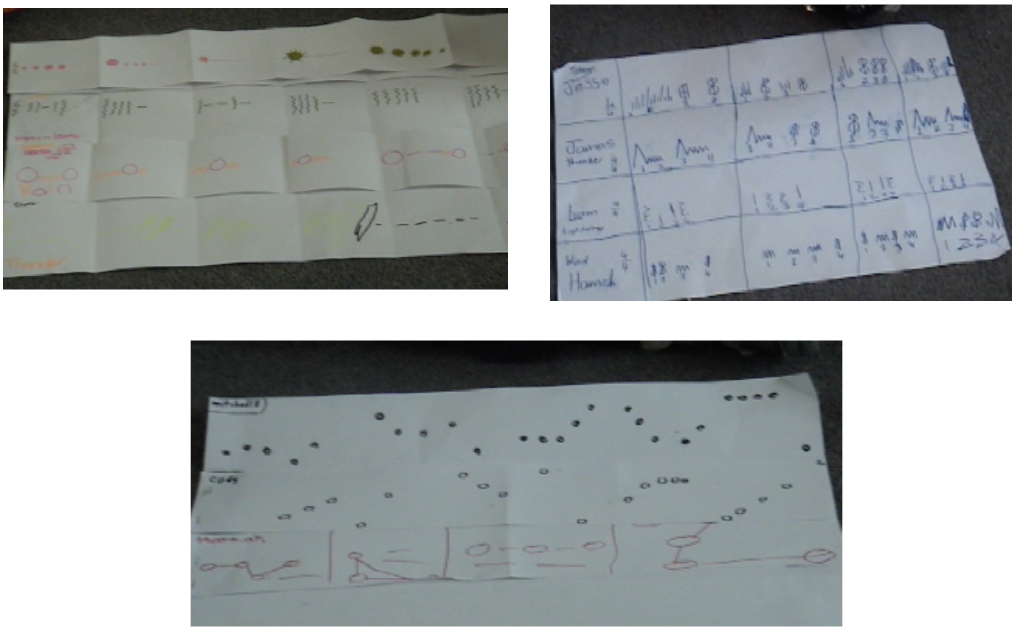
Photo 7. *Mismatch between score and actual performance*

Note how the rain symbol of Photo 7 line 3 finishes before the other lines. However, in actual performance, all lines ended together.

> Teacher-researcher: Your symbols show you do not play with the others at the end. Is this what you actually do?
>
> Child: I do drips … mmm. I would make it longer so I finished with the Tara's rainbow sound.

After this discussion, the children made efforts to adjust the 'rain' symbols to match their true performance intent.

This apparent inability to decentre from the self enough to become aware of more than one line within the larger whole when writing symbolic cues was interesting, given that developmentally, 9- to 10-year-olds are generally becoming less self-focused and more aware of group and peer cues. In contrast, such a temporal mismatch was not apparent for some of the other groups. Their scores showed a clear sense of the temporal relationship between lines of the score, with different instruments stopping and starting relative to the timing of others Photos 8-10 show this clearly. Note the grouping according to beat in all of them and the pitch mapping in the third image.



Photos 8-10. *Metrical grouping of symbols*

An explanation for this difference could be that the focus group was endeavouring to capture sonic imagery, or quality of sound, which had no sense of consistent pulse or beat. Put another way, in performance, they seemed more intent on capturing the evocative nature of their sound piece rather than being driven by a consistent pulse or beat. In fact, they rarely referred to their score as they played. This contrasted sharply with other groups, whose pieces had a strict metrical beat focus which they slavishly followed when performing. As a result, their performance outcome lacked the looseness of the more evocative sound piece captured by the focus group. This emphasis on metrical groupings of beats tends to indicate that these children were conversant with or had experienced conventional musical notation. The grouping of their symbols clearly showed that they were moving into a more *formal* stage of representation (Bamberger, 1991). Alternatively, however, it may have shown that they were hooked on beat, assuming that it was essential to any music making.

Davidson and Scripp (1989) argued "there is yet little evidence that untrained musicians can engage in formal compositional problem-solving using standard notation" (p. 73). They state that while there is rapid development of notational systems in young children, there is "little evidence that this growth continues without the support of musical training" (p. 65). This concurs with findings by Telfer (1992) who discovered that competent sight-singers continually cross reference one line of the score to another when singing at sight. This contrasts with the skills of less knowledgeable musicians who can only focus on their own line.

We can speculate as to whether it was the children's musical training or experience of conventional music notation that fostered for some, an awareness of the temporal inter-relationship between different lines on a score; or, conversely, whether lack of musical experience meant the others were unaware of the temporal links needing to be made. However, to counter this position, it can be argued that in capturing a more literal representation of the imagery through sound, the focus group's piece was more evocative and less beat driven. But it is conceivable that temporal matching between parts or lines may, therefore, be more difficult when the visible cues on the score are flexible in length, with nothing common between them to match to. On the other hand, when there is a common metrical influence between the parts, the beat cues can be easily followed and lined up between the lines of the score.

Bruner (1973) suggests that there are three kinds of representational processes, which are based upon motor actions, images and language systems. These representations express qualitatively different types of knowledge ranging from the first sensory-motor responses to fully functioning symbol systems. According to Bruner (1973), "the more advanced symbolic representations enrich rather than replace the initial action orientated stages" (p. 63). Certainly, it can be argued that the focus group's use of notation enriched their awareness of particular elements in their music. As they drafted and redrafted their symbols, their actions and conversation indicated an awareness that they needed to accurately represent their dynamic levels, as well as the number of instruments being played at once. However, to the observer, it appeared that the children's process was predominantly about creating the right icon and adjusting this to represent the sounds that they had made. Clearly, the use of symbols was not about adjusting and developing their sound ideas as a result of using the notation, as the teacher had anticipated. Put simply, it seemed that the score was more a reflection of what the children could actually write down symbolically and how well they could formulate the symbols. Taken further, rather than enrich what they were creating, it could be argued that the complexity of mastering the notation system itself may have mitigated against the quality of the musical ideas under consideration.

To this end, it is debatable whether the children used their symbols to develop or grow their ideas further. In fact, the initial ideas and structure of the focus group's piece were cemented in the initial exploratory stages. This structure was not altered in the 18 live, improvised repetitions, or on their notated score. Such adherence to a structure conceived very early in the devising process was also evident in other disciplines of this arts research project, particularly visual art and dance. It was common to observe narrative being used as a trigger for imaginative idea development. However, narrative structure can dictate the creative sequence, if the narrative is adhered to in a strictly literal sense. While initially such a framework can generate confidence for children when they first start composing, conversely, it can consolidate prematurely their structure, and herein lies a problem. Children may not move outside their initial structural frame because they do not have the techniques to do so. Children need to be encouraged to move past their first, literal response to explore a wider range of imaginary possibilities. However, it begs the question as to how much supremacy is actually given, as a ritual of practice, to teaching techniques that foster the development of musical ideas, such as repetition, layering, reversal, augmentation and so on. This raises the age-old tension for teachers between allowing for the freedom to create, balanced against the need for structured teaching of arts-specific concepts and techniques.

According to Davidson and Scripp (1989) reflective thinking is an important dimension of musical development that arises from the core enactive stages where skills are first manifest. Music commentators, such as Bamberger (1991), Davidson and Scripp (1989), Gromko (1994) and Regleski (1982), emphasise the importance of *reflection in action* in music and, significantly, the role that symbolic representation plays in this. "The process of invention may contribute to building understanding because the children's visual representations are images to be evaluated in a process of reflection" (Gromko, 1994, p. 6). According to Bamberger (1991), children create written material that "holds still" (p. 52) so that children can reflect on it and this ability to reflect in action, moving back and forth between reflection and experience, is often helped by the teacher.

The reflective discussion that arose as the children negotiated their use of symbols was rich in informing us about their thinking processes. Given the temporal nature of music, there is clearly an advantage in using symbols as a visible cue system to prompt the teacher and children to recall sound ideas which would normally be lost in time. In this regard, we observed symbolic representation acting as a valuable reflective and refining tool. By utilising the method of overlaying paper strips on the score as each line changed, a permanent record of the children's pathway was visually available. However, idea generation did not appear to start with the symbols, nor was development or extension of the ideas witnessed through the manipulation of symbols, which is contrary to what the teacher-researcher might have expected.

The children were questioned as to why they had used symbols on the score. Their responses varied from compliance with what the teacher had asked of them, to:

> "So you can tell who is doing what part."
>
> "It can help when you get lost and you don't know what to do…if you get all freaked out".
>
> "It might help if you came back in a few weeks to do it again".

However, when playing their piece, the focus group made no visual reference to their score at all. They worked as an ensemble using sound cues produced by one pivotal instrument (the chimes), which triggered the next progression in their sequence. The intensity of their ensemble listening and watching skills was noticeable and they were arguably the only group, who created an evocative sound piece that communicated their ideas as a connected, holistic whole. When asked why they did not use the score their response was

> "We don't need to … we sort of have it in our heads"
>
> "When Tara starts playing the sun I know I get lighter then she starts …"

While other groups performed with slavish attention to the minute detail of metre and bar lines on their scores, it was to the exclusion of ensemble connection. Their outcome was arguably stilted and lacked the spontaneity and ensemble awareness of the focus group. Put another way, they were aware of the parts or the symbolic organisational detail on their scores but not the whole.

It is apparent that *figural* or more *formal* notation systems have an impact on the sonic outcome of a composition. There is tension and paradox here in that the teacher introduced the symbols with the belief that they would aid the development and refinement process but they appeared to have little influence on this process. However, the research did show that symbols clearly affected the sonic outcome. The more formal metrical properties of conventional music notation tended to constrict the musical result. Conceivably, traditional music notation with its emphasis on metre, beat and rhythm is less suited to soundscape creations which evoke mood and may demand freedom from beat. The utilisation of symbols in music for representation is an unquestioned ritual of practice for teachers and, indeed for many, equates with what music is. However, the symbol is not the music, it is merely the cue to retrieve it; the music is the sound and this needs to be kept at the forefront of the composing process. Teachers need to be aware of the diversity of musical symbol types available and encourage children to use the most appropriate symbolic notation to capture the sonic intent of a theme. For children, metrical beat representation may be more suited to traditional music rather than evocative soundscapes.

Finally, it is important to acknowledge an underlying assumption embedded within this research question; that musical notation is necessary within musical composition and that what is written down is most valuable. Anecdotal evidence suggests that some primary school generalists believe that music is only real music when it is written down. Arguably, the findings of this paper challenge such embedded beliefs.

CONCLUSION

This study signals that the use of symbols may have little influence on the generation, development and structuring of children's sound ideas when they are creating soundscapes. In fact, the best use of symbols in the teaching and learning process in primary school settings still appears less than clear. However, the research does indicate that the use of symbols in this context has several purposes in the compositional process. If it is to recall and refine work that could be lost in time because of the temporal, sonic nature of sound, then it clearly has efficacy. If it is for performance retrieval of long, complex works then it has an essential part to play to aid memory. However, if it is for performance retrieval of simple, evocative sound pieces, then slavish adherence to a score, especially if the notation is based on more formal or traditional musical symbols may jeopardise the holistic nature of the sound making. In addition, it may draw away from the essential ensemble performance skills needed to communicate a musical whole. The research did show however, that the use of symbols to represent sound can be valuable if the teacher uses these as a discussion tool for reflection, further development and refinement. It is feasible that if structured teaching of musical techniques and devices to develop and refine initial sound ideas were part of the music teaching and learning cycle, the efficacy of using symbols for this purpose may arguably result in different outcomes and bears further scrutiny.

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