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# Literacy and Numeracy – How Does Music Fit into the Equation?

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## Introduction

Certainly in the past, and arguably continuing into the present, music education in schools has been and is often perceived as the exclusive domain of the so-called 'talented and able' with a distinct bias towards middle class West-centric society. Yet we are constantly reminded that education ought to address issues of inclusivity, access and equity for students, no matter what their background or history (Smith, 1995). In fact effective music education experiences often provide another means of access to learning areas such as language or maths for children excluded by their apparent lack of literacy or numeracy skills (Campbell, 2000).

Obviously there are some challenges to be addressed if access to equitable music education is to become a reality for all students. For example, stringent economics and the paucity of human resources mean that it is probably an unrealistic expectation that small or remote schools employ full-time classroom music specialists or instrumental staff. Besides this, there are some sensitive issues

which will need to be resolved if the integrity of each cultural setting is to be maintained.

Discussion related to music support here will mostly be about what I refer to as 'West-centrally oriented' music, the music perceived as representing 'mainstream' Australia. I do not mean that any program cannot embrace other cultural musics, but rather that it is generally appropriate for music educators from a West-centrally oriented background to share only their expertise in that particular musical culture. If we talk about supporting the West-centric direction of a 'both-ways' education focus grounded in English literacy, numeracy and related areas, this seems a logical form of cultural support. West-centric music carries West-centric cultural baggage as substantially as English language, even if its communication seems more apparently abstract.

Increasingly there is a need to view music education in a region like the Northern Territory as a 'both-ways' practice, particularly in the light of the success many indigenous music groups are having in the mainstream. The reasonable assumption ought to be that we can all learn from each other. But Indigenous Australians must freely maintain control of the dissemination of their own culture and traditions. Implicit in this is responsibility for decisions about which aspects they are prepared to share if they are to continue to retain ownership.

Elliott (1995) recognises four positions for music learning. These include learning **for** and **in** music, both of which recognise the importance of music as a discipline with its own intrinsic value. However, and critical to this discussion, he identifies the other two as learning **by means of** and **about** music. At the risk of raising the ire of those who contend that music must only be recognised as a discrete subject area, I suggest that we need to recognise Elliott's latter positions, for the supportive value they suggest for music education as a vehicle for the acquisition of competencies across the curriculum, but particularly in relation to renewed concerns about raising West-centrally oriented literacy and numeracy levels in Indigenous Australian educational settings. Music ought to provide an incredibly powerful focus, not only towards inspiring and capturing the imaginations of children, but as a jumping-off point for forays into all other learning areas.

### Music Ought to Support Enjoyment

'Music' may well be the subject in the curriculum most tied to the notion of 'enjoyment', often providing opportunities for 'education-without-pain'. No matter what formal learning assertions we make for music in support of literacy and numeracy, the fact that there will be pleasure and excitement in making, it has to remain near the top of the list of reasons why music has powerful potential. In fact, sometimes this need be the only outcome!

After all there is the critical issue that before we can begin educating children we must first get them to go happily by their own choice, to school. Of course school must embrace learning, but at the same time it ought to be an enjoyable place where 'happy' events play a significant role in the education process, by the minute, hour and day, week in and week out. In this way children will want to be a part of that education process. Of course increased regular attendance would be an indicator that

this was actually happening. In one remote community education centre I led music-making sessions one afternoon each week, an afternoon in the week when an almost full complement of students could be guaranteed to be in attendance. While we talk of the pleasure provided in music-making, I must note that the singularly most important competence which music supports across learning, is good **listening**. Listening and enjoyment go hand in hand. Hearing is simply not enough. Listening is hearing with awareness, hearing with attitude!

### Music — A Multiple Intelligence

Gardner (1993) argued that 'reason, intelligence, logic, [and] knowledge are not synonymous', that the concept of intelligence ought also to include such areas as music, spatial relations, and interpersonal knowledge in addition to mathematical and linguistic ability. As Goleman (1995: 38) notes, and pertinent to this discussion:

This multifaceted view of intelligence offers a richer picture of a child's ability and potential for success than the standard IQ.

Originally Gardner proposed seven intelligences, but the number he identified continues to grow. These intelligences are capacities 'to solve problems or to fashion products that are valued in one or more cultural settings' (Gardner, 1993). This notion challenges the traditional view of two intelligences as verbal and computational. Gardner's intelligences include 'Logical-Mathematical Intelligence', 'Linguistic Intelligence', 'Spatial Intelligence', 'Bodily-Kinaesthetic Intelligence', 'The Personal Intelligences', interpersonal and intrapersonal intelligence, and 'Musical Intelligence'.

Our interest here is in the seventh. Musical Intelligence embraces a person's capacity to recognise and compose musical pitches, tones and rhythms. While auditory functions are required for a person to develop this

intelligence in relation to pitch and tone, it is not needed for the knowledge of rhythm.

Of course music-making does not preclude the application of the other 'intelligences'. Although they are anatomically separated from each other, Gardner claims that the seven intelligences very rarely operate independently. Rather, the intelligences are used concurrently and typically complement each other as individuals develop skills or solve problems. In her definitive volume 'Aboriginal Music, Education for Living; Cross cultural experiences from South Australia', Ellis (1985) said:

In the process of the education of the total person which occurs through the use of music, the student may learn relatively little about music (although this is not necessarily so). But he inevitably gains a great deal of experience in reconciling and rising above contradictions both within himself and in his relations to others.



Both nature and nurture contribute to the development of the intelligences. All societies value different types of intelligences. The cultural value placed upon the ability to perform certain tasks provides the motivation to become skilled in those areas. Thus, while particular intelligences might be highly evolved in many people of one culture, those same intelligences might not be as developed in the individuals of another.

Sperber (1994) suggests that our knowledge of the world is represented in two different areas of the mind. One is within its own specialised cognitive domain and the other which contains knowledge about the social and the non-social world. The different ways in which people from diverse cultures perceive what is socially or culturally correct arises in part from what Mithen refers to as **cognitive fluidity** between the two. Thus, in many hunter-gatherer societies, animals which provide food may also be revered as 'brothers, sisters' or as other intimate family members.

No dissonance is seen between hunting, killing and eating them, and esteeming their kinship. If this sounds surprising we need only reflect on our own seeming ambivalence about the animals we eat and the animals we keep as members of our families but which we call pets. The first piece of knowledge belongs in the cognitive domain related to acquiring food to eat and the other the domain of social intelligence, protocols established by our cultural knowledge (Mithen, 1996). In working across cultural domains these seeming but related differences must be a consideration. Accepting the contrasted ways in which people operate is critical to the kinds of sharing and exchange envisioned in this discussion.

## Communication — Concrete and Abstract

A significant part of the communication of literacy and numeracy is through 'messages' that convey concrete notions and ideas. Music also provides communication between humans but its 'messages' are emotional and aesthetic, expressed using symbolic codes. However many music authorities, such as Pinker (1997), who avers that people most enjoy the musical styles of the culture and idioms they grew up with, refute metaphors that represent music as a 'universal' language. The 'mental software for language', in which these conform to an abstract Universal Grammar, may also apply to an abstract Universal Musical Grammar so that globally while people recognise all music as 'music' they do not necessarily recognise it as their own. What this implies is that one people, learning in another's, ought to be able to recognise the separateness and integrity of the music of each other.

Creativity in all art forms transcends language barriers and that interest is closely paralleled within Aboriginal Australia (Onus, 1990:14).'

While the music component of a musical presentation itself may be conveyed to its audience in abstract form it often supports the communication of related constituents. The most obvious examples are in the language of lyrics, the rhythm of dance and the enhanced dramatic impact of drama. Across historical and cultural settings the widespread use of music in intensifying and enhancing the spirituality of mystic, religious, ritual and ceremonial settings, is significant. In fact music may be perceived (sometimes realistically) as supporting opinions or philosophies so opposed to accepted norms in these settings that its application may be banned or forbidden or restrictions placed on the ways it is presented.

Rhythm and harmony find their way into the inward places of the soul, thought Socrates. St Augustine agreed, adding that it was a grievous sin to find the singing in church more moving than the truth it conveyed (Ridley, 1996).

For indigenous Australians in traditional settings music may be perceived as critical to high level emotional-spiritual communication (Ellis, 1986). At a national level in Australia music may be an imperative in realising national commitment and loyalty through compositions such as our national anthem or *Waltzing Matilda*. Songs like Yothu Yindi's *Treaty* and the Warrumpi Band in its reconciliatory *Blackfella, Whitefella* powerfully convey such messages.

A document which details the most up-to-date rigorous research into the impact of arts across education is the 1999 USA Federal Government Report, *Champions for Change* (which can be downloaded from the Kennedy Arts-Edge site in Washington DC). In terms of their support for the power of the arts in general across the curriculum, two quotations from that document deserve inclusion here.

High-arts (participants) youngsters were far more likely than their low-arts counterparts to think of themselves as competent in academics. They were also far more likely to

believe that they did well in school in general, particularly in language and mathematics.

When well grounded in the kind of learning we observed, the arts develop children's minds in powerful ways. In arts learning young people become adept at dealing with high levels of ambivalence and uncertainty, and they become accustomed to discovering internal coherence among conflicting experiences. Since young people live in worlds that present them with different beliefs, moralities, and cultures, schools should be the place where learning fosters the reconciliation of apparent differences.

The examples that follow suggest ways in which music-making might support literacy and numeracy in diverse settings, but with particular attention to Indigenous Australian settings in the Northern Territory. Anyone familiar with 'Walking, Talking Texts' will recognise the ease with which many can be matched to activities in that literacy learning model.

### Cognitive Academic Language Proficiency — Alphabetising

One piece of music may have the capacity to support acquisition of a number of skills and conceptual understandings. An example is the *ABC Song* which uses as its metric vehicle the 'triplet' rhythm that underlies spoken English. This becomes immediately evident when we sing nursery rhymes. Almost without exception they are set in compound duple (6/8 metre). In one fell swoop the *ABC Song* introduces and provides a significant vehicle for learning the alphabet, reviews nursery rhymes, and supports the practice of an aspect of register in spoken English. It also recognises the notion of 'tension and release' in the contrast provided by each new nursery rhyme balanced against the repetition of the alphabet between verses.

### Word Lyrics, Oral/Aural and Written Language

The lyrics of songs are, of course, mostly a form of poetry set to music. As a general rule these have a metre and end each line with rhyming words. When I work with classroom teachers I explain that when words are set to music their passage through the brain becomes almost radically different to that of spoken language. It is as though a different computer program has picked up and translated a file. When words are sung they pass through a region of the brain adjacent to that of long term memory, and are thus committed to memory with greater ease than if they were chanted as spoken text. As a musician I can recall immediately in song thousands of sets of lyrics orally. If, on the other hand, I attempt to speak rather than sing or chant these, I am usually unable to get past the second or third line of the first verse.

Most of us have used this facility at some point in our lives, in memorising numbers of days in the months of the year ("Thirty days hath September..."), or recalling rote learning for exams. Singing times-tables is a common learning experience. If read and spoken language is channelled through a different mental path to that of sung lyrics the practice

of first introducing the words of a song on a written chart does not necessarily make sense. This suggests that we ought to introduce song lyrics orally first, only displaying the written words after memorised acquisition is secure.

### Cloze

Classroom music-making provides many opportunities for cloze exercises, where a word or words are excluded from a sentence. The most obvious are those where children are encouraged to sing a song and omit words in successive verses. The early childhood song *Heads, Shoulders, Knees and Toes* is an obvious example. So are arrangements of the *Hokey Pokey*. Of course this exercise has outcomes in terms of music learning too. When children leave out words or whole phrases as they sing they are encouraged to maintain a rhythm, where musical silence is termed a 'rest'.

### Sequencing Categories and Lists, Hyponymic Hierarchies and so on...

There are many music activities that encourage students to enjoy creating long lists and categories. The simplest examples are in cumulative songs like *Old McDonald Had a*

## The A,B,C and Nursery Rhymes Song



Oh, A B C D E F G H I J K L M N  
 Ma- ry had a lit- tle lamb, its fleece was white as snow, and  
 Jack and Jill went up the hill to fetch a pail of water  
 Hey diddle diddle the cat & the fiddle the cow jumped over the moon, the  
 Hump-ty Dumpt-ty sat on a wall, Hump-ty Dump-ty had a great fall



O P Q R S T U V W X Y Z  
 ev' ry- where that Ma- ry went the lamb was sure to go.  
 Jack fell down and broke his crown and Jill came tumbling after.  
 little dog laughed to see such fun and the dish ran away with the spoon.  
 All the King's horses & all the King's men Couldn't put Humpty together again

*Farm*, where children are encouraged to recall not only the animal sounds, but also their names, and to add each new name and sound to the existing list. Among others there is *I Know an Old Woman Who Swallowed a Fly*, and *Oh Row the Rattling Bog*.

Such songs may be utilised to have a number of outcomes including recognising nouns and other parts of speech. More complex examples of lists and categories might be encountered with older students. The West-centric classification of instruments into the ‘**hyponymic hierarchy**’ of Strings, Woodwind, Brass and Percussion, contrasts with another, the ethnomusicological classification of instruments into chordophones, membranophones, idiophones, aerophones, electrophones and so on. The narrated version of Benjamin Britten’s *The Young Person’s Guide to the Orchestra* demonstrates the former. The second hierarchy is more appropriate when we start discussing instruments like clapsticks or yidaki.

**Basic Interpersonal Communication Skills — Modelling the Sounds of English in Action**

**Echo Songs** comprise a significant component of songs in early childhood education in West-centric schools because they often model effective English pronunciation to small children. This makes them an obvious and powerful tool for introducing foreign or second-language English-learning children to new words and unfamiliar language sequences in English. This might take place; for example, through the role modelling provided by an English first language teacher presenting the

‘call’ to which students then echo their ‘responses’. Many teachers do this as they mark their roll, singing a greeting and a child’s name and expecting the child to echo the tune and rhythm in their sung response (see Figure 1).

If learning the lyrics of songs orally is followed by written presentation of those lyrics and related comprehension exercises students often add considerably to existing vocabulary.

**Backward Chaining, alias ‘Retrogressive Concatenation’**

It is only when we have achieved some sophistication in our own language use that we can enjoy a joke of the nature of the title of ‘retrogressive concatenation’ given to ‘backward chaining’. Of course, for second- and foreign-language speakers this is just the very excluding language seen as supporting the ‘secret curriculum business’ of *balanda* (West-centric Australians in East Arnhem Land). Nevertheless ‘backward chaining’ has considerable significance to musicians and there may be rewards in its use in literacy programs. Put in the simplest terms it describes the seemingly bizarre and yet totally reasonable practice of introducing and rehearsing new musical works phrase by phrase from the end of the music back to the beginning.

Profit lies in the fact that the most rehearsed parts of the piece move sequentially from the finish so that the last sonorities the audience hears are the best rehearsed! Irascible English conductor, Sir Thomas Beecham, is reported as telling his orchestra that it was important to begin and to end well and that whatever

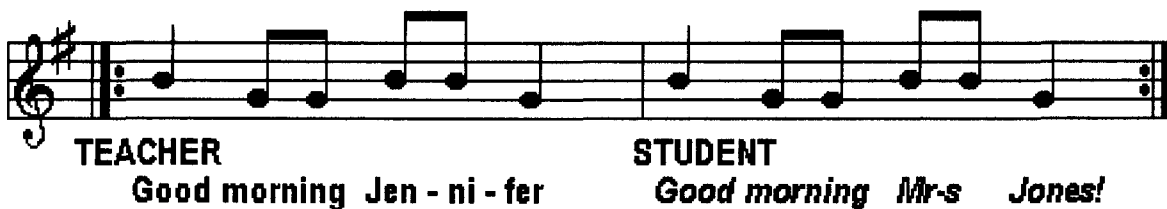


Figure 1: A greeting in song

happens in the middle matters not at all because the opening and conclusion of a piece of music is all that an audience remembers! In terms of retention for the performers backward chaining is a proven effective strategy. Every time a new section is introduced the musicians then proceed to a section they already know. I have found that introducing the lyrics of songs in this way works well and poetry taught from the last line backwards is equally well retained.

## Genres

Genres are depicted as social processes that describe, explain, instruct, argue and narrate. There are songs to match most if not all of the processes described above and the genres which each generates. For **procedural text**, one appropriate musical example is in explaining the 'form' of the Maori Stick Game, *Titi Toria*. Here six sequences of eight-bar patterns direct the way students' paired sticks are employed. Because I often accompany the 'stick game' with Maori lyrics children can run into difficulties remembering the order of activities. Consequently I use the format of simple procedural text to outline progress through the verses:

1. 'floor, together, right (hand toss) (eight times)
2. 'floor, together, together' (eight times)
3. 'floor, together, left (hand toss) (eight times)
4. 'floor, together, together' (eight times)
5. 'floor, together, both (hands toss) (eight times)
6. 'floor, together, together' (eight times)

In this way too students are enabled to identify the 'form' or unified structure of the piece as they recognise that all of the even sequences (2, 4, & 6) are identical, while the other three follow a pattern where the third beat only changes.

Music activities also lend themselves to the development of **story writing skills**. Traditional nursery rhymes can be taken apart line by line and reconstructed as expanded prose stories. Popular chant *Goldilocks* which

begins, 'Once upon a time, in a nursery rhyme...' is in effect a traditional children's story that has been turned about to make its prose lyric verse. When children reconstruct it as a story they may want to fill in its missing parts because poetic licence has allowed the writer to leave out significant parts of the original plot. Once, with a year 5/6 class of my own, I shared a journey of often surprised discovery as we turned the wonderfully evocative nursery rhyme, *Hey, Diddle, Diddle, the Cat and the Fiddle* into a piece of the most imaginative narrative text. I hadn't realised until then how many different interpretations there might have been for the cow choosing to jump over the moon.

There is a large resource of **narrative** songs in the repertoire of music for schools. These include *The Gipsy Rover*, Don McLean's *American Pie*, and old camp song favourites like the lengthy *Abdul Abhulbhu Amir* which also provides opportunities for children to examine **dialogue** in its lyrics. **Dialogue** between 'George and Lisa' is also the literary focus of the folk song *There's a Hole in my Bucket*. The thirty odd years of Australian Broadcasting Corporation's song-books provide wonderful examples.

## Maths and Numeracy

Classroom music teachers already employ significant numbers of songs and music activities in support of numeracy and mathematical concepts and skill acquisitions. A few are suggested here in a list which could be expanded with ease.





## Counting

A number of early childhood music activities focus on support for **counting**. One obvious example is the song *One Two Three Four Five, Once I Caught A Fish Alive*. Then there are songs where **numbers diminish** verse by verse. These have always been a popular social item because of the challenges they provide both to memory and numeracy in recalling previous verses. Typical are the camp fire songs, *Ten Green Bottles*, *Rolls Over* and early childhood's *Alison's Camel* which, in its first verse has ten humps and reduces to nothing in the closing verse because 'Alison's camel is a horse of course!' This song also provides opportunities for modelling simple addition to a total of ten as children first imitate the teacher showing sets of sums by displaying fingers on both hands in a variety of configurations for each new number, e.g. four and four adds up to eight. Earlier I alluded to cumulative songs where a word or phrase is added at each new verse. So, as well as the support it might provide for literacy, this also lends itself to 'addition' concepts in numeracy.

Musical chairs is always fun no matter how it is played. Of course it requires participants to be focussed and to exercise those listening skills I spoke of earlier, ready for the music to stop. There are plenty of variations. Instead of trying to find a chair children could be told to form a group of a particular number of students. For example the teacher might call 'seven'. As each group of seven is achieved those children sit. Those remaining at the end are out. 'Remainders' is another mathematical outcome of course.

The way in which musicians organise beats or pulses into regular and sometimes less regular patterns is called 'metre'. **Metre** in music provides an opportunity to look at means by which rhythm is 'measured' and relates music very powerfully to maths. Music in two-beat metre often takes the form of fast dances, in three-beat metre it is commonly waltz or similar music. Arguably four-beat metre is

the most frequently employed in West-centric popular music and possibly reflects the analytical and organised nature of the way this culture functions. 'Brussels sprouts for breakfast, brussels sprouts for tea, brussels sprouts for lunch, Mum's packed for me!'

Less frequent in West-centric music but common in eastern European and Middle Eastern music is the use of five-beat and seven-beat music. So, when American musician Dave Brubeck began to experiment with five, seven and other 'unusual' time metres in Jazz in the 1960s his music was only radical to those still stolidly entrenched in West-centrally oriented music settings.

## Geometric Shapes and Figures

It is significant too that I note those pieces of music that move in a **cyclical or circular** manner, rather than the more typically linear of much West-centric music. This could open a complex discussion of intercultural perceptions of time but suffice it to note that on a time continuum West-centric culture seems considerably more linear in its perceptions of the motion of time than many other cultures. Hence circular or cyclical music often reflects a less than western cultural leaning. Nevertheless examples of **cyclical music** are to be found in the rounds and canons we learned ourselves as children, such as *Kookaburra Sits in the Old Gum Tree*, *Frere Jacques* or *Three Blind Mice* and in the gamelan music of Western Indonesia.

If we include music which accompanies folk dance and, of course the dances themselves, then **line** dances and **square** dances provide a wonderful visual opportunity to appreciate how geometric shapes are formed. The well-known children's line dance *The Paw Paw Patch* begins with children in lines but, as each line moves through particular sequences students loop back and forward in sections of ovals and circles.

The square dance *Captain Jinks* begins with four pairs of students forming a square to face each other, a pair to each 'side' and with hand-held circles and promenades demonstrating the transition of a square to a circle by the removal of its corners. There are also plenty of **circle** dances to add to this geometric repertoire including **hora** such as the Israeli *Hava Nagila* or the Greek *Zorba's Dance*. At a more simple early childhood level there is the French *Rabbit Dance* and the game song *Cut the Cake*.

## Summary and Conclusion

The preceding discussion identified and expanded on some issues, concerns and strategies for employing West-centrally oriented music in support of the acquisition of English literacy and numeracy acquisition appropriate for operating in West-centric contexts for students in remote Indigenous Australian Northern Territory schools. It was critical in following the discussion that acquisition only of English literacy and of West-centrally oriented numeracy was considered. There was no intention here to challenge culturally relevant ways of learning or traditional forms of literacy or numeracy in Indigenous Australian settings. The notion the discussion espouses is of a program which does not support assimilationist assumptions but helps equip students from remote Indigenous Australian-oriented community settings in addressing competencies needed when they desire to function in West-centrally oriented contexts.

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