

Melodic Learning: More Torque for the Learning Engine

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This is the second in a series of white papers addressing the power and potential of *Melodic Learning*. The first paper in the series is titled, "Reframing *Melodic Learning* as a Transformative Multi-modal Construct".

One day on Sesame Street the little girl asked Grover...

*“Now here is a question, a question for you.
Remember, the answer will start with a ‘Q’.
Just think of a duck, be it white, brown, or black.
What sound does it make? Why, a duckie goes...”*

...and Grover learned quickly and he learned well. Since this rhyme first debuted on PBS millions of children have learned incredible amounts from basic phonics to complex cultural issues. It seems that children singing and playing in front of the television sometimes absentmindedly watching a show like Sesame Street learn a great deal and they retain what they learn (Truglio & Fisch, 2001). Why is so much learned via this seemingly unsophisticated process? Thirty years of research on Sesame Street provides one avenue of support for the power and torque of *Melodic Learning*. The fundamental components of *Melodic Learning* are discussed in this White Paper.

At first glance this seems to be merely a child watching television. This, however, is not nearly the full picture. Sesame Street was created to provide young children with the opportunity to experience and advance their emergent literacy processes through poems, jingles, chants, word games and singing songs. Several of the principles of literacy learning are interacting to maximize this learning experience. Rhyming and singing provide a high level of multi-modal interactions involving visual, auditory/aural, and kinesthetic modalities (Baines, 2008). Rhythmic and tonal processing is vital to success in this learning process.

There is actually a combination of five specific ways that children can learn in play. Aural, visual, kinesthetic, rhythmic and tonal processing simultaneously engage as learning taking place.

Aural - The child says, hears and processes the audio content as he listens to Grover and the girl.

Visual - The child sees and processes images from the television of the duck, of Grover and of the girl.

Kinesthetic – The child is animated, possibly singing, while processing the audio and visual content of the duck, Grover and the girl.

Rhythmic – As the melody and accompaniment to the song are played the child feels both the rhythm of the song and the rhythm of the language it is sung in. This feeling of the rhythm can lead to kinesthetic involvement.

Tonal – The child feels the beat of the music (rhythm) and is often moved to sing along. Singing encourages the child to modulate her tone as she tries to follow the tune of the melody. Tone or pitch helps transmit the meaning.

The integration of these five areas creates more powerful and permanent measurable learning outcomes. The simultaneous use of multi-learning modalities is like a turbo charger. It increases the torque for learning. The degree to which this method succeeds is largely dependent on how these areas are integrated. To have all five areas present does not guarantee that improved learning will occur. However, when integrated properly, these five areas generate *Melodic Learning*, accelerating learning for all types of learners, but particularly beneficial for struggling learners.

Many of us have seen parts and pieces of the results from *Melodic Learning* in events as simple as jump rope rhymes in which the jumpers sing a melody while turning or jumping. The tonal, rhythmic, aural and visual elements are clearly in play as the participants sing the rhyme. The motion of the rope supplies the kinesthetic element to enhance the process (Flemming & Mills, 1992). This may explain why many children learn jump rope rhymes faster and retain them longer than they do many of their classroom lessons.

Combining visual and auditory processing enables us to use today's GPS navigation systems effectively. Just as the child watching Sesame Street does not stare at the screen 100% of the time, a driver need only glance at the GPS display because the total message is being conveyed via a combination of visual and auditory techniques as the voice in the device supports the moving image on its screen.

Much research exists to support the well-known learning modalities: Visual, Auditory, Tactile and Kinesthetic. For years researchers approached modalities by trying to find each learner's predominant learning modality. We now have an abundance of research concluding that teaching to one modality is not effective. However, utilizing multi-modalities in various combinations results in an enhanced learning effect, particularly for learners who have not been successful using more traditional approaches. Rhythm and Tonality have not typically been associated with the more well known visual, auditory/aural and kinesthetic modalities yet they can play a vital role in helping to make learning easier and more sustained (Biggs, Homan, & Detric, 2008). There is learning strength in the use of patterns. Tonal, rhythmic, aural, kinesthetic and visual elements intertwine to form patterns that

help us learn. All five modalities combine to increase the patterns presented to the brain. *Melodic Learning* is the result of the integration of these five modalities.

Melodic Learning is of particular value to subgroups and cultures in which traditionally music has played a central role. It brings to the fore these previously more emphasized forms of transmitting information, from beating drums to playing harps; from singing routes for navigation, and it lights pathways in the brain that have been used throughout history to improve and enhance learning.

Melodic Learning is one of the oldest and most underutilized methods to improve learning. We all learned our ABC's with the ABC song. We often use mnemonic strategies to memorize facts. Perhaps with a wider understanding of the efficacy and power of this learning method, more educators will re-energize their classrooms with *Melodic Learning* approaches.

The next part of this paper reviews the importance of adding the rhythmic and tonality dynamic to the traditional visual, auditory and kinesthetic modalities.

“This so-called ‘music’, they would have to concede, is in some way efficacious to humans” (Sacks, 2006, pp. 129, 2528).

What is at the core of this power and how can it be harnessed to enhance learning?

Music is far more than a set of vibrations received by our ears that causes us to tap our feet. Philosophers from Proust to Langer have written of music's ability to stir emotions and create moods and passions (Sacks, 2006). Each generation has seen how the famous crooners or bands from Sinatra and Elvis to The Beatles and Bon Jovi can cause their audiences to swoon and gyrate with incredible passions.

Well beyond foot tapping is the case of composer Lukas Foss who suffers from Parkinson's disease and struggles to reach the piano, but once he begins to play his uncontrolled movements stop and he plays with grace. Once he stops playing his motor challenges return. There is a great force in play here (http://en.wikipedia.org/wiki/Lukas_Foss).

As discussed in my first White Paper, (Reframing *Melodic Learning* as a Transformative Multi-modal Construct) most people can relate to having a song or melody “stuck inside their head”. Science has coined the phrase “earworm” to describe this phenomenon. As recently as 2005, researchers discovered that the earworm is engraved in the auditory cortex and is therefore available for instant retrieval. Industrial psychologists have made good use of this link between music and learning by creating catchy jingles to sell products. More recently earworms are being used in training products (http://earwormsleaning.com/set_earworms.php).

There is ample evidence that human beings are uniquely musical and that our bodies are tuned for music from infancy (Sacks, 2006; Saffron & Gregory, 2001). Based on years of research we know that music can enhance learning.

The connections between music and learning run deep inside our brains. The patterns re-enforce each other resulting in a greater learning effect. Again, how did we learn our ABC's? The power of the ABC song as a learning tool is significant and permanent. I suggest we consider making a concerted effort to include such an effective teaching method throughout the learning years.

An adult can recognize a mistake in syntax/grammar almost instinctively. For example, "Boy the take his medicine." The adult, whether or not he had any formal knowledge of grammar or attended a single day of school, instantly knows that sounds wrong and therefore is wrong. In similar fashion, adults and even infants can recognize a wrong note in a simple melody. Imagine that just one note in "Mary had a Little Lamb" is played incorrectly. Children (and adults) who've heard the song before have the ability to instantly recognize that a note is wrong regardless of any previous familiarity with musical theory or any ability to play an instrument. Researchers have linked these two phenomena, identifying the syntactically wrong word and identifying the wrong musical note, to the same part of the brain, providing evidence of the strong interconnection of words and music (Patel, 2007).

"Words and music, man - they need each other."

Eddie and the Cruisers recognized this unique relationship in the 1983 film. This dependency of words and music on each other is not only instinctive and intuitive it is now backed by research. Not only is there a dependency but the ability of words and music to enhance learning has been established. Researchers at the Waisman Center at the University of Wisconsin – Madison as well as Carnegie Mellon University worked with infants to measure learning when words alone, music alone or words and music combined were used. These fascinating experiments reveal the power of music to enhance learning not only exists, but, begins at birth (Annals, 2009; Thiessen & Saffran, 2009).

Words and music intertwine to enhance learning. This special relationship does not end there. It goes on to enhance long-term memory (Saffran, Loman, & Robertson, 2000). What we learn with music, we learn forever. Ask a group of people how many have studied French in high school. A certain number respond positively. Ask this group how many feel comfortable speaking even a small amount of French today. Very few respond. Then ask the entire group to join in for a chorus of "Frere Jaques" and nearly everyone remembers this tune and can sing it with you, regardless of any background in French. They learned Frere Jacques with music and it stayed with them in their long-term memory.

Melodic Learning combines the power of music with visual imagery to enhance the learning process.

Having reviewed some history, a bit of neuroscience, and some popular culture, evidence of common elements emerge. The strength and power of music combined with visual imagery to supply the torque for the learning engine is strongly demonstrated. The construct of *Melodic Learning* explains the elegance with which this power benefits human beings of all ages, races and creeds.

Consider again the multi-modal elements of *Melodic Learning*.

Visual – The visual imagery processing must contain not only pictures but written words for maximum learning impact. This requirement for visual imagery to include pictures and words is as old as flashcards and as new as karaoke. It is a fundamental building block of *Melodic Learning* and applies equally in all languages and cultures.

Aural – Aural is the requirement to provide not only music but ideally a spoken voice reading the lyrics that are supplied by the visual imagery. This is often called a ‘voice-over’ or sometimes a ‘sing-along’. To be complete the learner must be saying the words aloud and or singing.

Tonal – Tonal processing derives from the variation of the pitch of the melody line. The music, more specifically, must contain a melody line. It must be clear, recognizable and musically correct for the culture in which it is being used. Western and Eastern music differ in certain matters of musical theory and these differences must be respected. When asked, “So how does that song go?”. The answer is often in the form of humming a melody line. It is also important that the quest to include Tonal processing not require the learner to modulate tone at the level of a professional singer, it must be made manageable, engaging and enjoyable.

Rhythmic - Rhythm is supplied by the music. It is at the core of the feeling that is transmitted to the learner. When asked, “Can you feel the beat?” Music needs rhythm to empower its ability to enhance learning.

Kinesthetic – The other elements often combine to induce a feeling or actual movement in the learner. The act of singing, foot tapping and finger snapping are all kinesthetic acts.

In addition, there must be repetition. Once is not enough. Repetition ensures the ‘engraving’ process etches the learning to long-term memory and provides sufficient exposure to the combination of tonal, rhythmic, aural and visual elements of *Melodic Learning*.

When properly crafted, *Melodic Learning* can be employed to teach almost any subject matter area. Elements of *Melodic Learning* have become popular in such products as *SchoolHouse Rock*, which teaches lessons as complex as how a bill

becomes a law (McCall, 1973); and through *Flocabulary*, which employs rap music to teach American History (<http://www.flocabulary.com/>). Math facts are often taught with elements of *Melodic Learning*. *Earworms* is a popular modern method for learning foreign languages employing pulsating rhythmic melodies to transmit vocabulary and phrases (<http://www.earwormslearning.com/intro.html>). Teachers have used the *Shared Singing Approach* for years to help children improve their reading (<http://www.tuneintoreading.com/English-Language-Learning>).

The applicability of *Melodic Learning* is quite broad and its benefit is enhanced when learners receive it across a range of disciplines. Examples of how and where *Melodic Learning* can be applied abound in the instruction of foreign languages, reading, vocabulary, math, history and social studies. Greater use of *Melodic Learning* across disciplines increases the permanence of the learning. One poignant example is how Alzheimer's patients often remember their nursery rhymes but not the names of family members. The nursery rhymes were learned through elements of *Melodic Learning* methods.

The learning of languages can benefit a great deal from *Melodic Learning* methods. Recent research demonstrates that we begin learning the *rhythm of our native language* while still in the womb. From birth infants begin to learn what are legal and illegal combinations of syllables, for example "pretty baby". The syllabic combinations "pre" and "tty" are a legal combination to make a word that has meaning and have a rhythm that differs from the illegal combination "tty" and "ba" which do not combine together to make a word. Infants continue to absorb the rhythm of their first language as they grow (Saffran, Loman, & Robertson, 2000). The rhythmic element of *Melodic Learning* is an essential element for transmitting linguistic meaning as part of the language learning process. This is of even greater importance when a tonal language, such as Mandarin Chinese, is being learned. Mandarin is often referred to as the *sung* language and is therefore a great fit for *Melodic Learning*.

The most recent research from the Institute of Neuroscience and Music provides evidence that all learners can benefit from *Melodic Learning*. However, students who have had difficulties and have fallen behind typically need something different in order to break out of their challenges, and *Melodic Learning* can often be that something different. Through *Melodic Learning's* musical components these learners are engaged, and therefore motivated. Engagement and motivation are often lacking in traditional skill and drill methods and today's digital natives often do not respond to "a good book" in the same positive way as learners of generations past.

I believe software-based implementations of *Melodic Learning* hold particular promise in capturing the attention of demographic subgroups that need a fresh approach to learning. Of particular significance is the potential for *Melodic Learning* to reach one of the most challenged groups, inner city adolescent African American males. The musical aspects of *Melodic Learning* are viewed by this group as engaging (Calderone, C., Bennett, S., Homan, S., Dedrick, R., & Chatfield, A. 2009). Once the

engagement begins, the learning can follow. All too often these groups disengage from the learning process and one of the fundamental reasons for this is the focus on traditional single modality instruction. It is the multiple modality nature of *Melodic Learning* that re-engages these students and helps them to learn when they previously were not able. *Melodic Learning* plays to the strengths of subgroups and cultures, which are predisposed to an affinity for multi-sensory input such as music, song, rhythm and dance.

In these modern times, it is often possible to use technology to create that which was not previously possible. The components of *Melodic Learning* cannot only be created, but can be made more effective with the aid of technology. Technology can enhance and deliver *Melodic Learning* to enhance the learning process in a wide variety of subject areas. Through technology, programs that embody the five foundation elements of *Melodic Learning* (Tonal, Rhythmic, Aural, Kinesthetic and Visual), are in early use and continue to be developed. One such embodiment is the *TuneIn™* method.

Over the past 6 years I have researched the use of this program with struggling readers at the elementary, middle, and high school levels (Biggs, M., Homan, S., Dedrick, R., Rasinski, T., & Minick, V. 2008) (Calderone, C., Bennett, S., Homan, S., Dedrick, R., & Chatfield, A. 2009) (Rasinski, T., Homan, S., & Biggs, M. 2009).

The findings, as I reported in White Paper #1 indicate that what we now call *Melodic Learning*, when used by struggling readers, consistently yield substantial gains. Outcomes improve when *Melodic Learning* is utilized. The learning gains are substantial and sustainable. This is particularly noteworthy for learners who have struggled with other methods. *Melodic Learning* methods will not increase learning in every instance. However, there is now sufficient evidence to make the case that it should be a part of every educator's toolkit. As educators we need to bring back the techniques that rely on simultaneous input from multiple modalities as encompassed by *Melodic Learning*. Certainly, there will be more development in this exciting area as we continue to see the positive results associated with *Melodic Learning* and its ability to improve cognitive outcomes.

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