# METHODOLOGY AND TOOLKIT FOR ~~FACILITATING~~ MUSIC LITERACY LEARNING

## Related Applications

**[01]** The present application claims priority benefit of Singapore patent application no. 10202103163W titled "Combined Music Literacy Matrix Manipulative System (MLMMS) and Integrated Multiple Musical Instrument Learning System (IMMILS)" filed on 26 March 2021. The subject matter of the foregoing is herein incorporated by reference in its entirety.

## FIELD OF INVENTION

**[02]** The present disclosure relates broadly, but not exclusively, to a music learning methodology and toolkit for ~~facilitating~~ music literacy learning.

## BACKGROUND

**[03]** Conventional music education practices are based on the assumption that preschool age children are typically not expected to learn musical literacy skills at the same level of competency as language and math literacy skills learned in school or at home. This viewpoint of including music at the periphery, rather than the center, of the preschool curriculum unfortunately results in a missed opportunity for preschool children to develop multiple literacies skills that researchers now know are optimized by simultaneous integration of study and practice of music literacy skill development in conjunction with virtually all subjects across the school curriculum.

**[04]** When conventional musical instruction remains inadequate and counterproductive by the lack of integrative and internalized musical literacy skills, many parents and music teachers are left with the common misunderstanding that some sort of exceptional innate ability (implied by the loosely defined word "talent") is a necessary prerequisite for being able to benefit from a comprehensive education in music. Furthermore, many parents mistakenly assume that preschool children should only choose a single instrument and stick with it or quit, thus prematurely cutting short any hope for the life-long benefit of comprehensive, integrated multiple musical instrument learning. When music is relegat-

## SUMMARY

**[07]** According to an aspect of the present disclosure, there is provided a kit for music literacy learning comprising a plurality of tools for developing, practicing and understanding the elements, functions and dynamics of music reading, composing, listening, critiquing and ensemble performing skills, the kit comprising~~for~~ a receptacle configured to represent a music note or rhythm, the receptacle comprising a slot; and a modifier card configured to be inserted into the slot of the receptacle for modifying ~~at least one of~~ an accent, volume, articulation, or chromatic alteration of the music note or rhythm based on a design of the modifier card, wherein the receptacle and modifier card serves as an indication for a user to vocally perform the modified music note or rhythm.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[08]** Embodiments and implementations are provided by way of example only, and will be better understood and readily apparent to one of ordinary skill in the art from the following written description, read in conjunction with the drawings, in which:

**[09]** Figs. 1A-1B show example Silent Practice Charts for practicing rhythm, according to various embodiments of the present disclosure.

**[010]** Figs. 2A-2B show example Silent Practice Charts for practicing pitch, according to various embodiments.

**[011]** Fig. 3 shows an example Silent Practice Chart for practicing two-hand conducting movements, according to various embodiments.

**[012]** Fig. 4 shows example illustrations for a Silent Practice Chart that facilitates learning how to play a pan drum or djembe drum~~tubano~~, according to various embodiments.

**[013]** Figs. 5A-5C show example Silent Practice Charts for learning tonebars according to various embodiments.

**[014]** Figs. 6A-6C show example Silent Practice Charts for learning keyboard fingering according to various embodiments.

**[015]** Figs. 7A-7D show example Silent Practice Charts for learning how to play a recorder according to various embodiments.

**[016]** Figs. 8A-8E show example Silent Practice Charts for learning how to play a violin according to various embodiments.

**[017]** Figs. 9A-9C show illustrations of Music MatrixMats according to various embodiments.

**[018]** Figs. 10A-10D depict various illustrations of MusicCups according to various embodiments.

**[019]** Figs. 11A-11L depict various illustrations of CupHolders according to various embodiments.

**[020]** Figs. 12A-12R depict various illustrations of MusicCards and MiniMusicCards according to various embodiments.

**[021]** Figs. 13A-13K show example illustrations of MatrixBoards in accordance with various embodiments.

**[022]** Figs. 13L-13T show example illustrations of MusicDots in accordance with various embodiments.

**[023]** Figs. 14A-14B illustrate example illustrations of a transitional ConductingScarf~~Flag~~ in accordance with various embodiments.

**[024]** Figs. 15A-15C show illustrations of an instrument model resembling a drum in accordance with various embodiments.

**[025]** Figs. 16A-16C show illustrations of an instrument model resembling a percussion instrument such as a xylophone in accordance with various embodiments.

**[026]** Figs. 17A-17E show illustrations of an instrument model resembling a recorder in accordance with various embodiments.

**[027]** Figs. 18A-18N show illustrations of an instrument model resembling a violin in accordance with various embodiments.

**[028]** Fig. 19 shows an example of stage 1 practice in accordance with various embodiments.

**[029]** Fig. 20 shows a learning process throughout stages 1-3 in accordance with various embodiments.

**[030]** Fig. 21 shows the public domain children's song "Hot Cross Buns" (HCB) reinterpreted with various representations of music in accordance with various embodiments.

**[031]** Fig. 22 shows example rhythm and pitch tasks for music literacy assessment in accordance with various embodiments.

**[032]** Skilled artisans will appreciate that elements in the figures are illustrated for simplicity and clarity and have not necessarily been depicted to scale. For example, the di-

mensions of some of the elements in the illustrations, block diagrams or flowcharts may be exaggerated in respect to other elements to help to improve understanding of the present embodiments.

## DETAILED DESCRIPTION

**[033]** Embodiments will be described, by way of example only, with reference to the drawings. Like reference numerals and characters in the drawings refer to like elements or equivalents.

**[034]** The methodology and toolkit for music literacy learning ~~combined~~ combines "Music Literacy Matrix Manipulative System" (MLMMS) and the "Integrated Multiple Musical Instrument Learning System" (IMMILS), and is developed as a comprehensive preschool music literacy and multiple instrument learning system. It is a kit that comprises four sets of MLMMS-IMMILS learning tools and methods designed to advance both music literacy and multiple instrument skills for users such as, for example, preschool children ages eighteen months to six years. Taken as a whole, this wide-ranging, innovative system includes four major assets: (a) a set of 30 MLMMS (linguistic and mathematical-visual) Symbolic Interdisciplinary Multi-Representation Systems, (b) 15 MLMMS (say-finger, sing- finger) Music Literacy Music-Matrix Manipulatives, (c) 12 IMMILS (say-finger, sing-finger) Beginning Silent Practice Charts, and (d) 8 IMMILS (say-finger, sing-finger-play) Transitional Silent Practice Instruments. Increasingly skillful application of MLMMS-IMMILS synchronous integration of musical literacy skill development with multiple instrumental technique is achieved by a rigorous MLMMS-IMMILS Music Literacy Digital Curriculum that includes hundreds of embedded matrices, sound files and access to (21) MLMMS-IMMILS (say-finger, sing-finger) MatrixBooks. The MLMMS-IMMILS also features a MLMMS-IMMILS Multiple Music Literacy Skills Performance Assessment System (MMLSPAS) that can be used for determining the impact and efficacy of the MLMMS-IMMILS program implementation.

**[035]** MLMMS (linguistic and mathematical-visual) Symbolic Interdisciplinary Multi-Representation Systems are used to establish and familiarize with values of various music literacy rhythm and pitch matrix manipulatives that are part of the MLMMS-IMMILS learning tools. Because musical literacy skills are inextricably related to shared fundamental concepts in language and math, these representations serve as foundational representations of the elements of musical pitch and rhythm. For example, a user may be taught to 'say-sing-clap, tap' various representations such as letters (e.g. consonants,

vowels), syllables, words, phrases, sentences, form, syntactical markers, stress, accents, prosodic forms, names, and other similar representations.

**[036]** Throughout the methodology and toolkit for music literacy learning~~MLMMS-IMMILS~~ program, a user will be required to perform vocally, non-vocally, or both based on various representations of music. Such performance may be described in various forms throughout the present disclosure. For example, a user may be required to 'say, sing, clap, tap' in response to a picture of a monkey which may mean various combinations, such as to say the word 'monkey', to sing the word 'monkey' based on a music note, rhythm, pitch or melody pattern, to clap or tap twice since monkey has two syllables, to sing the word 'monkey' based on a music note, rhythm, pitch or melody pattern while clapping or tapping once per syllable, or other possible combinations, depending on the curriculum. Other variations include 'finger' (e.g. positioning one or more fingers to replicate an indicated music note on a music instrument, as if a user is actually playing the music note on the music instrument), 'conduct' (e.g. a hand action that replicates a musical conductor's hand movement), 'pluck' (e.g. to pluck or mimic plucking a string of a music instrument), 'bow' (e.g. to play or mimic playing a violin with a violin bow), 'point' (e.g. to point at a representation, manipulative, instrument, etc, for example to indicate a correct source of a music note, rhythm, pitch, melody pattern or other similar music element) or other similar variations.

**[037]** MLMMS Manipulatives are a set of tools comprising MusicMats, MusicCups, CupHolders, MiniMusicCups, MiniCup Holders, MusicCards, MiniMusicCards, Magnetic MusicDots, MatrixBoards and ConductingFlags. Each of these manipulatives may indicate an image, number, letter, symbol, shape, coordinate system, or other representations which, based on the curriculum or context, can be used to represent a music note, rhythm, pitch, melody pattern, a modification thereof, or other similar musical element. The modification may be, for example, modifying at least one of an accent, volume, articulation, or chromatic alteration of the music note, rhythm, pitch, melody pattern or other similar musical element. One or more manipulatives may also be configured to interact with other manipulatives to indicate different variations of a musical element.

**[038]** Beginning Silent Practice Charts are charts that depict instructions and pictures that guide a user to familiarize with, for example, the Symbolic Interdisciplinary Multi-Representation Systems, as well as basic hand-placement finger skills of various music instruments and their corresponding music notes, rhythm, pitch, or melody pattern. These charts may be used alone or with one or more MLMMS Manipulatives to familiar-

ize a user with the Symbolic Interdisciplinary Multi-Representation Systems, or establish the vocal literacy link with basic hand-finger placement skills that will be transferred across various instrument types on both silent practice instruments (e.g. stage 2) and then traditional music instruments (e.g. stage 3). Using Beginning Silent Practice Charts provide an opportunity for users like preschool children to simultaneously process the vocal decoding of diverse musical literacy symbol systems in coordination with technical hand-finger skills that will later transfer smoothly to musical instrument techniques. For example, when users such as preschool age children say, then sing-finger depictions of MLMMS rhythm and pitch patterns on IMMILS fingering charts, they will be establishing, coordinating, and myelinating increasingly complex music literacy skills underlying musical instrument performance skills.

**[039]** The silent practice instruments are instrument models that are modelled to resemble music instruments such as a violin, pan drum, xylophone, recorder, tubano, and other similar instruments. Each silent practice instrument facilitates learning how to play a music instrument that it resembles, and may be further modelled with additional parts like cushions, thumb rest, or other similar parts to, for example, make holding the silent practice instrument more comfortable for children.

**[040]** The methodology and toolkit for music literacy learning~~MLMMS-IMMILS~~ is unprecedented in its scope of use in preschools, its suitability for integration with preschool math and language classroom instruction, its compatibility with social-emotional personal development, its potential for music and music integration education reform, assessment and research, and its general applicability to parent home music learning and learning reinforcement practices. It is designed to establish a foundation for musical literacy skill development for all young children (e.g. ages 18 months to 6 years) to parallel, if not exceed, expectations for math and language literacies and their impact of children's cognitive and neurological growth throughout their preschool years. The essential idea of the methodology and toolkit for music literacy learning~~MLMM-IMMILS~~ curriculum is to treat music as a core subject at the center of the preschool curriculum by designing a 4-day a week program aimed at developing progressively complex, stabilized, and internalized understanding of musical literacy skills that then can be transferred to the learning of multiple musical instruments (e.g. percussion, tonebars, keyboards, recorders, and violin) over, for example, five years of preschool instruction. This is advantageous over and in contrary to conventional preschool programs that only relegate music to once a week enrichment classes with little or no expectations for learning or understanding how to

decode, compose, perform, or recognize rhythm, pitch, melodic or ensemble music, let alone children learning the same extensive repertory of music on five different multiple instruments.

**[041]** The methodology and toolkit for music literacy learning combined MLMMS-IMMILS kits will challenge 21st century "music in education" teachers to guide children joyfully through a uniquely resourced classroom of myriad music literacy manipulatives and linguistic-mathematical-musical symbolic representations (all later described in detail in the present disclosure). The tools and method of this system are based on many new tools and methods discovered and developed by Dr. Scripp as a result of his decades of research into children's musical development. The new methodology and toolkit for music literacy learning MLMMS-IMMILS kits are, based on the investigation into fundamental concepts and symbolic representations shared between music, math, and language, shows how leveraging the inextricable inter-relationships among these domains constitutes a breakthrough in understanding the value of crossing the barriers among these cognitive domains. Thus, the MLMMS-IMMILS tools and methods are designed to enable virtually all children to stabilize and then internalize the integrative understanding of music literacy skills that then can be applied to reading, performing, transcribing and composing literacy skills in music, language, and analogously, reasoning, numeracy, seriation, proportion, order, sequence, hierarchy and other quantitative reasoning skills in mathematics.

**[042]** Research reported on the development of Music Plus Music Integration programs (Scripp & Gilbert, 2016) shows that when music becomes a core focus of young children's learning in schools, it benefits learning in other areas of the curriculum such that it becomes a hotbed for teaching for learning transfer through interdisciplinary inquiry-based practices. According to MindChamps CEO David Chiem, putting music at the center of preschool curriculum—rather than as a weekly afterschool enrichment class—represents the cornerstone of the integrated multiple literacies mindset and thereby optimizes the extraordinary potential value and efficacy of music in 21st Century education.

**[043]** The combined MLMMS-IMMILS kits, by making available to all preschool children the empowerment of musical literacy skills and access to multiple instruments, can, for the first time, create a new equity in music education for all students and, as recent advances in neuroscience now suggest (Fujioka, et al., 2006; Lappe, et al., 2008; Manzano & Ullen, 2018), provide new opportunities for optimizing brain growth and the concomitant cognitive benefits of comprehensive musical literacy skill instruction. That is, MLMMS-IMMILS trained children can be expected to benefit from an empowering music literacy learning

process that leads smoothly to the acquisition of complex integrated literacy-based performance skills on five types of music instruments: vocal, percussion, tonebars/keyboards, recorders, and violin. Sadly, when private instrumental instruction does not support the integration of basic literacy skills with instrumental performance skill development on a single instrument (let alone the five instruments of IMMILS), musical understanding is both limited and compromised. That is, the lack of internalized comprehensive literacy skills that guide intonation, tempo, rhythm, and pitch pattern processing impairs musical development for most students as they go forward with musical studies often throughout their lifetime.

**[044]** As in language and math preschool instruction, music students deserve equal opportunity for comprehensive, richly empowering literacy skill development, and school populations deserve the opportunity for an education that benefits from a multiple, integrated literacies-based curriculum. That is, if preschool children are expected to develop language concepts through oral, listening, writing and reading comprehension skills—and similarly expected to develop comprehensive math numeracy skills, quantitative reasoning, computation and problem solving skills—the methodology and toolkit for music literacy learning MLMMS-IMMILS kits will ensure that 21st century preschool students can also be expected to develop parallel aural, listening, reading, analytic music literacy skills—that actually depend in part of shared language and math concepts and processes—that are not at present expected, let alone provided systematically in preschools worldwide.

**[045]** Therefore, the effective adaptation of the research-based methodology and toolkit for music literacy learning~~MLMMS-IMMILS~~ in preschools not only will optimize children's brain growth and minds but will also optimize the entire preschool curriculum by virtue of its integration of shared fundamental concepts and effective social-personal learning Up to now, conventional music teachers or administrators have not known how to design, offer, and evaluate comprehensive music literacy-based multiple-instrumental study that is optimized by its close association with concepts shared with math, language, or social-emotional skill development. The adoption of the MLMMS-IMMILS combined kits promise~~s~~ to solve the challenge of putting music literacy skills development at the core of the 21st century preschool curriculum.

**[046]** The combined MLMMS-IMMILS is best understood by the purpose and function of its tools and how the focus of comprehensive skill development shifts according to the 3-stage development of its principal strands and their application to learning transfer:

**[054]** Lastly, because of the musical preparation that the MLMMS-IMMILS kits provide, preschool age children can enjoy using all the constituent components to promote the creation of music literacy infused performance practices in conjunction with learning transfer boost that comes from freely transitioning “from chart to practice instrument to real instrument” as the musical instrument skills remain constant enabling students to experience a greater depth of musical expression and understanding as they progress.

**[055]** Silent Practice Sheets facilitate learning of music throughout the 3 stages as mentioned above, and are divided into Stage 1 Silent Practice Sheets, Stage 2 Silent Practice Sheets and Stage 3 Silent Practice Sheets, with increasing levels of detail, complexity and difficulty from stage 1 to stage 3. An example of a Silent Practice Chart 100 for practicing rhythm is shown in Fig. 1A. Silent Practice Chart 100 comprises two rectangles 102 and 104, each rectangle further comprising linearly aligned squares 106. One or more MiniMusicCups may be placed in the one or more squares to represent beats, various clapping rhythm pattern representations and other similar musical representations depending on the curriculum to facilitate learning rhythm and rhythm patterns. A user may be guided to vocally perform a rhythm or rhythm pattern that is represented by a MiniMusicCup and its position on the Silent Practice Chart 100. In another variation, Silent Practice Chart 104 of Fig. 1B provides one or more rectangles 106 on which MusicCards may be placed to represent beats, various clapping rhythm pattern representations and other similar musical representations depending on the curriculum to facilitate learning rhythm and rhythm patterns. It will be appreciated that other variations of the illustrations are possible for learning rhythm, with varying levels of details, complexity and difficulty from stage 1 to stage 3.

**[056]** Fig. 2A shows another example Silent Practice Chart 200 for practicing pitch. Silent Practice Chart 200 comprises a plurality of rectangles 202 arranged in 2 rows, wherein one or more MiniMusicCards can be placed in either row to simultaneously show pitches and various singing pitch pattern representations depending on the curriculum to facilitate learning pitch and pitch patterns. A user may be guided to vocally perform a pitch or pitch pattern that is represented by a MiniMusicCard and its position on the Silent Practice Chart 200. In another variation, Silent Practice Chart 204 of Fig. 2B provides one or more squares 206 on which MiniMusicCups may be placed to represent pitches and various singing pitch patterns depending on the curriculum to facilitate learning pitch and pitch patterns. It will be appreciated that other variations of the illustrations

are possible for learning pitch, with varying levels of details, complexity and difficulty from stage 1 to stage 3.

**[057]** Fig. 3 shows another example Silent Practice Chart 300 for practicing two-hand conducting movements, wherein a user is guided by illustrations 302 and instructions on how to move his or her hands in coordination with, for example, a musical note, beat or rhythm, depending on the curriculum. It will be appreciated that other variations of the illustrations are possible for learning conducting movements, with varying levels of details, complexity and difficulty from stage 1 to stage 3.

**[058]** Fig. 4 shows example illustrations for a silent Practice Chart that facilitates learning how to play a pan drum or tubano (djembe) drum. Illustrations 400 and 408 shows a top of a drum such as a pan drum or tubano, and indicates 3 portions 402, 404 and 406 of the top of the drum, each portion having a different colour. Depictions of hands are also shown to indicate how a user should position his hands over the illustrations 400 and 408 to mimic playing a drum. The illustrations may also include indications on what to vocally perform when mimicking hitting a drum with hands, for example to say or sing 'bear' or 'dum' when hitting portion 402, or say or sing 'mon-key' or 'pa-pa' when hitting portion 404 twice, each time with an alternate hand. Illustration 400 features a 2-tone practice guide in which a user's hands are guided to mimic hitting only 2 portions 402 and 404, while illustration 408 features a more advanced 3-tone practice guide in which a user's hands are guided to mimic hitting all 3 portions 402, 404 and 406. It will be appreciated that other variations of the illustrations are possible for guiding how to play a drum, with varying levels of details, complexity and difficulty from stage 1 to stage 3.

**[059]** Figs. 5A-5C show example Silent Practice Charts for learning tonebars. In Silent Practice Chart 500, one or more rectangles 502 each representing a tonebar that emits a music note may be arranged in a vertical manner as shown in rectangle 504 or horizontally like in rectangle 506. Each rectangle 502 may have a different colour to facilitate guidance e.g. through indication of colours. The rectangles 502 may be spatially arranged to reveal scale degree intervals. For example, rectangles 502 that are spaced closely to each other indicate a half-step or semitone relationship with each other, while rectangles 502 spaced farther apart have a one step relationship with one another. With the Silent Practice Chart 500, a user may be guided to 'perform' with the rectangles 502 by sing-pointing them (e.g. pointing at a rectangle 502 and singing out a music note that should be emitted by a tonebar that the rectangle 502 represents), while paying close

**[0105]** The complexity of the musically literate say-sing-finger-conducting processing of melodic patterns can advantageously increase according to the order of melodic complexity in the MatrixBook repertoire for voice and instruments. The final stages of expert translation of the Melodic Magnetic MatrixBoard representations prepare users such as preschool age children to sightread the MatrixBook and MusicCard renditions (below) of the Curriculum MatrixBook Repertoire.

**[0106]** Conducting is an essential music literacy skill because it establishes the metric frame into which all rhythms or melodies belong. More powerful than simply keeping the beat through foot tapping or clapping, conducting patterns organize rhythms into direct associations of the meter of the music, analogous to keeping the pitches in a musical key. The MLMMS-IMMILS conducting lessons may begin by using Beginning Two-Hand practice conducting charts such as chart 300 of Fig. 1C to trace and then independently shape conducting patterns linked to the 1,2,3,4 beats in a measure. An example of a ConductingScarf~~Flag~~ 1400 with dimensions is shown in Fig. 14A. The ConductingScarf~~Flag~~ 1400 may be a piece of fabric or handkerchief that may be held by the fingers or tied to a stick for performing the conducting movements. Various renderings of ConductingScarf~~Flags~~ are depicted in illustration 1402 of Fig. 14B, wherein each ConductingScarf~~Flag~~ may be dyed in a colour of a plurality of colours to facilitate guidance based on colours, which is useful for instructing a plurality of users.

**[0107]** For example, a user may be guided to follow the following steps toward rhythm-contour musical literacy by:

A. Starting with beginning “up and down” 1-beat patterns, the user may say-point to trace the shape of a 2-hand conducting pattern in the chart and then replicate the action while walking to the tempo of a tempo castanet, and then conclude with an inside-out “tie the ribbon” gesture to indicate a spoken “STOP”! Over time, the user learns 2,3,4 beat patterns while counting aloud the numbers of beats in the meter at a steady, pulse while walking in a circle waiting for a designated conductor or a lesson facilitator to say “STOP”!

B. Next, the user may use one or more of a transitional ConductingScarf~~Flag~~ 1400 as shown in Fig. 14A to keep the tempo flowing and in synchrony with say-conducting beat numbers (1,2,3,4), or basic conducting verbal gestures (down, inside, outside, inside) four times and then “STOP” after delineating the meter while walking or marching to the beat and simultaneously listening to melodies selected from the MLMMS-IMMILS Active Listening MatrixBook (repeating at least four times before stopping).

C. Finally, the user will use one or more of the ConductingScarf~~Flag~~ 1400, then single fingers, then hands to musically shape the metric conducting patterns.

Variations in the kinetic shapes going from beat to beat can be reduced or enlarged to suggest loud and soft dynamic fluctuations in the music. Other expressive gestures that can indicate short-long, light-heavy, accented-smooth, articulation of the notes or phrases can also be added.

**[0108]** The different elements of the MLMMS fit together to allow young children to execute, understand, and internalize the underlying principles of music literacy skill development and how the matrices and manipulatives can guide the course of development from the earliest stage of the MLMMS-IMMILS curriculum. The ingredients of the MLMMS part of the combined system are as follows:

- The MLMMS includes multiple flexible, patterned representations of each rhythm, pitch, and melodic musical element identified and fully operationalized by way of future teachers guiding users' engagement through a distinct set of newly invented manipulative systems: the MusicMats, MusicCups, MusicCards, MusicDots/Magnetic MatrixBoards, and the ConductingScarfs~~Flags~~.

- This generative set of MLMMS tools allow users to cultivate fundamental musical literacies socially, personally, aurally, visually, kinesthetically by way of
  - o active listening & response,
  - o questioning & investigation,
  - o variation & creativity,
  - o performance & interpretation,
  - o self-assessment & reflective understanding,

- As it progresses over five years, the disciplined, ongoing engagement with the MLMMS tools and methods will advantageously increasingly:
  - o serve to optimize multiple literacy skills in music, language and math simultaneously;
  - o enable users such as young children to vary and physically manipulate musical patterns, resulting in constant variation, cognitive flexibility, and limitless creative possibilities music literacy skill;
  - o enable music teachers and their students to understand comprehensive music literacies as a vehicle for learning musical repertoire from cultures across the world through the development of music literacy skills rather than unstructured general exposure or narrowly focused rote learning; and

instruments, and the IMMILS Silent Practice Charts (such as illustrations and charts 400 to 800 as shown in Figs. 4 to 8 respectively) comprise guidance via illustrations and instructions for hand placement and movement on the associated instrument models that mimic playing of the resembled musical instrument.

**[0112]** Fig. 15A shows an illustration of an instrument model 1500 resembling a drum. The instrument model 1500 may comprise a drum cover 1502 and a drum guide 1504. The drum guide 1504 may be a piece of fabric, paper, plastic or other similar material that is configured to be placed over the drum cover 1502, wherein the drum guide 1504 may comprise two or more colours indicating parts of the drum cover 1502 that should be struck to mimic playing a drum. The underside of the drum guide 1504 may comprise a non-slip rubber base 1506 to prevent the drum guide 1504 from falling off the drum cover 1502. The drum cover 1502 and drum guide 1504 combination as shown by setup 1508 may be set on the floor for mimicking, for example, playing a pan-drum. The drum cover 1502 may be configured to be fittingly placed over a top of a drum such as a tubano to prevent sound from being emitted by the tubano when the drum cover 1502 is struck, so that the instrument model 1500 can advantageously be used for silent practice by placing the setup 1508 on a tubano. In an embodiment, the instrument model 1500 may further comprise a cylindrical part (not shown) resembling a tubano (djembe), wherein the drum cover 1502 may be fittingly placed over a top of the cylindrical part for silent practice.

**[0113]** Further, illustration 1510 of Fig. 15B shows example measurements, dimensions and materials that make up the instrument model 1500, and illustration 1512 of Fig. 15C shows various renderings of the instrument model 1500 with and without a Tubano (djembe) 1514. In the MLMMS-IMMILS curriculum, the instrument model 1500 may be used together with illustrations 400 and 408 of Fig. 4 for learning how to play a drum, and may also be used with other similar charts for learning how to play a drum with increasing detail, difficulty and complexity.

**[0114]** Fig. 16A shows an illustration of an instrument model 1600 resembling a percussion instrument such as a xylophone. The instrument model 1600 may comprise a main body 1602. The main body 1602 may comprise a plurality of indentations 1604 that correspond to positions of tone-bars in a percussion instrument such as a xylophone. A plurality of tone-bars 1606 may be configured to be placed in the plurality of indentations 1604, wherein the plurality of tone-bars 1606 can be easily removed from the main body

standing of multiple transferable instrumental techniques as the broad foundation of their musical development.

**[0127]** In sum, the IMMILS system overcomes the problems of conventional early childhood instrumental music instruction because it guides the way for preschool children success by:

- Breaking down each step of the learning sequence down into something accessible to users like young children
- Ensuring the Integration of voice and kinesthetic rhythms (with ConductingScarf~~Flag~~s as a foundational conduit for instrumental technique at all stages of instruction in order to maximize internalization of musical expression in multiple ways
- Supporting learning transfer as the same motions and techniques are required across all instruments (one to five finger/one to two hand positions and techniques)
- Creating a teaching and learning growth mindset and the joy of technical and advanced integrative-cognitive orientation that allows IMMILS technical scaffolding and learning transfer tools and strategies (e.g., BowController, FingerDivot indentations on violin, supporting rod on the recorder) to optimize the development of complex motor skills necessary to master foundational musical skills in any of the IMMILS instrumental paths of musically literacy infused voice, unpitched percussion, pitched percussion, wind and string skill development
- Encouraging parents and students (a) to approach music learning through the fun of playing multiple instruments (b) to enjoy the sound of singing music while say- or sing-fingering the silent instruments, and (c) to watch children confidently face the challenges of a variety of instruments, musical styes and repertoire.

**[0128]** The MMLMMS-IMMILS kit may comprise a MLMMS-IMMILS Instrumental Skills Digital Curriculum to organize and integrate the use of MLMMS-IMMILS inventions throughout, for example, 5 years of preschool education. The annual digital curriculum may contain, for example, 40 weekly unit plans containing 160 lessons for each of five levels of preschool (ages 18 months to 6 years), is designed to take best advantage of the MLMMS-IMMILS literacy skill matrix manipulatives as optimizers of musical literacy skills and 3-Stage IMMILS Practice Charts and Practice Instruments as ideal preparation for the nearly simultaneous study of traditional instruments throughout the entire 5-year preschool curriculum. The MLMMS both frames the content of the digital curriculum and provides guidance for trained specialists to teach a comprehensive set of preschool musical literacy skills (reading, composing, analysis) that accelerates and strengthens instrumental performance with guidance from trained specialists who are responsible for distributing focus on 6 essential areas of focus in each lesson plan, for example as shown below:

(1) Introduction of lesson activities and goals in discussion with, for example, a 'famous person' puppet(s),
(2) rhythm warmups with varied matrices and manipulatives,
(3) pitch warmups with varied matrices manipulatives,
(4) introduction of new repertoire related to the warmups
(5) review of past repertoire with new variants and new orchestration,
(6) reflection on the day's and/or week accomplishments with the puppet(s)

**[0129]** Thus, how the Music Literacy Matrix Manipulatives frame and deepen understanding fundamental multiple literacies concepts forms the foundation of the presently disclosed music teaching and learning methods, starting with the ability of music teachers in schools to demonstrate and activate music literacy learning skill development through projected digitally rendered matrices for music classrooms and then enlarge its range of applicability of the projected images to through the employment of hands-on manipulatives (MusicMats, MusicCups, MusicCards, MusicDots/Magnetic MatrixBoards, ConductingScarf~~Flag~~s) as illustrated previously.

**[0130]** Throughout the, for example, 200 weekly Unit Planners (800 daily lessons) of the Digital Curriculum across five preschool grade levels, over 1200 projected MusicMatrices of songs, exercises and large ensemble excerpts flexibly accommodate various types of representations within the cells of the matrix, such as Do-Re-Mi syllables, scale degree numbers, alphabet note names, song lyrics, and musical noteheads. For example, example illustration 2100 in Fig. 21 shows the public domain children's song "Hot Cross Buns" (HCB) with various representations of music contained within the matrix cells, exemplifying the philosophy of learning multiple representations of musical elements, concepts, and processes. It will be appreciated that other variations of illustration 2100 in varying levels of detail, difficulty and complexity may be used for the lessons. Further, the number of weekly Unit Planners, daily lessons, MusicMatrices of songs, exercises and large ensemble excerpts may vary based on lesson requirements and further improvements of the MMLMMS-IMMILS curriculum.

**[0131]** The MMLMMS-IMMILS kit ~~may~~ further comprises an assessment system MMLSPAS. Under the MMLSPAS, matching MLMMS Hands-On Manipulative tools to preschool levels of music cognitive processes underlying levels of performance make it possible to assess a wide array of levelled preschool assessments of musical processes such as encoding, decoding, performing, reordering, modifying discrete musical patterns. The MMLSPAS provides tools for music educators and school leaders to advantageously make the case for reliable, measurable performance outcomes (a) to determine ac-

- read and perform single and multiple melodic lines for ensemble performance:
- develop fluency in decoding and performing mutually reinforcing multiple representations and symbol systems of music
- apply literacy skills to musical composition and improvisation
- become more aware of melodic and harmonic dimensions of musical performance and form

**[0136]** The MLMMS-IMMILS kit ~~may~~ further comprises a Music Literacy GameBox (MLGB) which is a game-oriented component of the MLMMS that allows the portable, reduced size version of the MLMMS MusicCups, Matrix Mats, MusicDots with Magnetic MatrixBoards and MusicCard Decks to be packaged for use by parents, music educators, and small group learning in schools worldwide independent of the licensed school curricular materials. The application of the MLMMS kit provides innovative ways to teach or learn music literacy skills through a gaming system created to engage children, youth, and adults in a wide variety of introductory tutorial, skill building, and advanced problem-solving strategy games. The MLGB can advantageously be used to introduce, expand, or reinforce music literacy skill learning in schools, intergenerational community centres, or home family music learning environments through portable, gaming style versions of the more formal and larger scale MLMMS materials that can only be used in classrooms.

**[0137]** The MLGB may be configured to challenge young or inexperienced players to develop a working hands-on understanding of basic music literacy skill concepts through “SkillBuilder Tutorial Games” eventually applied to more sophisticated or challenging “Champion Games” to demonstrate the application of skills previously developed in the SkillBuilder games. At every level, the MLGB games foster, expand, and reinforce the principles of musical literacy skill development by using the “multiple representations” (multiple symbol systems) approach to reading, performing, transcribing and composing music. All MLGB games are aimed at providing significant insight into in developmentally appropriate levels of understanding conventional music notation for preschool, primary school, or novice adult players to necessary to play the games; or advanced young or competent adults to enjoy the fun of solving an extensive array of problem-solving tasks in collaboration or competition with similarly levelled players.

**[0138]** A example inventory table for the MLMMS-IMMILS kit may be as shown in Table 1 below:

Table 1: Sample Inventory list for MLMMS-IMMILS kit

| | **Stage 1 First Step Tools** | **Stage 2 Transitional Tools** | **Stage 3 Applied Tools** |
|---|---|---|---|
| **Stages of Music Literacy Based Vocal and Instrumental Skill Development** | **MLMMS Symbolic Interdisciplinary Multi-Representation Systems; IMMILS (*say-sing-tap*) Hand, Voice and Finger Referenced Beginning Silent Practice Charts (Stage 1)** | **MLMMS Practice Matrix-Manipulatives; IMMILS (*say-sing-finger*) Transitional Silent Practice Instruments (Stage 2)** | **Application of Stages 1-2 Skill Building Tools to MLMMS Digital Curriculum MatrixBooks for Voice and *Purchased* Percussion, ToneBar, Keyboard, Recorder, Violin & Bow (Stage 3)** |
| The Development of Foundational Voice and Kinetic Music Literacy Skills | (**31**) Total **MLMMS Symbolic Interdisciplinary Multi-Representation Systems:** *(11)* ***Expressive-Linguistic-Musical representations:*** (*say-sing-clap, tap*) letters (consonants, vowels), syllables, words, phrases, sentences, form, syntactical markers, stress, accents, prosodic forms, names, etc.<br>---<br>***(20) Numerical-Graphic-Musical Representations:*** (*say, sing, clap, tap*) numbers (scale degrees, finger numbers), proportion sticks, long-short, beats, measures, matrices, staffs, meter, order-sequence, geometric shapes, conducting shapes, contours, section boxes, circle-linear fractions, operands (add, subtract, multiply, divide), rulers, notehead-beams, dots, dice, stick-figures… | **(15) Total MLMMS** (say-sing-clap-foot) **MusicMats** (A)<br>(*say-clap-sing*) **MusicCups** (B)/ **MusicCup Holder** (C)<br>(*say-clap-sing*) **MiniMusicCups** (D)/ **Mini MusicCup Placement Charts** (E) / **Mini MusicCupHolders** (F)<br>(*say-clap-sing*) **MusicCard Decks** (G)/ **MusicCard Placement Charts** (H)<br>(*say-clap-sing*) **Mini MusicCard Decks** (i)/ **Mini MusicCard Placement Charts** (J)<br>(*say-clap-sing*) **Magnet MusicDots** (K) / **Magnet MatrixBoards** (L)<br>(*say-sing-snap or tap*) **Two-Hand** Beginning Finger **ConductPattern Tracing and Silent Practice Charts (O)**<br>(*say-conduct*) **Transitional Conducting~~Flag~~Scarfs (P)**<br>**TempoCastanets** (Q) | *(4) Purchased* **Rhythm Sticks, Shakers, TubeWackers , Large Foam Dice,** percussion instruments (A, B, C, D)<br>---<br>(8) MLMMS (say-sing-conduct) Folk Song Levels 1-3 (A, B, C), Folk Song Ensemble (D), Active Listening Themes/Extracts (E), Vocal Key-Theme Progression (F), Jazz (G), Percussion (H) **MatrixBooks** |
| Learning Transfer 1: Percussion | **IMMILS** (*say-tap*) **HandDrum Beginning Silent Practice Chart (A), 3-Tone HandDrum Beginning Silent Practice Chart (B)** | **IMMILS** (*say-tap, then say play*) **3-Tone Transitional Silent Practice PanDrum** (A), then placed on top of purchased Tubano (Djembe) | **IMMILS** (*say-play)* Practice 3-Tone Pan Drum from top of *purchased* (*say-play)* **Tubano (Djembe) Hand Drums (D)**<br>---<br>**MLMMS Percussion** (I) **Percussion Ensemble (J) Repertoire MatrixBooks (H)** |
| Learning Transfer 2: ToneBar, GlockBars | **IMMILS** (*say-finger, sing-finger*) **Diatonic 5, 8-ToneBar Vertical-Horizontal Silent Beginning Practice Chart (C); Chromatic 13-Tone GlockBar Beginning Silent Practice Chart (D)** | **IMMILS** (*say-finger,say-sing-finger*) **Transitional Silent Practice ToneBar Interval Box (B)** (*say-finger, sing-finger)* purchased ToneBars | *(Sing-finger-conduct, sing-play) Purchased* **ToneBars (E), GlockBars (F)**<br>---<br>**MLMMS *ToneBar/ GlockBar Levels 1-3) Repertoire MatrixBooks*** |

| | | | |
|---|---|---|---|
| | | | **(I, J, K)** |
| Learning Transfer 3: Keyboard | **IMMILS** (*say-finger, sing-finger*) **LHand-RHand 7-Key Chromatic Keyboard Silent Beginning Practice Charts (E), 13-Key Chromatic Keyboard Beginning Silent Practice Charts (F)** | Power OFF *(say-finger, sing-finger) Purchased* **Silent Transitional Silent Practice Electronic Keyboards** (C) | Power ON *(sing-finger, sing-play-conduct) Purchased* **Electronic Keyboards (G)** *(say-sing-conduct)* **MLMMS Keyboard *Repertoire* MatrixBooks (L*)** |
| Learning Transfer 4: Recorder | **IMMILS** (*say-finger, sing-finger*) **LHand Flat Silent Beginning Practice Chart for small Sopranino, Soprano Recorder (G); Two-Hand Beginning Silent Practice Charts for both small, large Recorders (H)** | **IMMILS** (*say-finger, sing-finger*) **extended length Transitional Silent Practice Sopranino Recorder (D)** (practice soprano recorder not needed) | *Purchased* (*say-conduct, sing-finger conduct, play-footmarch*) **Small Sopranino (H) and Large Soprano Recorders (I)** **MLMMS Sopranino Recorder (M), Soprano Recorder (N) Mixed Recorder Ensemble [O] *Repertoire* MatrixBooks [O]** |
| Transfer 5: Violin | **IMMILS** (*say-finger-pluck, sing-finger-pluck*) **LHand "Dulcimer position" Violin Beginning Silent Practice Chart (I)** (*say-finger, sing-finger-thumb pluck*) **Violin Beginning Silent Practice Chart in "guitar position" (J),** (*say-finger, sing-finger-pluck-bow*) **Violin Beginning Silent Practice Chart in "cello position" (K)** (*say-finger-pluck-bow, sing-finger-pluck-bow*) **Violin Beginning Silent Practice Chart in "violin standard position" (L)** | Viewing **IMMILS** Practice Charts while (*say-finger-pluck-bow, sing-finger-pluck-bow*) Violin in "Cello, Guitar, Violin Positions" with **IMMILS Violin & Bow (E) Transitional Silent Practice Instrument (E)** and **Bow (F)** includes shoulder rest, chin rest, pinky finger holder and **end-pin accessories (G)** with **Violin Transitional Resting-Playing Position Silent Practice FootChart (H)** | *Purchased* (*say-finger-pluck-bow, sing-finger-pluck-bow*) **Wood Violin & Bow (J)** (with shoulder rest, chin rest, pinky holder) endpin, and foot chart (optional purchased Bow Guide **MLMMS Suzuki adapted Violin Folk Songs (P), Violin Folk Songs Levels 1-2 (Q, R, S), Violin Ensembles ~~(T)~~ *Repertoire* MatrixBooks (T)** |
| | **(30) MLMMS** *(say-clap, say sing* **Symbolic Interdisciplinary Multi-Representation Systems** and (**12) Voice and Finger-Hand Referenced** *(say finger, sing finger)* **Beginning Silent Practice Charts** **(Stage 1)** | **(17)** *(say-clap, say sing)* **Matrix-Manipulatives and** (*say-sing-finger-hand)* **(8) IMMILS Transitional Silent Practice Instruments** **(Stage 2)** | **(12)** *Purchased Traditional* (say-play) **Rhythm Sticks, Shakers, TubeWackers, Foam Dice, HandDrum (Tubano),** (say-play-pluck-bow, sing-play) **ToneBars, GlockBars, Keyboards, Sopranino/Soprano Recorders, Violin & Bow and (21) MLMMS-IMMILS** (*say-sing-finger-pluck-bow-conduct*) **MatrixBooks for Voice and** (*say-sing-finger)* **All In-** |

## CLAIMS

What is claimed is:

1. A kit for ~~facilitating~~ music literacy learning, the kit comprising:

a receptacle configured to represent a music note or rhythm, the receptacle comprising a slot; and
a modifier card configured to be inserted into the slot of the receptacle for modifying ~~at least one of~~ an accent, volume, articulation, or chromatic alteration of the music note or rhythm based on a design of the modifier card, wherein the receptacle and modifier card serves as an indication for a user to vocally perform the modified music note or rhythm.

2. The kit according to claim 1, wherein:
the receptacle comprises four side walls;
wherein a first end of the four side walls forms a base of the receptacle and a second end of the four side walls opposite the first end forms a top of the receptacle;
wherein the slot is disposed at the top or on one of the four side walls of the receptacle.

3. The kit according to claim 1, wherein the design of the modifier card comprises a colour of a plurality of colours, wherein each colour of the plurality of colours indicates a different modification of at least one of an accent, volume, articulation, or chromatic alteration of the music note or rhythm.

4. The kit according to claim 1, further comprising one or more boards each comprising one or more linearly aligned indentations, the one or more linearly aligned indentations representing a rhythm, pitch pattern or a whole-half step scale structure, wherein the first receptacle is configured to be placed in any one of the indentations as an indication for a user to vocally perform the music note represented by the receptacle and its position on the boards.

5. The kit according to claim 4, wherein each of the one or more boards comprises one or more magnets disposed on each side of each board for magnetically linking one or more boards together to extend the rhythm, pitch pattern or whole-half step scale structure represented by the one or more boards.

6. The kit according to claim 1, further comprising:
a first set of cards configured to facilitate teaching rhythm patterns, each card of the first set of cards representing at least one of a syllable, music note, or a rhythm modifier for performing along with or modifying a rhythm, wherein each card serves as an indication for a user to vocally perform the at least one of a syllable, music note, or modified rhythm represented by the card;
a second set of cards configured to facilitate teaching pitch, each card of the second set of cards representing at least one of a syllable, music note, or a pitch modifier for performing along with or modifying a pitch, wherein each card serves as an indication for a user to vocally perform the at least one of a syllable, music note, or modified pitch represented by the card; and

a third set of cards configured to facilitate teaching melody patterns, each card of the third set of cards representing at least one of a syllable, music note, or a pitch modifier for performing along with or modifying a melody pattern, wherein each card serves as an indication for a user to vocally perform the at least one of a syllable, music note, or modified melody pattern represented by the card.

7. The kit according to claim 6, wherein each of the first, second and third set of cards are further divided into two or more decks of cards in order of difficulty of modifying the rhythm, pitch or melody pattern.

8. The kit according to claim 7, wherein the modifier card is a card from the first or second set of cards, wherein the modification is based on the syllable, music note, pitch modifier, or rhythm modifier represented by the card.

9. The kit according to claim 8, further comprising:

a magnetic board comprising a grid having one or more cells arranged in a X and Y axis, each axis representing a measure of beats in a rhythm or a measure of a pitch; and

one or more magnets configured to be placed in the one or more cells for plotting or modifying a rhythm pattern, pitch pattern or melodic pattern with reference to the X and Y axis, wherein each of the one or more magnets represents at least one of a syllable, music note, stick notation, start of a rhythm or start of a scalar pattern, wherein the rhythm pattern, pitch pattern or melodic pattern is plotted on the grid or modified based on the represented syllable, music note, stick notation, start of a rhythm or start of a scalar pattern, wherein the one or more magnets placed on the grid serves as an indication for a user to vocally perform the plotted or modified rhythm pattern, pitch pattern or melodic pattern.

10. The kit according to claim 1, further comprising:

an instrument model, the instrument model resembling a musical instrument; and

one or more charts comprising instructions for hand placement and movement on the instrument model that mimic playing of the resembled musical instrument.

11. The kit according to claim 10, wherein the instrument model resembles a violin, the instrument model configured for learning how to play the violin, comprising:

a cushion configured to rest a chin of a user of the instrument model;

a plurality of colour-coded strings running longitudinally along a centre of the instrument model, the plurality of coloured-coded strings disposed at different heights from each other;

a fingerboard below the plurality of strings, the fingerboard comprising labels, frets and divots configured to guide finger placement on the plurality of strings;

a bow model resembling a violin bow for moving across the strings to mimic playing a violin; and

a bow controller comprising pair of transparent ridges disposed at a centre of the violin replica for guiding movement of the bow model over the plurality of ridges between the transparent ridges.

12. The kit according to claim 10, wherein the instrument model resembles a drum, the instrument model configured for learning how to play the drum, comprising:

a cylindrical part comprising or resembling a tubano (djembe) drum;
a drum cover configured to be fittingly placed over a top of the cylindrical part to prevent sound from being emitted by the cylindrical part when the drum cover is struck; and
a piece of fabric configured to be placed over the drum cover, the piece of fabric comprising two or more colours indicating parts of the drum cover on which the instrument model should be struck to mimic playing the drum.

13. The kit according to claim 10, wherein the instrument model resembles a recorder, the instrument model configured for learning how to play the recorder, comprising:

a straight tubular body comprising a plurality of indentations along the body that correspond to position of holes in a recorder, the indentations configured to guide finger placement to mimic playing a recorder;
a tapered end on one end of the tubular body resembling a recorder mouthpiece; and
a ledge for resting a thumb of a user of the instrument model.

14. The kit according to claim 10, wherein the instrument model resembles a xylophone, the instrument model configured for learning how to play the xylophone, comprising:
a main body comprising a plurality of indentations that correspond to positions of tone-bars in the xylophone;
a plurality of tone-bars configured to be placed in the plurality of indentations, wherein the plurality of tone-bars can be removed from the main body; and
a pair of mallets for striking on the plurality of tone-bars for producing music, or over the plurality of indentations to mimic playing on the xylophone.

# METHODOLOGY AND TOOLKIT FOR ~~FACILITATING~~ MUSIC LITERACY LEARNING

## Abstract

The present disclosure provides a methodology and toolkit for ~~facilitating~~ music literacy learning, comprising a plurality of tools for developing, practicing and understanding the elements, functions and dynamics of music reading, composing, listening, critiquing and ensemble performing skills. The kit comprises: a receptacle configured to represent a music note or rhythm, the receptacle comprising a slot; and a modifier card configured to be inserted into the slot of the receptacle for modifying ~~at least one of~~ an accent, volume, articulation, or chromatic alteration of the music note or rhythm based on a design of the modifier card, wherein the receptacle and modifier card serves as an indication for a user to vocally perform the modified music note or rhythm. Other kits detailed in this application contain charts, repertoire matrixbooks, and practice instruments that include detailed instructions as to how preschool children music literacy skills and how these skills can be transferred to the invented silent practice musical instruments that finally lead to reading, performing and composition with standard notation and performance on conventional music musical instruments.

(Figure 2)