The Oakland Unified School District’s

Music Integration Learning Environment (MILE)

Arts in Education Model Development & Dissemination (AEMDD) Project (2009-2013)

Principal Investigator’s Final Report

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Abstract

From 2005-2013 the Oakland Unified School District developed, implemented and finally researched the Music Integrated Learning Environment (MILE) Project, offered as a model of support for early literacy intervention strategies to address school improvement through “Music PLUS Music Integration” (M+MI) professional development, curricular units, instructional practices, portfolio practices, and musical literacy skills tests. This project targeted high poverty schools with a high percentage of students at risk for failure in both early literacy and social-emotional development. The cross-sectional design of this project developed a parallel set of literacy-rich, music-integrated instructional program interventions in lower elementary (Grades K-2) and upper elementary (Grades 3-5) curriculum.

Findings from the project indicate that, with the advent of professional development programs aimed at M+MI teaching practices and support from digital portfolio systems for both music and classroom teachers, (a) MILE school student cohorts outperformed their matched control school cohorts in academic achievement and musical literacy skills, (b) low performing MILE school results approached the level of performance of the high performing laboratory schools that had far more experience with MILE, and (c) MILE schools demonstrated a relatively higher “degree of association” between music learning and academic achievement outcomes—especially for African American students. We have seen the school culture of low income families transformed by MILE teaching and learning practices through qualitative analysis of teacher focus group interviews. We have learned that (a) MILE digital portfolios can demonstrate high quality curriculum units that reveal both the nature and impact of MILE on critical thinking, meta-cognition and social development, (b) adapted M+MI lessons and assessment instruments can be employed productively in both music and classrooms, and (c) MILE portfolio conference interview tools in the future can be used to rate teacher and student reflective understanding of M+MI and its impact on teaching and learning in elementary school classrooms.

* * *
I. Introduction

IA. Purpose of the MILE Project Report

The Principle Investigator’s Report is part of a collection of reports to the federal Department of Education’s Art Education Model Development and Dissemination (AEMDD) program published by the Oakland Unified School District (OUSD). The PI’s perspective—as distinguished by the Project Evaluator’s report on efficacy and quality of project implementation—focuses instead on research design, methods, validity and reliability of data collection and analysis, and the reporting of teacher and student learning outcomes. The PI is responsible also for the interpretation of the data with respect in particular to implication for the field of arts education and program dissemination in the future.

The Structure of the report, as delineated in the Table of Contents, provides background information, detailed descriptions of the research methods, findings from conversations with teaches, and statistical student learning outcomes. The report concludes with a reflection on the overall findings of the project and its forecasted expanded dissemination in the Oakland Unified School District.

IB. The Evolving Mission of MILE

The Music Integration Literacy Enhancement (MILE) project began as a partnership between the OUSD, Music in Schools Today in San Francisco, and with what is now called the Center for Music-in-Education in 2002. After Music in Schools Today in San Francisco (MuST) received a National Endowment for the Arts grant to develop a new strand of music based on music’s integration with other disciplines, the first years of the project were spent in Oakland Public schools developing a team of interested music teachers to create projects and curricular units led by a small group of music teachers and classroom teachers at the Thornhill Elementary School. This would eventually become the basis for a proposal for a four-year MILE AEMDD grant in 2008. At that point MILE became a quasi-experimental study, now currently renamed the Music Integrated Learning Environment (MILE) project, and the Thornhill School, now a Learning Laboratory School, as part of the FIPSE Music-in-Education National Consortium (MIENC) project, became the model for recruiting a set of three new dissemination schools to test the efficacy and practicality of their effectiveness of their adapted Music PLUS Music Integration practices in relation to a matched set of control schools in the OUSD. The purpose of this phase of MILE was to formalize early literacy intervention strategies and address school improvement in the OUSD through M+MI professional development services, model curricular units, guided instructional practices, effective portfolio practices, and musical literacy skills assessments in collaboration with members of the Oakland community and members of the MIENC in San Francisco, Los Angeles, Vista, Minneapolis, and Chicago.
IC. The MILE Principal Hypothesis and Guiding Research Questions

The operational definition of the MILE AEMDD project is based on a Principal Hypothesis and a follow-up series of guiding research questions.

The Principal Hypothesis

The MILE “Principal Hypothesis” is an assumption that will be investigated and eventually tested in relation to every phase and element of the project. The ambitious scope of this arts learning intervention experiment is stated clearly in this two-part statement:

“We assume that the effective implementation, documentation, and evaluation of a high-quality, fully accountable Music PLUS Music Integration program will result in improved school academic and music learning outcomes in high poverty schools in comparison to matched control school populations. In addition, we predict that a high degree of validated statistical association between academic performance and Music Plus Music Integration learning outcomes will result from this intervention, indicating that “teaching for learning transfer” practices aimed at learning or reinforcing fundamental concepts and processes shared between music, math, and language literacy development has been demonstrated.”

The Guiding Research Questions

In order to fully investigate and eventually answer the research question, a series of guiding questions, as indicated in its 2008 AEMDD proposal, are needed to validate the research and evaluation processes:

1. How can music integrated literacy interventions help the Oakland Unified School District meet academic and arts learning objectives in its high poverty elementary schools?
2. To what extent will the M+MI interventions change the teaching practices and expand the role of music education in urban elementary schools?
3. To what extent will MILE enhance professional development for classroom and music teachers who embrace music integrated teaching and documentation practices?
4. To what extent will this initiative optimize student music or academic learning?

As part of the process for approving the project in its schools, OUSD identified strategies for building the capacity to carry out the research project by collaborating with MIENC professional development conferences, using “guided practice consultants,” the adaptation of MIENC resources such as the digital portfolio system, and music learning assessment tools. Without the necessary capacity-building measures in place, neither the program definition nor the research & evaluation methods would be sufficient to carry out the project or validate its results.
Once the capacity for high quality program implementation and vigorous research methods were established, a set of additional, more specific, research “sub-questions” eventually would need to be answered to ensure the future “replicability” of the initiative. They include:

- To what extent did the MILE professional development program assist MILE dissemination schools in their program development?
- To what extent did the digital portfolio system and other technologies assist MILE dissemination schools in their program development?
- To what extent was the OUSD able to train its classroom teachers as music integration specialists and prepare its music teachers for their evolving role as Music PLUS Music Education Specialists?
- To what extent did MILE increase the capacity for OUSD schools to use music learning assessments to inform the quality of music instruction and its impact on other learning in the OUSD?
- To what extent did Music PLUS Music Integration serve as an effective model for music education reform in the OUSD?
- To what extent will the data collected in the MILE project be used to support future expansion into other OUSD schools?

### ID. MILE Teacher Professional Development and Learning Documentation Assets for Future Program Expansion

If this ‘optimal effects hypothesis,” as stated above, could be verified, it was anticipated that MILE project would yield the following products as assets necessary for the sustainability and continued dissemination of the project in the future:

1. A complete K-5 music-integrated literacy curriculum intervention for 3 OUSD elementary schools with high percentages of youth at-risk for early literacy failure.
2. Evidence of generative professional development outcomes and access to exemplary curriculum resources, teaching practices, teacher reflection on the impact of MILE, and classroom assessment tools represented and published in submitted grade level digital portfolios with other Web and print resources available to all OUSD teachers.
3. Working models of large scale standardized student Music PLUS Music Integration learning assessment systems and proof of their validated relationship to standardized language and math test scores; performance indicators in early language and math literacy development—both documented in MILE Schools with data comparison to control schools that have only conventional or no music program instruction and services.

This PI report will articulate positive responses to the principal research questions and many of the optimal effects of the MILE, as well as illustrations of the products emanating from the project. This report will also point out the few remaining unanswered sub-questions and program challenges that should be addressed in future follow-up research and development efforts.

* * *
II. Research Design and Methods

IIA. One Model MILE Laboratory School, Three Dissemination Schools, Three Control Schools

The research design expands on the trajectory of mission and history of MILE. After years of investment in the laboratory school program at Thornhill, the school became a California Distinguished School, the highest possible award from the state board of education. The Principal, when interviewed about the honor bestowed upon her school, said that Thornhill had been in the running for such an award years ago, and, the only difference she could think of was that the MILE program was now her featured innovative program at the school. The success of Thornhill’s program notwithstanding, it could never serve as evidence for policy change in the OUSD, simply because of residential area demographics. The Thornhill student population is mostly white, virtually no high poverty families live in the area, the resources are ample, and their test scores have always been relatively strong. From an urban district administrator’s viewpoint, what works in a school like Thornhill holds little significance for the mostly low socio-economic neighborhoods in Oakland.

The K-5 Thornhill-district data below (Figure 2.1) provides a window into the challenges facing the Oakland Unified School District as a whole and how the Thornhill School is perceived as an outlier within the district.

<table>
<thead>
<tr>
<th></th>
<th>Socio-Economic Disadvantaged Students (School Lunch Program)</th>
<th>English Language Learners</th>
<th>% students (Gr. 2-5) proficient or above on CST (Language Arts)</th>
<th>% students (Gr. 2-5) proficient or above on CST (Math)</th>
<th>% students (Gr. 5) proficient or above on CST (Science)</th>
<th>Program Improve Plan (AYP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thornhill</td>
<td>7%</td>
<td>6%</td>
<td>86%</td>
<td>91%</td>
<td>95%</td>
<td>No</td>
</tr>
<tr>
<td>OUSD</td>
<td>81%</td>
<td>29%</td>
<td>52%</td>
<td>62%</td>
<td>47%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Nonetheless, the research depended on the Thornhill School as the forerunner of the model MILE program adapted by the treatment schools—schools randomly selected out of an RFP process that resulted in research sites more typical of the average profile of OUSD schools. Thornhill thus became the “model” lab school that was responsible for sharing its curricular resources, teaching practices, and portfolio methods, and to then serve as the quality standard and performance target for the new MILE schools. Three MILE dissemination schools served as the “treatment” schools that would be compared both to results of the randomly selected “control” schools and standards set by the original laboratory school. The treatment-control schools were matched as a whole according to the aggregated level of prior academic achievement and student demographic profiles, such as gender and ethnicity, to ensure that a fair comparison could be made through the three years of the project.
IIB. Structure of the Experiment: Longitudinal, Cross-Sectional, Control-Treatment Comparisons

The MILE dissemination experiment depends on explicit criteria for making fair and precise comparisons throughout three years of program development and data collection.

**MILE Program definition**

In order to distinguish the learning environment in the treatment schools from control schools, the program content and method of development has to be well defined. In this study, the key distinguishing elements of the treatment MILE school are (a) the expanded focus of the music program to include integrated learning approaches to music instruction and (b) the music instructor’s need to collaborate with the classroom teachers to produce music integration units that are focused on fundamental processes and concepts shared between music, math, language, science, or history. Conversely, the control schools (a) provide only conventional music instrumental or choral instruction at some point in the K-5 curriculum, (b) make it impractical for music teachers to collaborate with classroom teachers on interdisciplinary units, and (c) do not support interdisciplinary studies in the academic classroom that include music.

While the treatment and control program differences are clearly exclusive and uncontaminated by ensuing practices throughout the term of the longitudinal experiment, the data collection methods (timing tools, sample size, population, etc.) need to be defined and balanced in exactly the same way for both schools. If both the program differences and the data collection remain constant, then valid and reliable comparisons are possible.

In MILE, three years of teacher professional development with monthly guidance supervised by Eric and Alyson Swihart ensured the quality, consistency, and ongoing improvement of curricular units, instruction, classroom assessments and student work documentation in the lab and the three treatment schools. In both the control and treatment schools, the same supervisors made sure that two versions of Music Literacy Skills Tests were administered every year of the project. In the final year of the project a special M+MI curriculum intervention, teacher-student portfolio conferences, and teacher-teaching artist focus group interviews were implemented by the Swihart team. The Principal Investigator provided overall guidance for creating, adapting and refining all assessment instruments and protocols, curriculum design criteria, the curriculum interventions, and all data collection procedures including data entry, data coding, and database management.

**Student Selection and Data Collection Methods**

The structure of the datasets reflects the distribution and balance of the data collection process. 

*Figure 2.2* displays the balanced distribution of the entire grade level population of students divided into two longitudinal student cohorts within each of three types of schools (laboratory, treatment, and control): (1) lower elementary students who progressed from K-2 over the three
year period of the study; (2) upper elementary students who progressed from grades 3-5 during the course of the project).

**Figure 2.2**

1. Control Schools (529)
   - Bella Vista Elementary [(226 students: 126 (K-2) and 100 (3-5))]
   - International Community School [(142 students: 91 (K-2) and 51 (3-5))]
   - Lakeview Elementary\(^1\) (until school closed) [31 students: 18 (K-2) and 13 (3-5)]
   - Burckhaller Elementary\(^2\) [130 students: 60 (K-2) and 70 (3-5)]

2. Dissemination Treatment Schools (360)
   - Ascend Elementary [100 students: [52 students (K-2) and 48 (3-5)]
   - Cleveland Elementary [131 students: 71 (K-2) and 60 (3-5)]
   - Lafayette Elementary [129 students: 78 (K-2) and 51 (3-5)]

3. Laboratory Treatment School (133 students)
   - Thornhill Elementary [133 students: 65 (K-2); 68 (3-5)]

A significantly smaller sample of matched comparison students were chosen for the most intensive scrutiny throughout the three years of the project. Nine students were originally selected randomly from each grade level classroom, two from each of three groups of students identified as high (H), average (A), and low (L) academic achievers from previous standardized tests. This process of randomized sampling with each academic performance group amounted to approximately 54-72 students per school (2 longitudinal cohorts x 3 or 4 grade level classrooms x 9 students per classroom).\(^3\) The HAL designation made randomization feasible and allowed for testing for the effect of the MILE programs on different strands of academic achievers.

Despite issues of attrition within the initial randomized sample population (reducing the original 9 students to 6-7 students per classroom), the final HAL designation still resulted in relatively well-balanced sub-datasets as shown in **Figure 2.3**:

**Figure 2.3**

- **High (H)**
  - Grade K-2 cohort: 57 students (Control: 24, Treatment: 26, Laboratory: 7)
  - Grade 3-5 cohort: 50 students (Control: 20, Treatment: 24, Laboratory: 6)
- **Average (A)**
  - Grade K-2 cohort: 64 students (Control: 28, Treatment: 31, Laboratory: 5)
  - Grade 3-5 cohort: 51 students (Control: 20, Treatment: 25, Laboratory: 6)
- **Low (L)**
  - Grade K-2 cohort: 55 students (Control: 27, Treatment: 22, Laboratory: 6)
  - Grade 3-5 cohort: 48 students (Control: 19, Treatment: 23, Laboratory: 6)

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1 School was closed after the first year of the project.
2 Replaced Lakeview Elementary during the last two years of the project.
3 The number of students varied according to number of classrooms per grade level, attrition, and oversampling.
In addition to balancing the data collection processes and the fair distribution of academic achievement in the small sample cohorts, the datasets were also checked for equal distribution of gender and ethnicity.

Figure 2.4 below shows that the MILE project is reasonably balanced in terms of student gender.

![MILE Gender Profile: Number of Students by CTL Cohort](image)

Figure 2.4

38 rows exclude

Gender
- Female
- Male

Female 180 students (Control: 78, Treatment: 81, Laboratory: 21);
Male 166 students (Control: 68, Treatment: 79, Laboratory: 19)

Figure 2.5 below shows that the MILE project is reasonably balanced in terms of student ethnicity.

Figure 2.5
Taking great lengths to maintain equal distribution of the various categories of data collection processes and balanced representation of student categorical data (baseline academic ratings, gender, ethnicity) ensures that valid statistical comparisons of student outcomes will be possible in the final analysis as presented in Section IV of this report.

IIC. Challenges of the MILE Program Development and Research Design

Unstable School Leadership

The challenges of program development and research are embedded in the realities of conducting research in public schools. In this study, unanticipated problems with school leadership created instability and some degree of chaos for schools faced already with the problem of supporting the creation of the MILE program. One principal who applied successfully to MILE left her post before the project began; another treatment school principal resigned from her job because she felt school academic and budgetary policies had been usurped by the city board of education, making the MILE program an impossibility. The school principal in the laboratory school retired, bringing the standard of continuing the MILE program into doubt. In all cases the school programs did proceed despite these obstacles, but the conditions for building or sustaining program excellence were less than ideal—and very different from the problems of creating a laboratory program from scratch years before this MILE study began.
Uncertain school participation

As noted in Figure 2.2, one control school (Lakeview) withdrew from the project because it was closed by the district during the second year of program implementation. Fortunately, the Burckhaller School agreed to serve as a replacement control school, in part because many of the students from Lakeview had transferred to this school. In another case, a MILE dissemination treatment school (Ascend) decided to become a charter school. Despite the upheaval, this school continued to participate in the project.

While these instabilities and uncertainties beyond the control of MILE project leadership interrupted the flow of program implementation, they did not in the end constitute dire threats to the validity of the project. Problems that posed greater risk to the quality of program implementation had to be remedied by the OUSD project administrators.

Rebalancing student cohorts

Because of student population attrition and school uncertainties, the samples had to be rebalanced for ethnicity and equal representation of HAL academically rated students. Student oversampling procedures were implemented in schools with underrepresented minorities in order to preserve the balance of students with respect to control students. By going back into OUSD academic records, the project leadership rectified inequities in representation of low academic rated students in the project.

Both of these adjustments enabled a fairer determination of the MILE effect on previously low academic achieving and ethnically underrepresented students in the project.

Improving M+MI teacher leadership

The first year of project implementation revealed that there were problems in music and classroom teacher leadership.

Music PLUS Music Integration, as presented in the teacher professional development (PD) sessions, was clearly outlined as a requirement for the dissemination school participation in the project. Adaptation to the guiding M+MI principles and practices was required, not optional. While most music specialists and teaching artists focused primarily on music being a part of classroom-teacher music integration units, on the whole they did not take responsibility for teaching music from the viewpoint of the diversity or processes and concepts shared between music, mathematics, and language.

This imbalance was remedied eventually in several ways during the first two years of the project. First, the professional development sessions became more prescriptive, meaning that the teacher driven curriculum, teaching practices, and portfolio documentation had to articulate explicitly the underlying fundamental concepts and process shared between music and other disciplines. Music specialists, classroom teachers, and teaching artists all had to take responsibility for
incorporating M+MI into their practices in the music classroom as well as during the general classroom units. Second, the teaching artists hired for the MILE project as consultants now took a leading role in guiding classroom teachers with their unit design, with collaborative teaching, and helping with portfolio documentation processes. Third, the music teachers were challenged to teach explicitly to the aims of M+MI musical literacy assessments and not simply to continue teaching conventional music classes aimed at rote learning of song repertoire.

By holding all teachers more closely to their responsibilities as MILE instructional leaders, the treatment schools began to establish a clearer representation of M+MI principles and, therefore, clearly functioning as MILE treatment schools. With redoubled efforts to make sure MILE teachers aligned themselves with all aspects of the program, they better represented M+MI principles in their teaching practices and, by year three, student learning outcomes.

**Building assessment capacity**

The MILE program experiment necessitated extensive testing for music literacy skills and their relationship to fundamental concepts of language and math. While these tests were extensively piloted in the MIENC laboratory school network, of which Thornhill was a member, no school district has yet to commit its resources to the individual, longitudinal student assessment of musical literacy skills development. In MILE, the Individual Music Literacy Skill Tests (MLST) became a staple of the program. However, this individual performance assessment is time consuming and expensive because it requires one-on-one testing and additional time for making judgments throughout the testing process. For MILE this also meant considerable time training the testers and making extensive logistical arrangements for time and space in schools.

To solve this problem, the MILE project directors themselves committed themselves to implementing all testing procedures during the final year of the project.

Without this herculean effort, the music literacy development aspect of the project would have been inconclusive, and most of the research questions would have gone unanswered.

**IID. Limitations of the Research Design and Implementation**

The limitation of the project mostly had to do with the time it took to get to high program quality in place, limited data collection with respect to the classroom teacher music integration units, survey data, and portfolio conferences.

The period of time necessary to establish the model for dissemination of MILE practices was hampered by circumstances of school instability, teacher leadership, the challenges of program clarity, and the initially overwhelming amount of effort going into assessments. By the third year of the project, the program was clarified by:

- standards established for grade level portfolios documentation of high quality MILE units,
- focusing the teaching artists hired for the MILE program on leading the music classes as well as the music integration units
- the establishment of an adapted curriculum intervention linked explicitly with assessments of M+MI music literacy skills (described in the next section)
- the creation of a highly efficient group MLST (taking 1/40th the amount of time to administer) as a model for M+MI curricular goals
- piloting of student-teacher portfolio conference and classroom-music teacher protocols for systematic gathering of evidence for generative reflective understanding of the mission, goals, success, and challenges of the MILE program

Remaining goals for MILE are to:

- administer and analyze teacher and student survey data that makes clear the treatment and control school difference in classroom culture (survey data was lost and abandoned during this study)
- administer, record, code and rate individual performance assessments for teachers and students during the portfolio conference
- establish MILE classroom observation tools for the purpose of ensuring, reviewing, and rating teaching standards required for the successful implementation of MILE practices
- establish rating systems for individual student work based on exemplars made public in the teacher portfolios.

* * *

III. The Refinement and Emerging Efficacy of MILE Music and Classroom Teacher Practices

As indicated in the previous section, the MILE dissemination program reached a significant level of quality and stability only by the third year of project implementation. This section and the next present qualitative and quantitative findings that emerged in the final stages of program refinement that preceded substantial evidence of broad-based success by the final year of the project. Before Year 3 project implementation, important strategies for refining MILE teaching practices, curriculum models, and assessments resulted in substantive advances in program efficacy and results. The value of these changes was eventually reflected increased alignment to M+MI principles and practices and are represented by evolution of the portfolio documentation of samples of teacher and student work, reflections from teacher interviews, teacher-student portfolio conferences, teacher focus group interviews, and post-project interviews with the project directors. The quantitative results of these changes are represented also by the statistical analyses presented in Section IV of this report.

IIIA. Strategies for Program Refinement Enacted in the Final Year of MILE

During the summer after Year 2 of project implementation, there were serious concerns raised about the performance of the MILE music specialists and the results on both student academic and music learning outcomes. Results from the music skills tests were no better in the treatment
schools than in the control schools and many expressed dissatisfaction and doubt concerning the quality of the M+MI curriculum units and the willingness or ability of the teachers to teach music from the M+MI perspective.

As Project Director, Phil Rydeen recalls in his post-project interview with the MILE Principal Investigator in 2014:

> After the second year I remember very clearly the MILE team sitting around the table and saying, “wait a second, we’ve got a problem here, the kids aren’t learning,” and in that moment, I remember the team being panicked. But I had a smile on my face. And the reason I had a smile on my face was it was probably the first time in the country this kind of conversation actually occurred around music learning, that we actually were looking at real data and we were going, “oh my goodness, there’s something wrong.” We’re teaching stuff, but the kids aren’t learning it, or we’re not assessing it the right way, or any of these kinds of issues that would come up.

Out of this moment of panic emerged a consensus about the need for program revision; the M+MI program was not being implemented to the degree of clarity and quality that was needed to make a difference, and that changes in teacher roles, instructional focus, and assessments specifically related to M+MI principles would be required to enact the program efficaciously. Furthermore, there was a need for invention: scripted teachers-student portfolio conferences adapted from the CMIE needed to be developed in order to gather evidence of reflective understanding of the essential principles, teaching practices, and student learning outcomes of the MILE program.

The set of strategies designed to enact these changes in the final year of the project now have become essential requirements for sustaining MILE programs in the future.

**IIIB. Strategy 1: Empower a team of teaching artists and academic and music supervisors to take full responsibility for refining and modeling new MILE practices**

The strategy was accomplished by the OUSD contracting teaching artists as prototype MILE “Music PLUS Music Integration Specialists” (led by Sarah Willner), an academic curriculum professional development specialist hired as MILE team member (Alyson Noel-Swihart), and an OUSD music supervisor (Eric Swihart) to immediately take full responsibility for the quality of Year 3 project implementation. That is, Ms. Willner would assume responsibility for MILE teaching responsibilities, Ms. Noel-Swihart would hold all classroom teacher accountable for working on their own guided, yet unassisted, documentation of the curriculum units, and Mr. Swihart would personally conduct the new MILE assessments and portfolio conference interviews—all activities informed by M+MI tools and resources supervised by project director (Phil Rydeen) and the Principal Investigator (Lawrence Scripp).

**IIIC. Strategy 2: Invent a Final Year Music Teacher’s M+MI Curriculum Intervention**
Besides the lack of application to M+MI principles to music teaching in the early stages of the project, the project leadership became increasingly concerned that treatment school students on the whole would perform no better on the MLST than did the control school students on the second year music assessments. Eric Swihart was particularly concerned with these findings because he noticed also that, although there were positive correlations between music and academic performance, the correlation primarily manifested itself as a strong association between low musical literacy and low academic performance. His response was to urge the music teachers and classroom teachers to make sure that every MILE school was “receiving the full scope of the [MILE] program” so that a high positive correlation in the future would show that high musical understanding was linked with improved academic performance.

The curriculum materials, adapted from The Music PLUS Music Integration Curriculum Series: Voice, Bell Set, & Percussion Primer, were to be adapted by Noel-Swihart and Willner and implemented during the first semester of the final year of the project. The object was ensure that students were taught how to read, write, and perform simple rhythm and melodic patterns from a M+MI perspective. Each student would clap rhythms and use their own 7-pitch bell set (glockenspiel) to learn how to perform and rearrange 10 simple melodies using multiple learning strategies based on the explicit incorporation of fundamental language and math concepts and symbol systems.

Figure 3.1 below shows how the M+MI works with the simple tune “Hot Cross Buns.” Using the three numbered Music Cups as ‘manipulatives’ for learning and reordering the pitch sequence on their bell sets provided students with “fully operational knowledge” of the song to be sung or played in a full range of permutations. Using large multi-colored Music Cups as manipulatives for the phrase structure of the song (top row), students learned to represent and then reorder the structural aspects of the tune in any permutation. According to Scripp and Swihart, this approach not only imparted a very stable rendering the song, but also a very flexible understanding of the scale steps and intervals featured in the melodic design. Equally important, the M+MI approach introduced or reinforced math concepts such as scale, interval, order, sequence, pattern, reversibility, and permutation along the way. Language concepts embedded in vocal diction and text setting engaged in this activity included phonemic awareness, auditory discrimination, syllabification, and the enrichment of phonetics enrich, vocabulary, sentence structure, syntax, and prosody.

Figure 3.1

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4 Affron Scripp & Associates © 2012-14
Students are also given opportunities to improvise new patterns to existing melodies as indicated by another lesson plan excerpted from the book in Figure 3.2 below, where the Music Matrix can incorporate several different symbol systems to represent the combination of mathematical, linguistic, and musical symbol systems.

(Figure 3.2 next page)
Figure 3.2

According to Swihart, for one semester students were challenged to read, write, and perform simple music patterns using multiple symbol systems and performance variants with their bell set in the manner illustrated above. Each one of them was also given their own 7-pitch bell set (glockenspiel to demonstrate further their cognitively-rich performance understanding grounded in their processing of multiple representations.

Furthermore, these special “reinforcement” music classes fostered musical problem-solving skills being measured by the Music Literacy Skills Test. The hypothesis, based on evidence that music learning and ELA/Math learning were already highly-correlated in the data collected by year 2 of the project, was to discover if increased music literacy skills would lead to higher levels of achievement in language arts and math thereby suggesting that there is a causal relationship between music learning and academic achievement.

IID. Strategy 3: Measure the Impact of the M+MI Intervention on Music Learning
The impact of the M+MI intervention was two-fold: (1) future music teachers would now have fully validated and field-tested M+MI curriculum units that focus primarily on music learning in the context of its explicit links to math and language concepts and cognitive skills, and (2) this new standard of M+MI teaching could not be evaluated according to MLST performance.

Evidence for the positive effect of the curriculum intervention on music learning became obvious during the third year of the project. Figure 3.3 shows not only that the treatment schools performance on musical literacy skills posttests improved significantly, but also that they generally improved to a greater degree than did the control schools.

**Figure 3.3**

<table>
<thead>
<tr>
<th>School Type</th>
<th>School</th>
<th>2012</th>
<th>2013</th>
<th>Pt. Change</th>
<th>% Change</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Bella Vista</td>
<td>178</td>
<td>196</td>
<td>18</td>
<td>10.2%</td>
<td>2</td>
</tr>
<tr>
<td>Control</td>
<td>ICS</td>
<td>172</td>
<td>186</td>
<td>14</td>
<td>8.1%</td>
<td>2</td>
</tr>
<tr>
<td>Control</td>
<td>Lakeview/Burckhalter</td>
<td>181</td>
<td>232</td>
<td>50</td>
<td>27.8%</td>
<td>2</td>
</tr>
<tr>
<td>Treatment</td>
<td>ASCEND</td>
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<td>216</td>
<td>31</td>
<td>16.7%</td>
<td>2</td>
</tr>
<tr>
<td>Treatment</td>
<td>Cleveland</td>
<td>215</td>
<td>268</td>
<td>53</td>
<td>24.4%</td>
<td>2</td>
</tr>
<tr>
<td>Treatment</td>
<td>Lafayette</td>
<td>177</td>
<td>224</td>
<td>47</td>
<td>26.9%</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory</td>
<td>Thornhill</td>
<td>206</td>
<td>272</td>
<td>66</td>
<td>32.1%</td>
<td>2</td>
</tr>
</tbody>
</table>

As demonstrated in the statistical findings in Section IV, the gains shown by the treatment schools in the final year of the project are most likely due to the curriculum intervention described here.

As Project Director Rydeen concludes,

So the bell curriculum was really an intervention, and it was a curriculum that Eric and Alyson and Larry [project Principal Investigator] put together to address some very specific needs, using the matrix as a scaffold for learning pitch and rhythm or beats structures. And so it also allowed students to play various lessons and repeat things back using a small bell set, so there was a very physical quality to the sound, and it was very easy to represent high and low and those kinds of concepts, that they could easily visualize and also physicalize in terms of the music they were learning.

And so part of what it did is it ended up really teaching them the structures and forms that we were using and piloting in the MILE project, so they became more familiar with them when it came time to do the assessments, and so you might call this teaching to the test. But I don’t really think so. I think it just really helped us to focus the curriculum around some very specific goals for the program, and it really helped us to refine the way we delivered, and it helped us to refine the professional development, and it helped us to refine the content that we were developing and implementing in classrooms.
IIIE. Strategy 4: Develop a More Efficient Version of the MLST Focused on M+MI

Learning Outcomes

The final step of the MILE revision process was to adapt a new version of the MLST assessment for two purposes: (1) to provide a highly efficient assessment instrument that could eventually be used for future district wide application, and (2) to create a music literacy skill assessment instrument that would a test for a student’s ability to process multiple symbol systems when solving music literacy problem-solving tasks.

The new Group Music Literacy Skills Test, administered in the final year of MILE, provided ratings for every grade level student (Grades 2, 5) for every control and treatment school (in addition to the laboratory school) in the study because 40 students could be tested simultaneously in one sitting. This development also substantially increased the practicality of the project.

The new tests also employ multiple linguistic and mathematical symbols (numbers, words, letters) and displays (matrices, bar charts, contour maps, geometric shapes, abstract graphics) requiring students to think critically and problem-solve as a measure of musical, linguistic and quantitative reasoning (see Section IV of this report). Thus, this test demonstrates musical skills and their transferability of concepts shared between music, math, and language and, implicitly, the success of M+MI as a medium for teaching and learning for transfer.

Since the Group MLST was administered successfully to all students in Grades 2 and 5 (including all students in the original longitudinal sample cohorts), analyses presented in Section IV of this report will include more precise and valid results reported in the final year of the project.

IIIF. Strategy 5: Clarify the Purpose and Standards for the MILE Digital Portfolio System

Through the entire final year of the project, Noel-Swihart and her colleagues made sure that teacher followed the M+MI guidelines modeled in previous years as they created portfolio documentation of the MILE units.

Alignment with the M+MI curricular frameworks presented (Figures 3.4 & 3.5) below indicate that the MILE units designed and enacted by the teachers constitute optimal conditions for M+MI teaching and learning practices.
**Figure 3.4**

**Music PLUS Music Integration Framework 1**:  
**Five Fundamental Learning Processes**  
**Shared between Music and other Disciplines**

Music and music integration teaching and learning is enhanced when it engages fundamental cognitive processes shared between music, other domains, and social-emotional development:

- **LISTEN** – perceive, focus on, observe, describe discriminate, decipher, experience, etc.
- **QUESTION** – inquire, investigate, analyze, hypothesize, test, discover, etc.
- **CREATE** – invent, improvise, produce, imagine, compose, transform, etc.
- **PERFORM** – demonstrate, recite, practice, memorize, interpret, master skills, etc.
- **REFLECT** – make connections, self assess, set goals, plan, reconsider, cultivate reflective understanding, etc.

*Developed for M+MI laboratory schools (Scripp 2000 p. 30; Davidson et al. 2003 p. 65, 71; Scripp 2007 p. 205-206).*

**Figure 3.5**

**Music PLUS Music Integration Framework 2**:  
**Fundamental Concepts Shared between Music and other Disciplines**

Music and music integration teaching and learning is enhanced by the investigation of fundamental concepts shared between music and other domains and social-emotional development:

- **LANGUAGE and Music** – words, theme, syntax, dialogue, expression, character, narrative, etc.
- **MATH and Music** – number, unit, sequence, patterns, proportion, hierarchy, duration, etc.
- **SCIENCE and Music** – measurement, categorization, systems thinking, experimentation, etc.
- **HISTORY and Music** – timeline, cultural studies, historical events, figures, etc.
- **MOVEMENT and Music** – timing, coordination, expression, etc.
- **VISUAL ART and Music** – composition, abstraction, color, shape, design, perspective, etc.
- **DIGITAL MEDIA and Music** – composition, tone color, balance, orchestration, multimedia, etc.
- **SOCIAL-EMOTIONAL DEVELOPMENT and Music** – risk taking, empathy, collaboration, pursuit, self-assessment, respect for others, dealing with frustration, delayed gratification, etc.

*Developed for M+MI laboratory schools (Scripp 2000 p. 30; Davidson et al. 2003 p. 65, 71; Scripp 2007 pp. 205-206).*

**Figures 3.6 & 3.7** below are digital portfolio examples submitted as evidence of artifacts that show student and teacher understanding of the principle of multiple representations of literacy through music, language, and math in M+MI lessons.
The format for the digital portfolios (Figure 3.8) evolved from the original format provided by the MIENC to become customized by the OUSD to provide broad access to a large store of examples relevant for teachers attempting to participate in MILE. The key validating features of the portfolios is not only their alignment with M+MI principles but also the depth of investigation and evidence of student learning they include as the project progresses up to the point culminating events are completed. The example below shows an early-year project from the Lafayette Schools (Figure 3.9). Note the attention to curricular goals, the role of the teacher and the sections of the web-based portfolio for display of student work and learning assessments.

(See vertically adjoined figures next page)
In the next example (Adjoined Figure 3.9) a later OUSD digital portfolio format from Lafayette show a far more detailed and in-depth physics and music unit.
Figure 3.9

The third year success of the digital portfolio system confirms its utility and its validation of MILE treatment school practices. Rather than being modeled and assisted by MILE project staff.
in the early years of implementation, the third year portfolio represented the guided yet independent work of the MILE school portfolio teams. More portfolios were completed, shared and used for school assessment than before. These portfolios at present comprise a repository of best practices sufficient for taking MILE to a new level of expansion. (For a more complete and detailed understanding of the portfolio system development and its impact on teacher professional learning, see David Program Evaluator’s Report and the OUSD MILE project publication to be published in the summer of 2014).

In general, the limitation of the system is its inability to provide individual teacher and student assessment. Until the system represents the work of individual teachers and larger samples of student documentation and assessment, school administrators and researchers will not be able to assess the individual classroom teaching and learning quality sufficiently for individual student diagnostics or to evaluate schools or district needs for criterion-referenced benchmarks of excellence for M+MI teaching practices.

IIIIG. Strategy 6: Devise Reflective Thinking Assessment Tools to Collect Evidence of MILE Professional Development Outcomes

The final year of MILE project implementation also featured the implementation of two new tools: (1) the MILE Teacher-Student Portfolio Assessment protocol (adapted from CMIE), and (2) informal teacher-teaching artist-music specialist focus group sessions. Both of these tools, facilitated by Eric and Alyson Noel-Swihart, produced rich, nuanced descriptions of the goals, practices, and results of MILE from teacher and student perspectives.

Quotations stemming from these interviews provide examples of important moments of learning that emerge from the philosophy and modeled practices of M+MI in MILE schools.

The first example demonstrates how the Teacher Focus Group sessions can illuminate through interactive discussion what may only be suggested in portfolio documentation. The following examples are structured by a sample of interview questions and summarized answers all organized by topics in bold font.

IIIH. What Cleveland and Lafayette MILE teachers say about the program: An Exhibit of Music and Teachers’ Reflective Understanding of their Participation in MILE

The following exhibits provide qualitative evidence for the validity and impact of MILE on teaching practice and student learning outcomes that reached full fruition in the final year of the project. The dialogue, images and reflections were all gathered in the in the context of teacher-student portfolio conference meetings and teacher focus group sessions facilitated by the MILE project coordinators, transcribed and summarized below by the research team.
Overarching Inquiry Question: What is the overall efficacy of MILE?

Theme A: Music Teachers feel more like an integral part of the larger curriculum at the school.

MILE teachers feel “like a part of the whole school community”

Among the interviews of classroom teachers, teaching artists, and music teachers discussing their thoughts on the program, it becomes obvious that music teachers in particular convey that they feel that their work is taken seriously and that it’s being used for the greater community of the school culture and not solely within the music classroom. For example,

Alyson Swihart, the interviewer, asks “How has MILE changed...or not...teaching practices, collaboration, school culture, any of those, or none? Being part of this process, what have you learned from it?”

To which the music teacher replies, “Well for me, it sure makes me feel more like a part of the whole school community. Usually music is off in the corner, and the kids come, you do your thing, the kids leave, and you really don’t get to see what goes on in much of the rest of the school. And it’s been so different at Cleveland. I feel a part of the school community”

Theme B: Music made learning more effective, more efficiently.

“Music as the glue”

Classroom teachers report that music had an important place within the overall structure of the school day. This group of teachers felt comfortable embedding music into their “situation map,” and using “music as a good base,” or foundation, for their curriculum. These teachers were able to utilize music in an effective way to facilitate their lessons and unit plans. These teachers saw music as a beneficial part of the overall curriculum.

Classroom Teacher “BS”: I wanted to also say that the music was really the glue, because even though they did all of the activities, just the flow of music, the flow of the activities, they would always end up somehow back to music, and some of the kids, you’d hear them singing in between some of the stations. It worked really well this year, I thought...it took two years to get there, and when you asked me to do the station map, I said, “well let’s just put music in the middle, whatever they do they always go back to music.” It just seemed to be really what this is all about, is getting music as a good base.

Theme C: Deep, Integrative Knowledge helps mitigate fear about music.

In the following excerpt from one interview, one classroom teacher shares something very interesting about how the overall unit on sequencing benefitted students’ musical performance. This teacher shares that knowing the sequence “helped with their stage fright.” This is important
for two reasons. First, by teaching sequencing through the language arts, students learned a valuable lesson that they applied to their musical performance. By deepening their knowledge of the importance of sequencing, students felt more confident in their parts, presumably being able to problem solve and troubleshoot their way out of potential memory slips. Second, by having a culminating musical event that depends on the students’ ability to order musical notes, lyrics, and entire musical sections, the concept of sequencing was reinforced in a very strong way given that the pressure to perform well motivated the students to memorize their parts better, thus forcing them to utilize the knowledge that they were taught about sequencing in the “Little Red Hen” unit.

Figure 3.10 - Three Teachers from Cleveland share their thoughts on the "Sequencing Unit" that they implemented for the MILE project.

Alyson Swihart: So from that first year, what do you feel that the students, if you can even remember, took away that first year? What are some of those student-learning goals you felt that this unit addressed that first year?

Classroom Teacher “BS”: I think that interest in a story, and what a story can be, acting the story out; you know, having it come alive through them was a very major thing. You know, performing in front of their parents, we had a lot of parents coming in for the performance. And also, being safe within that sequencing, you know...they know the story, they know the sequence, so that helped with their stage fright. It kind of gave them a framework, somehow, to move along the stage, because we had different stations on the stage, so we started with stations - you would sing a song, and then go over and put the bread in the oven, or grind the wheat, you know we had different stations on stage.
Theme D: Classroom Teachers report that Music integration helped students to remember historical facts.

Classroom teachers also report that singing songs, creating lyrics, and performing works based on integrative ideas makes learning more enjoyable and more memorable. Although seemingly counterintuitive, MILE teachers feel that music integration helps students learn more efficiently than discipline-specific or isolated learning. The following excerpt from the teacher interview portion of a Portfolio Conference at the Lafayette school demonstrates why students may be able to retain more information after learning in an integrative environment than they do in an isolated or specialized environment.

Eric Swihart: That’s interesting, because the philosophy is “I’m going to teach this in isolation, I do math for an hour, then I do language arts for an hour, then I do music for an hour;” whereas what I hear you saying is, music and science - together, opera and history or opera and social studies, math and writing, science and writing, ...  

Mr. Morgan: If I had just taught...for example the history, the Stamp Act, and the Boston Massacre—these are our three areas—and the Boston Tea Party, I bet maybe, 90% wouldn’t remember an of these things. But when they’re singing a song about the Stamp Act, and the Massacre and the Tea Party, they’re going to always remember that, and when they have to get up on stage and perform. So I think that’s the best way to teach, isn’t it? Get them to remember what you taught? It’s like field trips - how much do you remember about fourth grade? Well I remember going on a field trip. Anything else? Not really. That’s the problem with education - get their pique of interest.  

I think it [music] helps a lot. It’s nice to have a different voice coming in the room, a different face...but he also is bringing something in that they’re learning, and it goes right along with our curriculum, it doesn't change your curriculum.

Theme E: Larger lessons about ethics and life can be taught and learned through integrative methods

Students learn the moral of the story to the old Russian folk tale, “The Little Red Hen”

Students not only benefitted in academic performance through activities such as “The Little Red Hen” sequencing unit, but they also learned important lessons about ethics as well. Sequencing, or the ability to understand the order of events and to use that knowledge on a broader cognitive level, is a critical part of everyday life, study, and work. The two important life lessons that teachers found were communicated through the story are (1) to say, “yes, I can,” instead of “no, I can’t” (i.e. to try to help someone who needs it even if it may feel like you are “too busy”), and (2) “you don’t work, you don’t eat”.

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Academic knowledge is, of course, very important, but this comment reveals something that is very important within education and may not be getting the attention it deserves. Moral lessons and ethics may or may not be taught at home, and since many classic folk tales and fables, such as “The Little Red Hen” have underlying moral lessons, it is important to have teachers that are prepared to discuss these topics. These teachers seem confident in their approach to discussing these topics with the children.

Classroom Teacher “BS”: But also, sequencing is very important, and within the Little Red Hen story, it just is sequencing, you know, how something is...the order of things, so that’s why we went to sequencing, and used that the first year, and thought that that would be something the kids would benefit from, and then adding music to it...
Classroom Teacher “GS”: I was most excited about the potential of that story, being able to teach about how to impact how children can impact their social world, and that whole critical thinking piece, how they can change the outcome of social situations, what a great story - it's a classic: you don’t work, you don’t eat.

BS: Right, well we also said that, because the first year we had plays, the culminating event was a play, and at the end, the animals changed and instead of saying, “I’m too busy I can’t help you,” to saying “yes I can” instead of “no I can’t”. That was the first year, the first two years. (From interview with Cleveland MILE school teachers.)

Students experience “the joy of singing” while they learn

Students are learning music, but how are they learning music? And equally important, how do they feel when they are learning music? By these teachers’ accounts, music is a “part of life.” These teachers are striving to not only teach basic musical concepts, but to integrate music into other aspects of life to help instill a “joy of singing.” These teachers are not simply focused on the quantitative results of learning in and outside of the classroom, but the qualitative results as well.

Teaching Artist Sarah Willner: ...being part of it all, it shows more what they can do. As you say authentic assessment, but I’m wondering - there’s also one more subtext with their skills in singing, there’s this joy in music of singing. I was looking at the Kindergarten standards, and there is a standard: music in context, what’s it for, what do people do music for? But this doesn’t fit any of those categories because it is music as part of life. It’s broader than a category of music, so it’s music as part of life, but it’s not necessarily music as a separate thing. (From interview transcript labeled."

Integrative learning as a concept shared across disciplines is worthy of deep exploration through a number of different academic subjects.
It is evident that sequencing was taught at Cleveland schools both within specialized disciplines (i.e. music, language arts, science, math), as well as across disciplines (i.e. musical performances and plays). Integrating the subjects helped to reinforce the concept of sequencing.

Alyson Swihart: And just one quick second, so talk a little bit about the sequencing in music, because you guys were talking about it in other academic areas, so could you talk about how sequencing that first year was taking place in your music class a little bit?

Music Teacher: It was in the sequencing of the verses of the song, and in the choice of the song, so that the sequencing was a feature of the songs like the little seed song, that talks about the stages of growth from a seed to a sprout to a little plant to a big plant and then the stages of the story, and then we had two different versions of the Little Red Hen story, so the sequencing was a little bit different in each one. The musical goals the first two years were not sequencing; they were hearing the so-mi interval, and feeling steady beat. But the last year, I did change it so that actually we were talking about sequencing of quarter notes and quarter rests in a four-beat pattern. So the sequencing came into the music part a little around.

**Theme F: Students learn about physics, acoustics, and sound**

Students of the Lafayette school had a wonderful opportunity to explore physics, acoustics, and sound through music and technology. The teaching artists brought a tone generator to create sounds from different types of wave patterns; the students were shown diagrams of what those wave forms look like, and then were quizzed on their ability to match the sound with the abstract, graphical representation. The following is an excerpt of a spontaneous demonstration of the tone generator, with the teaching artist quizzing the students’ ability to match the sound with the diagrams that are on the table in front of them.

*Figure 3.11* A student points to the correct wave form type from a series of choices, while Teaching Artist, Mr. Spencer, plays the sound from his laptop. Footage taken from Mr. Cohen's 2nd Grade class Portfolio Conference for MILE at the Lafayette school.

Eric Swihart: So, Mr. Spencer, are you going show us...?
Mr. Spencer: We’re going to do a test really quick. I am going to play a waveform, and you’re going to tell me which one it is, ok? And I’ll start with the sine wave. First we’re going to listen to all four, ok? Then I’m going to play one. Here’s the first one [plays four wave forms]. Now I’m going to play one, can you tell me which one it is? [plays another example. Students point to the answer on the worksheet.] It was the triangle. Now I’m going to play another one, can you tell me which one it is? [plays another example. Students point to the square wave] That was the sine wave. [Plays another example. Students point to the answer on the worksheet.] That is the sawtooth [all students cheer]. Here’s one more [plays last example. Students point to the answer.] Now I’m going to play one more waveform, tell me which one it is. [Plays example. Students point to sine wave.] Yes Sine wave. (all - Yes!)

Mr. Spencer (continued): So Mr. Swihart, we looked at a tone generator, and listened to different wave forms at different frequencies to determine pitches of those. And then, we looked at what different sound waves looked like on an oscilloscope. So we made sounds like “oooooh!” [sings a high pitch] to see what they looked like on a projector. And we made sounds like “aggghhhhh!” [makes grunting sound. All students burst out laughing].

ES: That’s really cool, you can actually see laughter as a wave form.

Mr. Spencer: And everybody came up and made a sound into the mike, and we captured it to see what their voice signature looked like.

**Theme G: Students were able to absorb more information in a less effortful way.**

Eric Swihart: In terms of the science before MILE, or before teaching this way, what was the science curriculum like?

Mr. Cohen: It absolutely improved children’s concept of what makes music—that it’s vibration, and their voice vibrates, the guitar strings vibrate, and they produce sound. I think the children really got a good picture of that—what it is when they are making music, when you’re banging on something or strumming. I don’t think we used reed instruments (Mr. Spencer adds - saxophone).

ES: What evidence do you have of that? I know some of it can be observational, qualitative data, or the pre-imposed test - where did you see evidence that they were making those connections?

C: I think they understood that blowing into something produced sound, and the longer you blew more sound, the softer the sound was. Sound and music are the same thing, and you make sounds to make music.

ES: What were your big learning goals for them that you wanted them to achieve?

C: To realize that music is organized sound. That you can make music by simple sound...symbols.

The classroom teacher quoted above, for example, says that, “it absolutely improved children’s concept of what makes music—that it’s vibration… they got a good picture of that.” This teacher seems confident that bringing a teaching artist and music into the curriculum did not distract from the regimen, but actually complemented and supported it quite well.
III. Summary of MILE Program Refinement Findings

Once the interventions—which included refinements, newly invented assessment tools, and reflective thinking protocols—were implemented, it then became clear that M+MI approaches to music learning and academic practices strengthened. And when asked what the effect of MILE meant to their teaching practices during portfolio conferences, their comments revealed that M+MI teaching and learning had become a distinctively positive contribution their school performance and culture.

The next section presents evidence that, as was hypothesized, M+MI outcomes are significantly associated with measurable difference between the control and treatment schools with regard to academic test results, music literacy skill ratings, and the degree of positive correlation between the two.

* * *
IV. Statistical Results: Analysis of MILE Student Learning Outcomes

IVA. Overview of Research and Analysis Methods

During the course of this three-year longitudinal study, the student performance data were collected at three control schools, three MILE treatment schools, and one model MILE Laboratory School in the Oakland Unified School District (OUSD). Academic and music learning data were gathered over the past four years and analyzed here in order to find clear evidence that a Music PLUS Music Integrated program in two grade level cohorts (Grades K-2, Grades 3-5)—specifically focused on the interrelationships between music, math, and language literacies—can significantly impact positively both student academic and musical literacy achievement for pre-rated high, average, and low performing students by the end of the project.

The data displayed below summarize control/treatment/laboratory academic performance comparisons drawn from data collected from (a) randomly selected matched student sample cohorts from every grade-level classroom, and, in some cases, from (b) the entire grade level population of students.

The *academic performance data* are comprised of averaged math-reading scores on the grade 2-5 California State Tests (CST), the grade 1-4 Comprehensive English Language Development Test (CELDT), and K-2 OUSD Math Benchmarks ratings.

The *musical literacy ratings* were determined through the adaptation of the Center for Music-in-Education’s Music Literacy Skills Tests (MLST) assessments in order to track the course of student skill development throughout the project. These tests were administered in two different ways. First, the *Individual* MLST, administered one-on-one for 45 minutes over a three-year period to the small longitudinal cohort in the control, treatment, and laboratory schools, constituted a comprehensive performance assessment. These repeated measures tests challenged students to draw on both linguistic and mathematical elements of music performance to solve notation, reading, listening, and error detection tasks. Designed by the Center for Music-in-Education (CMIE) for control-treatment comparisons since 1999, these tests do not depend on knowledge of conventional music symbols or musical instruments, but rather draw on mathematical and linguistic symbols that can be used to clap or sing simple melodic and clapping patterns (see Figure 4.1 “Item 3” music pitch matrix and “Item 4” stick notation clapping pattern below). Thus, untrained adults, as is the case with many classroom teachers, are able to succeed on these tests. The test gets progressively more difficult as more complex words or contour markings represent more complex musical patterns.

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5 The Thornhill OUSD Elementary School, a MILE “Learning Laboratory” school for 10 years has been awarded the status as a California Distinguished School on the basis of its academic achievement, school climate, and innovative curriculum (MILE). This project is a model of success in a high SES neighborhood now being tested for its dissemination to the three new treatment schools in this study.
Figure 4.1

Item 3:

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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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Figure 4.2: Example from CMIE MLST Group Test: “Please circle the symbol system display that best matches the clapping pattern you heard.”

<table>
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<tr>
<th>15</th>
<th>Watermelon Pear</th>
<th>Apple Pear</th>
<th>( A )</th>
<th>( B )</th>
<th>( C )</th>
<th>( D )</th>
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MILE also adapted the CMIE’s Group Version of the MLST—an assessment based on the learning goals and instructional practices of the M+MI Bell Curriculum Intervention described earlier that can be administered to over 40 students during a 45 minute period—to provide large sample data from the entire grade level population of the control, treatment, and laboratory schools in the project. This multiple-choice test requires students of all ages to listen carefully to progressively more complex melodic and rhythmic patterns and to match a variety of mathematical and linguistic representations with the item performed. Rhythmic patterns can be conveyed through dots and dashes, nonsense words, or divisions of geometric shapes (see Figure 4.2); melodic patterns can be represented by bar charts, contour maps, numbers, assigned vowels, or Cartesian coordinate systems.
The ability of students to employ mathematical or linguistic symbols and concepts to solve musical problems, or conversely, to respond to musical elements they can sing or clap by coding or decoding these patterns with math and language symbols, is one of the key objectives of the M+MI curriculum that distinguishes the treatment schools from the control schools. Statistically determining the “bivariate linear fit” between academic and music assessment outcomes now made possible by the MLST assessments, will suggest the degree to which music integration has enabled students to excel in solving multiple symbol system tasks.

IVB. Testing the MILE Project “Optimal Effects” Hypothesis

The MILE research questions focus on the validity and feasibility of M+MI as a model for 21st Century music education policy and practices in urban school districts. Arguing the benefits for music and classroom teachers has been made with regard to professional development outcomes reflected by the institutionalization of the MILE Portfolio Assessment system, the catalog of high quality MILE units produced by OUSD supervisory staff, the adaptation of M+MI assessment tools, and portfolio assessment protocols. Yet, student performance data alone will ultimately make the case for M+MI as the foundation for innovative teacher roles, curricula, instruction, and assessment practices in the future.

According to the “optimal effects hypothesis6,” if M+MI leads to MILE students outperforming the matched control school students both academically and musically, and if these data demonstrate a statistically higher association between academic and musical performance assessments by the end of the project, then the aim of music and its integration has been fulfilled. That is, teaching for learning transfer in and through music has been achieved for the benefit of other forms of literacy in language and math, as well as music and its application to science and history in K-5 MILE units. Furthermore, a significant “degree of association” (predictive inter-relationships) among these multiple disciplinary learning outcomes is here assumed to be a valid measure of the success of integrative teaching (or “teaching for learning transfer”) in MILE schools.

The following statistical analyses are aimed at detecting the extent to which evidence from this study can support the hypothesis that music and its integration can enhance both lower and upper levels of the OUSD elementary school curriculum.

IVC. Control-Treatment-Laboratory School Student Learning Performance Outcome Comparisons

IVC1. Academic Performance Comparisons

California State Test Results (Grades 2-5)

Figures 4.3-4.5: Control-Treatment Comparisons of CST scores. Comparing averaged reading and math scores in Grades 2 and 5, demonstrates that the MILE Treatment Schools

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modestly, yet with some degree of statistical significance outperformed the Control Schools (see the bubble separation to the right of the statistical means and box plots). The data display makes clear that the ten-year MILE laboratory school continues to excel ahead of both the new MILE schools and the control schools, indicating that the full effect of MILE in the new schools has not been achieved.

Figure 4.3

2012-2013 Grade 2 CST Combined (Math/Language) Scores by CTL Cohort

Figure 4.4

2012-2013 Grade 5 CST Combined (Math/Language) Scores by CTL Cohort

Longitudinal results from the MILE upper elementary school cohort, displayed in Figure 4.5, show that, by the final year of the project, the treatment school students outperformed the control
school cohort primarily by closing the achievement gap between the lowest (L) rated students at the beginning of the project. By comparing the blue bar (the third year results) of each statistical grouping, we can see a slight advantage for the MILE schools previously-rated high (H) and average (A) students, yet a far more robust indication of improvement for the MILE low (L) students. In contrast, the increasing gap between the HA and the L students is distinctly present in the control and the laboratory school results. These findings indicate that, as the MILE schools improve in relation to the control schools, they are providing greater support for the academic progress of low performing students.

**Figure 4.5**

Comprehensive English Language Development Test (CELDT)

**Figure 4.6: Control-Treatment Comparisons of CELDT scaled scores.** For English Language Learners (ELL), test results suggest a similarly positive third-year effect obtained in the longitudinal results as indicated below.

In the left chart of Figure 4.6, the lower elementary students (Grades K-3) appear to have taken an early lead in language literacy scoring before both schools leveled off by Grade 2. However, the upper elementary (Grades 3-5) student cohort (right chart of Figure 4.6) reveals that the MILE students not only outpaced the control school students after the first year of the project, but the degree of separation increased substantially after the third year of the project. Apparently, for ELL students, M+MI has a positive association with progress in these “at risk” students.

**Figure 4.6**

MILE CELDT Overall Scaled Scores by Grade Level by CTL Cohort
OUSD Math Benchmark Results

Figures 4.7-4.9: Control-Treatment Comparisons of Percent of Students Meeting OUSD Benchmarked Math Performance Ratings (Grades K-1). The OUSD developed the benchmark assessment to evaluate student progress before the CST tests begin in Grade 2. Results displayed here indicate that the MILE lower elementary students significantly outperformed the control students in both years of testing. By Grade 2, the results between the treatment and long-term laboratory schools were not deemed significantly different (see overlapping bubbles in right columns of Figure 4.7). These data suggest that MILE has had a beneficial inter-relationship with early mathematical literacy development.

Figure 4.7

Figure 4.8 demonstrates that the MILE students in the upper elementary grade cohort initially scored significantly below the control schools and improved only slightly after the second year of the project, to the point that the difference in scores was not significant.

Figure 4.8
However, during the final year of the project, the results were dramatically different (see Figure 4.9): the Grade 5 MILE students progressed far beyond the level of the control school cohort (note that no data from the Laboratory School were made available in the final year of the project).

**Figure 4.9**

**2012-2013 Grade 5 Math Benchmark Percentages by CTL**

Summary of Academic Performance Results: By the third year of the project, the MILE longitudinal student cohorts demonstrated positive, consistent gains in relation to the control schools. These results indicate that the additional focus on MILE units and music teaching methods in both music and academic classroom settings is positively associated with optimized academic performance in math, reading, ELL testing, and OUSD math benchmarks.

IVC2. Music Literacy Skill Test Comparisons
(a) Individual Music Literacy Skills Test (MLST)

By year three of MILE, school student cohorts outperformed their matched control school cohorts in individual music literacy averaged skill ratings.

**Figures 4.10 & 4.11: Control-Treatment Comparisons of Individual Music Literacy Skills Test (MLST) ratings.** Comparing longitudinal MLST data from year 1 (Grades K, 3) to year 3 (Grades 2, 5) in the data displays in **Figure 4.10** reveals that both the lower and upper elementary MILE treatment student cohorts outperformed the control schools significantly by the final year of the Project, as indicated by the far right bars in each of the school clusters. The ten-year laboratory MILE program continued to excel in all three years of the project in the upper elementary grades.

**Figure 4.10**

![Graph showing MILE MLST Individual Total Average Scores by Grade Level by CTL Cohort]

**Figure 4.11** provides comparisons between the early elementary (Grades K-2) MILE Cohorts to the late elementary cohorts (Grades 3-5) in relation to high-average-low (HAL) academic performance designation assigned before the project began. Whereas control schools reveal that excellence in musical literacy is limited to previously highly rated academic learners, the MILE schools display a far more equitable distribution of scores across the HAL-rated students.

**Figure 4.11**

![Graph showing MILE MLST Individual Total Average Scores by Research Cohort and HAL]

The Individual MLST test challenges students of all ages in problem solving tasks focused on conventional music education content and process standards such as reading, writing, listening, performing, singing, analyzing, and critiquing short rhythm or melodic patterns. It appears from these data that the MILE students are acquiring superior levels of music literacy skills in the context of the integration of music across the curriculum.

(b) Group MLST Music Integration Version Results
The group-administered, multiple choice MLST does not focus on individual performance skills, but it provides a window onto the student’s ability to hear and analyze musical patterns through the use of multiple representations and symbol systems borrowed from language and mathematical symbols and processes. Because of the nature of solving problems through symbols, processes, and concepts shared between music and other disciplines, this test is also known as the Multiple Literacies version of the MLST test described above.

**Figures 4.12-4.14:** MILE students demonstrate substantially higher pre-post Group MLST assessment gains. These results define a major distinction between the control and treatment school students. Whereas all students in the MILE schools received intensive M+MI instruction aimed at the use of multiple representations of music in the course of musical literacy skill instruction and their Music Integration classroom units, the control school students only received conventional instruction with standard music notation from a music specialist. The MLST group version assessment measured the effect of this instruction on the entire grade level population in contrast to the small-sample individual MLST data, thus providing a more precise and reliable assessment of M+MI literacy skill development.

First, *Figure 4.12* shows that the MILE treatment schools improved the most after the initial pre-test was given.

The large sample MLST group test results also show that, by the end of the project, pre-post gain scores also predicted significantly higher levels of performance in both the lower (Grade 2) and upper (Grade 5) elementary school cohorts as indicated in *Figures 4.13 & 4.14.*
Results from both the Individual and Group versions of the MLST demonstrate that the MILE students have a deeper and more flexible mastery of their musical literacy skills than students who are only trained to read and write music in traditional notation and do not otherwise explicitly incorporate mathematical-linguistic literacy symbols, concepts, and process into their music lessons or their classroom music integration units as demonstrated previously.
Figure 4.15: Sample MLST group test item: “Please circle the symbol system pattern that best matches the pitch pattern you just heard.”

IVC3. Determining the Degree of Association between Music and Academic Outcomes

So far, the statistical analyses have shown that, by the third year of the program, MILE school students outperform their control school counterparts in three forms of academic assessments and two forms of musical literacy tests. But if music, language, and math were taught from the perspective of concepts and processes shared between their foundational literacy skills, the degree of association among these learning outcomes should be significant.

Because the Group MLST is the most precise and reliable measure of understanding the symbol systems that best represent the commonalities between music, math, and language—and because of a far greater sample size of students taking the test—the relative degree of association between the group MLST test and academic performance tests will be determined through correlation analysis.

(a) The Association Between Group Music Literacy Skill Assessment Ratings and CST Scores

Figures 4.16-4.22 reveal control-treatment school differences in the degree and pattern of association between grade-level CST tests and the grade-level Group MLST Music Integration version test student performance ratings. Whereas previous results presented here have established that the MILE students generally outperform control students both academically and musically, these next data displays compare control-treatment school differences in the “degree of association” between these literacy skill ratings.

Figure 4.16 reveals the strong overall positive relationship between Music Skills and CST scores across all control and treatment schools combined. The index of correlation is robust (r=.54) and the probability value is highly significant (p < .0001), which suggests that that the relative degree
of association that exists between academic and music literacy skill performance rating in any school that administers grade-level musical skill development tests.

Figure 4.16 (Combined Control and Treatment School data)

MILE Bivariate Fit of Project Year Three MLST Group
POST Total Average Scores By CST Combined Average

This finding reveals that excellence in musical literacy skill development, and not just participation in music programs, is strongly associated with academic performance. Furthermore, Figures 4.17-4.18 display correlation patterns in MILE schools that appear to intensify between CST and MLST scores by the time that the program has taken full effect.

In Grade 2, the final year of the MILE lower elementary school cohort, a pattern of control-treatment school differences in the degrees of association between music literacy ratings and academic performance is revealed, a pattern that continues to appear throughout all phases of the analysis. In the figures below, the treatment scatter plot shape shows a steeper slope and broader expanse characteristic of a correlation index that is significantly higher than the control group display. The Laboratory School correlation pattern is tighter yet, signifying an even higher level of association between music and academic achievement scores. These results suggest that early elementary MILE M+MI programs resulted in a higher degree of predicative association between academic and music literacy learning outcomes than control schools that provided conventional music programs.
Figure 4.17

MILE Bivariate Fit of Project Year Three MLST Group POST Total Average Scores By CST Combined Average Scores; Grade Level=5, CTL Cohort=Treatment

ANOVA F Ratio = 17.8; r = .41 P < .0001; n=91

Figure 4.18

MILE Bivariate Fit of Project Year Three MLST Group POST Total Average Scores By CST Combined Average Scores; Grade Level=2, CTL Cohort=Control

ANOVA F Ratio = 80.2; r = .62, p < .0001; n=133

Figure 4.19 (MILE Lab School)
Figures 4.20-4.22 display similar, yet more pronounced, differences in the degree of correlation than revealed in the previous data. Compared to control schools, the correlation patterns appear to deepen between CST and MLST scores in MILE schools by the time the upper elementary program has taken full effect in Grade 5.
Figure 4.20
MILE Bivariate Fit of Project Year Three MLST Group POST Total Average Scores By CST Combined Average Scores; Grade Level=5, CTL Cohort=Con

ANOVA F Ratio = 12.8; r = .35, P < .0005; n=95

Figure 4.21
MILE Bivariate Fit of Project Year Three MLST Group POST Total Average Scores By CST Combined Average Scores; Grade Level=5, CTL Cohort=Treat

ANOVA F Ratio = 31.8; r = .48, p < .0001; n=108

Figure 4.22
The Grade 5 data displays suggest that the MILE M+MI program results in a higher degree of predicative association between academic and M+MI learning outcomes throughout the elementary school curriculum when compared to control schools that have conventional music programs that do not explicitly teach for blended understanding of literacy skills concepts shared between music, math, and language literacy skills. The patterns of statistical correlation are clearly not random. Instead, the consistency of these findings demonstrates that differences in the strength of association between academic and music learning is proportional to the degree of time that students are involved with the MILE M+MI program. Taken together, these analyses provide evidence for a causal link between music literacy skills and academic performance in elementary programs featuring MILE M+MI practices.

(b) The Association Between Group Music Literacy Skill Assessment Ratings and CELDT Scores

Figures 4.23-4.24 reveal the degree and pattern of association between grade-level 2 CELDT outcomes and the grade-level Group MLST Music Integration version test student performance ratings. Similar to the CST-MLST results just reported, the degree of correlation between CELDT and the Group MLST is higher in the treatment than in the control schools. These findings suggest that M+MI programs in MILE schools have a far more significant link with ELL language proficiency than do the control schools.

Figure 4.23
Students who meet the OUSD Math Benchmarks.

(c) The Association Between Group Music Literacy Skill Assessment and the Percentage of Students who meet the OUSD Math Benchmarks.

Figures 4.25-4.26 demonstrate the degree and pattern of association between grade-level 2 OUSD Math Benchmark outcomes and the grade-level Group MLST Music Integration version test student performance ratings. Once again, the pattern and degree of correlation between music literacy skills and academic performance is evident in math. The displays below
show that music literacy is more likely to predict math benchmark ratings in MILE schools in comparison to the control schools.

*Figure 4.25*

**MILE Bivariate Fit of Project Year Three MLST Group POST Total Average Sco by Math Benchmark Percentages (Spring); Grade Level = 2; CTL Cohort = Con**

ANOVA F Ratio = 10.40; r = .37, p < .002

*Figure 4.26*

**MILE Bivariate Fit of Project Year Three MLST Group POST Total Average Sco by Math Benchmark Percentages (Spring); Grade Level = 2; CTL Cohort = Tre**

ANOVA F Ratio = 22.45; r = .46, p < .0001
V. Discussion of the MILE Statistical Findings

VA. Music PLUS Music Integration Optimizes both Music and Academic Performance and Contributes to a More Equitable School Culture

Summary of “Degree of Association” Analysis

The administration of the MLST in both MILE control and treatment schools revealed that literacy in music is significantly related to language and math literacy assessments. This finding establishes the importance of music instruction as a domain of literacy in its own right and as a bridge that optimizes or reinforces aspects of language and math literacy learning that are authentically shared with other literacy domains. These MILE experimental results further suggest that the more elementary students advance in music skills through engagement with the M+MI curriculum, the more likely these same students will advance in the aspects of other literacies that are shared with music. Correlation, in the case of M+MI, appears to measure the degree to which “teaching for learning transfer” influences development in two or more domains simultaneously. And because teaching for learning transfer depends on teachers who understand what facets of music can influence learning in other subjects, high quality professional development, curriculum models, and teaching methods that exploit processes and concepts among different cognitive domains will be needed to reliably and powerfully facilitate inter-relational aspects of multiple literacy learning in 21st century schools.

*   *   *

V. Discussion of Report Findings and OUSD Policy Implications

VA. Music PLUS Music Integration Optimizes both Music and Academic Performance and Contributes to an Equitable School Culture

The MILE Project is a study of the dissemination of a multiple literacy based “Music PLUS Music Integration” program developed in one highly resourced, low diversity laboratory school and utilized in three highly underserved, high poverty Oakland Unified School District elementary schools. Results indicate that—with the development of highly focused professional development programs, intervention strategies, support from digital portfolio systems and sophisticated, yet practical music and music integration assessment tools—MILE school students outperformed matched control school cohorts in terms of both combined math and language literacy standardized tests and music literacy skill ratings, and they demonstrated a higher ‘degree of association’ between academic performance and music literacy skill acquisition. Furthermore, qualitative analysis of teacher portfolio conference and focus group interviews suggest the MILE practices can change school culture and performance through field-tested MILE units that focus on shared concepts, themes, processes and historical contexts that are authentic to the academic curriculum and musical literacy skill development.
As a matter of future OUSD school policy, M+MI shows promise as an alternative approaches to early literacy, cognitive diversity, collaborative teaching, and authentic assessment that fosters interdisciplinary excellence, social-emotional development, and models of school reform. In the end, reconsidering the power of a music education should be an essential element in 21st century education.

**VB. Emerging Equity and Excellence: The Special Case of the Lafayette Treatment School**

*Indications of increased equity*

The results of this project are not simply a matter of improving academic performance. The MILE intervention offers new avenues of interdisciplinary teacher collaboration, curriculum connections, teaching for learning transfer practices, and assessment methods that also engages students in different pathways of learning while suggesting that excellence in one domain can support progress in another. Music PLUS Music Integration is not about developing musical skill, but discovering new ways to leverage learning in the arts with learning in nother domains. Thus, M+MI supports a culture of cognitive diversity and inclusion by integrating music throughout the curriculum. Data provide evidence of cognitive mobility within the hierarchy of academic scores in MILE schools, as HAL scores indicated that the gap between low and average academically rated students are no longer statistically significant indicate MILE has changed the culture of the school for the better when, as previously shown, the academic scores improve as cognitive mobility becomes increasingly present. The Optimal Effects Hypothesis, therefore, only truly manifests itself when verification exists of positive inter-correlational evidence among rising academic and music scores, a high positive degree of correlation among these factors, and an indication that the system is not correlated with past academic performanance.

Although the Lafayette faculty were the most enthusiastic proponents of MILE, it was not until the redefinition of MILE practices and the M+MI bell curriculum intervention that the school began to demonstrate some sense of academic improvement (Figures 5.1 & 5.2) or real success with music literacy score results (Figure 5.3). In Figure 5.1, Grade 5 Lafayette students demonstrate the highest percentage improvement compared to any school in the MILE project so far (data collection is incomplete). The results are modest, but for a perpetually underachieving school like Lafayette, the improvement—and its perceied connection with MILE—was a cause for celebration.

**Figure 5.1: Grade 5 CST Math Scores Year 3 of MILE**

*Figure 5.2 was another celebration for Grade 5 improvement on English Proficiency test for ELL students at Lafayette during the third year of MILE.*
Figure 5.2: Grade 5 CELDT English Language Learner Scores Year 3 of MILE

At the same time academic results were finally improving for Lafayette, the school surprisingly became the most improved and highest rated music literacy learners in MILE confirming the school leadership’s hunch that M+MI may finally be making a statistical difference in their children’s self esteem as learners (Figure 5.3).

Figure 5.3: A profile of MILE school Music Literacy Skills Tests Results over the period of the entire project.

In addition, the highest regarded portfolio work and portfolio conference session came from Lafayette faculty (see examples in Section III of the report).

Music and Academic Correlation: Evidence for MILE outcomes by Ethnicity

Particularly intriguing were statistical data that indicate MILE may offer some remedy for lingering OUSD school performance problems related to inequities in socio-economic status.
(SES). This finding may be particularly compelling for African American students in the most underresourced and under performing dissemination school in the MILE study.

Figure 5.4 below suggests that, for example, the degree of association between academic and musical development is particularly high for African American students in MILE schools at both late stages of early literacy (Grade 2) and upper elementary school performance (Grade 5) by the final year of the project. That is, although African American students from the less affluent sections of Oakland are generally not doing well academically, a MILE intervention program may offer an opportunity to leverage music and music integration as a way to reinforce, if not significantly enhance, early forms of language and math literacy development.

(see Figure 5.4 next page)

Though the African American sample size is small relative to the overall findings of a high association between music and academic learning, future replication of these results might suggest that MILE can be a particularly effective intervention for students who benefit most from the study of music literacy and integration in parallel with their elementary school academic instruction.

**Figure 5.4: Degree of Association Between Academic and Music Learning by Ethnicity**

MILE Bivariate Fit of Multiple Representation MLST Avg Scores by CST Math-Reading Avg Scores; Grade 2 All

ANOVA F Ratio = 53.4  \( r = 0.66 \)  \( p < 0.0001 \)

MILE Bivariate Fit of Multiple Representation MLST Avg Scores by CST Math-Reading Avg Scores; Grade 2 African American
ANOVA $F$ Ratio = 11.1  $r = 0.68$  $p < 0.005$

MILE Bivariate Fit of Multiple Representation MLST Avg Scores by CST Math-Reading Avg Scores; Grade 5 All

ANOVA $F$ Ratio = 18.0  $r = 0.50$  $p < 0.0001$

MILE Bivariate Fit of Multiple Representation MLST Avg Scores by CST Math-Reading Avg Scores; Grade 5 African American
As Alyson Swihart summarizes in her final interview, MILE it in her final interview, the results of this project are not just a matter of improving academic excellence. The MILE music intervention that offers new avenues of interdisciplinary teacher collaboration, curriculum connections, teaching for learning transfer practices, and assessment methods also supports increased cognitive and social equity in schools. Music engages students in different pathways of learning, while suggesting that excellence in one domain can support progress in another. M+MI is not about developing a special ability in the arts, but discovering new ways to leverage learning in the arts with learning in another domain. Thus, the culture of the school takes on the practice of cognitive diversity and inclusion by integrating music throughout the curriculum.

**VC. Final Reflections from the Project Director and Field Coordinators**

Upon project completion the question facing the MILE leadership team soon became, What influence will MILE results have on OUSD Music Education Policy?

Because of strong signs of success at a school like Lafayette, stakeholders in OUSD education policy can no longer dismiss the MILE program as something that can only work at a high SES, low diversity school like Thornhill Laboratory School.

As Alyson Swihart summarizes MILE it in her final interview,

So what I just said about what music actually does, how it teaches the whole student, that’s what happened at Lafayette. That’s what’s so special about Lafayette, their principal, Karen Haynes took a risk, just having a hunch, and she threw music at that school. She renamed it West Oakland Music Academy, we brought in MILE, we did music integration. We also had a general music teacher, violin instruction, there’s a band program, they started doing therapeutic drumming. They even did opera. They did all of
these things. … And the first couple of years didn’t show anything, and in a sense she got kind of slapped on the hand because of that. People asked, “What’s MILE doing? What’s this music thing doing?” But by that third year—and also by being very specific with our instruction at that school—that really brought the student achievement up.

Lafayette’s a special story because if it didn’t work at Lafayette, it wasn’t going to work anywhere for Oakland. Lafayette is Oakland. To see that it did take off in that third year, [shows] that we are onto something. This technique or this way we teach is not just for your Hill schools... This touches every student.

Phil Rydeen agrees with Swihart, and in his interview, sums up those elements he thinks are the most critical aspects of change needed to move MILE from a pilot project to an agent for music education reform in OUSD schools: (a) understanding of the value and quality of integration in music teaching and its application to other subjects, (b) technological support for district-wide student M+MI skill testing, (c) web-based support for teacher and student portfolio and portfolio based performance assessments, and (d) new hiring policies needed for music teachers on special assignment to develop M+MI curriculum, innovative teaching practices, and systematic in-class documentation and assessment practices.

Rydeen feels that traditionally “music has been taught in a discrete manner” but now believes that “when music and academic learning are equally prioritized” it benefits music instruction and music’s impact on the curriculum equally well. Yet, citing a fundamental idea of M+MI practices, he adds the caveat,

I don’t think you can have effective music integration if you don’t have music being taught as a discrete subject.

Thus, it is important to have a basis in musical skill and understanding in order to be able to integrate it with something else. Rydeen warns,

Music integration should not be relegated only the role of a mnemonic for factual content or ambience in the context of studying a particular historical period or culture, but rather as much as possible, a conduit for authentic musical experience where musical structure, concepts and process are always a valued part of the M+MI learning equation.

And once the equation is balance, then the most important value of music integration become clear:

Integration becomes an important strategy, because if you’re connecting that with learning in other ways and you’re able to work in close step with a grade level teacher who’s able to reinforce those strategies, and moving this learning back and forth between two different domains, music and language arts for example, you’re going to reinforce the learning, and from both perspectives—you’re going to reinforce the music learning through language arts strategies, you’re going to reinforce language arts learning through music strategies. And I think the idea and the hope is that the sum is greater than the parts.
M+MI as the basis for policy change depends on ongoing assessment

Rydeen believes that the establishment of system-wide M+MI assessment systems remains a major hurdle for MILE to clear, he also thinks also that user-friendly, flexible assessment tools may have been the most significant reward of continuing MILE in the Oakland public schools over the next four years. If the assessment system can be prioritized as one of the next steps of MILE, Rydeen feels it will have transformative effect because it can be used to look at the quality of all music instruction—“not just assuming that the quality of music instruction is good—but actually looking at how effective music teaching and learning is in the classroom.”

Recalling that “moment of panic” at the end of the second year of MILE referenced earlier in this report, Rydeen welcomed the challenge of ongoing refinement and redefinition of MILE when it is based on data that suggested things were not working at the inception of the project. This report suggests therefore that music education policy innovation based on M+MI framework will, by definition, depend on a constant influx of data collection and analysis in order to celebrate the good news and, equally important, understand and solve evidence-based challenges that emerge constantly in changing times.

Thus, a primary objective of building policies that support MILE in the future will be to elevate individual student music learning assessments, portfolio practices, and performance assessments in MILE schools to the level of district-wide policy through the development of more expeditious technology. Rydeen claims that the potential rewards are three-fold because technology will (1) highlight the assessment of music learning in conjunction with music integration to the stature of a joint venture with new standards of academic learning and Common Core (and NCCAS) framework, (2) create an ongoing database of student M+MI learning outcomes that can be used to investigate issues of quality, accountability, and ongoing improvement for music and its integration across the curriculum, and (3) allow use of these data to advocate for changes in hiring practices and qualification of the new generation of MILE music teachers.

Redefining the 21st century music educator

According to Rydeen, the real challenge of sustaining—let alone expanding—MILE’s presence in Oakland schools is to re-envision the role of a music educator. In sharp contrast to what has been done in the past, Rydeen imagines that MILE educators will be primarily responsible for enriching every student’s music learning and helping every student to fulfill their musical goals— not just teaching song repertoire and endlessly rehearsing ensembles for performance in the school assembly or sporting event.

The educator of the future in Oakland will teach in a way that supports the individual paths of every learner but will also strive to make literate and self-confident music learners out of every student who, empowered by musical literacy skills, will figure out how to apply their musical skills across the curriculum. Young children will be able explore multiple aspects of musical development, such as using music to become creative problem solvers, not rote learners.
A pragmatic strategy for implementing M+MI programs staffed by highly qualified teachers will be necessary to make this vision a success in Oakland. Thus, Rydeen is now faced with the challenge of designing the innovative professional learning processes by which this can happen:

As it stands now, the next phase of MILE program development in Oakland is really building those criteria for what the music teacher of the 21st century is really going to look like. We need to go through our interview process, not only a strong pedagogical approach in music pedagogy, but also a strong understanding of the cognitive science of music learning and that both those things become really, really important as part of the job description as a music specialist and as a collaborator with classroom teachers.

For the time being, Rydeen imagines a new policy of hiring music teachers on Special Assignments for which 80% of their job will be working directly with students, or doing direct instruction, or even exploring new collaborative models of teaching music for its own sake. But in any case, while they are teaching music, 20% of their work week is in planning, collaboration, and assessment practices aimed at becoming a more effective teachers and contributors to whole-school performance.

The approach to making MILE a working model for district policy changes in music requires creating a unique position that might be called perhaps the “music integration specialist.”

The MILE music integration specialist will be different from the standard music teaching position. Both are valuable to the district. After completing a decade of research-based MILE program development, we’d like to see a little extra effort go into “music integration specialty” so that, as Rydeen says, “our music teachers can really get the structures and the systems put in place so that we really understand how MILE plays out in schools, and ultimately can continue to really learn from it here in Oakland.

Implications for the Future of Music PLUS Music Integration in 21st Century American Education

In sum, the statistically significant patterns and degrees of correlation that exist between music learning outcomes and academic learning outcomes reported in the illustrations of evolving M+MI practices in experimental MILE programs in Oakland now can be understood—not as an argument for music as the sole determining agent of academic learning (“one-way causality”)—but as a way educators and parents to understand the strong bonds that develop between music learning and its association with learning outcomes in other disciplines, especially when arts or classroom teachers ignite “associative” or “interconnected” learning by teaching explicitly for learning transfer.

If policy consensus for the MILE program is forged and enacted policies aligned in Oakland, then Music PLUS Music Integration professional development programs, innovative music teaching practices, interdisciplinary curricula connections and assessments reflecting an equilibrium between learning music for its own sake and for the sake of learning across the curriculum will be understood as an organizer and optimizer of music’s essential to public school excellence and equity in 21st century public education.