

Review of Evidence: Arts Integration Research Through the Lens of the Every Student Succeeds Act

November 7, 2017

Meredith J. Ludwig, Andrea Boyle, and Jim Lindsay
American Institutes for Research

Review of Evidence: Arts Integration Research Through the Lens of the Every Student Succeeds Act

November 7, 2017

Meredith J. Ludwig, Andrea Boyle, and Jim Lindsay



1000 Thomas Jefferson Street NW
Washington, DC 20007-3835
202.403.5000

www.air.org

Copyright © 2017 American Institutes for Research. All rights reserved.

This research was commissioned and funded by The Wallace Foundation as part of its mission to support and share effective ideas and practices.

Acknowledgments

We express our gratitude to the staff of The Wallace Foundation, in particular Rachel Hare Bork, Ed Pauly, and Sarosh Syed. Their questions, suggestions, and comments helped us improve the content and style of the report. We also wish to thank the many colleagues who helped us. We appreciate the corrections and recommendations of Kathryn Young of Education Counsel, who checked our presentation of the key elements in the Every Student Succeeds Act (ESSA) as they pertain to arts interventions. Rebecca Herman and colleagues from Rand Corporation offered their experience and analysis. David English informed our description of ESSA and the arts, and Mengli Song provided feedback on the technical parts of this report (both of American Institutes for Research). We take full responsibility for any errors.

Contents

	Page
Acknowledgments.....	iii
Executive Summary	1
Report Highlights	2
Recommendations	3
Chapter 1. What Is Arts Integration?	5
Components, Processes, and Outcomes: A Logic Model of Arts Integration Interventions	7
Organization of This Report	10
Chapter 2. How Can the Every Student Succeeds Act Support Arts Integration, and How Does It Define Evidence-Based Interventions?	11
Support for Arts Integration Within ESSA.....	11
Identifying the Evidence Base of Arts Integration Interventions	19
Chapter 3. What Evidence Exists Linking Arts Integration With Improved Student Outcomes?	22
Evidence Supporting Arts Integration Interventions for Students in Early Elementary Grades: Prekindergarten–Grade 2	23
Evidence Supporting Arts Integration Interventions for Students in Elementary and Mixed Elementary School Grade Levels (up to Grade 8)	28
Evidence Supporting Arts Integration Interventions for Students in Mixed Grade Levels Up to Grade 12	33
Summary.....	37
Chapter 4. How Large Are the Effects of Arts Integration Interventions on Student Outcomes?	38
Average Effect of Arts Integration on Student Outcomes	40
Summary.....	46
Chapter 5. Recommendations	47
Recommendations for Practitioners and Policymakers.....	47
Recommendations for Future Research.....	47
References	49
Appendix A. Descriptions of Arts Integration Interventions Examined in the Evidence Review	57
Appendix B. Studies—No ESSA Tier-Aligned Evidence	73
Appendix C. Technical Approach to the Evidence Review	78
Appendix D. Supplemental Findings From Meta-Analysis	89

Tables

	Page
Table 2.1. Opportunities for Funding, Evidence Required for Funding, and Eligible ESSA Arts-Related Activities	13
Table 3.1. Studies Involving Students in Early Elementary Grades (Prekindergarten–Grade 2) That Provide Evidence at Tiers II–III.....	25
Table 3.2. Studies Involving Students in Early Elementary Grades (Prekindergarten–Grade 2) That Provide Evidence at Tier IV.....	27
Table 3.3. Studies Involving Students in Elementary and Mixed Elementary Grades (up to Grade 8) That Provide Evidence at Tier III.....	29
Table 3.4. Studies Involving Students in Elementary and Mixed Elementary Grades (Up to Grade 8) That Provide Evidence at Tier IV.....	31
Table 3.5. Studies Involving Students in Mixed Grade Levels (up to Grade 12) That Provide Evidence at Tiers I–III	34
Table 3.6. Studies Involving Students in Mixed Grade Levels (up to Grade 12) That Provide Evidence at Tier IV.....	36
Table 4.1 Average Effects of Arts Integration Interventions on Different Types of Student Outcomes.....	42
Table 4.2. Average Effect Sizes for Samples With Different Characteristics	45
Table A.1. Descriptions of Arts Integration Interventions as Implemented in Studies Involving Students in Early Elementary School Grades (Prekindergarten–Grade 2)	57
Table A.2. Descriptions of Arts Integration Interventions as Implemented in Studies Involving Samples Made Up Mostly of Students in Grades 3–5.....	61
Table A.3. Descriptions of Arts Integration Interventions as Implemented in Studies Involving Samples Made Up Mostly of Students in Grades 6–12	69
Table B.1. Studies—No ESSA-Tier Aligned Evidence.....	73
Table C.1. Criteria for Determining Tier of Evidence Based on ESSA and U.S. Department of Education’s Supplemental Guidance	82
Table C.2. Types of Study Features Recorded From Each Eligible Study Report.....	84
Table D.1. Variation of Average Effect Sizes by Study Characteristics (Moderator Analysis)	90
Table D.2. Variation of Average Effect Sizes by Sample Characteristics (Moderator Analysis).....	91
Table D.3. Variation of Effect Sizes by Characteristics of Arts Integration Interventions (Moderator Analysis)	92

Figures

	Page
Figure ES.1. Evidence of the Effects of Arts Integration Interventions on Student Outcomes: Number of Interventions by Grade Level and Tier of Evidence.....	3
Figure 1.1. Logic Model for Arts Integration Interventions.....	9
Figure 2.1. “Evidence-Based” Intervention as Defined by ESSA	19
Figure 3.1. Evidence of the Effects of Arts Integration Interventions on Student Outcomes: Number of Interventions by Grade Level and Tier of Evidence.....	22
Figure 4.1. Average Effects of Arts Integration Interventions on Student Outcomes Within and Across Studies	41
Figure 4.2 Distribution of Improvement Indices for Intervention Effects on Student Achievement in Mathematics, Reading, and Science Based on What Works Clearinghouse–Reviewed Intervention Reports	43
Figure C.1. Disposition of Reports of Studies of Arts Integration Interventions Found in This Evidence Review	83
Figure C.2. Examples of Possible Effects of an Arts Integration Intervention on Student Academic Achievement	86
Figure C.3. Interpreting the Improvement Index.....	87

Boxes

	Page
Box ES.1. Definitions of Key Terms	2
Box 1.1. Definition of Terms.....	6
Box 1.2. Key Components of Arts Integration Interventions	8
Box 2.1. Types of Rationales as Tier IV Evidence	21
Box 4.1. Meta-Analysis Explained	39
Box C.1. Extent of Literature Search.....	80
Box D.1. Description and Number of Studies Included in Meta-Analysis.....	89

Executive Summary

During the past 20 years, education scholars and researchers have argued that linking arts strategies and activities with curriculum and instruction in other subjects (e.g., mathematics, reading, science, and social studies) can improve student learning in those subjects. This approach of incorporating the arts in other subjects is referred to as *arts integration* (see, for example, Arts Education Partnership, 2004; Burnaford, Brown, Doherty, & McLaughlin, 2007; Deasy, 2002).

This report examines the relevance of arts integration to the Every Student Succeeds Act (ESSA), the 2015 reauthorization of the Elementary and Secondary Education Act. ESSA includes a diverse array of programs and funding streams that states, local educational agencies, and schools might leverage to support school improvement and student success. Furthermore, ESSA contains provisions requiring that educational agencies seeking to use federal funds available through the law adopt evidence-based interventions.

The report then presents the results of a review of evidence about arts integration based on the new evidence requirements in ESSA. According to ESSA, for an intervention to be evidence based, research or theoretical support for the intervention must fall within one of four evidence tiers. Evidence in Tiers I–III must “demonstrate a statistically significant effect on improving student outcomes or other *relevant outcomes*,” and the three tiers represent varying levels of rigor from “strong evidence” to “promising evidence.” Tier IV evidence must “demonstrate a rationale” that an intervention is “likely to improve student outcomes or other *relevant outcomes*,” and it must be coupled with “ongoing efforts to examine the effects” of the intervention (ESSA, Title VIII, Section 8101(21)(A)). School improvement activities funded through ESSA (Title I, section 1003) must include at least one intervention in one of the first three tiers. This report examines arts integration research through the lens of these four tiers.

The evidence review addresses two research questions:

1. Are there research studies on arts integration that meet the criteria for evidence as specified in ESSA?
2. How large are the effects of arts integration interventions on student outcomes, particularly for students who are disadvantaged?

To answer these two questions, we undertook four steps:

1. We conducted a comprehensive search of educational databases and clearinghouses to identify reports about the implementation and outcomes of arts integration interventions. The search focused on research reported since 2000. The number of reports found through this search was 1,619.
2. Our search was refined as we screened abstracts and then full-text documents with a focus on finding empirical studies with data about student outcomes in prekindergarten through Grade 12. We screened out ineligible abstracts and texts and identified 135 reports of studies appropriate for review by What Works Clearinghouse-certified reviewers.

3. We examined the reports that contained studies of arts integration interventions and classified the studies according to definitions of the ESSA tiers of evidence (I–IV).
4. Finally, to gain a fuller picture of the research findings on arts integration across all the well-designed studies, we recorded the magnitude of effects from 27 studies of interventions and meta-analyzed those effect sizes.

Box ES.1 provides definitions to clarify the distinctions among some of the key terms used in this evidence review report.

Box ES.1. Definitions of Key Terms

Arts integration intervention: A specific approach, set of activities, strategy, or program linking arts with at least one other subject to improve student and school-related outcomes.

Study: An empirical investigation of the effect of an arts integration intervention on a particular sample and set of outcomes. The findings (single or multiple findings) from a single study can appear in a single report or in multiple reports.

Report: A written summary of a study, in the form of a journal article, a book or book chapter, a dissertation, a technical report, or a conference paper. A report may present findings from a single study or multiple studies. The results of a study of an intervention may appear in multiple reports, such as consecutive evaluation reports of a multiyear implementation of arts integration.

Report Highlights

Arts integration takes many forms and can be observed in specific strategies, activities, and multifaceted interventions. Descriptions of arts integration interventions in the literature identify some common components, such as professional development opportunities, the use of specialized personnel, and the use of specialized instructional materials.

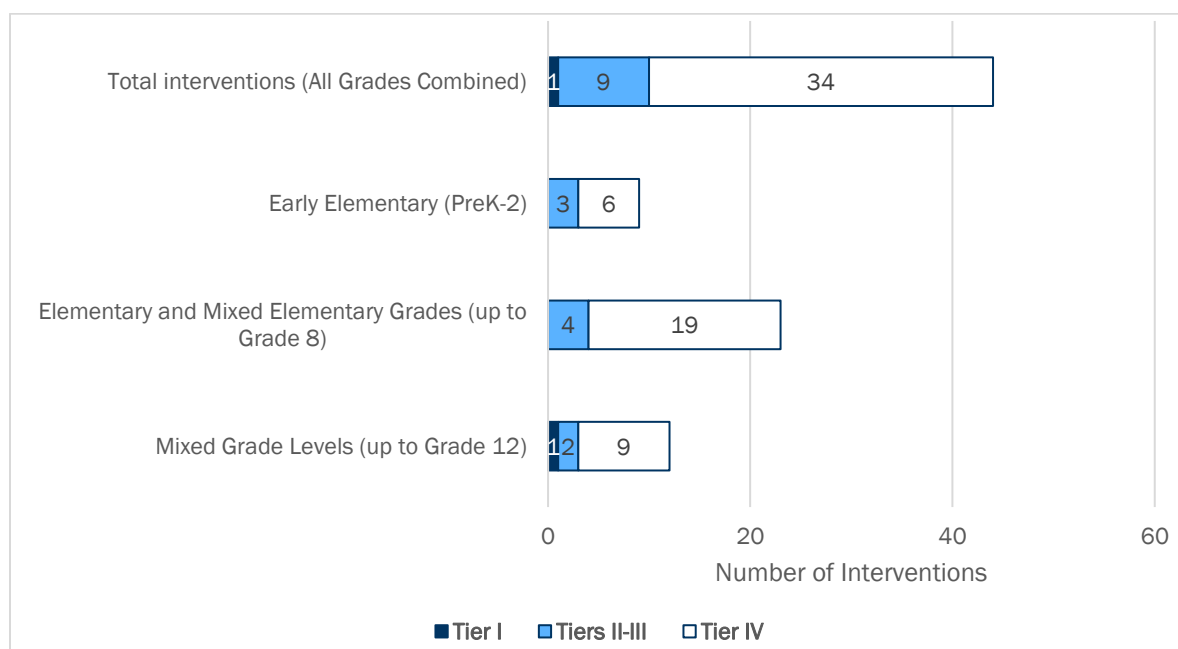
ESSA includes at least 12 different funding opportunities that state educational agencies, local educational agencies, and schools can use to implement arts integration interventions for students in all grades, from prekindergarten to Grade 12. These funding opportunities can be used to support activities such as teacher professional development, school improvement efforts, supports for English learners, arts integration courses, instructional materials, extended learning time programs. They can also be used to support arts-focused charter or magnet schools.

ESSA addresses the issue of arts education—and, more specifically, arts integration—in several ways. It maintains an emphasis throughout its varied funding streams on ensuring that students have access to a “well-rounded education,” which, according to the law, can include “the arts” and “music” along with other subjects. Title IV of ESSA explicitly identifies programs in the arts and arts integration as allowable activities, and it provides for dedicated assistance for arts education. ESSA also offers funding for arts integration interventions that address the needs of specific student subgroups, such as economically disadvantaged students and English learners.

Evidence of the effects of arts integration on student outcomes exists at all four ESSA evidence tiers. However, most arts integration interventions included in this review are supported by Tier IV evidence only. As Figure ES.1 illustrates, this review identified a total of 44 interventions with evidence in one or more of the four tiers. Ten of those interventions met the evidence

requirements for Tiers I–III, including one intervention that met requirements for the most rigorous tier, Tier I. The other 34 interventions had evidence in Tier IV only; that is, reports on these interventions lack empirical results from rigorous studies, but they do contain a theory- or research-based rationale for why the intervention should improve student outcomes. Our review identified one study with countervailing evidence that is not reported in Figure ES.1.

Figure ES.1. Evidence of the Effects of Arts Integration Interventions on Student Outcomes: Number of Interventions by Grade Level and Tier of Evidence



Note. Two interventions that focus on students in early elementary grades and one intervention that focuses on students in mixed elementary grades were supported by evidence at multiple tiers. In the figure, these interventions are counted just once, in the higher-level tier (indicating stronger evidence).

According to a meta-analysis conducted as part of this evidence review, the average effect found in the 27 well-designed studies examined was statistically significant but modest in magnitude. Based on the average effect across all 27 studies that met design requirements for Tiers I–III, one can expect an average child to gain four percentile points in achievement as a result of an arts integration intervention. The four-percentile-point increase would put the average effect of arts integration interventions at the 30th percentile among the interventions in mathematics, reading, and science reviewed by the What Works Clearinghouse. According to our meta-analysis, the effects of arts integration interventions varied by student outcomes, sample characteristics, and study settings.

Recommendations

Based on our work on this evidence review, we offer several recommendations for stakeholders and researchers as they engage in selecting, implementing, and evaluating arts integration interventions.

Recommendations for Practitioners and Policymakers

Be thoughtful in selecting which ESSA funding program(s) to pursue to support a proposed arts integration intervention. Important factors to consider include the types of activities that are required and allowable under the program(s), the amount and duration of funding available, and the level of evidence required.

Critically assess the theoretical and empirical support behind a proposed arts integration intervention. Adopting a conservative interpretation of ESSA's evidence-based criteria might help promote interventions with a stronger likelihood of success.

Recommendations for Future Research

Research that is more rigorous is needed to provide stronger evidence for arts integration.

Researchers can help provide more Tier I evidence by using a randomized controlled trial study design, documenting the attrition of study participants, and providing sufficient details of analyses and findings in report appendices.¹

Further research is needed to understand the effects of arts integration on specific types of educational outcomes. For some student outcomes (e.g., science, social studies, arts-related outcomes, and critical thinking), our meta-analytic findings are based on a single study. Researchers should consider examining these outcomes in future studies of arts integration interventions to better understand the effects of arts integration on those outcomes.

Additional research is needed to shed light on the effects of the individual components of arts integration interventions. Although our findings suggest a relationship between the types of materials used in an arts integration intervention and student outcomes, researchers should consider conducting studies that examine the effects of specific components of arts integration interventions.

Additional research is needed to shed light on the effects of the use of arts integration with diverse student populations in a range of settings. Researchers should plan their studies to include systematic comparisons of the effects of arts integration on different student subgroups, such as students who are economically disadvantaged, English learners, and students with disabilities. Moreover, researchers should consider studying the effects of arts integration among schools located in different settings (e.g., rural vs. suburban areas).

¹ In a randomized controlled trial, study participants are randomly assigned to an intervention group that receives the intervention or to a control group that does not receive the intervention.

Chapter 1. What Is Arts Integration?

Chapter Highlights

- ▶ Arts integration is the practice of purposefully connecting concepts and skills from the arts and other subjects. This report summarizes the evidence supporting arts integration–related interventions.
- ▶ Key components of arts integration interventions include professional development opportunities, the use of specialized personnel, the use of specialized instructional materials, field trips, and whole-school reform models.
- ▶ The theory and research-based logic model in this report suggests contextual factors such as teacher and student needs can shape the design and implementation of arts integration interventions. Arts integration implementation can affect intermediary outcomes, such as teacher practice, and student outcomes, such as academic achievement.

Advocacy efforts for including the arts in prekindergarten through Grade 12 public education have a long history in the United States. This advocacy has intensified in response to public outcries that schools were eliminating arts education for reasons such as a perceived mismatch between arts education and the academic program, lack of resources, and lack of research evidence on arts education’s impact on student outcomes. Another factor in the availability of arts in prekindergarten through Grade 12 is budgetary constraints. For example, a 2009 report from the Government Accountability Office (GAO) found that teachers at schools with higher percentages of low-income or minority students were more likely to report a reduction in time spent on the arts; teachers reported larger average reductions than teachers at schools with low percentages of such students (GAO, 2009). The GAO report confirmed that budgetary constraints and school improvement initiatives were influencing availability in some states.

Advocates of the arts in education have emphasized their potential for improving a host of academic, social-emotional, and behavioral outcomes for students (Arts Education Partnership, 2004; Burnaford, Brown, Doherty, & McLaughlin, 2007; Deasy, 2002; Hanna, Patterson, Rollins, & Sherman, 2011; Menzer, 2015; Rabkin, Reynolds, Hedberg, & Shelby, 2011), as well as their potential for fostering schoolwide improvements in instruction, school climate, and family/community engagement (Biscoe & Wilson, 2015; Catterall & Waldorf, 1999; Nelson, 2001; Noblit, Corbett, Wilson, & McKinney, 2009; President’s Committee on the Arts and the Humanities, 2012; Stoelinga, Joyce, & Silk, 2013). Efforts in recent years to transform low-performing schools have led to growing interest in how the arts can support the success of students who are economically disadvantaged or face other educational risks (Toppo, 2016).

One way the arts are incorporated into schools is through arts integration, which is the purposeful connection of concepts and skills from the arts with concepts and skills from another

subject.² Arts integration is viewed as a promising strategy for improving a variety of school and student outcomes. However, it has been unclear whether the research on arts integration interventions shows the unambiguous effects on student outcomes needed to justify federal funding of these types of interventions.

The 2015 reauthorization of the Elementary and Secondary Education Act as the Every Student Succeeds Act (ESSA) includes numerous federal funding opportunities that states, districts, and schools can use to support arts activities, strategies, and interventions designed to improve student learning. To help ensure the success of such interventions, the law requires or encourages that certain activities funded through ESSA be “evidence based,” and it outlines four evidence tiers for evaluating the level of evidence supporting a particular activity.

This report presents findings from a review of recent research on arts integration interventions through the lens of ESSA’s four-tiered evidence framework. The findings result from a systematic search, screening, and review of reports of original studies published from 2000 to 2016 that examined arts integration interventions in prekindergarten through Grade 12 and their effects on student outcomes.³ (See Box 1.1 for definitions of “arts integration intervention,” “study,” and “report,” as used for the purpose of this review.)

Box 1.1. Definition of Terms

Arts integration intervention: A specific approach, set of activities, strategy, or program linking arts with at least one other subject to improve student and school-related outcomes.

Study: An empirical investigation of the effect of an arts integration intervention on a particular sample and set of outcomes. The findings (single or multiple findings) from a single study can appear in a single report or in multiple reports.

Report: A written summary of a study, in the form of a journal article, a book or book chapter, a dissertation, a technical report, or a conference paper. A report may present findings from a single study or multiple studies. The results of a study of an intervention may appear in multiple reports, such as consecutive evaluation reports of a multi-year implementation of arts integration.

The evidence review was guided by the following two research questions:

1. Are there research studies on arts integration that meet the criteria for evidence as specified in ESSA?
2. How large are the effects of arts integration interventions on student outcomes, particularly for students who are disadvantaged?

In the remainder of this chapter, we describe our conceptual understanding of arts integration, which provided a framework that guided all aspects of our evidence review. Specifically, we clarify commonly used or key components of arts integration interventions (Box 1.2) and present a logic model (Figure 1.1) depicting how arts integration is theorized to improve student outcomes.

² The arts are also incorporated into schools through discipline-based arts instruction (also known as sequential arts instruction), which is arts instruction that focuses on essential concepts and skills of the art discipline without necessarily making purposeful connections to skills or concepts from other subjects. Interventions that focused on discipline-based arts instruction were not included in this evidence review.

³ We also screened and reviewed studies examining other outcomes, such as teacher instruction, school culture, or school community outcomes. These studies may not have been selected for this report for a number of design or data issues.

Components, Processes, and Outcomes: A Logic Model of Arts Integration Interventions

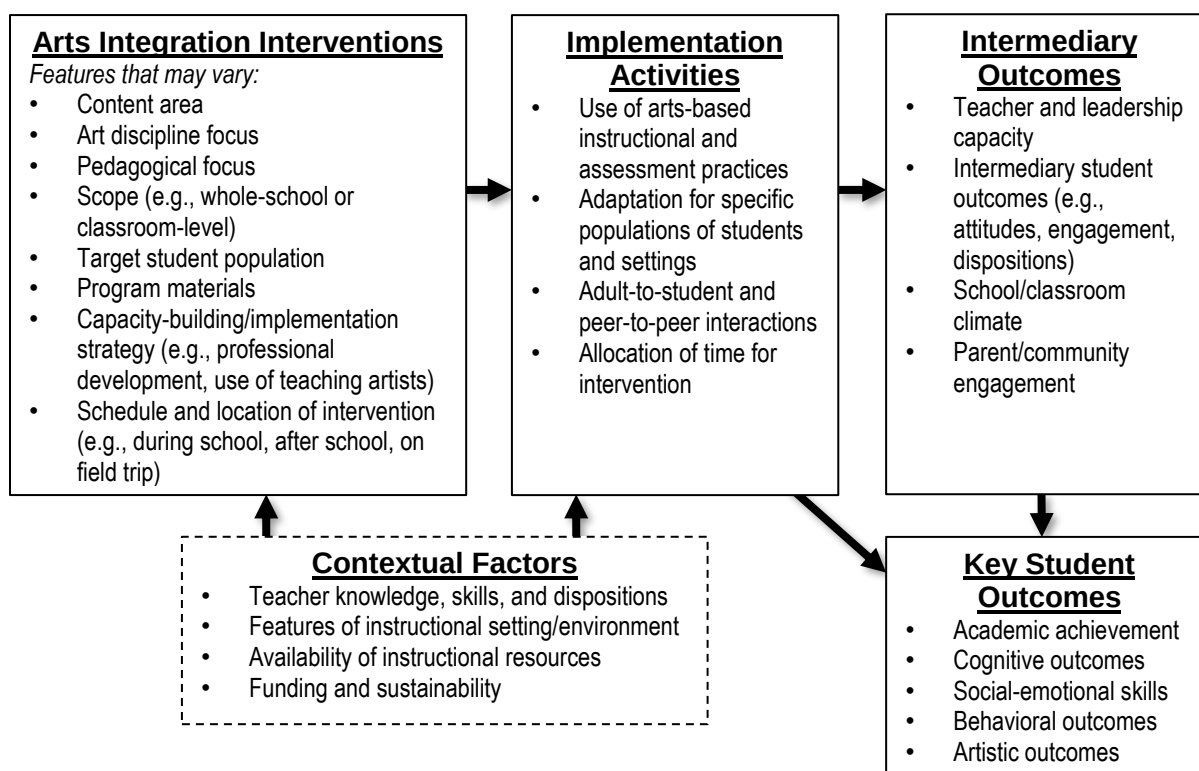
Arts integration interventions take numerous forms. Examples of arts integration range from discrete instructional strategies, such as using drama techniques to support literacy instruction, to multifaceted programs, such as the A+ program, a whole-school model that addresses multiple areas of a school's operation (e.g., professional development, scheduling, and assessment practices) to support arts-integrated learning (Horowitz, 2004). The look and feel of arts integration, as well as the studies that have been done on arts integration, have been influenced by support from philanthropic foundations and the U.S. Department of Education. The latter agency has administered federal arts in education programs such as the Arts in Education Model Development and Dissemination grant program and the Professional Development for Arts Educators grants program, established under the No Child Left Behind Act of 2001.

In the course of performing this review, we found that researchers and model developers frequently use different terms for the same components and processes (and similar terms for different components and processes). To clarify the terms used in this report and help readers understand the process through which arts integration is expected to affect student outcomes, we developed a list of key components that are frequently included in arts integration interventions as well as a general logic model for how arts integration interventions are theorized to work (see Box 1.2 and Figure 1.1). The logic model is described in more detail in the following section.

Box 1.2. Key Components of Arts Integration Interventions

The following are key components of arts integration interventions. They may not exist in all interventions and when they do, they may be found in a variety of configurations.

- ▶ **Professional development.** Professional development activities involve efforts to build educators' capacity for using arts integration strategies in their classroom. Professional development experiences can take many forms, such as workshops, summer institutes, job-embedded coaching, and/or collaboration with teaching artists or arts specialists. They can also vary in terms of how much time educators spend engaging in professional learning activities, how often such activities occur, and over what time frame such activities occur.
- ▶ **Use of specialized personnel as full- or part-time school faculty.**
 - **Teaching artists.** Teaching artists work with classroom teachers to help build the teachers' capacity to design and implement arts-integrated lessons. They generally play teacher coaching and mentoring roles; for example, they might help teachers develop curricula or lesson plans, co-teach lessons with the classroom teacher, model practices, provide mentoring, and/or observe teachers' instruction and provide feedback.
 - **Resident artists.** Resident artists go into schools to provide arts-integrated lessons directly to students without the involvement of the classroom teacher. Unlike teaching artists who aim to provide professional learning experiences for classroom teachers, resident artists' focus is on teaching students.
 - **Arts specialists.** Rather than—or in addition to—bringing a teaching or resident artist into a school, some arts integration interventions draw on arts specialists who are already working in the school such as a certified art, music, or drama teacher. Arts integration interventions that involve arts specialists typically have the specialists collaborate with classroom teachers to develop lesson plans and co-teach arts-integrated lessons. For example, a school's music teacher might work with a math teacher to provide a series of arts-integrated lessons on music notes and fractions.
 - **Art therapists.** An art therapist is a trained counselor or special educator who provides art-based therapy (e.g., music therapy) to students with specialized learning needs (e.g., students with cognitive or physical disabilities or social-emotional issues), often in a one-on-one or small-group setting.
- ▶ **Provision of instructional materials.**
 - **Curriculum.** Some arts integration interventions provide a premade curriculum or set of curricular units that outline the arts-integrated content and skills that should be incorporated into arts-integrated lessons.
 - **Lesson plans.** Arts integration interventions may provide a series of lesson plans that outline specific activities for teachers to implement in their classroom. These lesson plans may specify student learning objectives as well as questioning, assessment, and other instructional strategies for teachers to use when implementing the lesson plans.
 - **Curricular tools.** Rather than providing a premade curriculum, set of curricular units, or lesson plans, some arts integration interventions provide tools such as frameworks, templates, and/or guidelines to assist teachers in developing their own arts-integrated curricular units, lesson plans, or assessments.
 - **Software programs.** Some arts integration interventions involve the use of specialized software programs or applications, which—by virtue of their ability to convey sounds, images, and movement—may lend themselves well to facilitating arts-based instruction. Teachers may use arts integration software programs to facilitate whole-class activities, but software programs can also provide a platform for students to interact one-on-one with arts-integrated content. In this regard, they can serve as a vehicle for providing targeted, individually tailored support to students who are struggling or have special learning needs. Some software programs also produce data to help teachers monitor student progress.
- ▶ **Field trips.** Some arts integration interventions capitalize on arts-related resources in the surrounding school community and take students on field trips to locations such as a museum, concert hall or theater, art studio, or university. Field trips often involve student interactions with outside professionals such as museum directors or professional artists. Field trip approaches often have follow-up activities such as complementary classroom projects or discussions.
- ▶ **Whole-school models.** Although many arts integration interventions involve multiple components, only some are designed to serve as a cohesive, schoolwide model that addresses various aspects of a school's operation (e.g., leadership roles, scheduling, and school climate) to support arts-integrated teaching and learning.

Figure 1.1. Logic Model for Arts Integration Interventions

Reading from the top of Figure 1.1, this conceptualization is expressed as follows:

The box on the far left of the logic model represents **arts integration interventions** as they are designed, and it describes some of the key features of these interventions. Arts integration interventions, for example, typically include an emphasis on teaching and learning through the arts, which is characterized by interactions among three elements: (1) a content focus (e.g., an academic content area such as math, or a theme such as social change through history), (2) an art discipline focus (e.g., visual art, drama, music, or dance), and (3) a pedagogical focus (e.g., research-based strategies for teaching concepts such as number sense or fractions).

The arts integration interventions box identifies additional dimensions along which arts integration interventions may vary. Arts integration interventions can differ in scope: Some interventions are aimed at the whole school, whereas others may concentrate on particular classrooms, grade levels, or content areas. Arts integration interventions may target different student populations, such as students with special learning needs or students of a particular grade level. Some interventions incorporate a strong focus on building teacher capacity. Some provide specific curricula and instructional materials, whereas others rely on teachers to develop them. Furthermore, arts integration can be scheduled to take place during the school day, in before- or after-school programs, during field trips, and during weekends or summer.

The box in the center of the logic model represents the activities that actually take place as part of an arts integration intervention's **implementation**. As noted previously, arts integration can reflect various models for implementation. For example, some may focus solely on building the capacity of current

classroom teachers as a means of implementing arts integration; others may engage resident artists to collaborate with teachers or lead the integration. Implementation features can include the use of prescribed instructional strategies, the interactions that take place between teachers and students and among students, and the amount of time devoted to arts-integrated instruction.

Contextual factors related to the circumstances in which an arts integration intervention takes place can influence the intervention's design as well as its implementation. For example, the knowledge, skills, and dispositions that participating teachers possess might determine how much and what types of teacher support are included in an intervention's design. They are also likely to affect how well the teachers understand and implement the intervention's prescribed practices. Similarly, features of the instructional setting (e.g., type of physical space available, proximity to museums or performing arts centers) and the availability of instructional resources (e.g., necessary technology, art supplies) can shape how an intervention is devised and carried out. Moreover, the availability of funding and other resources that are important for sustaining an intervention over time (e.g., community support, school leadership buy-in) can play key roles in an intervention's design and implementation as well.

The implementation of arts integration initiatives may lead to improved **intermediary outcomes** that are expected ultimately to contribute to improved student achievement and other key student outcomes. Examples of intermediary outcomes at the teacher level include teachers' ability to employ specialized instructional strategies, classroom interactions and behavior/motivation techniques, and assessment practices. Intermediary outcomes also include student-level outcomes that may affect student achievement, such as engagement and attitudes toward learning. In addition, intermediary outcomes include school- and parent/community-level measures such as school climate, leadership quality, and parent/community engagement.

These intermediary outcomes may, in turn, affect **key student outcomes** such as academic achievement, cognitive outcomes, social-emotional skills (e.g., self-confidence and self-awareness), behavioral outcomes, and artistic outcomes.

Organization of This Report

In Chapter 2, we describe the funding opportunities available in ESSA for arts integration interventions as well as the specific evidence requirements and guidelines for determining whether those interventions meet ESSA's definition of evidence based. The findings from our evidence review are presented in Chapters 3 and 4. Chapter 3 identifies studies of arts integration interventions that met the criteria for ESSA Evidence Tiers I–IV. Chapter 4 examines the magnitude of effects of arts integration interventions on student outcomes. Chapter 5 offers a set of recommendations for policymakers and practitioners and for future research. Our appendices include two lists of interventions examined. Appendix A is a list of interventions that met the criteria for Tiers I–IV with descriptive information. Appendix B lists studies that did not meet the criteria for Tiers I–IV. Appendix C contains detailed information about the review methods. Appendix D contains findings from supplementary analyses.

Chapter 2. How Can the Every Student Succeeds Act Support Arts Integration, and How Does It Define Evidence-Based Interventions?

Chapter Highlights

- ▶ The Every Student Succeeds Act (ESSA) offers at least 12 different funding opportunities that state educational agencies, local educational agencies, and/or schools can use to support arts integration.
- ▶ Although ESSA's definition of evidence-based interventions provides some criteria for evaluating the level of evidence supporting a particular intervention, it leaves room for interpretation. Interpretation for this evidence review was based on several sources of expertise including prior evidence reviews and expertise of colleagues at AIR and Education Counsel.
- ▶ This evidence review adopts the evidence criteria specified in nonregulatory guidance issued by the U.S. Department of Education in September 2016, which are stricter than the criteria specified in the law.

In this chapter, we consider the decisions that stakeholders will be making as they plan to use arts integration interventions supported by funding under ESSA. First, we explore which funding programs within ESSA might lend themselves to supporting particular types of arts integration interventions based on the programs' stated purposes and allowable activities. We then unpack ESSA's definition of "evidence-based" interventions and explain how we applied that definition to our evidence review.

Support for Arts Integration Within ESSA

ESSA addresses the issue of arts education—and, more specifically, arts integration—in several important ways. For one, it broadens the subject area emphasis on mathematics, reading/English language arts, and science of its predecessor, the No Child Left Behind Act, to include a "well-rounded education." Although the law does not dictate what subject matter constitutes a well-rounded education, it clarifies that a well-rounded education can include "the arts" and "music" along with other academic subject areas, such as history and foreign languages (Elementary and Secondary Education Act Section 8101(52)). An increased focus on ensuring that students have equitable access to a well-rounded education runs throughout ESSA's various titles and thus opens the door to using numerous ESSA funding programs to help finance arts integration interventions.

Title IV of ESSA features the law's most explicit connections to arts integration. For instance, Title IV, Part A identifies the following as examples of allowable activities for Student Support and Academic Enrichment Grants: providing interdisciplinary programs that combine art and mathematics; integrating the arts into science, technology, engineering, and mathematics (STEM) subject areas; and using "music and the arts as tools to support student success through the promotion of constructive student engagement, problem solving, and conflict resolution" (p. 224).

Title IV also establishes a dedicated Assistance for Arts Education program (Sec. 4642 of ESSA, similar to the No Child Left Behind Act's Arts in Education program), which supports a range of activities that can promote both arts integration and discipline-based arts education.

Last, ESSA provides funding opportunities to increase support for particular student subgroups such as students who are economically disadvantaged and English learners. Those opportunities can be used to fund arts integration interventions that address those subgroups' specialized learning needs. ESSA also requires states to set aside funds for school improvement activities in their lowest performing schools, which could support the use of school turnaround strategies with an arts integration focus.

To qualify for funding under a specific ESSA grant program, an arts integration intervention must align with the grant program's purpose and allowable activities. It also must satisfy any applicable evidence-based intervention requirements associated with that program. For certain ESSA programs such as Title I, Section 1003: School Improvement, the law explicitly requires the use of evidence-based interventions for at least some of the activities allowable under that program. For other programs, the law indicates that evidence-based interventions must receive competitive preference in grant competitions, meaning that grant applications are not required to propose evidence-based interventions but must have a greater chance of being awarded if they do. Finally, some ESSA grant programs do not specify any evidence-based intervention requirements. Nevertheless, applicants might still choose to propose evidence-based interventions for these programs in the hopes, for example, that such interventions will be more likely to improve student outcomes.

Table 2.1 presents a summary of ESSA funding opportunities that seem particularly well suited for supporting arts integration interventions, and it summarizes the applicable evidence-based intervention requirements for each opportunity listed.

Table 2.1. Opportunities for Funding, Evidence Required for Funding, and Eligible ESSA Arts-Related Activities

Opportunities for Supporting Arts Integration	Description	Eligible Entities	Authorized Funding ^a	Evidence Required	Examples of Eligible Arts Integration Activities ^b
Title I, Section 1003: School Improvement	Funds are intended to support school improvement activities to improve the performance of schools identified for comprehensive or targeted support and improvement.^c	LEAs with low-performing schools identified for comprehensive or targeted support and improvement by their state's accountability system	SEAs must reserve 7% of their Title I, Part A allocation.	At least one intervention must meet evidence requirements of Tier I, II, or III.	- School turnaround models with an arts integration focus - Professional development to help teachers use arts integration strategies to improve instruction - Arts integration strategies that support the needs of underperforming student subgroups (e.g., ELs, students with disabilities)
Title I, Section 1003A: Direct Student Services	- Funds are intended to support academic coursework not otherwise available at the school. - Examples include advanced courses, career and technical education courses, credit recovery or academic acceleration courses, and personalized learning approaches.	LEAs that reflect geographic diversity within the state, with priority given to LEAs serving the highest percentage of schools identified for comprehensive or targeted support and improvement	SEAs may reserve up to 3% of their Title I, Part A allocation.	Tier I, II, III, or IV	- Courses that use arts-based strategies to teach academic subjects - Arts integration activities that support personalized learning - Arts integration courses that support schools' provision of a well-rounded education

Opportunities for Supporting Arts Integration	Description	Eligible Entities	Authorized Funding ^a	Evidence Required	Examples of Eligible Arts Integration Activities ^b
Title I, Part A: Basic Programs for Schoolwide and Targeted Assistance	▶ Funds are intended to support schools and LEAs that serve high numbers or percentages of students from low-income families. ▶ Schools operating Title I schoolwide programs can use their funds to improve the school's entire educational program. ▶ Schools operating targeted assistance programs must focus Title I-funded activities on students who are failing or most at risk of failing to meet state standards.	Schools where at least 40% of students come from low-income families qualify for Title I schoolwide programs; other schools can implement targeted assistance programs.	\$15 billion for FY 2017 to \$16.2 billion for FY 2020	No minimum evidence threshold, except that any external providers selected to help schools implement their schoolwide or targeted assistance programs must have experience in using evidence-based strategies (Tiers I–IV).	▶ Whole-school improvement models or strategies with an arts integration focus ▶ Professional development to support teachers in providing arts-integrated instruction ▶ Arts integration interventions for students who are struggling to meet state standards ▶ Instructional materials and/or technology (e.g., digital learning resources) to provide low-achieving students with arts-integrated instruction ▶ Arts integration programs that promote parent engagement
Title II, Part A: Supporting Effective Instruction	▶ Funds are intended to recruit teachers and enhance the quality and effectiveness of current teachers, principals, and other school leaders.	LEAs	Approximately \$2.3 billion per year for FY 2017 to 2020	Some specific uses of funds (e.g., professional development, induction, and mentoring) require Tier I, II, III, or IV evidence, to the extent that the state determines such evidence is reasonably available. ^d	▶ Teacher professional development activities (including activities for arts educators) to support their use of arts integration strategies ▶ Collaboration time for subject area teachers, teaching artists, and/or other arts educators to plan arts-integrated lessons ▶ Time for teachers to develop arts integration curricula ▶ Financial incentives to recruit arts educators ▶ Financial incentives to help qualified individuals with an arts background become art teachers

Opportunities for Supporting Arts Integration	Description	Eligible Entities	Authorized Funding ^a	Evidence Required	Examples of Eligible Arts Integration Activities ^b
Title II, Part B: National Activities—Literacy Education for All, Results for the Nation	Funds are intended to boost student achievement in reading and writing by ensuring that all students—particularly those most in need—have access to high-quality, comprehensive literacy instruction.	SEAs, LEAs, and early childhood education programs	Approximately \$151 to \$180 million per year for FY 2017 to 2020	Competitive preference is given for proposals with evidence-based activities (Tier I, II, III, or IV).	- Activities to help teachers implement arts integration programs that promote comprehensive literacy instruction (e.g., professional development, common planning time for literacy teachers) - Arts-based activities that support students' language development - Efforts to connect literacy-focused arts integration activities outside of school with literacy focused instruction during the school day
Title III, Part A: English Language Acquisition, Language Enhancement, and Academic Achievement Act	Supplemental funding provides support for ELs in attaining English proficiency and developing high levels of academic achievement.	LEAs or consortia of multiple LEAs that serve sufficient numbers of ELs	Approximately \$760 million for FY 2017 to \$885 million for FY 2020	No minimum evidence threshold	- Supporting ELs' access to arts-integrated coursework - Professional development to build EL educators' capacity to use arts integration techniques - Acquiring digital resources that use arts integration techniques to support ELs

Opportunities for Supporting Arts Integration	Description	Eligible Entities	Authorized Funding ^a	Evidence Required	Examples of Eligible Arts Integration Activities ^b
Title IV, Part A: Student Support and Academic Enrichment Grants	Funds provide support for: ▶ providing all students with access to a well-rounded education which may include the arts, ▶ improving school conditions for student learning to create a healthy and safe school environment, and ▶ effectively using technology to improve academic achievement and digital literacy.	LEAs or consortia of multiple LEAs	Approximately \$1.6 billion per year	Some specific uses of funds require Tier I, II, III, or IV evidence, to the extent that the state determines such evidence is reasonably available. ^d	▶ Courses or instructional programs that incorporate arts and academic subject instruction to provide students with a well-rounded education ▶ Arts integration programs that promote problem solving, conflict resolution, or other cognitive or social-emotional skills ▶ Programs or activities that integrate arts-based learning into science, technology, engineering, and mathematics (STEM) subject areas (also known as science, technology, engineering, art, and mathematics [STEAM])
Title IV, Part B: 21st Century Community Learning Centers	▶ Funds are intended to support academic enrichment activities and other support services that occur during times when school is not in session.	LEAs or other public or private nonprofit entities, with priority given to those who serve students from high-poverty and low-performing schools	\$1 billion for FY 2017 and \$1.1 billion per year from FY 2018 to 2020	Some specific uses of funds require Tier I, II, III, or IV evidence.	▶ Expanded learning time (e.g., before- or after-school programs) that uses arts integration to reinforce instruction provided during the school day ▶ Summer school programs that provide arts-integrated instructional activities
Title IV, Part C: Expanding Opportunity Through Quality Charter Schools	▶ Start-up funds are provided for creating new charter schools or replicating charter schools with a track record of success.	Charter management organizations, with priority given to those that serve high-poverty student populations	\$270 to \$300 million per year for FY 2017 to 2020	No minimum evidence threshold	▶ Planning activities for establishing or replicating charter schools with a specialized arts focus or curriculum ▶ Professional development for teachers working in new charter schools to help them provide arts-integrated instruction

Opportunities for Supporting Arts Integration	Description	Eligible Entities	Authorized Funding ^a	Evidence Required	Examples of Eligible Arts Integration Activities ^b
Title IV, Part D: Magnet School Assistance	▶ Start-up funds are provided for establishing public schools or education centers that offer a specialized, theme-based instructional program designed to attract and bring together students from different racial and socioeconomic backgrounds.	LEAs or consortia of multiple LEAs that serve students from diverse racial and socioeconomic backgrounds	\$94 million for FY 2017 to \$108 million for FY 2020	Competitive preference is given for proposals with evidence-based activities (Tier I, II, III, or IV).	▶ Creating or replicating a magnet school with a specialized arts integration focus or curriculum ▶ Professional development for teachers working in a new magnet school to help them provide arts-integrated instruction
Title IV, Part F: National Activities Subpart 2—Community Support for School Success	▶ Promise Neighborhoods grants support the provision of comprehensive, coordinated services to neighborhoods with high rates of poverty, multiple signs of distress (e.g., high rates of academic failure, obesity, incarceration), and low-performing schools. ▶ Full-Service Community Schools grants support the coordination and provision of pipeline services (a continuum of coordinated services from birth to postsecondary education and career attainment) in public elementary or secondary schools.	<i>Promise Neighborhoods:</i> Non-profits, institutions of higher education, Indian tribes <i>Full-Service Community Schools:</i> LEAs working in partnership with one or more community-based organizations, nonprofit organizations, or other public or private entities	Approximately \$70.5 million per year for FY 2017 and 2018 and approximately \$70 million per year for FY 2019 and 2020	<i>Promise Neighborhoods:</i> Application requirement includes support for evidence-based programs, and competitive preference is given for proposals with evidence-based activities (Tier I, II, III, or IV). <i>Full-Service Community Schools:</i> Competitive preference is given for proposals with evidence-based activities (Tier I, II, III, or IV).	▶ Arts integration initiatives that focus on improving students' academic and social-emotional outcomes ▶ Extended learning time opportunities (before- or after-school or summer programs) that use arts integration strategies ▶ Partnerships with community arts organizations to support arts integration initiatives

Opportunities for Supporting Arts Integration	Description	Eligible Entities	Authorized Funding ^a	Evidence Required	Examples of Eligible Arts Integration Activities ^b
Title IV, Part F: National Activities Subpart 4—Awards for Academic Enrichment	▶ Funds include Assistance for Arts Education Grants that support efforts to promote arts education, including arts education for students who are disadvantaged and students with disabilities	▶ An LEA or a consortium of LEAs where at least 20% of students come from low-income families ▶ SEAs ▶ Institutions of higher education ▶ Museums or cultural institutions ▶ Bureau of Indian Education ▶ Other nonprofit or private organizations	Approximately \$55 to \$56 million per year for FY 2017 to 2020	No minimum evidence threshold	▶ “Arts in education” courses ▶ Professional learning programs for art educators ▶ Arts-related instructional materials and digital resources ▶ Partnerships with art museums

Note. EL = English learner. FY = fiscal year. LEA = local educational agency. SEA = state educational agency.

^a The funding levels reported reflect the total amount of funding authorized in the law; they do not necessarily reflect the actual funding levels for each year, which are determined through the annual federal budget process.

^b The activities listed are only examples of eligible arts integration activities for these programs as provided in statute, nonregulatory federal guidance or otherwise; it is not an exhaustive list.

^c Comprehensive support and improvement schools are those among the lowest 5% of Title I schools across all required indicators within their state’s accountability system, those that fail to graduate one third or more of their students, and Title I schools with chronically underperforming student subgroups. Targeted support and improvement schools are those with one or more student subgroups that are consistently underperforming, as defined by the state, based on all required indicators within their state’s accountability system. Schools with one or more subgroups that would perform, on their own, as poorly as the lowest 5% of Title I schools receive additional targeted support and improvement activities.

^d In some instances, the Every Student Succeeds Act allows states to waive evidence-based intervention requirements for specific uses of funds if the state determines that an evidence base is not reasonably available to apply to those requirements.

Identifying the Evidence Base of Arts Integration Interventions

Title VIII, Section 8101 of ESSA defines four tiers of evidence for evaluating the level of rigor in the research base, as shown in Figure 2.1. Evidence in Tiers I–III must “demonstrate a statistically significant effect on improving student outcomes or other *relevant outcomes*,” and the three tiers represent varying levels of rigor from “strong evidence” to “promising evidence.” Tier IV evidence must “demonstrate a rationale” that an intervention is “likely to improve student outcomes or other *relevant outcomes*,” and it must be coupled with “ongoing efforts to examine the effects” of the intervention.⁴

Figure 2.1. “Evidence-Based” Intervention as Defined by ESSA

WHAT IS AN “EVIDENCE-BASED” INTERVENTION? (from section 8101(21)(A) of the <u>ESEA</u>)	
“...the term ‘evidence-based,’ when used with respect to a State, local educational agency, or school activity, means an activity, strategy, or intervention that –	
(i)	demonstrates a statistically significant effect on improving student outcomes or other <i>relevant outcomes</i> based on –
(I)	<i>strong evidence</i> from at least one well-designed and well-implemented experimental study;
(II)	<i>moderate evidence</i> from at least one well-designed and well-implemented <i>quasi-experimental study</i> ; or
(III)	<i>promising evidence</i> from at least one well-designed and well-implemented correlational study with statistical controls for selection bias; or
(ii)	(I) <i>demonstrates a rationale</i> based on high-quality research findings or positive evaluation that such activity, strategy, or intervention is likely to improve student outcomes or other <i>relevant outcomes</i> ; and
	(II) includes ongoing efforts to examine the effects of such activity, strategy, or intervention.

As Table 2.1 in the previous section shows, under most federal programs that require or encourage the use of evidence-based interventions, interventions can satisfy ESSA’s definition of evidence-based if they meet the requirements for any of the four evidence tiers. However, the law requires that school improvement activities funded under Title I, Section 1003 must include at least one intervention that meets the evidence requirements for one of the first three (i.e., the most rigorous) tiers.

Although ESSA’s definition of evidence-based interventions outlines general criteria for each evidence tier, it leaves room for states to specify more detailed criteria in areas in which the law is silent (Herman et al., 2016). In this section, we outline the general approach we took in interpreting and applying ESSA’s evidence-based intervention criteria for the purposes of this evidence review. However, we recognize that guidance and interpretations of ESSA’s new

⁴ At the time of publication, new regulations were approved that “make technical changes only and do not establish substantive policy.” These regulations are available at <https://www.federalregister.gov/documents/2017/07/31/2017-15989/definitions-and-selection-criteria-that-apply-to-direct-grant-programs>.

requirements for evidence-based interventions are still evolving as of this writing, and in light of this dynamic situation, we encourage the reader to delve more deeply into available guidance and other resources on the evidence-based intervention criteria to make informed decisions.

For this evidence review on arts integration interventions, we adopted the stricter evidence criteria laid out in a September 2016 U.S. Department of Education document that provides nonregulatory guidance⁵ to states and school districts on how they might interpret the four evidence tiers (U.S. Department of Education, 2016). This document suggests that evidence tiers be defined using the following general criteria:

- ▶ Strong evidence (Tier I) comes from study reports that (a) show statistically significant impacts on important outcomes (without any negative impacts); (b) meet What Works Clearinghouse standards without reservations⁶; and (c) were conducted using a large, multisite sample (i.e., more than 350 students and more than a single school district).
- ▶ Moderate evidence (Tier II) comes from study reports that (a) show statistically significant impacts on important outcomes (without any negative impacts); (b) describe studies that meet What Works Clearinghouse standards with reservations⁷; and (c) describe studies that were conducted using a large, multisite sample (i.e., more than 350 students and more than a single school district).
- ▶ Promising evidence (Tier III) comes from study reports that (a) show statistically significant correlations between intervention status and outcomes, and (b) describe studies that control for potential confounding factors.
- ▶ Research-based rationale (Tier IV) evidence comes from study reports that (a) feature a well-specified logic model informed by research and (b) describe interventions that are undergoing additional study regarding the effects.

As Herman et al. (2016) noted, the criteria for Tier IV evidence—a “research-based rationale”—are particularly challenging to apply because ambiguities in the definition of Tier IV evidence leave it open to broad or narrow interpretation. In their review of school leadership research, Herman et al. (2016) drew on information from the Department of Education’s September 2016 nonregulatory guidance to interpret the first criterion for Tier IV evidence—a “well-specified logic model informed by research”—to mean (a) a graphically presented logic model that includes key components of the intervention and outcomes, where (b) research or evaluation findings exist to support a connection between at least one intervention component and at least one desired outcome.

Because the studies and reports collected for this review of arts integration interventions vary considerably in how they present rationales or theories for the ways in which arts integration

⁵ Nonregulatory guidance is information released by the Department of Education to assist SEAs and LEAs in implementing particular provisions of the law. It might include explanations, examples, and suggestions on how to implement the law’s provisions, but it does not require the use of specific activities or practices.

⁶ To meet What Works Clearinghouse standards without reservations, a study must be a randomized controlled trial with low attrition. For more information, see the What Works Clearinghouse procedures and standards handbook: https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_procedures_v3_0_standards_handbook.pdf.

⁷ Studies meeting What Works Clearinghouse standards with reservations include randomized controlled trial studies with high attrition and quasi-experimental studies wherein the intervention group and the comparison group are deemed equivalent on key outcome measures (or their proxies) prior to the intervention.

interventions are expected to influence student outcomes, we decided to employ a more inclusive approach to applying Tier IV evidence requirements. We considered studies that featured any type of rationale or theory of action linking features of the intervention to desired outcomes as candidates for Tier IV evidence. However, we developed a system for classifying the types of rationales provided (see Box 2.1). We did not evaluate whether the studies met the second criterion for Tier IV evidence (i.e., that they describe an intervention that is undergoing additional research) as part of this review.

Box 2.1. Types of Rationales as Tier IV Evidence

Studies classified as providing a **research-based logic model** present a graphical representation of how the intervention is intended to affect relevant outcomes, and at least one of the components included in that logic model is supported by empirical research. These criteria are modeled after the Tier IV evidence requirements used in Herman et al.'s (2016) review of school leadership research.

Studies classified as providing a **research-based theory of action** come close to meeting Herman et al.'s (2016) Tier IV evidence requirements in that they describe how at least one feature of the intervention is theorized to affect relevant outcomes, and at least one of the described features is supported by empirical research. However, they do not include a graphical representation of a logic model.

Studies classified as providing a **theory-based rationale** present an explanation of how at least one of the intervention's features is theorized to affect relevant outcomes and/or discuss underlying theories that shaped the intervention's design. However, these studies do not specify whether the theoretical framework they present is supported by empirical research, thus they warrant further investigation to determine if the theory is supported by research.

For this review, we classified studies as providing *no tier-aligned evidence* if the following two conditions were met: (1) The study lacked statistically significant findings or described a study using a research design other than those specified for Tiers I–III and (2) the report describing the study lacked any type of rationale or logic model.

One additional classification was made for this review. Research findings emerging from studies that use research designs aligned with Tiers I–III but resulting in statistically significant *negative* findings were classified as providing *countervailing evidence*.

More details about the methodology used to identify studies on arts integration and classify the evidence from those studies according to the ESSA evidence tiers are provided in Appendix C.

Chapter 3. What Evidence Exists Linking Arts Integration With Improved Student Outcomes?

Chapter Highlights

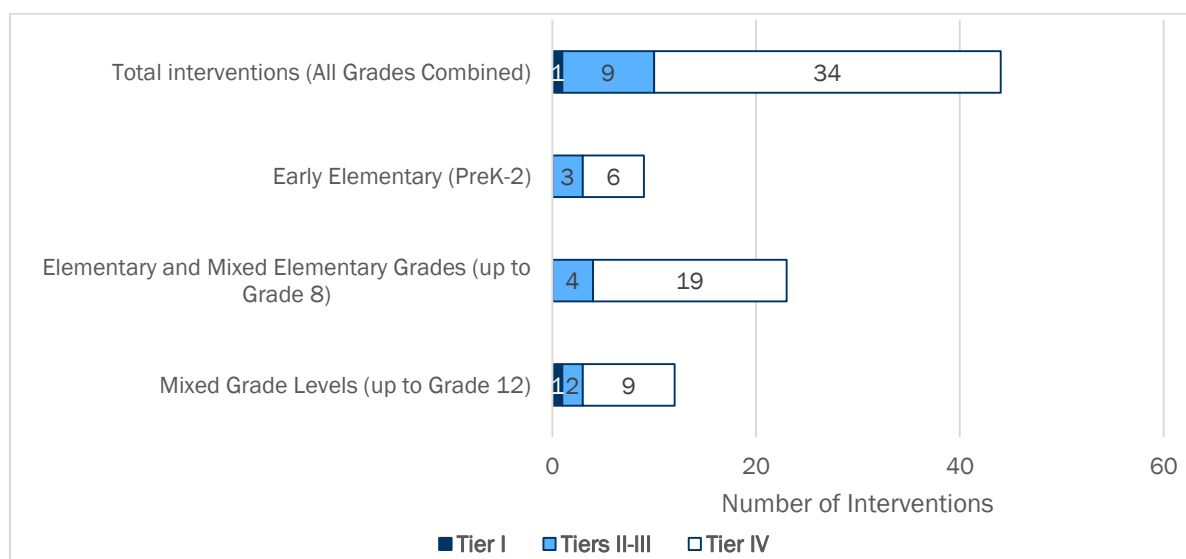
- ▶ Evidence of the effects of arts integration on student outcomes exists at all four Every Student Succeeds Act (ESSA) evidence tiers.
- ▶ Only one arts integration intervention was found to be supported by evidence at Tier I, which is the most rigorous of the four tiers.
- ▶ Nine arts integration interventions were found to be supported by evidence at Tiers II and III. Thirty-four interventions were found to be supported by a theory- or research-based rationale only (Tier IV).

The findings from the evidence review are divided into two chapters. Chapter 3 presents findings for the first research question (repeated below), whereas Chapter 4 presents the meta-analytic findings for the second research question.

Research question 1: Are there research studies on arts integration that meet the criteria for evidence as specified in ESSA?

To address this question, we classified the evidence from each relevant study on arts integration interventions based on whether the study and its findings met the criteria for ESSA's Evidence Tiers I–IV. Figure 3.1 summarizes the number of interventions for which evidence exists at one of the four tiers.

Figure 3.1. Evidence of the Effects of Arts Integration Interventions on Student Outcomes: Number of Interventions by Grade Level and Tier of Evidence



Note. Two interventions that focus on students in early elementary grades and one intervention that focuses on students in mixed elementary grades were supported by evidence at multiple tiers. In the figure, these interventions are counted just once, in the higher-level tier (indicating stronger evidence).

As Figure 3.1 shows, evidence of the effects of arts integration on student outcomes exists at all four ESSA evidence tiers. A total of 44 separate interventions with tiered evidence are reported: one intervention at Tier I, nine interventions at Tiers II or III, and 34 interventions at Tier IV. Most arts integration interventions included in this review are supported by Tier IV evidence only. Reports providing this type of evidence lack empirical results from rigorous studies, but they do contain a theory- or research-based rationale for why the intervention should improve student outcomes. Three interventions were reported to have evidence that could be classified at two tiers. They are represented just once in the graph, with the higher level of evidence.

The classification of evidence into ESSA's tiers can be organized in a number of ways, including by type of art, by type of outcome, or by sample characteristics. We present the information as educators may prefer to view it—by the grade level of the students included in the studies, and then by the type of outcome within those grade-level bands. In the remainder of this chapter, we first present evidence supporting arts integration interventions for the youngest students, those in early elementary grades (prekindergarten through Grade 2), followed by evidence for students in elementary and mixed elementary grades (up to Grade 8). Finally, we present the classification of evidence for mixed grade levels (up to Grade 12). There are two sets of tables for each grade band: One lists studies with evidence at Tiers I–III and the other lists studies with evidence aligned with Tier IV. To provide more context and help inform the interpretation of the findings, we present information about the key components and art disciplines used in each intervention. (See Box 1.2 in Chapter 1 for descriptions of key components of arts integration interventions.) Appendix A provides further details about each intervention.

Evidence Supporting Arts Integration Interventions for Students in Early Elementary Grades: Prekindergarten–Grade 2

Our review found 11 studies involving students in prekindergarten–Grade 2 that provide evidence at Tiers I–IV. Three of the studies produced evidence aligned with Tiers I–III, and the other eight studies provided Tier IV evidence.

Studies Providing Evidence at Tiers I–III

Three studies on arts integration that involved students in this grade-level band produced evidence aligned with Tiers I–III (see Table 3.1). Mulker-Greenfader, Brouillette, and Farkas (2015) found that the Teaching Artists Project (TAP), a professional development program, improved the scores of English learners on a speaking subtest of the state English language proficiency assessment. Under TAP, teachers of English learners in Grades K–2 worked with teaching artists to develop and implement lessons that used drama, creative movement, and visual arts to teach oral language skills.

In a correlational study with statistical controls, Brown, Benedett, and Armistead (2010) found that prekindergarten students' exposure to the Kaleidoscope Preschool Arts Enrichment Program curriculum—which taught prekindergarten students school readiness skills through music, creative movement, and visual arts instruction—was positively related to their general academic achievement and, in particular, their achievement in English language arts. Ludwig and Song (2015) found that the Early Childhood STEM Learning through the Arts intervention, which provided teachers with professional development and ongoing coaching from teaching artists to help them integrate performing arts based strategies in their classrooms, produced positive effects on prekindergarten and kindergarten students' mathematics achievement. The samples for all three studies featured high percentages of students representing racial/ethnic minority groups, and two studies involved high percentages of students who were economically disadvantaged.

Table 3.1. Studies Involving Students in Early Elementary Grades (Prekindergarten—Grade 2) That Provide Evidence at Tiers II–III

Grade Level	Name of Intervention	Intervention Components	Outcomes for Which Positive Effects Were Found	Type of Art	Evidence Tier	Characteristics of Study Samples	Citation
K–2	Teaching Artists Project	▶ Teacher PD ▶ Teaching artists	▶ English speaking skills	Dance, drama	Tier II	▶ 5,240 students across 14 schools ▶ 100% ELs ▶ >67% low income ▶ 99% minority	Mulker-Greenfader, Brouillette, & Farkas (2015) See also Brouillette, Grove, & Hinga (2015)
PK	Kaleidoscope Preschool Arts Enrichment Program	▶ Arts specialists ▶ Whole-school model	▶ Reading/ ELA ▶ General achievement	Music, creative movement, visual arts	Tier III	▶ 194 children in one school^a ▶ >87% minority ▶ >99% low income	Brown, Benedett, & Armistead (2010)
PK and K	Wolf Trap’s Early Childhood STEM Learning Through the Arts	▶ Teacher PD ▶ Teaching artists ▶ Curricular tools	▶ Math	Dance, music, drama	Tier III	▶ 369 students in 18 schools (Year 1) ▶ 334 students in 18 schools (Year 2)^a ▶ 67% minority ▶ 44% low income	Ludwig & Song (2015)

Note. ELA = English language arts. EL = English learner. PD = professional development. Sample characteristics preceded by the “>” symbol indicate that the sample was composed of more than the percentage given. In these instances, the study authors did not report the exact percentage for that characteristic. Appendix A provides more descriptions regarding each intervention.

^a These studies involve a small sample (fewer than 350 students) or were conducted in a single site.

Source: Authors’ analysis of findings from literature review on arts integration.

Studies Providing Evidence at Tier IV

The report by Mulker-Greenfader et al. (2015), along with seven reports describing studies involving students in prekindergarten through Grade 2, provided a rationale for why arts integration should produce positive impacts on student outcomes (see Table 3.2). Five of these reports provided a rationale for why the arts integration interventions examined should improve students' performance in reading/English language arts. Biscoe and Wilson (2015) provided a whole-school model of arts integration. McMahon, Rose, and Parks (2003) investigated the Whirlwind reading intervention, which incorporates performance-based concepts from dance. Newland (2013) reported on a researcher-designed approach using music to teach phonemic awareness. Register, Darrow, Standley, and Swedberg (2007) reviewed a researcher-designed program linking music and reading. Warner and Andersen (2004) studied the use of the process drama pedagogy in an intervention applied to the science-based study of snails. Two reports explained how arts integration should affect students' achievement in math: Biscoe and Wilson (2015) and McDonel (2013). Biscoe and Wilson (2015) described a whole-school arts integration model where all classroom teachers integrated visual and performing arts in their core subjects. McDonel (2013) discussed a program called MusicPlay where teachers incorporate selected songs that relate to math curriculum.

Table 3.2 includes two interventions that also appear in Table 3.1 (Kaleidoscope Preschool Arts Enrichment Program and the Teaching Artists Project as per Brown & Sax, 2013, and Mulker-Greenfader et al., 2015, respectively). These interventions are listed in both tables because the supporting evidence for some outcomes (those listed in Table 3.1) is stronger than the supporting evidence for other outcomes (those listed in Table 3.2). Specifically, Brown and Sax (2013) provided a rationale for why the Kaleidoscope prekindergarten intervention should improve students' social-emotional learning outcomes. Mulker-Greenfader et al. (2015) provided a research-based logic model illustrating the ways in which the Teaching Artists Project is expected to improve student engagement and attendance.

Table 3.2. Studies Involving Students in Early Elementary Grades (Prekindergarten—Grade 2) That Provide Evidence at Tier IV

Grade Level(s)	Name of Intervention	Intervention Components	Outcome ^a	Type of Art	Type of Rationale Provided	Citation
K	Music Instruction and Phonemic Awareness (generically labeled)	► Art specialist	► Reading/ELA	Music/rhythm and rhymes	Research-based theory of action	Newland (2013)
1	Whirlwind's Basic Reading Through Dance	► Resident artists ► Curriculum and lesson plans	► Reading/ELA	Dance	Research-based theory of action	McMahon, Rose, & Parks (2003)
2	Process Drama and Scientific Inquiry	► Field trip	► Reading/ELA	Drama	Theory-based rationale	Warner & Andersen (2004)
2	Music Intervention for Reading Skills	► Curriculum and lesson plans	► Reading/ELA	Music	Research-based theory of action	Register, Darrow, Standley, & Swedberg (2007)
PK–6	Arts integration schoolwide model (generically labeled)	► Teacher PD ► Whole school model	► Reading/ELA ► Math	Literary arts, music, theater, visual arts	Research-based theory of action	Biscoe & Wilson (2015)
PK	MusicPlay (Music Learning Theory and Mathematical Learning Trajectories)	► Teacher PD ► Arts specialists ► Curriculum	► Math	Music/rhythm	Research-based theory of action	McDonel (2013)
PK	Kaleidoscope Preschool Arts Enrichment Program	► Teacher PD ► Arts specialists ► Curriculum	► Social-emotional learning	Music, creative movement, visual arts	Research-based theory of action	Brown & Sax (2013)
K–2	Teaching Artists Project	► Teacher PD ► Teaching artists ► Curriculum	► EL student engagement/attendance	Drama, creative movement, visual arts	Research-based logic model	Mulker-Greenfader, Brouillette, & Farkas (2015) See also Brouillette, Childress-Evans, Hinga, & Farkas (2014)

Note. EL = English learner. ELA = English language arts. PD = professional development. Appendix A provides more descriptions regarding each intervention.

^a Positive effects are expected for these outcomes according to the research-based theory of action, logic model, or theory-based rationale provided.

Source: Authors' analysis of findings from literature review on arts integration.

Evidence Supporting Arts Integration Interventions for Students in Elementary and Mixed Elementary School Grade Levels (up to Grade 8)

We found that the majority of studies that were relevant to this evidence review involved students in the upper elementary grade levels or a mix of lower and upper elementary grade levels. We identified 24 reports of studies that tested the causal connection between an arts integration intervention and the outcomes of students in these grade levels. None of those study reports provides evidence at the first two tiers, and four study reports provide evidence at Tier III (sufficient for all ESSA programs). The other 20 study reports provide evidence at Tier IV because they provide a rationale for why an arts integration intervention should improve student outcomes, but they do not meet the design or statistical significance criteria for Tiers I–III. In our review of the research, we found one study involving students in this grade band that used a design and analysis approach appropriate for a Tier III study but found a statistically significant negative impact on student achievement.

Studies Providing Evidence at Tiers I–III

Four arts integration studies that involved elementary school students were classified as providing evidence at Tier III (see Table 3.3). Ingram and Riedel (2003) evaluated Arts for Academic Achievement, an arts integration intervention implemented in Minneapolis Public Schools during the late 1990s/early 2000s. The authors found positive impacts of this intervention on students' achievement in reading/English language arts and math. Palmer-Wolf, Holochwost, Bar-Zemer, Dargan, and Selhorst (2014) examined the impacts of Nations in Neighborhoods on students' reading/English language arts outcomes and found positive impacts. Nakamoto, Sobolew-Shubin, and Orland (2015) examined the impacts of the Arts for Learning Project over multiple years for students in a suburban Seattle school district and found positive impacts on achievement in reading/English language arts. Walker, McFadden, Tobone, and Finkelstein (2011) examined impacts of the Theater Infusion Project on students' outcomes in 14 urban elementary schools and found positive impacts on reading/English language arts achievement and attitudes toward the arts for students in Grades 4 and 5.

Table 3.3. Studies Involving Students in Elementary and Mixed Elementary Grades (up to Grade 8) That Provide Evidence at Tier III

Grade Level	Name of Intervention	Intervention Components	Outcome for Which Positive Effects Were Found	Type of Art	Evidence Tier	Characteristics of Study Samples	Citation
3–5	Arts for Academic Achievement	► Varied ^a	► Reading/ELA ► Math	Dance, literary arts, theater, visual media arts	Tier III	► 2,889 students in 45 schools	Ingram & Riedel (2003) See also Ingram & Seashore (2003)
3–8	Nations in Neighborhoods	► Teacher PD ► Resident artists, arts specialists ► Curriculum	► Reading/ELA	Literary arts, theater, visual arts, and oral presentations	Tier III	► 1,375 students in five schools ► 18% English learner students ► 85% minority	Palmer-Wolf, Holochwost, Bar-Zemer, Dargan, & Selhorst (2014)
3–5	Arts for Learning Project	► Teaching artists ► Curriculum	► Reading/ELA	Theater, visual arts, music, dance	Tier III	► One year exposure: 11,829 students ► Two years exposure: 6,915 students ► Three years exposure: 2,296 students in 32 schools ► 20% English learner students ► 41% low income ► 48% minority	Nakamoto, Sobolew-Shubin, & Orland (2015)
4 and 5	Theatre Infusion Project	► Teacher PD ► Teaching artists ► Lesson plans	► Reading/ELA ► Attitudes toward the arts	Drama	Tier III	► 1,140 students in 14 schools	Walker, McFadden, Tobone, & Finkelstein (2011) See also McFadden & Walker (2009)

Note. ELA = English language arts. PD = professional development. Appendix A provides more descriptions regarding each intervention.

^a *Varied* indicates that the intervention featured different sets of components for different participating sites.

Source: Authors' analysis of findings from literature review on arts integration.

Studies Providing Evidence at Tier IV

Twenty reports describing studies involving students in middle to upper elementary grade levels did not meet the criteria for Tiers I–III evidence but did provide rationales needed for Tier IV evidence (see Table 3.4). Most of these reports provided rationales linking specific arts integration interventions to student achievement outcomes in reading/English language arts (e.g., Cunnington, Kantrowitz, Harnett, & Hill-Ries, 2014; Doyle, Huie-Hofstetter, Kendig, & Strick, 2014), math (e.g., Brandon, Lawton, & Krohn-Ching, 2007; Kariuki & Humphrey, 2006; Kinney & Forsythe, 2005); science (Kinney & Forsythe, 2005); or social studies (Brugar, 2012; Kinney & Forsythe, 2005). Other reports provided rationales linking arts integration interventions with student attitudes toward math (An, Tillman, Boren, & Wang, 2014; Werner, 2001), social-emotional outcomes (Curva et al., 2005), behavioral outcomes (Anderson & Berry, 2015; Philadelphia Arts in Education Partnership, 2014), and spatial reasoning (Taylor & Hutton, 2013).

Table 3.4. Studies Involving Students in Elementary and Mixed Elementary Grades (Up to Grade 8) That Provide Evidence at Tier IV

Grade Level	Name of Intervention	Intervention Components	Outcome ^a	Type of Art	Type of Rationale Provided	Citation
5	Framing Student Success	▶ Teacher PD ▶ Arts specialists ▶ Curriculum	▶ Reading/ELA ▶ Math	Visual arts	Research-based theory of action	Cunnington, Kantrowitz, Harnett, & Hill-Ries (2014)
1–6	Collaborations: Teachers and Artists	▶ Teacher PD ▶ Teaching artists	▶ Reading/ELA	Visual arts, dance	Theory-based rationale	Doyle, Huie-Hofstetter, Kendig, & Strick (2014)
2–5	Picturing Writing	▶ Teacher PD ▶ Curriculum	▶ Reading/ELA	Visual arts	Research-based theory of action	Trainin, Andrzejczak, & Poldberg (2005)
4	Reading Comprehension through Drama	▶ Resident artists ▶ Curriculum and lesson plans	▶ Reading/ELA	Drama	Research-based theory of action	Rose, Parks, Androes, & McMahon (2001)
3 & 4	Developing Reading Education with Arts Methods	▶ Teacher PD ▶ Teaching artists	▶ Reading/ELA	Theater, visual arts	Research-based theory of action	Saraniero (2011)
4	Creative Dramatics	▶ Teacher PD ▶ Lesson plans	▶ Reading/ELA	Drama	Research-based theory of action	Joseph (2014)
5	Arts Integration With Science Lessons	▶ Teacher PD ▶ Curriculum and lesson plans	▶ Reading/ELA	Music, visual arts, and performance arts	Theory-based rationale	Hardiman, Rinne, & Yarmolinskaya (2014)
5	Reading and Singing Software Program	▶ Software program	▶ Reading/ELA	Music–singing	Research-based theory of action	Bennett, Calderone, Dedrick, & Gun (2015)
5	Authentic Arts-Based Curriculum	▶ Curriculum	▶ Reading/ELA	Visual arts	Research-based theory of action	Spina (2006)
3–5	ARTS FIRST Windward District	▶ Teacher PD ▶ Teaching artists ▶ Curricular tools	▶ Reading/ELA ▶ Math ▶ Attitudes toward school	Dance, drama, visual arts	Theory-based rationale	Brandon, Lawton, & Krohn-Ching (2007)
3	Academic Music	▶ Arts specialists ▶ Lesson plans	▶ Math	Music	Theory-based rationale	Courey, Balogh, Siker, & Paik (2012)

Grade Level	Name of Intervention	Intervention Components	Outcome ^a	Type of Art	Type of Rationale Provided	Citation
4	Drama and Kinesthetic Movement	▶ Lesson plans	▶ Math	Drama, kinesthetic movement	Theory-based rationale	Kariuki & Humphrey (2006)
4	Interdisciplinary Model Program in the Arts for Children and Teachers (Arts IMPACT)	▶ Teaching artists ▶ Curriculum	▶ Math ▶ Science ▶ Social studies	Dance, drama, music, visual arts	Research-based theory of action	Kinney & Forsythe (2005)
5	Visual Arts and History	▶ Teacher PD ▶ Curriculum and lesson plans ▶ Field trip	▶ Social studies	Visual arts	Research-based theory of action	Brugar (2012)
2–5	Arts for Academic Achievement	▶ Teacher PD ▶ Teaching artists	▶ Attitudes toward mathematics	Dance	Theory-based rationale	Werner (2001)
3	Music-mathematics integrated activities	▶ Teacher PD ▶ Curriculum	▶ Attitudes toward mathematics	Music	Theory-based rationale	An, Tillman, Boren, & Wang (2014)
3–5	Artful Citizenship	▶ Teacher PD ▶ Curriculum and curricular tools	▶ Social-emotional learning	Visual arts	Theory-based rationale	Curva et al. (2005)
2–5	ArtsLink	▶ Teacher PD ▶ Teaching artists, arts specialists ▶ Curricular tools ▶ Whole-school model	▶ Suspensions ▶ Student attendance	Visual arts	Research-based theory of action	Philadelphia Arts in Education Partnership (2014)
3	Dramatic language arts	▶ Teacher PD	▶ On-task behavior	Drama	Theory-based rationale	Anderson & Berry (2015)
4	Think3d!	▶ Curriculum ▶ Lesson plans ▶ Art specialists	▶ Spatial visualization	Visual arts: Origami and paper engineering	Theory-based rationale	Taylor & Hutton (2013)

Note. ELA = English language arts. PD = professional development. Appendix A provides more descriptions regarding each intervention.

^a Positive effects are expected for these outcomes according to the research-based theory of action, logic model, or theory-based rationale provided.

Source: Authors' analysis of findings from literature review on arts integration.

Countervailing Evidence

Our review also identified one study that involved students in middle to upper elementary grades and showed a *statistically significant negative impact* on student achievement in math. Albright's (2011) doctoral dissertation study included 102 students in Grades 3 and 5, who were randomly assigned either to a music-math integration condition (where students heard classical music during math instruction and music-related math concepts during music instruction) or to a regular math instruction condition. If not for the negative impact, the study would qualify as providing Tier III evidence based on its sample size, research design, and statistical methods. Given the magnitude and direction of the effect from this study compared with other studies of arts integration interventions (see Chapter 4), we determined that Albright's (2011) findings reflect the effect of this particular music-math intervention and are not a sign that arts integration interventions as a whole may be harmful and not worthy of support through ESSA.⁸ Additional research is needed to determine whether other types of music-math integration interventions produce results similar to Albright (2011).

Evidence Supporting Arts Integration Interventions for Students in Mixed Grade Levels Up to Grade 12

Our literature search, screening, and reviewing process uncovered reports of 18 studies that involved arts integration for older students (students in Grades 6–12) or students in mixed grade levels that included these secondary grade levels. Six of these studies produced evidence at Tiers I–III. The other 12 studies provide a research-based rationale for why student outcomes should be enhanced by arts integration (i.e., Tier IV) but do not provide direct empirical evidence.

Studies Providing Evidence at Tiers I–III

The six studies providing evidence at Tiers I–III for students in this grade range are summarized in Table 3.5. Three studies examined students' reading/English language arts outcomes following exposure to Global Writes' poetry-focused interventions—Honoring Student Voices and Poetry Express (Ellrodt, Fico, Harnett, Ramsey, & Lopez, 2014; Ramsey, Boyer, & Byrne, 2015).⁹ The other three studies involved student exposure to the arts through field trips to an art museum (Crystal Bridges Museum of American Art in Bentonville, Arkansas; Greene, Kisida, & Bowen, 2014; Kisida, Bowen, & Greene, 2016) or to a live theater performance (Attending Live Theater; Greene, Hitt, Kraybill, & Bogulski, 2015). Students participating in these field trips showed better social-emotional outcomes (tolerance and empathy), more critical thinking (Greene et al., 2014), and improved attitudes toward museums (Bowen, Greene, & Kisida, 2014).

⁸ Chapter 4 presents the average effect size for each of the 27 studies that were meta-analyzed. All but one of those effects are clustered between -0.09 standard deviation units and +0.89 standard deviation units. The average effect of -0.90 standard deviation units found by Albright (2011) represents a clear anomaly, suggesting that the effect found for the intervention examined in this study may not reflect the effect of arts integration interventions in general.

⁹ Although these poetry interventions have different names (e.g., Honoring Student Voices, Poetry Express), the interventions are much the same. These programs were both developed and supported by Global Writes. Each includes a performance component, which led to their classification as arts integration interventions.

Table 3.5. Studies Involving Students in Mixed Grade Levels (up to Grade 12) That Provide Evidence at Tiers I–III

Grade Level	Name of Intervention	Intervention Components	Outcomes for Which Positive Effects Were Found	Type of Art	Evidence Tier	Characteristics of Study Samples	Citation
3–8	Global Writes: Poetry Express	▶ Resident artists, teaching artists	▶ Reading/ELA	Literary arts: poetry with performance	Tier III	▶ 730 students in 10 schools in one city ▶ >98% minority ▶ >18% English learner students ▶ >81% low income	Ellrodt, Fico, Harnett, Ramsey, & Lopez (2014)
6–8	Global Writes: Honoring Student Voices	▶ Resident artists, teaching artists	▶ Reading/ELA	Literary arts: poetry with performance	Tier II	▶ 700 student across six middle schools in two cities ▶ >97% minority ▶ >2.1% English learner students ▶ >88% low income	Ellrodt, Fico, Harnett, Ramsey, & Lopez (2014)
6–8	Global Writes model	▶ Resident artists, teaching artists	▶ Social-emotional learning: social skills	Literary arts: poetry with performance	Tier III	▶ 86 students across four middle schools in one city ^a	Ramsey, Boyer, & Byrne (2015)
3–12	Crystal Bridges Museum Field Trip	▶ Curriculum ▶ Field trip	▶ Other cognitive: critical thinking ▶ Social-emotional learning: empathy ▶ Social-emotional learning: tolerance ▶ Attitudes: interest in art museums	Visual arts	Tier I	▶ Spring cohort: 3,811 students within 35 student groups ▶ 40% minority ▶ 52% low income ▶ 46% rural	Bowen, Greene, & Kisida (2014) See also Greene, Kisida, & Bowen (2014)
3–12	Crystal Bridges Museum Field Trip	▶ Curriculum ▶ Field trip	▶ Other cognitive: critical thinking	Visual arts	Tier I	▶ Fall cohort: 3,598 students within 32 student groups ▶ 42% minority ▶ 58% low income ▶ 46% rural	Kisida, Bowen, & Greene (2016) See also Bowen, Greene, & Kisida (2014); Greene, Kisida, & Bowen (2014)
7–12	Attending Live Theater	▶ Field trip	▶ Social-emotional learning: tolerance ▶ Social-emotional learning: empathy	Theater	Tier III	▶ 527 students	Greene, Hitt, Kraybill, & Bogulski (2015)

Note. Appendix A provides more descriptions regarding each intervention.

^a This study involved a small sample (fewer than 350 students) or was conducted in a single site.

Source: Authors' analysis of findings from literature review on arts integration.

Studies Providing Evidence at Tier IV

Twelve other study reports describing arts integration interventions and their potential effects for students in Grades 6–12 (or a mix of students from elementary and secondary grade levels) do not meet the evidence criteria for Tiers I–III, but do provide research- or theory-based rationales for a causal link between arts integration and student outcomes (Table 3.6). Eleven of the 12 study reports provide a rationale suggesting how arts integration can improve student achievement in English language arts. Five reports provide a rationale for a link between arts integration and math outcomes. Two reports describe the rationale for arts integration’s effects on student behavior outcomes, such as attendance and discipline referrals (Stoelinga, Silk, Reddy, & Rahman, 2015; U.S. Department of Education, 2008). Corbett, Wilson, and Morse (2002) provide a rationale for the effect of arts integration on overall school performance.

Table 3.6. Studies Involving Students in Mixed Grade Levels (up to Grade 12) That Provide Evidence at Tier IV

Grade Level(s)	Name of Intervention	Intervention Components	Outcome ^a	Type of Art	Type of Rationale	Citation
1–9 (except Grades 2 and 5)	Chicago Arts Partners in Education	▶ Teacher PD ▶ Teaching artists	▶ Reading/ELA	Unspecified	Theory-based rationale	DeMoss & Morris (2002) See also DeMoss (2005)
1–8	Collaborate, Research, Exhibit, Analyze, Think, Education (CREATE)	▶ Teacher PD ▶ Field trips	▶ Reading/ELA	Visual arts	Theory-based rationale	Eno & Chojnacki (2013)
1–8	CREATE	▶ Teacher PD ▶ Field trips	▶ Reading/ELA	Visual arts	Theory-based rationale	Piriz & Williams (2015)
1–8	CREATE	▶ Teacher PD ▶ Field trips	▶ Reading/ELA	Visual arts	Theory-based rationale	Piriz & Williams (2016a)
1–8	DREAM	▶ Teacher PD	▶ Reading/ELA	Visual arts	Theory-based rationale	Piriz & Williams (2016b)
6 and 7	Using Music Therapy Strategies in ESL Classrooms	▶ Music therapist	▶ Reading/ELA	Music, dance	Theory-based rationale	Kennedy & Scott (2005)
6 and 7	Integrating Theater Arts Project	▶ Teacher PD ▶ Lesson plans	▶ Reading/ELA ▶ Math	Theater	Theory-based rationale	Inoa, Weltsek, & Tabone (2014)
6–8	Supporting Arts Integrated Learning for Student Success	▶ Teacher PD ▶ Teaching artists	▶ Reading/ELA ▶ Math	Visual arts, dance, and vocal and instrumental music	Research-based theory of action	Snyder, Klos, & Grey-Hawkins (2014)
7 and 8	Greater Arts Integration Initiative	▶ Teacher PD ▶ Teaching artists	▶ Reading/ELA ▶ Math ▶ Student attendance ▶ Behavior discipline referrals	Visual arts	Research-based theory of action	U.S. Department of Education (2008)
6 and 7	Integrating Theater Arts Project	▶ Teacher PD ▶ Teaching artists ▶ Lesson plans	▶ Reading/ELA ▶ Math	Theater	Theory-based rationale	Walker, Tabone, & Weltsek (2011)
PK–8	Turnaround Arts Initiative	▶ Teacher PD ▶ Arts specialists	▶ Reading/ELA ▶ Math ▶ School culture ▶ Disruptive behavior	Varied by school	Research-based logic model	Stoelinga, Silk, Reddy, & Rahman (2015)
PK–8	Whole Schools Initiative	▶ Teacher PD ▶ Field trips ▶ Whole-school model	▶ School performance ratings	Dance, drama, music, visual arts	Research-based theory of action	Corbett, Wilson, & Morse (2002)

Note. ELA = English language arts. PD = professional development. Appendix A provides more descriptions regarding each intervention.

^a Positive effects are expected for these outcomes according to the research-based theory of action, logic model, or theory-based rationale provided.

Source: Authors' analysis of findings from literature review on arts integration.

Summary

This chapter presents findings for the first research question that motivated this review: Are there research studies on arts integration that meet the criteria for evidence as specified in ESSA? These findings are summarized by the grade level of the students included in the studies.

For the youngest students (prekindergarten–Grade 2):

- ▶ One study provides Tier II evidence supporting the effectiveness of the Teaching Artists Project on English learners' English-speaking skills.
- ▶ One study provides Tier III evidence suggesting that the Kaleidoscope Preschool Arts Enrichment Program is related to students' general achievement and achievement in reading/English language arts. One study provides Tier III evidence that the Wolf Trap arts integration intervention can have a positive impact on students' achievement in math.
- ▶ Eight studies provide Tier IV evidence supporting arts integration. That is, these reports include a research- or theory-based rationale for how arts integration should impact student outcomes.

For students in later elementary school grades (mostly Grades 3–5, with one study including students up to Grade 8):

- ▶ Four studies produced Tier III evidence supporting arts integration. Each of these studies examined the effects of a specific arts integration intervention (i.e., Arts for Academic Achievement, the Nations in Neighborhoods, Arts for Learning Project, and the Theater Infusion Project) on students' achievement in reading/English language arts. Arts for Academic Achievement also was related to students' math achievement, and students participating in the Theater Infusion Program showed more positive attitudes toward the arts than students who did not participate.
- ▶ Twenty studies provide Tier IV evidence supporting arts integration interventions by presenting research- or theory-based rationales for such interventions.
- ▶ There exists countervailing evidence regarding one particular arts integration intervention. Having students listen to classical music during math instruction while also integrating math concepts during music instruction had a statistically significant negative effect on students' math achievement, according to one study.

For students in secondary grades (Grades 6–12) or schools with mixed elementary and secondary grades (e.g., Grades 3–8):

- ▶ Two studies provide Tier I evidence indicating that taking students to an art museum produced beneficial effects on students' critical thinking and social-emotional outcomes.
- ▶ One study provides Tier II evidence and two studies provide Tier III evidence for the effects of the Global Writes poetry infusion interventions on students' reading/English language arts achievement and social-emotional outcomes.
- ▶ One study provides Tier III evidence suggesting that students who attended live theater performances showed better social-emotional outcomes than students who did not.
- ▶ Twelve studies provide Tier IV evidence supporting arts integration interventions by presenting research- or theory-based rationales for such interventions.

Chapter 4. How Large Are the Effects of Arts Integration Interventions on Student Outcomes?

Chapter Highlights

- ▶ The average effect found in well-designed studies (i.e., those having research designs capable of producing evidence at Tiers I–III) was statistically significant but modest in magnitude.
- ▶ The effects of arts integration interventions varied by student outcomes and sample characteristics; however, some of these findings may be confounded with other study characteristics.

Whereas the focus of Chapter 3 was on the levels of evidence supporting arts integration interventions, the information presented in this chapter focuses on the size of the effects that educators might expect if they adopt an arts integration intervention. Specifically, this chapter addresses the second research question:

Research question 2: How large are the effects of arts integration interventions on student outcomes, particularly for students who are disadvantaged?

Although the classifications of studies based on the Every Student Succeeds Act (ESSA) evidence tiers are useful for policymakers to ensure that educational agencies implement interventions that are supported by research, this approach has several conceptual shortcomings. First, the classification of studies based on the evidence tiers is biased toward statistically significant findings. As a hypothetical example, a study can make 100 statistical comparisons between an arts integration group and a comparison group, and 99 of the comparisons could show no statistically significant differences. However, the one statistically significant effect would be sufficient for the study to be classified as providing evidence at Tiers I–III.

Second, the classification based on the ESSA evidence tiers is biased toward large studies and multisite studies. In one way, this bias makes sense in that larger studies can generate estimates of impact that are more accurate than smaller studies. However, the numbers of sites and individuals involved in large-scale studies may stretch the abilities of arts integration intervention developers to monitor the quality of implementation and address deviations from the intended program model. In reviewing the research evidence, some allowance should be given to small studies that could have implemented the arts integration interventions with greater fidelity.

Third, for school and district administrators who are considering investing in an arts integration intervention, the classification of research evidence into ESSA's tiers fails to provide them with an idea of the magnitude of improvement that can be expected when adopting an arts integration intervention. Such information requires an examination of all the effects produced from well-designed and well-implemented studies, regardless of whether they produced statistically significant findings.

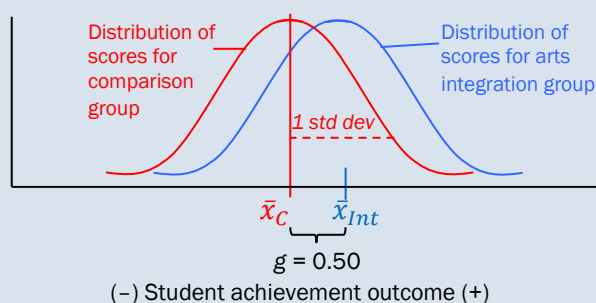
To address these shortcomings with the ESSA evidence tiers and better understand the expected effects of arts integration interventions, we examined findings about the effects of arts integration interventions from all 27 studies that met the design-related criteria for Tiers I–III, even if their results did not meet the ESSA evidence standards. We reviewed, for example, reports in which findings were not statistically significant, reports of studies with a sample size smaller than 350 students, and reports of studies conducted in a single site.

For each of the 27 studies, we examined the magnitude of the differences in student outcomes between the arts integration group and the comparison group using meta-analysis procedures. We began by converting group differences in each study to the Hedges' g statistic, which is an expression of the magnitude of the difference between two groups in terms of the standard deviations of the outcome measure. Conversion to the Hedges' g allows us to compare the effects observed based on different outcome measures in different studies using a single, common metric. Box 4.1 gives a brief explanation of our meta-analysis procedures. See Appendix C for more details on the methods used.

Box 4.1. Meta-Analysis Explained

Meta-analysis is a set of quantitative procedures used to statistically combine the effects from multiple studies (Cooper, 2010). These procedures can help researchers and policymakers better understand the magnitude of the effect that an intervention can have as well as the variability of effects found with different types of samples or settings. The meta-analyses that produced the findings presented in this chapter involved the following six steps:

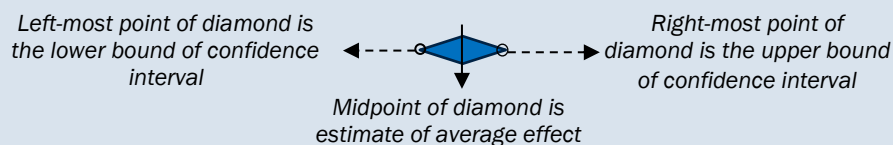
- 1. Recording details about each study.** For each study that met the design criteria for ESSA's Tiers I–III (regardless of the size of the study), the review team recorded the characteristics of the intervention, the research design, study setting (e.g., urban versus suburban versus rural), sample characteristics (e.g., student demographic information), sample size, outcome measures, and statistics about the effect of the intervention on each relevant outcome.
- 2. Converting effect statistics into a common effect size metric.** Statistics reported in studies indicate the differences between students exposed to the intervention and students not exposed to the intervention on some outcome measure (or in some cases, the relationship between students' exposure to arts integration and the outcome). These statistics were converted into a common effect size metric—Hedges' g , which represents a standardized mean difference in terms of the pooled standard deviation of the outcome measure, as illustrated below.



- 3. Determining the standard error for each effect size.** Each effect size is based on a sample, and for each sample and effect, there is some degree of uncertainty about whether the effect reflects the *true effect* for the population. The amount of uncertainty, measured by the *standard error*, reflects to a large extent the sample size of the study. All else being equal, the larger the sample, the more certainty we have about the effect estimate and the smaller the standard error.
- 4. Averaging weighted effect sizes.** To determine the average effect on a particular outcome across all relevant studies, we multiplied each effect size by a weight representing the inverse of the sum of the within-study variance of the effect size estimate and the between-study variance of the effect sizes and calculated the average effect as the sum of the weighted effect sizes divided by the sum of the weights.^a

- 5. Calculating the confidence interval for the average effect.** Even across multiple studies, there remains some uncertainty about the true magnitude of the effect for the population. Another statistic—the 95-percent confidence interval—gives the upper and lower bounds within which the true population effect is likely to lie. The narrower the interval, the more confident we are about the average effect size accurately reflecting the true effect. The upper and lower bounds of the confidence interval were calculated as the average effect size ± 1.96 times the square root of the inverse of the sum of weights. In this chapter, we use figures like the one below to indicate the magnitude of average effect and the corresponding confidence interval.

Interpreting symbols used for effect size estimates and confidence intervals:



- 6. Identifying potential moderating factors.** To determine whether effect sizes are related to certain characteristics of the intervention, sample, setting, or outcomes, we calculated separate average effect sizes and confidence intervals for studies having different characteristics and used standard meta-analytic procedures to determine whether the variation in effect sizes across different types of studies exceeds what one would expect due to sampling error alone. The statistical significance of moderator effects is shown in Appendix D.

The meta-analyses were conducted using a software program called *Comprehensive Meta-Analysis* (version 3.0).

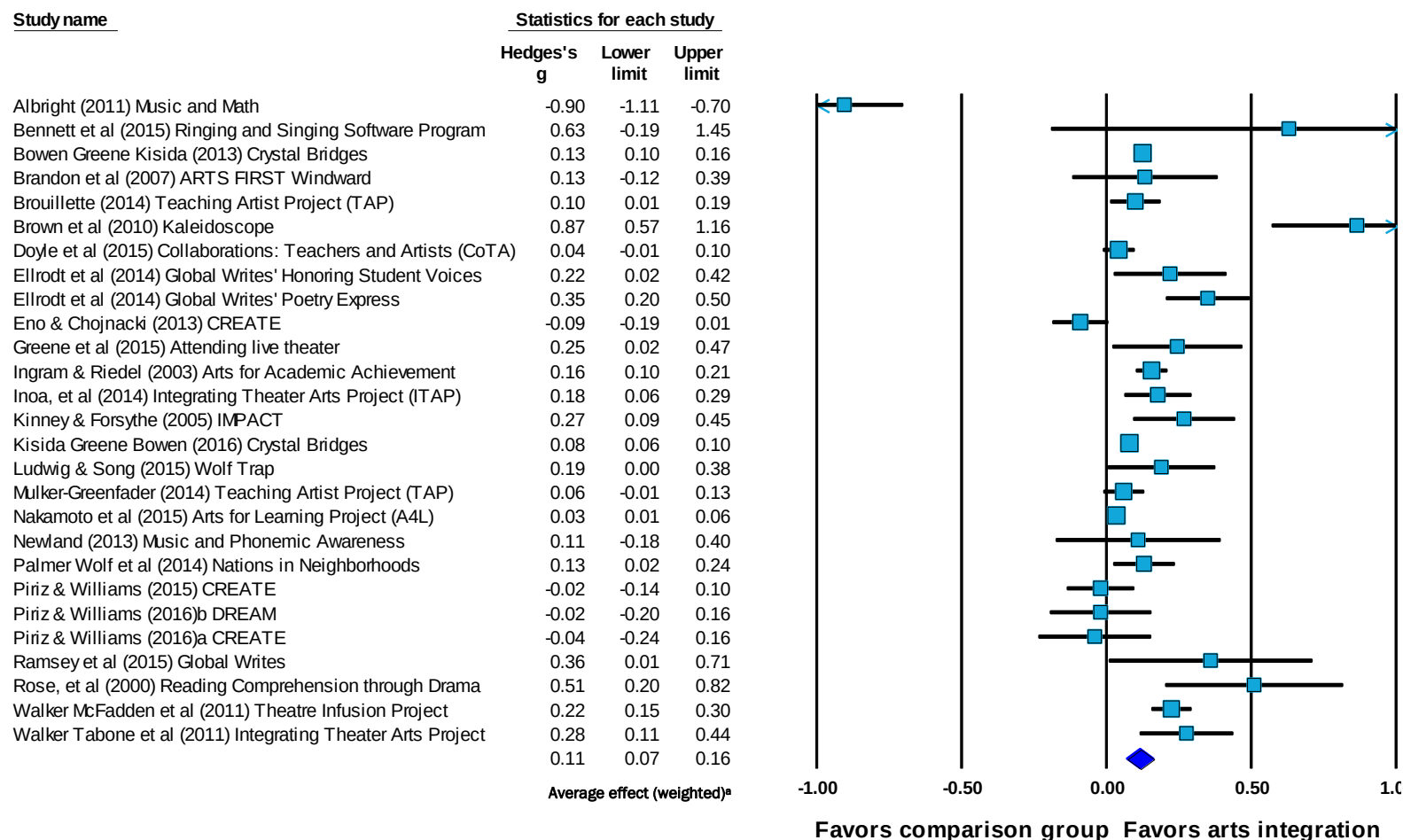
^a Our meta-analysis was based on a random-effects model, in which the weight assigned to each study took into account both the variance of the study-specific effect size and the between-study variance of effect sizes.

In the sections that follow, we first present the distribution of effect sizes and the average effect size across all the 27 studies reviewed, and then we break down the findings according to the type of outcome (i.e., academic achievement, social-emotional learning, and attitudes).

Average Effect of Arts Integration on Student Outcomes

Overall, we found 122 effect size estimates from the 27 studies that met the research design requirements for evidence at Tiers I–III. When the effects within each study were averaged, the average effects from the pool of relevant studies ranged from -0.90 (Albright, 2011) to $+0.86$ (Brown et al., 2010). All but five of the within-study average effect estimates were positive (see Figure 4.1). The overall average effect across all studies was $+0.11$ (95% confidence interval = $0.07/0.16$), a modest yet statistically significant effect (see Figure 4.1).

Figure 4.1. Average Effects of Arts Integration Interventions on Student Outcomes Within and Across Studies



Note. Titles of interventions are abbreviated or shown as acronyms. Full titles are in tables in Chapter 3 and in Appendix A. The square for each study represents the average effect size across all relevant outcomes for the study, and the size of the square is proportional to the sample size. The horizontal line for each study shows the 95% confidence interval (i.e., amount of uncertainty) for the average effect. Squares with no lines indicate very precise estimates. Average effects with horizontal lines crossing the vertical line for zero are not statistically significant at the .05 level.

^a The average effect across studies is based on a random-effects model, which tends to produce more conservative effect size estimates (i.e., estimates closer to 0) compared with a fixed-effects model.

Source: Authors' analysis of effects extracted from studies meeting design requirements for ESSA Tiers I–III.

The results presented in Figure 4.1 include effects on the various types of outcomes combined. However, it may be unrealistic to expect that arts integration interventions have similar effects on different types of outcomes. Therefore, we further examined the average effect sizes for the different types of outcomes separately, and the results are summarized in Table 4.1.

Table 4.1 Average Effects of Arts Integration Interventions on Different Types of Student Outcomes

Outcome	Number of Studies ^a	Average Effect Size	Improvement Index	95% Confidence Interval		Favors Comparison Group			Favors Arts Integration		
						-1.0	-0.50	0	+0.50	+1.0	
Academic achievement	22	0.11**	4	0.04	to 0.18						
English language arts	18	0.11***	4	0.05	to 0.16						
Mathematics	7	0.06	2	-0.17	to 0.30						
Science	1	0.24**	9	0.06	to 0.42						
Social studies	1	0.41***	16	0.23	to 0.59						
General achievement	1	0.73***	27	0.43	to 1.02						
Achievement in arts^a	1	0.91***	32	0.61	to 1.21						
Attitudes	4	0.11***	4	0.06	to 0.17						
Toward the arts	2	0.13*	5	0.01	to 0.27						
Toward art museums	2	0.11***	4	0.05	to 0.18						
Toward school	1	0.21	8	-0.04	to 0.46						
Critical thinking^a	1	0.11***	4	0.07	to 0.15						
Social-emotional learning	4	0.19**	8	0.05	to 0.34						

Note. The midpoint of each diamond indicates the point estimate for the average effect; the width of the diamond represents the 95% confidence interval. Diamonds that cross the vertical line for 0 are not statistically significant at the .05 level. Effects were first averaged within studies and then across studies, allowing each study to contribute only one effect estimate to the average effect across studies. Improvement index indicates the percentile point growth that would be expected for a student at the 50th percentile in the comparison group, had the student received the intervention.

^a Readers should exercise caution in interpreting effects based on a single study.

Source: Authors' analysis of effects from arts integration studies that meet design requirements for ESSA Tiers I–III.

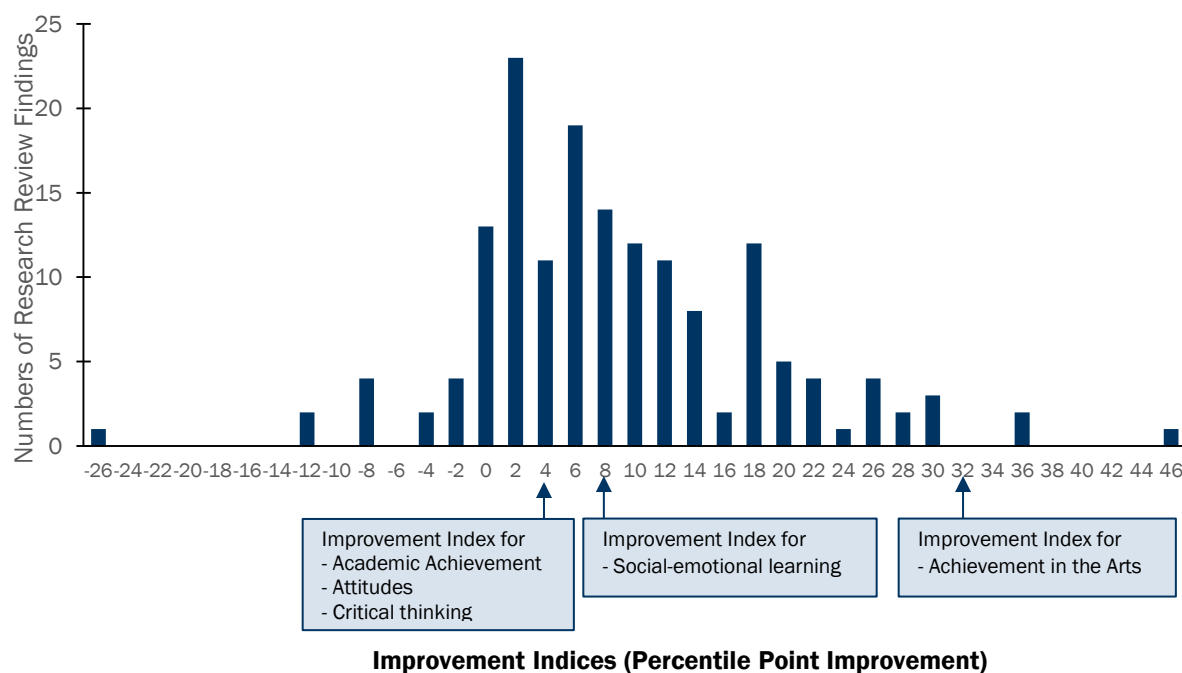
* $p < .05$. ** $p < .01$. *** $p < .001$.

Average Effects on Student Achievement in Core Subjects

When averaged within studies and then across studies, the effects of arts integration interventions on student achievement were positive and statistically significant (Table 4.1). However, the magnitude of the average effect on achievement is modest ($g = 0.11$). Another way of looking at the magnitude of this effect is to consider what exposure to arts integration might mean to an average student. Such a student would likely move from the 50th percentile to the 54th percentile in academic achievement (or an improvement index of 4 percentile points). This conversion of effect sizes to percentile improvement is based on the improvement index, which reflects the percentile point gain that an average student in the comparison group (i.e., the student at the 50th percentile) would have experienced had the student been exposed to the intervention. (See further explanation in Appendix C.) The four-percentile-point increase would put the average effect

of arts integration interventions at the 30th percentile among the 70 interventions in mathematics, reading, and science reviewed by the What Works Clearinghouse (see Figure 4.2).¹⁰

Figure 4.2 Distribution of Improvement Indices for Intervention Effects on Student Achievement in Mathematics, Reading, and Science Based on What Works Clearinghouse–Reviewed Intervention Reports



Note. Improvement indices reflecting arts integration effects on student outcomes are indicated in boxes below the horizontal axis.

Source: Authors' analyses and improvement indices found in What Works Clearinghouse–reviewed intervention reports.

A more detailed look at arts integration effects on academic achievement shows that the effects differ by content area. Arts integration interventions were found to have positive effects on students' achievement in reading/English language arts, science, social studies, and general achievement (g ranges from 0.11 to 0.73). The average effect of arts integration on mathematics achievement was also positive but smaller ($g = 0.06$) and not statistically significant. Examining the effects of arts integration on mathematics achievement in more detail, we found one study with a strong negative effect on mathematics achievement (Albright, 2011; the countervailing evidence described earlier), one study with no effect (Brandon et al., 2007), and five studies with positive effects (Ingram & Riedel, 2003; Inoa, Weltsek, & Tabone, 2014; Kinney & Forsythe, 2005; Ludwig & Song, 2015; Walker, Tabone, & Weltsek, 2011).

Average Effect on Students' Achievement in the Arts

The effect of arts integration on students' achievement in arts-related outcomes comes from a single study: Brown et al.'s (2010) study of the relationship between the exposure to the Kaleidoscope arts-enriched preschool curriculum and teachers' ratings of students' arts-related

¹⁰ Across the interventions reviewed by the WWC, the improvement indices ranged from negative 25 percentile points to positive 46 percentile points.

abilities based on a validated observational rubric. The study shows that the more exposure the disadvantaged preschool students had to the curriculum, the higher their ratings in music, creative movement, and visual arts ($g = 0.91$; improvement index = 32).

Average Effect on Students' Attitudes

Four studies examined the effects of arts integration on students' attitudes. In general, arts integration interventions had modest but statistically significant effects on students' attitudes with an average effect size (g) of 0.11 (improvement index = 4). Specifically, students participating in arts integration interventions tended to have better attitudes toward the arts ($g = 0.13$, Brandon et al., 2007; Walker, McFadden, Tabone, & Finkelstein, 2011) and arts' museums ($g = 0.11$; Bowen et al., 2014; Kisida et al., 2016). The only study that examined the effects of arts integration on students' attitudes toward school found a positive but nonsignificant effect ($g = 0.21$, Brandon et al., 2007).

Average Effect on Students' Critical Thinking

The effect estimate that we found on students' ability to think critically comes from a study conducted by Bowen et al. (2014; see also Greene et al., 2014). The researchers found that students who were randomly chosen to participate in a school field trip to the Crystal Bridges Museum of American Art scored higher on a validated assessment of critical thinking ($g = 0.11$; improvement index = 4) than students in a comparison group (whose visit to the museum was scheduled for the following semester).

Average Effect on Social Emotional Learning Outcomes

Four studies examined whether arts integration had effects on students' social-emotional outcomes such as empathy and tolerance (Greene et al., 2014, 2015), general scores on a validated social skills scale and problem behavior scale (Ramsey et al., 2015), and a validated scale of prosocial development (Walker, McFadden, Tabone, & Finkelstein, 2011). Collectively, these four studies showed a statistically significant positive effect of arts intervention on these social-emotional learning outcomes ($g = 0.19$; improvement index = 8).

Average Effect for Students Who Are Disadvantaged

We next examined whether arts integration interventions have positive effects for students who are disadvantaged. This question was addressed by comparing the magnitude of effects for different types of student samples and study settings (i.e., moderator analysis; see cautions of interpreting such analyses in Appendix D). The findings are presented in Table 4.2, which suggest the following:

- ▶ Samples consisting of 75% or more racial/ethnic minority students benefitted most from arts integration. The average effect for samples of mostly White students was negative and not statistically significant ($g = -0.63$). The average effect for more racially/ethnically diverse samples was positive and statistically significant ($g = +0.17$).
- ▶ The average effect of arts integration was positive and statistically significant for samples consisting mostly of students from low-income families ($g = +0.12$). The average effect was not statistically significant for samples consisting mostly of students from more affluent families or samples consisting of students from families of mixed incomes ($g = -0.12$ and $g = +0.03$, respectively).

- The average effect of arts integration was positive and statistically significant for studies conducted in urban settings and settings that included a mix of geographic locales ($g = 0.12$ and $g = 0.11$, respectively). The study conducted in a rural setting did not show a statistically significant effect ($g = 0.11$). The studies conducted in suburban settings produced an average effect that is statistically significant and negative ($g = -0.37$).¹¹

Whether samples consisting of more English learners benefit more from arts integration interventions cannot be determined with confidence given the effects obtained through this evidence review. Although the magnitude of effect appears to increase as the percentage of English learner students in the samples increases, the average effect for samples with the largest concentration of English learner students was not statistically significant.

Table 4.2. Average Effect Sizes for Samples With Different Characteristics

Sample Characteristic	Number of Studies ^a	Average Effect Size	Improvement Index	95% Confidence Interval	Favors Comparison Group			Favors Arts Integration	
					-1.0	-0.50	0	+0.50	+1.0
Percentage of sample made up of racial/ethnic minorities									
25% or less	2	-0.63	-24	-2.01 to 0.75					
26%–74%	6	0.03**	1	0.01 to 0.05					
75% or more	14	0.17***	7	0.07 to 0.27					
Percentage of sample made up of children from low-income families									
25% or less	4	-0.12	-5	-0.86 to 0.64					
26%–74%	8	0.03	1	-0.06 to 0.14					
75% or more	14	0.12***	5	0.08 to 0.15					
Setting of study									
Rural ^a	1	0.11	4	-0.18 to 0.40					
Suburban	2	-0.37***	-14	-0.52 to -0.23					
Urban	19	0.12***	5	0.07 to 0.18					
Mixed	4	0.11***	4	0.06 to 0.15					
Percentage of sample made up of English learner students									
25% or less	10	0.07	3	-0.01 to 0.15					
26%–74%	3	0.18**	7	0.05 to 0.31					
75% or more	2	0.31	12	-0.19 to 0.82					

Note. The average effects organized by moderating variables listed in this table represent effects across different types of outcomes. The midpoint of each diamond indicates the point estimate for the average effect; the width of the diamond represents the 95% confidence interval. Diamonds that cross the line for 0 are not statistically significant at the .05 level. Effects were first averaged within studies and then across studies, allowing each study to contribute only one effect estimate to the average effect across studies. Improvement index indicates the percentile point growth that would be expected for a student at the 50th percentile in the comparison group, had the student received the intervention.

^a Readers should exercise caution in interpreting effects based on a single study.

Source. Authors' analysis of effects from arts integration studies that meet design requirements for ESSA Tiers I–III.

** $p < .01$. *** $p < .001$.

¹¹ The anomalous finding mentioned in Chapter 3 (Albright, 2011) is among the studies examining suburban samples.

Summary

Although evidence supporting the general practice of arts integration is available at all four ESSA evidence tiers (see Chapter 3), the average effect found in the 27 well-designed and well-implemented studies (i.e., studies meeting the design criteria for Tiers I–III) was statistically significant but modest in magnitude. Based on the average effect across all the 27 studies reviewed, one can expect an average child to gain four percentile points in achievement as a result of an arts integration intervention. Effects of arts integration interventions varied by student outcomes and sample characteristics.

The meta-analytic findings from this review suggest that arts integration interventions may have stronger effects on students from racial/ethnic minority groups, low-income families, and urban settings. However, future research studies should attempt to examine these relationships directly.

Although these findings suggest arts integration may be a promising way to improve the outcomes among student groups that are traditionally disadvantaged, readers should view these findings as tentative at best. The findings for samples with different characteristics may be confounded with other study characteristics. Future studies on arts integration interventions should examine more directly whether the effects of arts integration are different for particular student subgroups.

Chapter 5. Recommendations

As we examined reports and studies, we considered some guidance for stakeholders and researchers as they continue to be engaged in selecting, implementing, and evaluating arts integration interventions.

Recommendations for Practitioners and Policymakers

Be thoughtful in selecting which Every Student Succeeds Act (ESSA) funding program(s) to pursue to support a proposed arts integration intervention. Important considerations to bear in mind when identifying sources of funding within ESSA include the specific types of activities that are required and allowable under a given ESSA funding program, the amount and duration of funding available through that program, and the level of evidence required to use ESSA program funds for a particular activity. Combining funding from multiple ESSA programs could be a useful strategy for increasing the amount and duration of support available for an arts integration intervention. However, when using funds from multiple ESSA programs, it is important to ensure that these funds—and the specific activities they support—fit together in a coherent way.

Critically assess the theoretical and empirical support behind a proposed arts integration intervention. ESSA's requirements for evidence-based interventions are grounded in the idea that interventions with stronger evidence bases behind them have a greater likelihood of success and can therefore lead to more effective and efficient use of ESSA funds. However, ambiguities in how to define and apply the criteria that are outlined for each ESSA evidence tier—particularly Tier IV, the least rigorous level of evidence—can lend the criteria to overly broad or loose interpretations. As Herman et al. (2016) argued, adopting a conservative interpretation of the evidence criteria might help promote interventions with a stronger likelihood of success.

Recommendations for Future Research

Research that is more rigorous is needed to provide stronger evidence for arts integration. Our evidence review uncovered a noticeable dearth of Tier I evidence to support arts integration. Researchers and evaluators can help provide Tier I evidence by using a randomized controlled trial study design, documenting the attrition of students and schools from the time of randomization to final data collection, and providing sufficient details of analyses and findings in study reports.¹²

Further research is needed to understand arts integration effects on specific types of educational outcomes. For some student outcomes (e.g., achievement in science and social studies, arts-related outcomes, and critical thinking skills), our meta-analytic findings are based on a single study. Researchers should consider examining these outcomes as they design their studies on arts integration to build a stronger evidence base for the effects of arts integration on these types of outcomes.

¹² A randomized controlled trial is a study where study participants are randomly assigned to an intervention group that receives the intervention or a control group that does not receive the intervention.

Additional research is needed to shed light on the effects of the individual components of arts integration interventions. Although our meta-analytic findings suggest a relationship between the types of materials used in an arts integration intervention and student outcomes, researchers should consider conducting further studies that explicitly examine the effects of specific components of arts integration interventions on student outcomes.

Additional research is needed to shed light on the effects of using arts integration with particular student populations in particular settings. To help educators know whether particular types of students are more likely to benefit from arts integration than other students, researchers should plan future studies to include systematic comparisons of arts integration effects on different student subgroups, such as students who are economically disadvantaged, English learners, and students with disabilities. Moreover, our meta-analysis revealed that the effects of arts integration interventions differed by study setting. Studies conducted in urban and mixed geographical settings showed statistically significant positive average effects, whereas the few studies conducted in suburban or rural settings showed effects that were negative or not statistically significant. Researchers should consider conducting more studies of arts integration in the future in schools located in rural or suburban areas to strengthen the limited evidence base for arts integration studies in such settings and to better understand the differences in the effects of arts integration between different settings.

References

- Albright, R. E. (2011). *The impact of music on student achievement in the third and fifth grade math curriculum* (Doctoral dissertation, Northcentral University, Scottsdale, AZ). Retrieved from <http://search.proquest.com/docview/916789457>
- An, S. A., Capraro, M. M., & Tillman, D. A. (2013). Elementary teachers integrate music activities into regular mathematics lessons: Effects on students' mathematical abilities. *Journal for Learning through the Arts*, 9(1), 1–19.
- An, S. A., Tillman, D. A., Boren, R., & Wang, J. (2014). Fostering elementary students' mathematics disposition through music-mathematics integrated lessons. *International Journal for Mathematics Teaching and Learning*, 15(3), 1–19. Retrieved from <http://www.cimt.org.uk/journal/an.pdf>
- Anderson, A. (2015). Dance/movement therapy's influence of adolescents' mathematics, social-emotional, and dance skills. *Educational Forum*, 79(3), 230–247.
- Anderson, A., & Berry, K. (2015). The influence of classroom drama on teachers' language and students' on-task behavior. *Preventing School Failure*, 59(4), 197–206. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/1045988X.2014.903464>
- Arts Education Partnership. (2004). *The arts and education: New opportunities for research*. Washington, DC: Author.
- Barry, N. H., Gunzenhauser, M. G., Montgomery, D., & Raiber, M. A. (2003). *Oklahoma A+ Schools: Research report year one: 2002–2003*. Edmund, OK: Oklahoma A+ Schools/Central Oklahoma University.
- Bennett, S. V., Calderone, C., Dedrick, R. F., & Gun, A. A. (2015). “Do I have to leave?” Beyond linear text: Struggling readers' motivation with an innovative musical program. *Reading Improvement*, 52(2), 51–60. Retrieved from <http://www.ingentaconnect.com/contentone/prin/rimp/2015/00000052/00000002/art00002>
- Biscoe, B., & Wilson, K. (2015). *Arts integration: A strategy to improve teaching and learning, promote personal competencies and turn around low-performing schools*. San Francisco, CA: WestEd.
- Borenstein, M. (2009). Effect sizes for continuous data. In H. Cooper, L. V. Hedges, and J. C. Valentine (Eds.), *The Handbook of Research Synthesis and Meta-analysis* (2nd ed., pp. 221–235). New York, NY: Russell Sage Foundation.
- Bowen, D. H., Greene, J. P., & Kisida, B. (2014). Learning to think critically: A visual art experiment. *Educational Researcher*, 43(1), 37–44.
- Brandon, P. R., Lawton, B., & Krohn-Ching, V. (2007). *Evaluation of the final year of the ARTS FIRST Windward Research Project*. Mānoa, HI: University of Hawai'i at Mānoa. Retrieved from http://manoa.hawaii.edu/crdg/wp-content/uploads/AFWRP_FINAL_REPORT_9_18_07.pdf
- Broglia-Krupke, C. (2003). *Improving student achievement through the use of music strategies* (Unpublished master's thesis, St. Xavier University, Chicago, IL).

- Brouillette, L., Childress-Evans, K., Hinga, B., & Farkas, G. (2014). Increasing engagement and oral language skills of ELLs through the arts in the primary grades. *Journal for Learning through the Arts*, 10(1), 1–25. Retrieved from <http://escholarship.org/uc/item/8573z1fm>
- Brouillette, L., Grove, D., & Hinga, B. (2015). How arts integration has helped K–2 teachers to boost the language development of English-language learners. *Journal of School Leadership*, 25, 286–299.
- Brown, E. D., Benedett, B., & Armistead, M. E. (2010). Arts enrichment and school readiness for children at risk. *Early Childhood Research Quarterly*, 25, 112–124. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0885200609000477>
- Brown, E. D., & Sax, K. L. (2013). Arts enrichment and preschool emotions for low-income children at risk. *Early Childhood Research Quarterly*, 28, 337–346. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0885200612000798>
- Brugar, K. A. (2012). *What difference does curricular integration make? An inquiry of fifth graders' learning of history through the use of literacy and visual arts skills* (Doctoral dissertation, Michigan State University, Lansing). Retrieved from <https://etd.lib.msu.edu/islandora/object/etd%3A1345>
- Bryant, K. G. (2012). *Effect of music-integrated instruction on first graders' reading fluency* (Unpublished doctoral dissertation, Liberty University, Lynchburg, VA).
- Bryant-Jones, M., Shimmings, K. J., & Vega, J. D. (2003). *Increasing math achievement through use of music* (Unpublished master's thesis, St. Xavier University, Chicago IL).
- Burnaford, G., Brown, S., Doherty, J., & McLaughlin, H. J. (2007). *Arts integration frameworks, research and practice: A literature review*. Washington, DC: Arts Education Partnership. Retrieved from <http://choice.dadeschools.net/rrm/resources/BurnafordArtsIntegrationFrameworksResearchPracticeALitReview.pdf>
- Casciano, R., Chutuape, E., McPhall, D., Puma, J., Rivers, J. & Temple, R. (2015). *A summary of findings from an evaluation of the EAN program in year 1*. Skillman, NJ: GlassFrog Solutions.
- Catterall, J., & Waldorf, L. (1999). Chicago Arts Partnerships in Education: Summary evaluation. In E. B. Fiske (Ed.), *Champions of change: The impact of the arts on learning* (pp. 47–62). Washington, DC: Arts Education Partnership. Retrieved from <http://artsedge.kennedy-center.org/champions/pdfs/ChampsReport.pdf>
- Cooper, H. (2010). *Research synthesis and meta-analysis: A step-by-step approach* (4th ed.). Thousand Oaks, CA: Sage.
- Corbett, D., Wilson, B., & Morse, D. (2002). *The arts are an "R" too: Integrating the arts and improving student literacy (and more) in the Mississippi Arts Commission's Whole School Initiative*. Jackson, MS: Mississippi Arts Commission.
- Courey, S. J., Balogh, E., Siker, J. R., & Paik, J. (2012). Academic music: Music instruction to engage third-grade students in learning basic fraction concepts. *Educational Studies in Mathematics*, 81, 251–278. Retrieved from <http://link.springer.com/article/10.1007/s10649-012-9395-9>

- Cunnington, M., Kantrowitz, A., Harnett, S., & Hill-Ries, A. (2014). Cultivating common ground: Integrating standards-based visual arts, math, and literacy in high-poverty urban classrooms. *Journal for Learning through the Arts*, 10(1), 1–24. Retrieved from <http://escholarship.org/uc/item/0377k6x3>
- Curva, F., Milton, S., Wood, S., Palmer, D., Nahmias, C., Radcliffe, B., ... Youngblood, T. (2005). *Artful citizenship project: Three year project report*. Tallahassee, FL: Curva and Associates. Retrieved from <http://d3dijho760a7v12.cloudfront.net/system/resources/W1siZiZlsljwMTUvMDQvMDkvMjMvMTEvMTgvMjcwL0FydGZ1bF9DaXRpemVuX1Byb2pY3RfUmVwb3J0LnBkZiJdXQ/Artful%20Citizen%20Project%20Report.pdf>
- Deasy, R. J. (Ed.). (2002). *Critical links: Learning in the arts and student academic and social development*. Washington, DC: Arts Education Partnership. Retrieved from <http://www.eric.ed.gov/PDFS/ED466413.pdf>
- DeMoss, K. (2005). How arts integration supports student learning: Evidence from students in Chicago's CAPE partnership schools. *Arts and Learning Research Journal*, 21(1), 91–117.
- DeMoss, K., & Morris, T. (2002). *How arts integration supports student learning: Students shed light on the connections*. Chicago, IL: Chicago Arts Partnerships in Education.
- Doyle, D., Huie-Hofstetter, C., Kendig, J., & Strick, B. (2014). Rethinking curriculum and instruction: Lessons from an integrated learning program and its impact on students and teachers. *Journal for Learning through the Arts*, 10(1), 1–16. Retrieved from <https://escholarship.org/uc/item/9b88f8th>
- Elementary and Secondary Education Act of 1965 (ESEA), Pub. L. No. 89–10, 79 Stat. 27 (1965).
- Ellrodt, J. C., Fico, M., Harnett, S., Ramsey, L. G., & Lopez, A. (2014). The mirror and the canyon: Reflected images, echoed voices: How evidence of Global Writes's performing arts integration model is used to build support for arts education integration and to promote sustainability. *Journal for Learning through the Arts*, 10(1), 1–19. Retrieved from <http://escholarship.org/uc/item/4vx5k65b>
- Eno, J., & Chojnacki, G. (2013). *Milwaukee Public Schools' Project CREATE evaluation: Year 1 results*. Chicago, IL: American Institutes for Research.
- Every Student Succeeds Act of 2015 (ESSA), Pub. L. No. 114–95 (2015).
- Government Accountability Office. (2009). *Access to arts education: Inclusion of additional questions in education's planned research would help explain why instruction time has decreased for some students*. Washington, DC: Author.
- Greene, J. P., Hitt, C., Kraybill, A., & Bogulski, C. A. (2015). Learning from live theater. *Education Next*, 15(1), 55–61. Retrieved from <http://educationnext.org/learning-live-theater/>
- Greene, J. P., & Kisida, B. (2013, September 16). Supplemental study: Long-term benefits of field trips to the Walton Arts Center. *Education Next*. Retrieved from <http://educationnext.org/supplemental-study-long-term-benefits-of-field-trips-to-the-walton-arts-center/>
- Greene, J. P., Kisida, B., & Bowen, D. H. (2014). The educational value of field trips. *Education Next*, 14(1), 78–86.

- Griffin, N. C., & Miyoshi, J. N. (2009). *Third year report: Evaluation of the Artful Learning Program* (CRESST report 760). Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing.
- Hanna, G., Patterson, M., Rollins, J., & Sherman, A. (2011). *The arts and human development: Framing a national research agenda for the arts, lifelong learning, and individual well-being*. Washington, DC: National Endowment for the Arts. Retrieved from <https://www.arts.gov/publications/arts-and-human-development-framing-national-research-agenda-forthe-arts-lifelong>
- Hanson, J. (2002). *Improving student learning in mathematics and science through the integration of visual art* (Unpublished master's thesis, St. Xavier University, Chicago, IL).
- Hardiman, M., Rinne, L., & Yarmolinskaya, J. (2014). The effects of arts integration on long-term retention of academic content. *Mind, Brain, and Education*, 8(3), 144–148. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/mbe.12053/abstract>
- Hedges, L. V. (2009). Effect sizes in nested designs. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.), *The handbook of research synthesis and meta-analysis* (2nd ed., pp. 337–355). New York, NY: Russell Sage Foundation.
- Herman, R., Gates, S. M., Arifkhanova, A., Bega, A., Chavez-Herrerias, E. R., Han, E., Harris, M., ... Wrabel, S. (2016). *School leadership interventions under the Every Student Succeeds Act: Evidence review*. Washington, DC: RAND Corporation. Retrieved from <http://www.wallacefoundation.org/knowledge-center/Documents/School-Leadership-Interventions-ESSA-Evidence-Review.pdf>
- Hornbacher, J. (2008). Research review. *Teaching Artist Journal*, 6(2), 157–168.
- Horowitz, R. (2004). *Summary of large-scale arts partnership evaluations*. Washington, DC: Arts Education Partnership.
- Huey, J. A. (2000). *Comparison of first grade children receiving traditional instruction or traditional instruction with drama supplements and its effects on reading fluency* (Unpublished master's thesis, Johnson Bible College, Knoxville, TN).
- Ingram, D., Pruitt, L., & Weiss, C. (2014). Found in translation: Interdisciplinary arts integration in Project AIM. *Journal of Learning through the Arts*, 10(1), 1–20.
- Ingram, D., & Riedel, E. (2003). *What does arts integration do for students?* Minneapolis, MN: Center for Applied Research and Educational Improvement, University of Minnesota. Retrieved from <http://hdl.handle.net/11299/144121>
- Ingram, D., & Seashore, K. R. (2003). *Arts for academic achievement: Summative evaluation report*. Minneapolis, MN: Center for Applied Research and Educational Improvement, College of Education and Human Development, University of Minnesota.
- Inoa, R., Weltsek, G., & Tabone, C. (2014). A study on the relationship between theater arts and student literacy and mathematics achievement. *Journal for Learning through the Arts*, 10(1), 1–21. Retrieved from <http://escholarship.org/uc/item/3sk1t3rx>
- Joseph, A. R. (2014). *The effects of creative dramatics on vocabulary achievement of fourth grade students in a language arts classroom: An empirical study* (Doctoral dissertation, Seattle Pacific University. Retrieved from <http://gradworks.umi.com/35/79/3579799.html>

- Kariuki, P., & Humphrey, S. G. (2006). *The effects of drama on the performance of at-risk elementary math students*. Paper presented at the Annual Conference of the Mid-South Educational Research Association. Retrieved from <https://eric.ed.gov/?id=ED493996>
- Kennedy, R., & Scott, A. (2005). A pilot study: The effects of music therapy interventions on middle school students' ESL skills. *Journal of Music Therapy*, 42(4), 244–261. Retrieved from <https://academic.oup.com/jmt/article/42/4/244/919030/A-Pilot-Study-The-Effects-of-Music-Therapy>
- Kinney, D. W., & Forsythe, J. L. (2005). The effects of the Arts IMPACT Curriculum upon student performance on the Ohio fourth-grade proficiency test. *Bulletin of the Council for Research in Music Education*, Spring (164), 35–48. Retrieved from https://www.jstor.org/stable/40319258?seq=1#page_scan_tab_contents
- Kisida, B., Bowen, D. H., & Greene, J. P. (2016). Measuring critical thinking: Results from an art museum field trip experiment. *Journal of Research on Educational Effectiveness*, 9(s1), 171–187. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/19345747.2015.1086915>
- Klein, J. L., Gray, P., Zhbanova, K. S., & Rule, A. C. (2015). Upper elementary students creatively learn scientific features of animal skulls by making movable books. *Journal for Learning through the Arts*, 11(1), 1–32.
- Kosky, C., & Curtis, R. (2008). An action research exploration integrating student choice and arts activities in a sixth grade social studies classroom. *Journal of Social Studies Research*, 32(1), 22–27.
- Lipsey, M. (2003). Those confounded moderators in meta-analysis: Good, bad, and ugly. *The ANNALS of the American Academy of Political and Social Science*, 587(1), 69–81.
- Ludwig, M., & Song, M. (2015). *Evaluation of professional development in the use of arts-integrated activities with mathematics content: Findings from the evaluation of the Wolf Trap Arts in Education Model Development and Dissemination Grant: Final grant report*. Washington, DC: American Institutes for Research. Retrieved from <https://eric.ed.gov/?id=ED553403>
- Luftig, R. L. (2000). An investigation of an arts infusion program on creative thinking, academic achievement, affective functioning, and arts appreciation of children at three grade levels. *Studies in Art Education*, 41(3), 208–227.
- Mardirosian, G. H., Lewis, Y. P., & Fox, L. H. (2007). Transforming the classroom teacher into a teaching artist. *Teaching Artist Journal* 5(2) 122–132.
- McDonel, J. S. (2013). *Exploring the relationship between music learning and mathematics learning in an interdisciplinary pre-K curriculum* (Doctoral dissertation, State University of New York at Buffalo). Retrieved from <http://gradworks.umi.com/35/98/3598710.html>
- McFadden, L. B., & Walker, E. (2009). A study of the impact of an integrated theatre arts program on the cognitive development of lowest socioeconomic students in grades 4 and 5. *New Jersey Journal of Supervision and Curriculum Development*, 53, 72–85.
- McMahon, S. D., Rose, D. S., & Parks, M. (2003). Basic reading through dance program: The impact on first-grade students' basic reading skills. *Evaluation Review*, 27(1), 104–125. Retrieved from <http://journals.sagepub.com/doi/abs/10.1177/0193841X02239021>

- Menzer, M. (2015). *The arts in early childhood: Social and emotional benefits of arts participation: A literature review and gap-analysis (2000–2015)*. Washington, DC: National Endowment for the Arts.
- Miller, D. D. (2013). *Implementing a culturally and linguistically responsive phonics curriculum that incorporates music to meet the needs of English language learners in the Response to Intervention process* (Doctoral dissertation, Liberty University, Lynchburg, VA).
- Mulker-Greenfader, C., Brouillette, L., & Farkas, G. (2015). Effect of a performing arts program on the oral language skills of young English learners. *Reading Research Quarterly*, 50(2), 185–203. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/rrq.90/abstract>
- Nakamoto, J., Sobolew-Shubin, S., & Orland, M. (2015). *The Beaverton School District Arts for Learning (A4L) Lessons Project, an investing in Innovation (i3) Development Grant: Student impact findings from years 1, 2, and 3*. San Francisco, CA: WestEd. Retrieved from <https://www.wested.org/resources/beaverton-school-district-arts-for-learning/>
- Nelson, C. A. (2001). *Executive summary: The arts and education reform: Lessons from a four-year evaluation of the A+ Schools Program, 1995–1999* (North Carolina A+ Schools Program Series). Winston-Salem, NC: Thomas S. Kenan Institute for the Arts.
- Newland, C. M. (2013). *Music and phonemic awareness: The Kindergarten connection* (Doctoral dissertation, Capella University, Minneapolis, MN).
- No Child Left Behind Act of 2001 (NCLB), Pub. L. No. 107–110, 115 Stat. 1425 (2002).
- Noblit, G. W., Corbett, H. D., Wilson, B. L., & McKinney, M. B. (2009). *Creating and sustaining arts-based school reform: The A+ Schools Program*. New York, NY, and London, UK: Routledge, Taylor & Francis Group.
- Otuwa, C., MacGowan, A., & Hanan, E. (2016). *District perspective of the final report (Rochester Arts Impact Study Enhancement (RAISE) 2010–2014)*. Rochester, NY: Rochester City School District.
- Palmer-Wolf, D., Holochwost, S. J., Bar-Zemer, T., Dargan, A., & Selhorst, A. (2014). “Some things in my house have a pulse and a downbeat”: The role of folk and traditional arts instruction in supporting student learning. *Journal for Learning through the Arts*, 10(1). Retrieved from <http://escholarship.org/uc/item/3zq7s143>
- Peppler, K. A., Powell, C. W., Thompson, N., & Catterall, J. (2014). Positive impact of arts integration on student academic achievement in English language arts. *The Educational Forum*, 78, 364–377.
- Philadelphia Arts in Education Partnership. (2014). *Evaluation report: Building mathematics and science competencies through an arts integration model year four*. Philadelphia, PA: Author.
- Piriz, D., & Williams, R. (2015). *Milwaukee Public Schools Project CREATE evaluation: Year 2 results*. Chicago, IL: American Institutes for Research
- Piriz, D., & Williams, R. (2016a). *Milwaukee Public Schools Project CREATE evaluation: Year 3 results*. Chicago, IL: American Institutes for Research

- Piriz, D., & Williams, R. (2016b). *Milwaukee Public Schools Project DREAM evaluation: Year 1 results*. Chicago, IL: American Institutes for Research.
- Prager, D. R. (2004). Learning through creating an urban Waldorf Elementary School background. In L. Kim (Ed.), *2004 Yearbook of urban learning, teaching, and research* (pp. 19–26). Los Angeles, CA: Urban Learning, Teaching, and Research Special Interest Group.
- President's Committee on the Arts and the Humanities. (2012). *Overview: Turnaround arts—creating success in school* [Website]. Retrieved from <https://www.pcah.gov/turnaround-arts-creating-success-schools-0>
- Rabkin, N., Reynolds, M., Hedberg, E., & Shelby, J. (2011). *Teaching artists and the future of education*. Chicago, IL: NORC at the University of Chicago.
- Ramsey, L. G., Boyer, D., & Byrne, A. (2015). *The mirror and the canyon: Reflected images, echoed voices: Final report*. Washington, DC: National Endowment for the Arts. Retrieved from <https://www.arts.gov/sites/default/files/Research-Art-Works-GlobalWrites.pdf>
- Randi Korn & Associates. (2010). *Education research: The art of problem solving. Volume 1: Report*. Alexandria, VA: Author.
- Raudenbush, S. W. (2009). Analyzing effect sizes: Random-effects models. In H. Cooper, L. V. Hedges, and J. C. Valentine (Eds.), *The handbook of research synthesis and meta-analysis* (2nd ed., pp. 295–315). New York, NY: Russell Sage Foundation.
- Register, D., Darrow, A. A., Standley, J., & Swedberg, O. (2007). The use of music to enhance reading skills of second grade students and students with reading disabilities. *Journal of Music Therapy, XUV*(1), 23–37.
- Rose, D. S., Parks, M., Androes, K., & McMahon, S. D. (2000). Imagery-based learning: Improving elementary students' reading comprehension with drama techniques. *Journal of Educational Research, 94*(1), 55–63. Retrieved from http://www.jstor.org/stable/27542303?seq=1#page_scan_tab_contents
- Saraniero, P. (2011). *DREAM Year 2 implementation year-end evaluation report*. San Diego, CA: Moxie Research. Retrieved from <https://dreaminstitute.files.wordpress.com/2011/06/dream-201011-year-end-report-9-21-12.pdf>
- Scripp, L., Burnaford, G., Bisset, A., Pereira, S., Frost, S., & Yu, G. (2007). *DELTA Developing Early Literacy Through the Arts: A final report*. Chicago, IL: Chicago Arts Partnerships in Education.
- Scripp, L., & Paradis, L. (2014). Embracing the burden of proof: New strategies for determining predictive links between arts integration teacher professional development, student arts learning, and student academic achievement outcomes. *Journal for Learning through the Arts, 10*(1), 1–18.
- Seeman, E. (2008). *Implementation of music activities to increase language skills in the at-risk early childhood population* (Doctoral dissertation, Xavier University, Chicago, IL).
- Snyder, L., Klos, P., & Grey-Hawkins, L. (2014). Transforming teaching through arts integration. *Journal of Learning through the Arts, 10*(1), 1–24. Retrieved from <http://escholarship.org/uc/item/67d5s216>

- Spina, S. U. (2006). Worlds together...words apart: An assessment of the effectiveness of arts-based curriculum for second language learners. *Journal of Latinos and Education*, 5(2), 99–122. Retrieved from http://www.tandfonline.com/doi/abs/10.1207/s1532771xjle0502_3
- Stoelinga, S. R., Joyce, K., & Silk, Y. (2013). *Turnaround arts initiative: Progress report 2013*. Washington, DC: President's Committee on the Arts and Humanities.
- Stoelinga, S. R., Silk, Y., Reddy, P. & Rahman, N. (2015). *Turnaround arts initiative: Final evaluation report*. Washington, DC: President's Committee on the Arts and the Humanities. Retrieved from <https://www.giarts.org/sites/default/files/Turnaround-Arts-Initiative-Final-Evaluation-Report.pdf>
- Taylor, H. A., & Hutton, A. (2013). Think3d!: Training spatial thinking fundamental to STEM education. *Cognition and Instruction*, 31(4), 434–455.
- Toppo, G. (2016, May 15). Struggling schools hope Arts Focus can provide a boost. *USA Today*. Retrieved from <http://www.usatoday.com/story/news/2016/05/25/can-arts-turn-around-usas-most-struggling-schools/84905574/>
- Trainin, G., Andrzejczak, N., & Poldberg, M. (2005). Visual arts and writing: A mutually beneficial relationship. *Arts & Learning Research Journal*, 21(1), 139–155. Retrieved from <http://digitalcommons.unl.edu/cehsgpirw/5/>
- U.S. Department of Education. (2008). *Arts model and development and dissemination grants program. 2005 Cohort profiles*. Washington, DC: Author. Retrieved from <http://www2.ed.gov/programs/artsedmodel/performance.html>
- U.S. Department of Education. (2016). *Non-regulatory guidance: Using evidence to strengthen education investments*. Washington, DC: Author. Retrieved from <https://www2.ed.gov/policy/elsec/leg/essa/guidanceuseseseinvestment.pdf>
- Venzen, C. (2011). *Effects of an integrated arts curriculum on fifth grade students' mathematics test scores* (Doctoral dissertation, Capella University, Minneapolis, MN).
- Walker, E. M., McFadden, L. B., Tobone, C., & Finkelstein, M. (2011). Contribution of drama-based strategies. *Youth Theatre Journal*, 25, 3–15. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/08929092.2011.569471>
- Walker, E., Tabone, C., & Weltsek, G. (2011). When achievement data meet drama and arts integration. *Language Arts*, 88(5), 365–372. Retrieved from <http://www.ncte.org/journals/la/issues/v88-5>
- Warner, C. D., & Andersen, C. (2004). “Snails are science”: Creating context for science inquiry and writing through process drama. *Youth Theatre Journal*, 18(1), 68–86. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/08929092.2004.10012565>
- Werner, L. (2001). *Changing student attitudes toward math: Using dance to teach math*. Minneapolis, MN: Center for Applied Research and Educational Improvement. Retrieved from <http://hdl.handle.net/11299/143714>

Appendix A. Descriptions of Arts Integration Interventions Examined in the Evidence Review

Appendix A complements the evidence review tables in Chapter 3, which report on the results of the review of studies of interventions. In this appendix, we provide more details about each intervention included in our review, namely the setting in which it was implemented, the organizations involved, the intervention developer, and a brief description of the intervention. In addition, for each intervention reviewed, we present the ESSA evidence tier for the available evidence for its effectiveness and the student outcomes examined in the studies of the intervention that were the basis of our judgment of evidence tier alignment. The interventions are grouped into three tables based on the grade levels included in the intervention studies.

Table A.1. Descriptions of Arts Integration Interventions as Implemented in Studies Involving Students in Early Elementary School Grades (Prekindergarten—Grade 2)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Arts integration schoolwide model (generically labeled)	PK–6	Oklahoma City, Oklahoma Urban	▶ Oklahoma City Public School District ▶ Black Liberated Arts Center (BLAC) ▶ Partners in Education (Kennedy Center for the Performing Arts) ▶ WestEd ▶ Center on School Turnaround ▶ <i>Funding from the U.S. Department of Education</i>	Literary arts, music, theater, visual arts	Wilson Arts Integration Elementary School is an example of a schoolwide model of arts integration. All classroom teachers integrated arts into their core subjects. In addition, students attended a visual arts class and participated in vocal music instruction. K–2 students participated in the Orff music program, a developmental music education approach combining music, movement, drama, and speech.	IV	Reading/ELA Math	Biscoe & Wilson (2015)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Kaleidoscope Preschool Arts Enrichment Program	PK	Philadelphia, Pennsylvania Urban	► Settlement Music School ► West Chester University of Pennsylvania	Music, creative movement, visual arts	The Kaleidoscope Arts Enrichment Program at the preschool level was launched by the Settlement Music School. As an arts-enrichment preschool program, the curriculum focused on school readiness skills through themes connecting early learning, music, creative movement, and visual arts instruction.	III; IV	Reading/ELA General achievement Social-emotional learning	Brown, Benedett, & Armistead (2010) See also Brown & Sax (2013)
Music Intervention for Reading Skills	2	Southeast Not reported	► University of Kansas ► Florida State University ► <i>Supported by: National Association of Music Educators</i>	Music	This multisensory, intensive short-term intervention developed by researchers aims to assist students with a specific reading disability (SLD). The intervention consisted of a series of music/reading lessons each of which had at least one music activity designed to teach and practice a reading strategy. The reading strategies targeted are reading comprehension, decoding, and word knowledge.	IV	Reading/ELA	Register, Darrow, Standley, & Swedberg (2007)
MusicPlay	PK	Buffalo, New York Urban	► University at Buffalo, State University of New York	Music/rhythm	This intervention was part of a larger pilot program focused on an interdisciplinary PreK program. The dual-subject intervention consisted of adding math-related songs to the MusicPlay curriculum and providing professional development on music practices to classroom teachers. Songs were selected as they related to existing math objectives (number and geometry) and other topics in the curriculum.	IV	Math	McDonel (2013)
Music Instruction and Phonemic Awareness (generically labeled)	K	Missouri Rural	► Capella University	Music/rhythm and rhymes	Music and phonemic awareness instruction are combined in this intervention targeted for kindergarten students. The developer of this intervention, conducting dissertation research, prepared the materials for use by music teachers to add instruction in phonemic awareness. The intervention focused on pitch, rhythm, rhyme, and letter sounds and phonemic awareness.	IV	Reading/ELA	Newland (2013)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Process Drama and Scientific Inquiry	2	Ohio Rural	► The Ohio State University	Process drama	The technique of process drama, a pedagogy to support interdisciplinary learning, was used in this intervention for students at the second grade level. Preservice teachers participated in this study's implementation of the technique focused on scientific inquiry and science communication. Teachers took roles and interacted with students engaging in scientific process, scientific reasoning, and knowledge development in the study of snails.	IV	Reading/ELA	Warner & Andersen (2004)
Teaching Artists Project	K–2	San Diego, California Urban	► San Diego Unified School District ► University of California, Irvine ► <i>Funded by the U.S. Department of Education's AEMDD grants program</i>	Drama, creative movement, visual arts	The Teaching Artists Project is a professional development program that prepares teachers in Grades K–2 to use creative movement, drama, gesture, and expression with language lessons. The goal was to support English language learners in their oral language. Teaching artists and teachers develop and coteach lessons in an initial phase and teachers then lead lessons.	II; IV	English speaking skills EL student engagement/attendance	Mulker-Greenfader, Brouillette, & Farkas (2015) See also Brouillette, Childress-Evans, Hinga, & Farkas (2014) and Brouillette, Grove, & Hinga (2015)
Whirlwind's Basic Reading Through Dance	1	Chicago, Illinois Urban	► Chicago Public Schools ► <i>Funding from Whirlwind, Illinois Arts Council, Polk Bros. Foundation, Lloyd A. Fry Foundation, Woods Charitable Trust</i>	Dance	Whirlwind's reading intervention taught students to visualize and then represent letters and letter combinations through individual and combinations of shapes. Dance concepts were used to reinforce two reading skills: code knowledge (alphabet sounds) and phoneme segmentation (separating letter sounds within spoken words).	IV	Reading/ELA	McMahon, Rose, & Parks (2003)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Wolf Trap's Early Childhood STEM Learning through the Arts	PK and K	Virginia Suburban	▶ Wolf Trap Foundation for the Performing Arts, Institute for Early Learning Through the Arts ▶ American Institutes for Research ▶ <i>Funded by the U.S. Department of Education's AEMDD grants program</i>	Dance, music, drama	Early Childhood STEM Learning through the Arts is a professional development program for preparing teachers in prekindergarten and kindergarten to integrate performing arts based strategies in their classrooms. The intervention has been adapted to subjects of literacy, math, and science. Teaching artists and teachers participate in a summer institute engaging in activities focused on learning and integrating arts-based strategies in subject areas. During the school year, teaching artists are in residence in classrooms coaching teachers and supporting students as the strategies are implemented. Teachers gradually take over the lead in their implementation.	III	Math	Ludwig & Song (2015)

Note. EL = English learner. ELA = English language arts. Studies of interventions for which two tiers of evidence are listed may have differential effects for various outcomes. We encourage the reader to check the tables in Chapter 3 for the tiers of evidence associated with specific outcomes.

^a If a specific name was provided for an intervention in the study report(s), we used it. If not, we indicated the intervention was arts integration generically labeled.

^b The organizations in boldface type are the named developers of the intervention.

^c The intervention description was developed from the description in the studies reviewed. Other representations of the intervention may exist or have been implemented in different contexts.

Source: Authors' analysis of findings from literature review on arts integration.

Table A.2. Descriptions of Arts Integration Interventions as Implemented in Studies Involving Samples Made Up Mostly of Students in Grades 3–5

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Academic Music	3	Northern California Not reported	► San Francisco State University	Music	Academic Music is an intervention in which music instruction is the vehicle for learning basic fraction concepts. The lessons employed components of the Kodaly system of music education, using speaking, moving, and gesturing. During math instruction, students study music notes and the fraction symbols attached to them. The lessons taught students about adding and subtracting fractions and showed students how to write a number sentence.	IV	Math	Courey, Balogh, Siker, & Paik (2012)
Artful Citizenship	3–5	Miami, Florida Urban	► The Wolfsonian-Florida International University ► Miami-Dade County Public Schools ► Visual Understanding in Education (VUE) ► Curva and Associates ► <i>Funded by the U.S. Department of Education's AEMDD grants program</i>	Visual arts	Artful Citizenship is an intervention grounded in visual understanding strategies with the goal of influencing students' character and social development. Teachers implemented social science content across academic subject areas to build visual vocabulary and teach critical thinking and visual literacy. Teachers were prepared through professional development and collaborative learning opportunities for classroom and art teachers.	IV	Social-emotional learning	Curva et al. (2005)
ARTS FIRST Windward District	3–5	Island of Oahu, Hawaii Suburban	► Hawaii Alliance for Arts Education ► Hawaii Department of Education ► HDOE Windward District ► Curriculum Research & Development Group, University of Hawaii at Mānoa ► <i>Funded by the U.S. Department of Education's AEMDD grants program</i>	Dance, drama, visual arts	ARTS FIRST is an initiative intended to assess the implementation of the Hawaii Essential Arts Toolkit for K–5 Classroom Teachers. Originally designed to teach 13 dance, drama, and music strategies to use in teaching reading, writing, and math, the ARTS FIRST approach evolved by identifying three commonly occurring strategies that could be taught and observed across performing arts forms: observing, patterning, and representing.	IV	Reading/ELA Math Attitudes toward school	Brandon, Lawton, and Krohn-Ching (2007)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Arts for Academic Achievement	2–5	Minneapolis, Minnesota Urban	▶ Minneapolis Public Schools ▶ University of Minnesota ▶ <i>Funded by Minneapolis Arts for Academic Achievement/Annenberg Challenge grant</i>	Dance, literary arts, theater, visual media arts	Arts for Academic Achievement is a voluntary districtwide program to encourage partnerships among schools, artists, and arts organizations. The goal was to encourage collaboratively developed instruction integrating arts and non-arts subjects. For example, in one initiative, the skills and concepts of dance and math were integrated to improve attitudes toward math and math knowledge.	IV; III	Attitudes toward math Reading/ELA Math	Werner (2001), Ingram & Riedel (2003) See also Ingram & Seashore (2003)
Arts for Learning Project	3–5	Beaverton, Oregon Suburban	▶ Beaverton School District ▶ Young Audiences, Inc. ▶ Young Audiences Oregon and Southwest Washington ▶ University of Washington ▶ WestEd ▶ <i>Funded by the U.S. Department of Education's Office of Innovation and Improvement (i3)</i>	Theater, visual arts, music, dance	Arts for Learning is an intervention designed to integrate reading and writing with exposure to a variety of art forms and literary genres. The intervention engaged artists and teaching artists with teachers with goals including critical thinking, creative problem solving, and life skills.	III	Reading/ELA	Nakamoto, Sobolew-Shubin, & Orland (2015)
Arts Integration With Science Lessons	5	Not reported Urban	▶ Johns Hopkins University ▶ <i>Support of the study from the Joseph P. Drown Foundation</i>	Music, visual arts, and performing arts	This intervention, created by researchers at Johns Hopkins University, consists of a group of arts-integrated science lessons designed to teach students science knowledge in astronomy and ecology and improve retention of content. Lessons were designed around a learning cycle called the 5E cycle consisting of Engage, Explore, Explain, Elaborate, and Evaluate. The approach incorporated training for teachers in the lesson implementation.	IV	Reading/ELA	Hardiman, Rinne, & Yarmolinskaya (2014)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Authentic Arts-Based Curriculum	5	Not reported Urban	► State University of New York, Cortland	Visual arts	Authentic Arts-Based Curriculum is an approach to teaching English as a second language students that focuses on cognitive development instead of language learning only. The approach explored the potential of integrating standard education content and visual arts, literature, drama, dance, and music. A unit of designing and creating murals integrating arts, literature, and cultural study of Central America and Mexico is an example of implementing the approach.	IV	Reading/ELA	Spina (2006)
ArtsLink	2–5	Philadelphia, Pennsylvania Urban	► Philadelphia Arts in Education Partnership ► School District of Philadelphia ► <i>Funded by U.S. Department of Education's AEMDD grants program</i>	Visual arts	ArtsLink is an approach to prepare teachers in teaching and learning teams in schools to integrate math and science competencies with arts curricula. Developed by Philadelphia Arts in Education Partnership and building on a prior AEMDD project (Arts Bridges), ArtsLink does not provide lessons but provided extensive professional development for teams consisting of an artist and two classroom teachers working with a master teaching artist. It also provided a framework with which teams organize and plan to deliver content.	IV	Suspensions Student attendance	Philadelphia Arts in Education Partnership (2014)
Collaborations: Teachers and Artists (CoTA)	1–6	San Diego County, California Urban and suburban	► National School District ► CoTA ► San Diego County Office of Education ► University of California San Diego ► <i>Funding for National School District to deploy and evaluate CoTA's methodology from U.S. Department of Education's PDAE grant</i>	Visual arts, dance	CoTA is a professional development program for preparing teachers to access arts and arts-based strategies in everyday instruction. Teachers identified learning needs of students and customized projects based on these needs. A unit designed for implementation through CoTA emphasized understanding a variety of academic content and demonstrating knowledge of content.	IV	Reading/ELA	Doyle, Huie-Hofstetter, Kendig, & Strick (2014)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Creative Dramatics	4	Pierce County, Washington Rural	► Seattle Pacific University	Drama	Creative dramatics emphasizes imagining, enacting, and reflecting upon human experience through all forms of improvised drama. This intervention, adapted for the fourth-grade language arts curriculum, was used for improvising vocabulary words and definitions and story retelling, as related to vocabulary learning.	IV	Reading/ELA	Joseph (2014)
Developing Reading Education with Arts Methods (DREAM)	3 and 4	California Urban and suburban	► San Diego County Office of Education ► North County Professional Development Federation ► California State University San Marcos ► Moxie Research ► <i>Funded by U.S. Department of Education's AEMDD grants program</i>	Theater, visual arts	DREAM is a professional development program to prepare teachers to use theater and visual arts concepts and strategies in reading instruction. It is based on a prior teacher/artist partnership program. Teachers participated either in institutes only or in combined professional development of institutes and coaching by teaching artists.	IV	Reading/ELA	Saraniero (2011)
Drama and Kinesthetic Movement	4	Tennessee Rural	► Milligan College	Drama, kinesthetic movement	Drama and Kinesthetic Movement is an intervention in which geometry concepts are taught using drama strategies, specifically engaging students in improvised roles through imagined concepts.	IV	Math	Kariuki & Humphrey (2006)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Dramatic Language Arts	3	Mid-Atlantic Not reported	▶ American University ▶ George Washington University	Drama	Dramatic Language Arts is a professional development program that prepares teachers to design language arts lessons integrating elements of drama, such as role play and tableau development, while recognizing the difference between integrated lessons and nonintegrated lessons. Contextualizing language learning with the aid of classroom drama techniques was focused on motivation and participation of students in a self-contained classroom who were identified as having learning disabilities and attention deficit/hyperactivity disorder.	IV	On-task behavior	Anderson & Berry (2015)
Framing Student Success	5	New York City, New York Urban	▶ New York City Department of Education (Blueprint for Teaching and Learning through the Arts) ▶ Studio in a School, Teacher's College Columbia University ▶ Metis Associates ▶ Funded by a U.S. Department of Education's AEMDD grants program	Visual arts	Based on the New York City Blueprint for Teaching and Learning in the Arts, Framing Student Success is designed to integrate visual arts in the study of math and literacy. Professional artists collaborated with classroom teachers with continuing professional development. Classroom units were followed by production of student work and reflection. Students followed models of thinking like artists as demonstrated by instructors. One example involved the creation of paper sculptures through which students explored basic Euclidean solids.	IV	Reading/ELA Math	Cunnington, Kantrowitz, Harnett, & Hill-Ries (2014)
Interdisciplinary Model Program in the Arts for Children and Teachers (Arts IMPACT)	4	Columbus, Ohio Urban	▶ Columbus Public Schools, Arts IMPACT ▶ Ohio State University	Dance, drama, music, visual arts	Arts IMPACT is an arts-integration approach at the school level. Schools determined the approach of arts instruction and arts integration. Arts IMPACT schools had a full-time arts team assigned to each school and additional art teachers providing schoolwide arts instruction and support to classroom teachers for integration in classrooms.	IV	Math Science Social studies	Kinney & Forsythe (2005)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Math and music intervention study	3 and 5	Georgia Suburban	► Northcentral University	Music	In this researcher-designed intervention, teachers participating in classrooms where students were receiving the treatment played baroque and classical music during math study. They also incorporated math into the music curriculum by teaching students to add, subtract, and multiply musical notes, and they combined music history and surveys to graph data, among other music-based strategies.	None; countervailing evidence	Math	Albright, 2011 ^d
Music-mathematics integrated activities	3	West Coast Urban	► The University of Texas at El Paso ► <i>Research is based upon work supported by the National Science Foundation</i>	Music	Music composition and music playing were two arts themes teachers used to integrate math content and music content in this intervention. Workshops for teachers, curriculum development, and resources were provided to prepare for implementation of music-themed math lessons. The intervention included a sequence of lessons, each of which was focused on at least one math content area.	IV	Attitudes toward math	An, Tillman, Boren, & Wang (2014)
Nations in Neighborhoods	3–8	Mid-Atlantic Urban	► New York City Department of Education ► City Lore ► The 92nd Street Y ► WolfBrown ► <i>Funded by the U.S. Department of Education's AEMDD grants program</i>	Literary arts, theater, visual arts, and oral presentations	Nations in Neighborhoods is an intervention in which folk and traditional arts instruction were integrated in English language arts. The intervention based the study of arts in the cultural life and heritage of communities and groups with a shared identity. Implementation components included literacy lessons, multimodal instruction, apprenticeship learning, and communal effort. School arts instructors were engaged. Teachers participated in workshops to prepare for integration. Teaching artists were embedded in classrooms and represented related arts disciplines. Field trips and student work performance were also components.	III	Reading/ELA	Palmer-Wolf, Holochwost, Bar-Zemer, Dargan, & Selhorst (2014)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Picturing Writing	2–5	Southern California Rural and urban	▶ University of New Hampshire, Picturing Writing development site ▶ Lake Elsinore Unified School District ▶ University of Nebraska, Lincoln ▶ University of California, Riverside	Visual arts	Picturing Writing is an approach in which art and literature are used to prompt students to write about and create visual art. In this example of the use of the strategy, two units were developed: Weather Poetry and Time of Day. Students completed original works at the conclusion of the units demonstrating visual art production and art appreciation.	IV	Reading/ELA	Trainin, Andrzejczak, & Poldberg (2005)
Reading Comprehension through Drama	4	Chicago, Illinois Urban	▶ Chicago Public Schools ▶ Whirlwind, Chicago ▶ 3-D Group, Berkeley, CA ▶ DePaul University	Drama	Arts educators of varying performing art types created a drama-based reading program focusing on reading comprehension. The program addressed imagery-based learning and memory. Students participated in lessons by working through four stages: story, sequence, perception, and evaluation. A different story was associated with each stage.	IV	Reading/ELA	Rose, Parks, Androes, & McMahon (2001)
Reading and Singing Software Program	5	Southwest Florida Urban	▶ Electronic Learning Products ▶ University of Mississippi ▶ Trinity Washington University ▶ University of South Florida ▶ University of South Florida St. Petersburg	Music–singing	The Reading and Singing Software Program provides real-time recognition and feedback to struggling readers who practice singing on pitch using this software program. The practice of singing on pitch is intended to improve fluency and prosody.	IV	Reading/ELA	Bennett, Calderone, Dedrick, & Gun (2015)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Theatre Infusion Project	4 and 5	Northeast Urban	▶ Seton Hall University ▶ Educational Arts Team, Jersey City, New Jersey	Drama	In the Theater Infusion Project lessons created by educators and artists were compiled in a handbook and teachers were able to adapt or implement the lessons to meet school or classroom needs. Teachers participated in workshops to prepare for lesson implementation. In the lessons theater arts strategies (e.g., creative dramatics, theater games, process drama, puppetry) are integrated into language arts and social studies. The lessons served as a springboard for further study and design using historical topics and language arts topics.	III;III	Reading/ELA Attitudes toward arts	Walker, McFadden, Tobone, & Finkelstein (2011) See also McFadden & Walker (2009)
Think3d!	4	New Hampshire Rural	▶ Tufts University ▶ Think3d!	Visual arts: Origami and paper engineering	Researchers and program developers created three classroom units that used the techniques of Origami, single-sheet pop-up engineering, and applied paper engineering. These units were used to introduce students to visuospatial thinking.	IV	Spatial visualization	Taylor & Hutton (2003)
Visual Arts and History	5	Michigan Suburban	▶ Michigan State University	Visual arts	Visual Arts and History, a curriculum intervention designed by the researcher at Michigan State University, was a unit of study about the convergence of three cultural groups in American History (i.e., African, American Indian, and European). The curriculum unit incorporated readings, map study, art study, field trips to museums, and student production of works, including a student-designed museum exhibit. Teachers were prepared for implementation of the unit.	IV	Social studies	Brugar (2012)

Note. AEMDD = Arts in Education Model Development and Dissemination. ELA = English language arts. PDAE = Professional Development for Arts Educators. *Varied* indicates that the intervention featured different sets of components at each participating site. Studies of interventions for which two tiers of evidence are listed may have differential effects for various outcomes. We encourage the reader to check the tables in Chapter 3 for the tiers of evidence associated with specific outcomes.

^a If a specific name was provided for an intervention in the study report(s), we used that. If not, we indicated the intervention was arts integration generically labeled.

^b The organizations in boldface type are the named developers of the intervention.

^c The intervention description was developed from the description in the studies reviewed. Other representations of the intervention may exist or have been implemented in different contexts.

^d This study is addressed in the text of Chapter 3 but is not listed in the Chapter 3 study tables.

Source: Authors' analysis of findings from literature review on arts integration.

Table A.3. Descriptions of Arts Integration Interventions as Implemented in Studies Involving Samples Made Up Mostly of Students in Grades 6–12

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Attending Live Theater	7–12	Fayetteville, Arkansas Urban and suburban	▶ TheatreSquared ▶ University of Arkansas	Theater	Attending Live Theater is an intervention created by researchers at the University of Arkansas. School groups were invited to participate. They applied and then were chosen by lottery for the intervention. Students were selected to attend a live theater performance of one of two plays. The goal of the field trip was to increase knowledge of plot, vocabulary, tolerance, and the ability to read the emotions of others.	III	Social-emotional learning: tolerance, empathy	Greene, Hitt, Kraybill, & Bogulski (2015)
Chicago Arts Partners in Education (CAPE)	1, 3, 4, 6–9	Chicago	▶ University of New Mexico (evaluator) ▶ CAPE	Unspecified; partner schools used a variety of teaching artists in classrooms	Existing veteran CAPE partner schools, where arts integration was already used with teaching content in subjects, created units in a variety of subjects and implemented them. For example, in a history class, the teacher and a teaching artist from the discipline of drama engaged students in the development of dramatic presentations where students used new knowledge about drama essential concepts and the study of history units.	IV;IV	Reading/ELA	DeMoss & Morris (2002) See also DeMoss (2005)
Collaborate, Research, Exhibit, Analyze, Think, Education (CREATE)	1–8	Milwaukee, Wisconsin Urban	▶ Milwaukee Public Schools ▶ American Institutes for Research ▶ <i>Funded by the U.S. Department of Education's AEMDD grants program</i>	Visual arts	Project CREATE is a professional development program for teachers. The program supported the implementation of project-based instruction in classrooms. Teachers integrated arts instruction and arts techniques with other content areas, such as social studies. The students participating in these arts-integrated classes completed their studies by producing student museum exhibit plans.	IV;IV;IV	Reading/ELA	Eno & Chojnacki (2013), Piriz & Williams (2015), Piriz & Williams (2016a)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Crystal Bridges Museum Field Trip	3–12	Bentonville, Arkansas Urban & Suburban	▶ Crystal Bridges Museum of American Art ▶ University of Arkansas ▶ University of Houston	Visual arts	A visit to the Crystal Bridges Museum was made possible through the School Visit Program of the museum. In this intervention designed by university researchers, students were selected to participate in a field trip. The goal of the field trip was to facilitate critical thinking vis-à-vis a new painting.	I;I	Critical thinking Social-emotional learning: tolerance, empathy Attitudes toward art museums	Bowen, Greene, & Kisida (2014), Kisida, Bowen, & Greene (2016) See also Greene, Kisida, & Bowen (2014)
Design, Research, Exhibit, Analyze Museums (DREAM)	1–8	Milwaukee, Wisconsin Urban	▶ Milwaukee Public Schools ▶ American Institutes for Research	Visual arts	Project DREAM followed Project CREATE, a former Milwaukee Public Schools arts integration program. Project DREAM supported the implementation of project-based instruction that is integrated across content areas using student-created museums. Ongoing professional development and support is provided to teachers, (specifically with training in Visual Thinking Strategies) along with support of student-created museums and with arts integration by using technology.	IV	Reading/ELA	Piriz & Williams (2016b)
Global Writes Model: Poetry Express, Honoring Student Voices, and Tale of Two Cities	6–8	Chicago, Illinois, Bronx, New York & San Francisco, California Urban	▶ Global Writes ▶ Dream Yard (Bronx) ▶ Performing Arts Workshop (San Francisco) ▶ Avery Young, Chicago Public Schools ▶ New York City Community School Districts 9 and 10 ▶ Metis Associates ▶ <i>Funded by the U.S. Department of Education's AEMDD grants program</i>	Poetry, performance	The Global Writes model of arts integration links the creation of original poetry writing, the art of performance, and English language arts. Teachers and teaching artists work together using drama-based techniques, such as improvisation. The model has been replicated at three sites.	III;II;III	Reading/ELA Social-emotional learning: social skills	Ellrodt, Fico, Harnett, Ramsey, & Lopez (2014) See also Ramsey, Boyer, & Byrne (2015)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Greater Arts Integration Initiative	7 and 8	Pittsburgh, Pennsylvania Urban	- School District of Pittsburgh Manchester Craftsmen's Guild	Visual arts	The Greater Arts Integration Initiative combined professional development and the support of permanent artists in residence. The goal of the program was to develop arts-integrated lessons and curricula linking arts projects with subjects such as communications, math, science, and world cultures, for example, making stained glass in math class.	IV	Reading/ELA Math Student attendance Behavior-discipline referrals	U.S. Department of Education (2008) Program Profiles
Using Music Therapy Strategies in ESL Classrooms	6 and 7	Southeast Rural	University of Georgia	Music, dance	This music-based intervention, also known as Music Therapy, supported language learning and comprehension skill development for English as a second language students. Students participated in activities such as linking movement to music, chanting, playing instruments, and participating in musical games, all of which were designed around academic topics.	IV	Reading/ELA	Kennedy & Scott (2005)
Supporting Arts Integrated Learning for Student Success	6–8	Anne Arundel County, Maryland Suburban	- Anne Arundel County Public Schools, Maryland Towson University (Arts Integration Post Baccalaureate Certificate in Arts Integration Program) - Arts Education in Maryland Schools Alliance - Young Audiences of Maryland <i>Funded by the U.S. Department of Education's AEMDD grants program</i>	Visual arts, dance, vocal and instrumental music	Supporting Arts Integrated Learning for Student Success was a full-school arts integration approach implemented at the middle school level. This professional development approach offered teachers opportunities such as a summer institute, lab for implementing arts integration lessons, work with teaching artists, workshops on arts discipline knowledge and skills, and access to a postbaccalaureate program in arts integration with a certificate credential at completion.	IV	Reading/ELA Math	Snyder, Klos, & Grey-Hawkins (2014)

Name of Intervention ^a	Grade Level	Geographic Location	Organizations Involved ^b	Type of Art	Intervention Description ^c	Evidence Tier	Outcomes	Citation
Integrating Theater Arts Project	6 and 7	New Jersey Urban	▶ The Education Arts Team, Jersey City, New Jersey ▶ Seton Hall University ▶ Indiana University ▶ <i>Funded by the U.S. Department of Education's AEMDD grants program</i>	Theater	The Integrating Theater Arts Project intervention uses elements of the dramatic arts disciplines to support skill development in language arts. Forty drama-based lessons build upon sections in specified novels. Students explored text through theater games, scenery design activities, process drama, improvisation, script writing, and enactment based on connections made between literacy and dramatic arts concepts.	IV;IV	Reading/ELA Math	Walker, Tabone, & Weltsek (2011) See also Inoa, Weltsek, & Tabone (2014)
Turnaround Arts Initiative	PK–8 and varied by school	Schools across the United States	▶ Turnaround Arts ▶ Individual schools ▶ Various organizational arts partners at the local level ▶ Artists	Dance, drama, music, visual arts (may vary by school)	Turnaround Arts is a nationwide initiative to support school improvement by using the arts. Schools follow a model with a set of eight principles. Schools choose art types and approaches and work with local art partners, according to their plans for improvement.	IV	Reading/ELA Math School culture Disruptive behavior	Stoelinga, Silk, Reddy, & Rahman (2015)
Whole Schools Initiative	PK–8	Mississippi Urban, suburban, & rural	▶ Mississippi Arts Commission ▶ <i>Study funded by the John N. Palmer Foundation and the U.S. Department of Education</i>	Dance, drama, music, visual arts	Whole Schools Initiative, building on a pilot started in 1998, worked with approximately 27 schools in several districts in the state. Each school was funded to embed arts into regular instruction and the core curriculum as well as to increase skills and knowledge in the arts, support the growth of educators, increase parent and community participation, and plan to sustain arts infusion. Grant resources were provided for a field advisor, participation in retreats, summer training, and technical support.	IV	School performance ratings	Corbett, Wilson, & Morse (2002)

Note. AEMDD = Arts in Education Model Development and Dissemination. ELA = English language arts. Studies of interventions for which two tiers of evidence are listed may have differential effects for various outcomes. We encourage the reader to check the tables in Chapter 3 for the tiers of evidence associated with specific outcomes.

^a If a specific name was provided for an intervention in the study report(s), we used it. If not, we indicated the intervention was arts integration generically labeled.

^b The organizations in boldface type are the named developers of the intervention.

^c The intervention description was developed from the description in the studies reviewed. Other representations of the intervention may exist or have been implemented in different contexts.

Source: Authors' analysis of findings from literature review on arts integration.

Appendix B. Studies—No ESSA Tier-Aligned Evidence

Studies were classified as providing *no ESSA Tier-aligned evidence* if two conditions were met: (1) The study lacked statistically significant findings or included a research design other than those specified for Tiers I–III and (2) the study lacked any type of rationale or logic model. As a reminder, a report may include several studies of outcomes. Some of these studies may have evidence at Tiers I–IV and some may have no ESSA tier-aligned evidence. A listing of these studies ordered alphabetically by citation author is provided below in Table B.1.

Table B.1. Studies—No ESSA-Tier Aligned Evidence

Name of Intervention	Outcome	Type of Art	Student Characteristics	Sample Size	Citation
Music-Mathematics Integrated Lessons	Math	Music	Grades 3 and 5 28% ELL	46 students from one school	An, Capraro, & Tillman (2013)
Dance/Movement Therapy	Math	Dance	Grade 7 64% LD/ADHD/EBD 100% below grade level in math	14 students from one school	Anderson (2015)
Dance/Movement Therapy	Social-emotional learning	Dance	Grade 7 64% LD, ADHD, or EBD 100% below grade level in math	14 students from one school	Anderson (2015)
Oklahoma A+ Schools Program	Reading/ELA	Dance, drama, literary arts, music, visual arts	Not specified	4,477 students in 14 schools	Barry, Gunzenhauser, Montgomery, & Raiber (2003)
Oklahoma A+ Schools Program	Math	Dance, drama, literary arts, music, visual arts	Not specified	4,477 students in 14 schools	Barry, Gunzenhauser, Montgomery, & Raiber (2003)
Oklahoma A+ Schools Program	Science	Dance, drama, literary arts, music, visual arts	Not specified	4,477 students in 14 schools	Barry, Gunzenhauser, Montgomery, & Raiber (2003)
Oklahoma A+ Schools Program	Social studies	Dance, drama, literary arts, music, visual arts	Not specified	4,477 students in 14 schools	Barry, Gunzenhauser, Montgomery, & Raiber (2003)

Name of Intervention	Outcome	Type of Art	Student Characteristics	Sample Size	Citation
Music Integration into Social Studies Curriculum	Social studies	Music	Grade 5	[insufficient information]	Brogla-Krupke (2003)
Music-Integrated Instruction	Reading/ELA	Music	Grade 1 9% ELL	115 students in two schools	Bryant (2012)
Music Integration for Math Achievement Using Mozart & School House Rock	Math	Music	Grades 2 and 5	33 students in one school	Bryant-Jones, Shimmins, & Vega (2003)
Everyday Arts Network	Social-emotional learning	Dance, theater, visual arts, music	Not specified	22 teachers (number of students unknown)	Casciano et al. (2015)
Global Writes: Poetry Express, Honoring Student Voices	Social-emotional learning	Literary arts: Poetry	Grades 6–8 92%+ minority 27%+ ELL 92.6%+ ELL	871 students across six middle schools	Ellrodt, Fico, Harnett, Ramsey, & Lopez (2014)
Field Trips to the Walton Arts Center	Social-emotional learning	Museum (Arts Center) visits	Grade 7	1,389 students from two school districts	Greene & Kisida (2013)
Artful Learning Program	Reading/ELA	Literary arts, music, visual arts	Grades 4 and 8	27 schools (school-level analysis)	Griffin & Miyoshi (2009)
Artful Learning Program	Math	Literary arts, music, visual arts	Grades 4 and 8	27 schools	Griffin & Miyoshi (2009)
Integrating Visual Art With Mathematics and Science Concepts	Math	Visual arts	Grade 4	30 students in one school	Hanson (2002)
Integrating Visual Art With Mathematics and Science Concepts	Science	Visual arts	Grade 4	30 students in one school	Hanson (2002)
Learning Through Music	Reading/ELA	Music	Grade 3 11% below grade level in reading	88 students in one school	Hornbacher (2008)

Name of Intervention	Outcome	Type of Art	Student Characteristics	Sample Size	Citation
Learning Through Music	Math	Music	Grade 3 11% below grade level in reading	88 students in one school	Hornbacher (2008)
Drama Supplement in Reading Instruction	Reading/ELA	Drama	Grade 1 16% FRPL 9% ELL	21 students from one class	Huey (2000)
Project AIM	Other cognitive: higher order thinking	Drama, literary arts (poetry), visual arts	Grades 5–8	30 students from six classrooms (interviews) and 491 students (surveys)	Ingram, Pruitt, & Weiss (2014)
Arts Integration in Science—Movable Books	Science	Visual arts	Grades 4–6	Nine students in one school	Klein, Gray, Zhbanova, & Rule (2015)
Arts Integration in Social Studies	Social studies	Visual arts	Grade 6	Unknown	Kosky & Curtis (2008)
SPECTRA+	Reading/ELA	Drama, dance, music, visual arts	Grades 2, 4, and 5	615 students from four schools in two districts	Luftig (2000)
SPECTRA+	Math	Drama, dance, music, visual arts	Grades 2, 4, and 5	615 students from four schools in two districts	Luftig (2000)
SPECTRA+	Social-emotional learning	Drama, dance, music, visual arts	Grades 2, 4, and 5	615 students from four schools in two districts	Luftig (2000)
SPECTRA+	Other cognitive: creativity	Drama, dance, music, visual arts	Grades 2, 4, and 5	615 students from four schools in two districts	Luftig (2000)
SPECTRA+	Attitudes toward the arts	Dance, drama, music, visual arts	Grades 2, 4, and 5	615 students from four schools in two districts	Luftig (2000)
Imagination Quest	Reading/ELA	Dance, drama, music, visual arts	Unknown	Unknown	Mardirosian, Lewis, & Fox (2007)
Sing, Spell, Read, Write	Reading/ELA	Music	Grades 3 and 5 100% English learner	29 students in one school	Miller (2013)
Rochester Arts Impact Study Enhancement	Reading/ELA	Music, theater, visual arts	Grades K–6	Unknown number of students in 37 schools	Otuwa, MacGowan, & Hanan (2016)

Name of Intervention	Outcome	Type of Art	Student Characteristics	Sample Size	Citation
Rochester Arts Impact Study Enhancement	Math	Music, theater, visual arts	Grades K–6	Unknown number of students in 37 schools	Otuwa, MacGowan, & Hanan (2016)
Rochester Arts Impact Study Enhancement	Science	Music, theater, visual arts	Grades K–6	Unknown number of students in 37 schools	Otuwa, MacGowan, & Hanan (2016)
Learning and Achieving Through the Arts	Reading/ELA	Performing arts, visual arts	Grades K–5 >90% minority >50% ELL >65% FRPL	2,762 students in six schools	Peppler, Powell, Thompson, & Catterall (2014)
Urban Waldorf School	Reading/ELA	Drama, music, visual arts	PK–Grade 5 >95% minority 87% low income	250 students in one school	Prager (2004)
Urban Waldorf School	Math	Drama, music, visual arts	PK–Grade 5 >95% minority 87% low income	250 students in one school	Prager (2004)
Urban Waldorf School	Science	Drama, music, visual arts	PK–Grade 5 >95% minority 87% low income	250 students in one school	Prager (2004)
Learning Through the Arts	Math	Visual arts	Grade 5	Questionnaires: 418 students from six schools. Problem-solving activity: 447 students	Randi Korn & Associates (2010)
Partnerships in Arts Integration Research Chicago Arts Partnerships in Education	Student achievement (combined subtests of state tests)	Dance, drama, music, visual arts	Grades 4–6	Unknown number of students in six schools	Scripp & Paradis (2014)
Supporting Arts Integration Learning for Student Success	Discipline referrals	Dance, visual arts, vocal and instrumental music	Grades 6–8 >67% minority >45% FRPL	1,200 students in two schools	Snyder, Klos, & Grey-Hawkins (2014)

Name of Intervention	Outcome	Type of Art	Student Characteristics	Sample Size	Citation
Developing Early Literacies Through The Arts Project	ELA/reading	Dance, drama, music, visual arts	Grades 1–3	Unknown number of students in three schools	Scripp et al. (2007)
Music Integration and Receptive Language Skills	ELA/reading (receptive language)	Music	Grades 3–5	9 students	Seeman (2008)
Greater Arts Integration Initiative	Science	Visual arts	Grades 7 and 8	388 students in two schools	U.S. Department of Education (2008)
Greater Arts Integration Initiative	Social studies	Visual arts	Grades 7 and 8	388 students in two schools	U.S. Department of Education (2008)
Integrated Arts Curriculum	Discipline referrals	Visual arts	Grade 5	37 students at one school	Venzen (2011)
Integrated Arts Curriculum	Math	Visual arts	Grade 5	37 students from one school	Venzen (2011)
Theatre Infusion Project	Prosocial orientation	Drama	Grades 4 and 5	1,140 students from 14 schools	Walker, McFadden, Tobone, & Finkelstein (2011)
Theatre Infusion Project	Social studies	Drama	Grades 4 and 5	1,140 students from 14 schools	Walker, McFadden, Tobone, & Finkelstein (2011)

Note. ADHD = attention deficit/hyperactivity disorder. EBD = emotional and behavioral disorder. ELA = English language arts. ELL = English language learner. FRPL = free or reduced-price lunch. LD = learning disabled.

Appendix C. Technical Approach to the Evidence Review

This evidence review was conducted in two stages. The first stage was the project and subject articulation phase, which involved an in-depth examination of previous research reviews. The purpose of this stage was twofold: (1) to inform our conceptual framework and (2) to inform our literature search parameters. AIR recognizes that since 2000 there have been eight to 10 key reports issued from within the arts and education community, each of which has grappled with the definitions of education-related arts activities and identified research studies that are relevant to our classification of studies according to the Every Student Succeeds Act (ESSA) evidence criteria. Through these reports and the planned literature search, we identified key sources and descriptions of arts integration interventions, as well as potentially relevant studies that do not appear in searches of traditional literature databases.

The second stage of our evidence review was composed of the literature search and screening, review of reports,¹³ and analysis and synthesis of study findings. This stage involved five distinct steps: (1) searching for relevant literature, (2) screening studies to ensure they meet basic inclusion criteria, (3) reviewing studies that pass screening criteria and classifying them into the ESSA tiers, (4) extracting key information from relevant studies that can meet design criteria for the ESSA tiers, and (5) synthesis of findings into tables and figures.

Stage 1: Project and Subject Articulation Phase

By consulting with key members of the Wallace Foundation, seminal works on arts integration, and the U.S. Department of Education's guidance for interpreting ESSA's tiers of evidence, we drew clearer boundaries for this evidence review. First, we arrived at definitions for arts integration and populations and time periods of interest.

- Arts integration: Interventions, programs, activities, or strategies in which essentials of at least one art discipline are incorporated through conceptual links and instructional strategies with the concepts and skills of another subject, such as mathematics, English language arts, science, or social studies.
 - This definition excludes from our review studies of discipline-based arts instruction or sequential arts education, which we consider to be direct arts instruction that occurs in an educational setting.
 - Occasionally it was difficult to determine if the intervention described in a study was a good fit with the arts integration definition. For example, one series of studies, the connection between student learning in school and the intervention is less clear. These studies involve student field trips to museums (for example, Greene et al., 2014) or live theater performances (e.g., Greene et al., 2015). The studies were included in our review

¹³ Throughout this report, we distinguish *reports* from *studies*. A report refers to a publication, which may contain a written summary of a research study, in the form of a journal article, a book or book chapter, a dissertation, a technical report, or a conference paper. A study is the investigation itself. This distinction is important given that a single research report may present findings from multiple studies with multiple outcomes, and the findings from a single study can appear in multiple research reports.

because the packets of information that schools sent home were meant to help students integrate the information from their field trip experience to topics being covered in school.

- ▶ Populations of interest: Students in prekindergarten through Grade 12 who are learning academic content in schools located in the United States or its territories.
 - This population excludes studies conducted with similarly aged students in other countries; studies that examined interventions or programs conducted outside the school setting that may be aimed at enhancing students' academic, behavioral, or social-emotional outcomes; and studies involving students in postsecondary settings.
- ▶ Time period of interest: Study reports must have been published during or after 2000.

Second, our review team consulted with partners at the Wallace Foundation and with education policy experts to determine whether to define the tiers of evidence based on the ambiguous parameters specified in the ESSA law itself or to define the tiers based on the additional nonregulatory guidance published by the U.S. Department of Education (2016). The tiers as defined in the latter document are more stringent in that they specify additional requirements for Tier I and Tier II classifications. The stakes involved with adopting an arts integration program are high in terms of district and state resources and student learning. For this reason, we chose the more rigorous interpretation of tiers of evidence specified in U.S. Department of Education's supplemental guidance document.

Stage 2: Search, Screening, Review, and Synthesis

Stage 2 involved a number of distinct activities: (a) searching for relevant reports; (b) screening of report abstracts and full texts against search criteria; (c) reviewing and classifying of studies based on ESSA's tiers of evidence; (d) extracting from each report information about study samples, settings, program components, outcomes, and magnitude of effects; and (e) synthesizing findings by cross-tabulating the evidence within each tier by grade-level groupings and features of interventions and by meta-analyzing all effects from studies that meet research design requirements for Tiers I–III. The activities are described in more detail below.

Search for Relevant Reports

We implemented a multipronged search strategy to uncover as many reports on arts integration as possible. First, our research librarian ran search strings and delimiters through as many relevant research literature databases as possible. (See Box C.1 for a list of the research databases searched and the search strings used.) Second, we scanned the websites of all organizations that are involved in arts integration policy and research to uncover additional reports that did not yet appear in the literature databases. Third, we used an ancestry approach by reviewing reports that are referenced in each report as they seemed eligible and searching for the listed studies that have yet to be examined and were eligible. As a result of our search strategy, we uncovered 1,619 reports.

Box C.1. Extent of Literature Search

Databases searched: ERIC, Education Source, and Education Research Complete.

Search string^a: Terms related to arts + terms related to integration or academics + terms related to outcomes + terms related to students in prekindergarten through Grade 12.

(TI Art OR TI arts OR TI artist* OR AB “arts education” OR AB “arts participation” OR AB “arts based” OR AB “art infus*” OR AB “arts infus*” OR AB “arts engagement” OR AB “Arts integrat*” OR AB “arts enrichment” OR TI “visual arts” OR TI painting OR TI photography OR TI music* OR TI chorus OR TI orchestra OR TI band OR TI theat* OR TI drama OR TI opera OR TI operas OR TI dance* OR TI dancing OR TI choreograph* OR TI ballet* OR AB “graphic arts” OR AB “media arts” OR AB “digital arts” OR “performing arts”) in Select a field, optional

AND

(TI Integrat* OR AB Integrat* OR interdisciplinary* OR “cross-disciplinary” OR transdisciplinary OR TI infus* OR AB infus* OR AB “language arts” OR AB English OR AB reading OR AB writing OR AB literacy OR AB math* OR AB algebra OR AB geometry OR AB science* OR AB biology OR AB chemistry OR AB physics OR TI STEM OR AB STEM OR TI “STEAM” OR AB “STEAM” OR AB “social studies” OR AB history OR AB civics OR AB geography OR AB “computer science”) in Select a field, optional

AND

(“educational opportunit*” OR TI outcome* OR TI Proficien* OR TI skills OR TI motivat* OR TI engagement OR TI Performance OR achievement* OR “academic gains” OR “academic performance” OR “academic behavior” OR “academic behaviors” OR attendance OR TI graduation OR “cognitive outcome*” OR TI cognition OR TI cognitive OR “behavioral outcome*” OR TI behavior* OR TI behaviour* OR “social emotional” OR “social and emotional” OR “parent involvement” OR “parental involvement” OR “parental participation” OR “parent participation” OR “family involvement” OR “community involvement” OR “community participation” OR “school readiness” OR “social competence” OR “social competency” OR “school culture” OR “school climate” OR TI creativity OR AB creativity OR “critical reasoning” OR “spatial reasoning” OR “student retention” OR “drop out” OR “drop outs”) in Select a field, optional

AND

(preschool* OR “pre-school*” OR “pre-K*” OR preK* OR “PK-12*” OR AB “PK-8*” OR AB “PK-6*” OR AB “PK-5*” OR “K-12” OR “K-8” OR “K-6” OR “K-5” OR prekindergarten* OR “pre-kindergarten*” OR kindergarten* OR TI students OR TI youth OR TI young OR TI children OR AB children OR “high school*” OR AB teens OR AB teenage* OR “secondary school*” OR “junior high” OR “middle school*” OR grade OR AB graders OR TI elementary OR “elementary school*” OR “primary school*” OR “school age*” OR “school based” OR “school system*” OR TI school* OR “school district*”) in Select a field, optional

Limits: English language; 2000–2016

A second search involved removing the second term (terms related to integration) to broaden the search. Duplicate citations were removed.

Other websites searched: ArtsedSearch; Title1arts.org; Institute of Education Sciences for grants; Arts in Education Model Development and Dissemination grants program and Professional Development for Arts Educators grants; Arts Education Partnership; Americans for the Arts; and national accrediting bodies for arts disciplines.

Note. The asterisk indicates a “wildcard,” which means to include words that may have suffixes added to the word.

^a For the search strings, TI means “title includes” and AB means “Abstract includes.”

Screening of Reports for Relevance

We first screened the abstracts of reports that were provided in the results of database searches. Abstracts that seemed potentially relevant were forwarded to the research librarian so that she could obtain the full text of the report. Full-text reports were screened using questions that reflected our search criteria.

Abstract Screening. As our research librarian retrieved lists of citations and abstracts of potentially relevant reports during the initial database searches, the abstracts were screened for relevance. Trained research assistants reviewed the abstracts and answered four questions for each:

1. Does the abstract mention arts integration (or synonyms or specific arts integration programs)?
2. Does the abstract report on a study that gathered data and reported findings?
3. Does the abstract indicate that the report is a literature review or cites arts integration studies?
4. Does the abstract mention students in prekindergarten through Grade 12 who attended schools in the United States or its territories?

If the screeners answered “yes” or “not sure” to the screening questions, then the study progressed to the report-screening phase. Of the 1,619 reports identified originally, 1,107 reports were screened out based on the abstracts. The remaining 512 were passed to the reference librarian for full-text retrieval.

Report Screening. The research librarian attempted to attain the full text of all 512 reports that passed the abstract screening and successfully retrieved the full text for all but 39 reports. Each of the 473 full-text reports was read by two screeners who answered the following questions for each:

1. Does the report mention arts integration (or synonyms, or specific arts integration interventions)?
2. Does the report describe data that were collected and analyzed?
3. Does the report describe a sample of students in prekindergarten through Grade 12 who were attending a school in the United States or its territories?
4. Does the report describe student-related outcomes?
5. Does the report cite other studies on arts integration?

For each question, screeners answered “yes,” “no,” or “unable to determine.” If both screeners answered “yes” or a combination of “yes” and “don’t know” to these five questions, then the report was forwarded to a What Works Clearinghouse (WWC)-certified reviewer for further review. For 90% of the reports, both screeners made the same judgments about the reports. The disagreements were adjudicated by the leader of the review team. This full-text screening activity removed 338 reports from the pool of potentially eligible arts integration reports, leaving 135 reports that were forwarded to WWC-certified reviewers.

Classification of Studies by WWC-Certified Reviewers

Each relevant full-text report was then reviewed by researchers who are certified to review studies using WWC standards. These reviewers classified studies in the reports into evidence tiers based on U.S. Department of Education’s (2016) nonregulatory guidance document, which recommends that evidence from each study be classified based on (a) the study’s research

design, (b) whether the study reports statistically significant findings, (c) the sample size of the study, and (d) the number of sites in which the study was conducted. The study reviewers made decisions as to whether study evidence fit into Tiers I–III based on those study features.

The classification of study evidence into Tier IV was informed by the principles from the U.S. Department of Education’s nonregulatory guidance on evidence-based interventions (2016) as well as the approach to “unpacking Tier IV” used in the school leadership evidence review conducted by Herman et al. (2016). To determine whether a study provided Tier IV evidence, we first examined whether the report(s) associated with that study included a logic model (i.e., a graphic representation of how the intervention was intended to affect relevant outcomes) and whether at least one of the components included in that logic model was supported by empirical research. If a study’s report(s) did not include a graphic logic model, then we determined whether the study’s report(s) described a theory of action explaining how at least one feature of the intervention was intended to affect relevant outcomes and whether at least one of the described features was supported by empirical research. We based our decisions about whether a logic model or theory of action was supported by empirical research on (a) the study’s explicit reference to empirical research or (b) our own understanding of relevant empirical research. Finally, for studies that did not include a research-based logic model or theory of action, we determined whether the report(s) for those studies outlined a theory-based rationale or discussed underlying theories that shaped the intervention’s design. Studies that included a research-based logic model, a research-based theory of action, or a theory-based rationale were identified as providing Tier IV evidence. Those that did not provide any of those items were identified as providing “no ESSA tier-aligned evidence.” A list of studies that were classified as providing no ESSA tier-aligned evidence is provided in Appendix B. The criteria for classification of evidence into ESSA tiers are presented in Table C.1.

Table C.1. Criteria for Determining Tier of Evidence Based on ESSA and U.S. Department of Education’s Supplemental Guidance

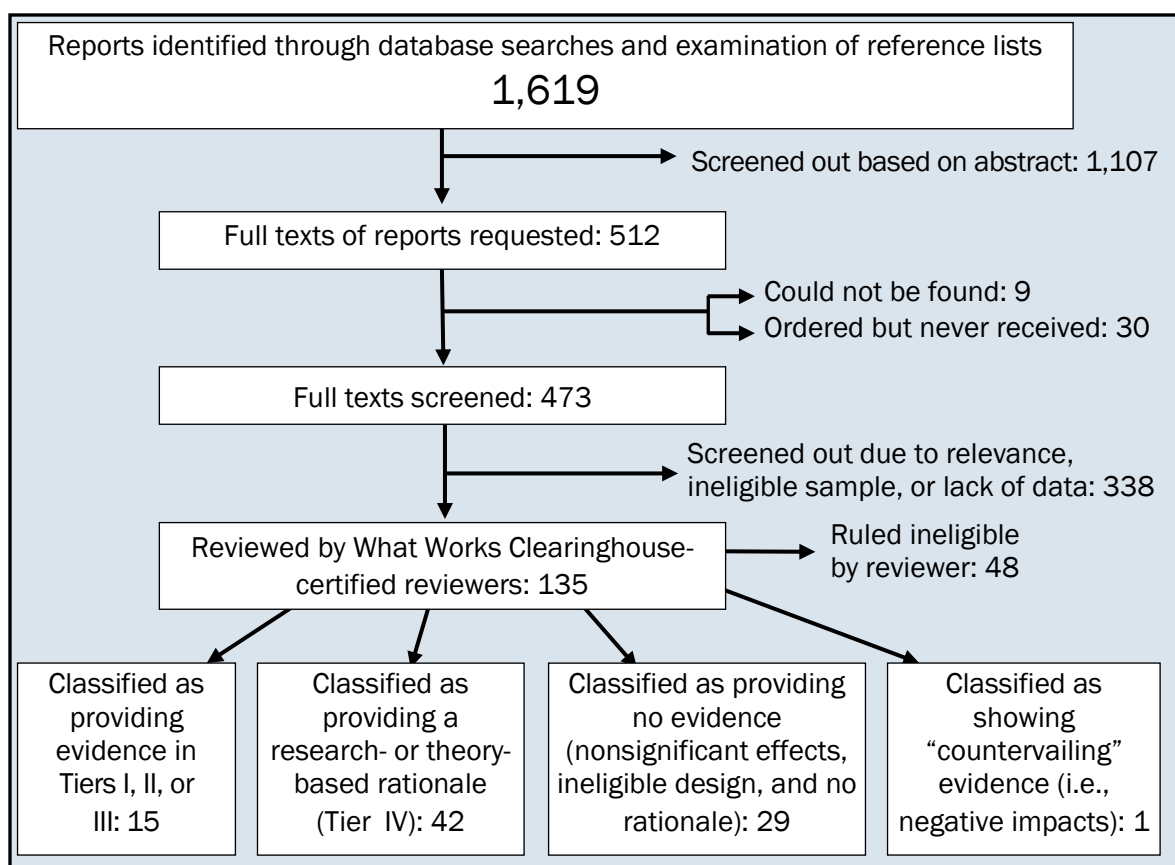
Evidence Tier	Randomized Study	Low Attrition	Quasi-experimental Study	Baseline Equivalence	Correlational Study With Control for Confounds	Sample >349 Students	Multisite Sample	Statistically Significant Findings ^a	Logic Model or Rationale
Tier I	✓	✓				✓	✓	✓	
Tier II	✓		✓	✓		✓	✓	✓	
Tier III	✓		✓		✓			✓	
Tier IV									✓

Note. ESSA = Every Student Succeeds Act. WWC = What Works Clearinghouse. To be eligible for Tiers I–III, studies using group designs must avoid the $N = 1$ confound, such as when a single teacher is responsible for the instruction of students in one condition. In such cases, differences between the conditions can also be attributed to that other factor (in this case, the single teacher) rather than the intervention. ^a For Tiers I–III, in accordance with WWC standards, impact estimates from clustered group design studies—those in which units of assignment were entire clusters rather than individuals—must account for the clustering. If the study-reported findings ignored clustering, WWC would apply a clustering correction to the study reported findings by using an intraclass correlation of .20 for academic achievement outcomes and .10 for attitude outcomes. These corrections were applied in this review as well.

Source: Authors’ review protocol.

The final disposition of the 1,619 reports that were originally identified as potentially eligible for the review are shown in Figure C.1.

Figure C.1. Disposition of Reports of Studies of Arts Integration Interventions Found in This Evidence Review



Extraction of Study Details

Even for arts integration interventions for which only Tier IV evidence exists, we gathered as much information about the interventions as possible to “potentially increas[e] opportunities for states and districts to develop interventions for their own context or to build evidence on popular but under-researched interventions” (Herman et al., 2016, p. 12). Specifically, the WWC-certified reviewers coded and recorded the characteristics of the report, study (i.e., research design and tier), sample and setting, components of interventions, outcomes, and effect sizes (see Table C.2 for a list of these features). The codes of study features were used in the evidence synthesis activity.

Table C.2. Types of Study Features Recorded From Each Eligible Study Report

Report	Study	Sample and Setting	Intervention	Effect Size
▶ Year of publication ▶ Publication vehicle	▶ Whether study meets WWC standards ▶ ESSA evidence tier	▶ Sample sizes ▶ Grade levels ▶ Race/ethnicity characteristics ▶ Students' socioeconomic status ▶ Setting	▶ Single or multiple components ▶ Teacher professional development ▶ Involvement of professional artist ▶ Types of program materials used ▶ Student field trip ▶ Schoolwide model	▶ Outcome of interest ▶ Effect size (g)

Source: Authors' review protocol.

Synthesis of Study Evidence

The study evidence was synthesized in two ways. First, we organized the ESSA-related findings using tables. Second, we meta-analyzed effect sizes to arrive at average effects across all studies reviewed and average effects for studies with different sets of features. In this section, we summarize the first method of synthesis, reserving the description of meta-analytic techniques to the section that follows.

We cross-tabulated the tiers of evidence by the grade levels of students in study samples. Many of the interventions identified spanned multiple grade levels within a school or across multiple schools. Therefore, we sought to group interventions by what seemed to be a prevailing grade-level focus and placed studies and interventions into the grouping that included most of the grades in the sample. We created three grade-level groupings: (1) early elementary (prekindergarten through Grade 2); (2) elementary and mixed grade levels in which the majority of the sample is in Grades 3–5; and (3) mixed grade levels in which the majority of the sample is in Grades 6–12. Within the tables created during the cross-tabulation of evidence tier and grade-level grouping, we also included information about key features of each study reviewed, including the name of the intervention, the outcomes examined in the study, the type of art used in the intervention, sample characteristics, and the study citation.

Meta-Analytic Methods

A meta-analysis is a set of statistical procedures used to combine the findings from multiple studies to obtain an understanding of (a) the magnitude of an intervention's effect across studies and (b) whether the magnitude of effects vary according to characteristics of studies. That is, meta-analysis can help state, district, and school-level decision makers answer the question of whether the likely effect of an intervention (i.e., average effect size) justifies the cost of implementing the intervention.

In this section, we describe the process that we followed to conduct our meta-analysis of arts integration studies, focusing in particular on the following issues:

- ▶ The criteria for including findings from research studies in the meta-analysis

- ▶ The process used to convert study-reported findings into standardized effect sizes
- ▶ A conceptual overview of how meta-analysis aggregates the effects across studies
- ▶ The process for exploring whether certain study features are related to the magnitude of effects (and the cautions associated with this exploratory analysis)

Eligibility of Studies for the Meta-Analysis

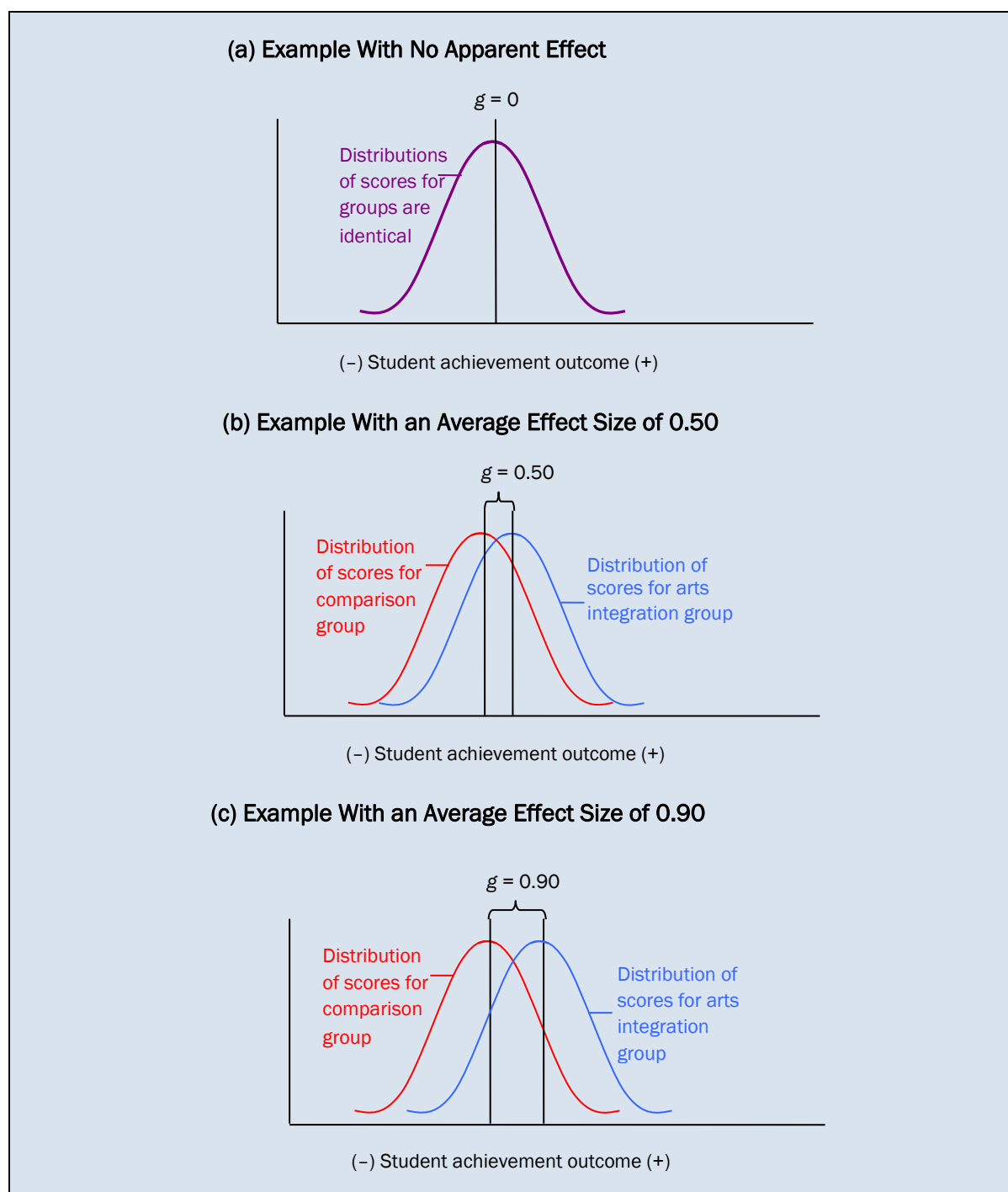
As our WWC-certified reviewers examined each study to determine whether its findings constitute evidence in ESSA's Tiers I–III, they focused on four features: (1) the study's research design, (2) whether the study showed statistically significant effects of arts integration, (3) whether the study was conducted with more than 349 students, and (4) whether the study was conducted in more than one site (see Table C.1 in the prior section). To be eligible for the meta-analysis, studies only had to meet the research design criterion and contain effect estimates that could be converted to an effect size. Thus, the meta-analysis includes findings that study authors reported as not statistically significant, findings from studies involving fewer than 350 students, and studies conducted in a single site.

The meta-analysis does not include findings from studies that did not use research designs necessary for meeting the criteria for Tiers I–III. This design requirement excluded pre-post studies common in action research, correlational studies that failed to control for potential confounds statistically, descriptive studies that did not use a comparison group, and group design studies in which the intervention and comparison groups were not equivalent at baseline. Regarding the latter group of studies (i.e., quasi-experimental studies with nonequivalent groups at baseline), an exception was made if the variable that distinguishes the groups at baseline was controlled for in the impact analysis (i.e., met the definition of Tier III).

Calculation of Effect Sizes

Hedges' *g* Statistic. Following the practice of the WWC, our review team used Hedges' *g* statistic as the effect size metric. Conceptually, Hedges' *g* reflects the difference between the intervention group's average score and the comparison group's average score scaled according to the pooled standard deviation of the groups (see examples in Figure C.2). For example, a *g* statistic of +0.60 indicates the average outcomes for the two groups differ by 6/10 of a standard deviation.

Figure C.2. Examples of Possible Effects of an Arts Integration Intervention on Student Academic Achievement

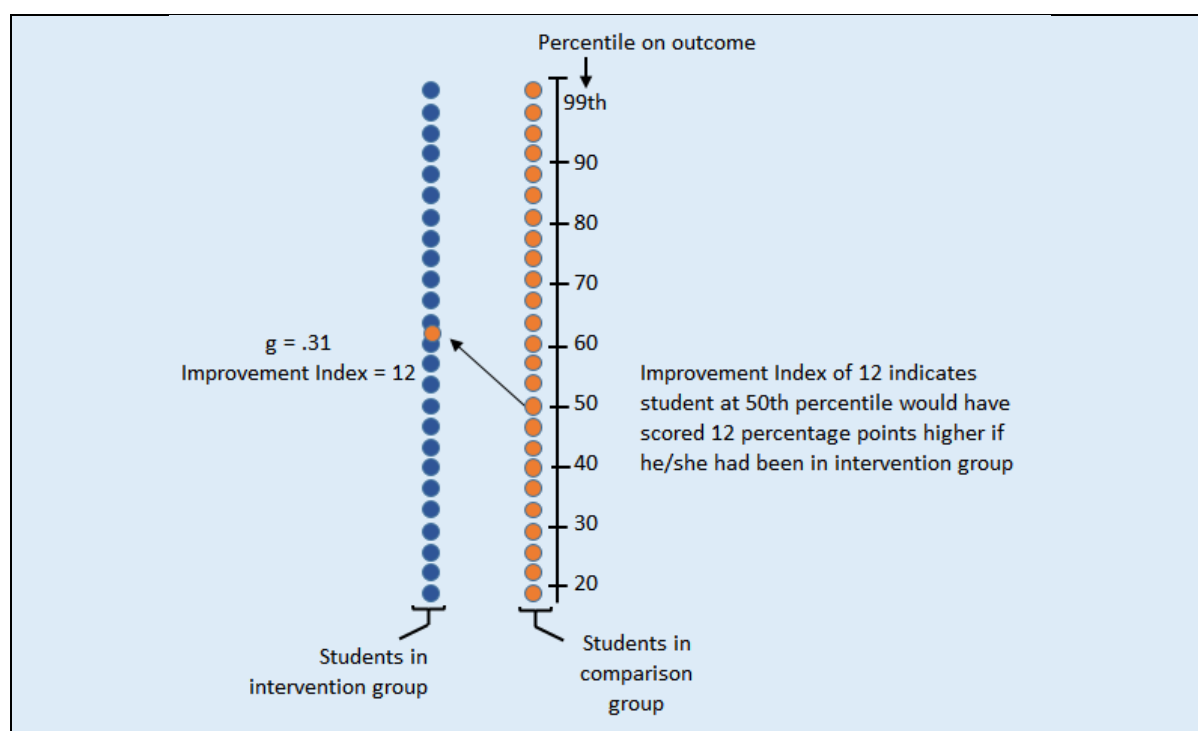


Our WWC-certified reviewers used WWC Study Review Guides to record study features and convert test statistics found in the research reports into Hedges' g . The study review guide is macroenabled and contains functions to determine whether attrition in a randomized controlled trial was high or low and whether groups in a quasi-experimental study were equivalent at baseline. It can also convert different types of test statistics into Hedges' g .

The one shortcoming of Hedges' g is that it fails to convey the magnitude of effects in a language that educators, school and district administrators, and policymakers can understand. One benchmark that the WWC has adopted is the effect size of 0.25, which is the threshold for labeling an effect "substantively important."

Improvement Index. Another practitioner- and policymaker-friendly way to convey the magnitude of an intervention's effects is to report the *improvement index* associated with each effect. The improvement index reflects the percentile point gain that an average student (i.e., the student at the 50th percentile) in the comparison group would experience had he or she been exposed to the intervention. See the example in Figure C.3.

Figure C.3. Interpreting the Improvement Index



Aggregation of Effect Sizes Across Studies

After converting all reported statistical comparisons within a study to effect sizes, we calculated the standard error associated with each effect size based on the number of students in each group and the effect size (see equation in Borenstein, 2009, pp. 226–227).¹⁴ Conceptually, the standard error indicates the amount of uncertainty surrounding an effect size. As the sample size increases, the standard error of the estimate decreases.

¹⁴ Per best practices in meta-analysis, an adjustment is made to the standard errors that come from studies for which the unit of assignment did not match the unit of analysis (such as when schools are randomly assigned to implement an arts integration program or serve as a control group, and yet the analysis was done at the student level). In such cases, the analysts failed to account for the clustered nature of the data. Hedges (2009) provided an adjustment that can be made to an effect's standard error so that it approximates the standard error that would occur had the analysis accounted for clustering.

Two other steps occurred prior to the aggregation of the effect sizes across studies. First, each effect size was given a weight (the inverse of the sum of the within-study variance of the effect size and the between-study variance of the effect sizes) that reflects (to a large extent) the size of the study. Effect sizes with larger weights then contribute more to the average effect size. Second, we computed an average effect size across relevant outcomes within each study, thereby assuring that each study contributed only a single effect size to the overall average across studies.¹⁵

The weighted average effect size across all studies was then calculated, along with the 95% confidence interval for that average effect. This interval is represented by upper and lower bounds. The “true effect” for the population is estimated (with 95% certainty) to be among the values within the interval bounds. This interval is influenced by three factors: the variance of the effect size from each study, the variation in effect sizes across studies, and the number of studies contributing to the average effect size.¹⁶

Exploring for Potential Moderators

We also conducted a set of moderator analyses to determine whether the magnitude of the effects of arts integration interventions was related to the characteristics of the studies. In Chapter 4 of the report, we present the results of two such moderator analyses: the examination of whether effects vary by the type of outcome and the examination of whether effects vary by sample characteristics (i.e., percentage of minority students, percentage of students from low-income families, study setting, and percentage of English learner students).

The study features that we examined in the moderator analysis are confounded. That is, some of these features are often correlated and appear together in a study, making it impossible to determine with certainty the unique effect of each feature on the size of the arts integration effects. For example, studies conducted in urban settings are more likely to involve students from racial/ethnic minority groups. When conducting a moderator analysis, we might find stronger effects among study samples that are mostly composed of minority students and we might find stronger effects for studies conducted in urban areas. Because the two features are confounded, we would be unable to say whether it is the urban setting or the minority status of the sample that influenced the effects. We can conclude only that the moderators are *related* to the size of effects and hope that future studies examine the role of the moderating factors directly. Moreover, to prevent overinterpretation of these moderator findings, we have relegated most of these findings to Appendix D. For a more thorough look at the issue of confounding in moderator analysis, see Lipsey (2003).

¹⁵ All meta-analyses were conducted using Comprehensive Meta-Analysis software, version 3. The manuals that accompany the software show that standard meta-analytic practices were followed.

¹⁶ We conducted this meta-analysis using a random-effects model. See Raudenbush (2009) for an explanation of random effects (as opposed to fixed-effects models) and related computations.

Appendix D. Supplemental Findings From Meta-Analysis

This appendix presents the findings from 16 separate tests of potential moderators. The findings from these tests are presented in this appendix—rather than the main text of the report—due to the confounded nature of the moderators and the fact that these were exploratory analyses (i.e., unrelated to the evidence review’s main research questions).

The investigation was restricted to studies that have been made public since 2000. We found that 27 separate studies in 26 reports met the criteria for inclusion in the meta-analytic review. A description of the studies included is presented in Box D.1.

Box D.1. Description and Number of Studies Included in Meta-Analysis

Year	Studies	Publication Vehicle	Studies	Meeting WWC Standards	Studies
2000–2004	2	Thesis/dissertation	2	Meet WWC standards	16
2005–2008	2	Journal article	16	Do not meet WWC standards	11
2009–2012	4	Technical report	9		
2013–2016	19				

Study Setting	Studies	Number of Students	Studies	Student Grade Levels	Studies
Not specified	1	0–50	1	Prekindergarten	1
Mixed	4	50–100	1	Lower elementary (K–3)	4
Rural	1	100–200	4	Upper elementary (4–5)	5
Suburban	2	200–300	2	Middle school (6–8)	4
Urban	19	300–1,000	11	High school (9–12)	0
		1,000+	7	Mixed levels	13

Note. WWC = What Works Clearinghouse.

Source: Authors’ analysis of effects extracted from studies meeting design requirements for Every Student Succeeds Act Tiers I–III.

Variation in Effect Sizes by Study Characteristics

We examined whether the effect of arts integration interventions varied by the characteristics of the studies. Specifically, we assessed whether the magnitude of arts integration effects varied by the year in which the study was made public, by the type of publication vehicle, by whether the study meets WWC standards, and by the tier of evidence in which the study lies (according to the Every Student Succeeds Act). Meta-analytic findings suggest that all these study characteristics are related to the magnitude of arts integration effects. Specifically, studies that were published more recently, summarized in dissertations or technical reports, have research designs that meet WWC standards, or are categorized as providing Tier I or Tier II evidence tend to have smaller impact estimates (see Table D.1).

Table D.1. Variation of Average Effect Sizes by Study Characteristics (Moderator Analysis)

Study Characteristic	Number of Studies ^b	Average Effect Size	Improvement Index	95% Confidence Interval	Favors Comparison Group			Favors Arts Integration	
					-1.0	-0.50	0	+0.50	+1.0
Year of Publication ^a									
2000–2004	2	0.30	12	–0.04 to 0.64					
2005–2008	2	0.22 **	9	0.08 to 0.37					
2009–2012	4	0.11	4	–0.42 to 0.64					
2013–2016	19	0.09 ***	4	0.05 to 0.12					
Publication Vehicle ^a									
Dissertation	2	–0.40	–16	–1.39 to 0.59					
Technical report	9	0.05	2	–0.02 to 0.11					
Journal article	16	0.18 ***	7	0.13 to 0.23					
Quality of Research Design ^a									
Does not meet WWC standards	11	0.20 ***	8	0.12 to 0.27					
Meets WWC standards	16	0.05	2	–0.01 to 0.11					
ESSA Tier of Evidence ^a									
No evidence	1	0.11	4	–0.18 to 0.40					
Tier I	2	0.10 ***	4	0.06 to 0.15					
Tier II	1	0.06	2	–0.01 to 0.13					
Tier III	14	0.16 **	6	0.06 to 0.25					
Tier IV	7	0.03	1	–0.06 to 0.12					

Note. WWC = What Works Clearinghouse. The midpoint of each diamond indicates the point estimate for average effect; the width of the diamond indicates interval between the lower bound and the upper bound of the 95% confidence interval (which reflects the amount of uncertainty about the average effect). The average effect sizes with diamonds that cross the line for 0 are not statistically significant at the .05 level. For each value of a given moderator, effect sizes were first averaged within the study, allowing each study to contribute only one effect size to the average effect size across studies. Improvement index indicates the percentile point growth that would be expected for a student at the 50th percentile in the comparison group, had the student received the intervention.

^a Average effects across categories of moderator variable vary, per Hedges' Q statistic, $p < .05$.

^b Readers should exercise caution in interpreting effects based on single studies.

** $p < .01$. *** $p < .001$.

Source: Authors' analysis of effects from arts integration studies that meet design requirements for ESSA Tiers I–III.

Variation in Effect Sizes by Study Sample Characteristics

Meta-analytic findings also suggest that arts integration interventions had differential effects for different types of student populations. Samples that had larger percentages of students who represented racial/ethnic minorities or that had larger percentages of students who were economically disadvantaged showed stronger effects of arts integration than did samples in which the majority of students were White or samples with a lower percentage of students who were disadvantaged (see Table D.2). Likewise, findings from the reviewed studies suggest that the effects of arts integration interventions were larger for samples of students in lower grades (prekindergarten and Grades K–5) than for samples of students in middle school grades or

samples made up of students from varying grade levels. Whether English learners benefited more from arts integration cannot be ascertained with the available evidence, given the wide range of observed effects.

Table D.2. Variation of Average Effect Sizes by Sample Characteristics (Moderator Analysis)

Sample and Setting Characteristics	Number of Studies ^b	Average Effect Size	Improvement Index	95% Confidence Interval	Favors Comparison Group			Favors Arts Integration	
					-1.0	-0.50	0	+0.50	+1.0
Percentage of sample made up of racial/ethnic minorities									
25% or less	2	-0.63	-24	-2.01 to 0.75					
26% to 74%	6	0.03**	1	0.01 to 0.05					
75% or more	14	0.17***	7	0.07 to 0.27					
Percentage of sample made up of children from low-income families									
25% or less	4	-0.12	-5	-0.86 to 0.64					
26% to 74%	8	0.03	1	-0.06 to 0.14					
75% or more	14	0.12***	5	0.08 to 0.15					
Student grade levels ^a									
Prekindergarten	1	0.86***	31	0.57 to 1.16					
Lower elementary (K-3)	4	0.08**	3	0.03 to 0.14					
Upper elementary (4-5)	5	0.25**	10	0.16 to 0.34					
Secondary school (6-12)	4	0.22***	9	0.13 to 0.30					
Mixed grade levels	8	0.07	3	-0.01 to 0.15					
Setting of study ^a									
Rural	1	0.11	4	-0.18 to 0.40					
Suburban	2	-0.37	-14	-0.52 to -0.23					
Urban	19	0.12***	5	0.07 to 0.18					
Mixed	4	0.11***	4	0.06 to 0.15					
Percentage of sample made up of English learners ^a									
25% or less	10	0.07	3	-0.01 to 0.15					
26-74%	3	0.18**	7	0.05 to 0.31					
75% or more	2	0.31	12	-0.19 to 0.82					

Note. WWC = What Works Clearinghouse. The midpoint of each diamond indicates the point estimate for average effect; the width of the diamond indicates interval between the lower bound and the upper bound of the 95% confidence interval (which reflects the amount of uncertainty about the average effect). Average effect sizes with diamonds that cross the line for 0 are not statistically significant at the .05 level. For each value of a given moderator, effect sizes were first averaged within study, allowing each study to contribute only one effect size to the average effect size across studies. Improvement index indicates the percentile point growth that would be expected for a student at the 50th percentile in the comparison group, had the student received the intervention.

^a Average effects across categories of moderator variable vary, per Hedges' Q statistic, $p < .05$.

^b Readers should exercise caution in interpreting effects based on single studies.

** $p < .01$. *** $p < .001$.

Source: Authors' analysis of effects from arts integration studies that meet design requirements for ESSA Tiers I–III.

Variation in Effect Sizes by Intervention Characteristics

One last set of moderator analyses examined whether the magnitude of arts integration effects varied depending on (a) whether the arts integration intervention involved multiple components, (b) whether the intervention included professional development for school staff, (c) whether an artist was involved in providing instruction, (d) whether the intervention included program materials, (e) whether students in the study experienced the arts through a field trip to a museum or theater, (f) whether the intervention was implemented at the whole-school level, and (g) the type of art to which students were exposed in the intervention. The results are shown in Table D.3.

Several intervention characteristics were found to be related to the magnitude of the arts integration effects. Arts integration interventions that involve resident artists tended to have effects that were nearly three times as large as those programs that involved teaching artists. In terms of the type of art that was integrated into the curriculum, interventions that incorporated dramatic arts, literary arts (e.g., poetry), visual art, and other types of art appear to have statistically significant findings, whereas those that integrate music into the curriculum did not.

Table D.3. Variation of Effect Sizes by Characteristics of Arts Integration Interventions (Moderator Analysis)

Intervention Characteristics	Number of Studies ^b	Average Effect Size	Improvement Index	95% Confidence Interval	Favors Comparison Group			Favors Arts Integration	
					-1.0	-0.50	0	+0.50	+1.0
Number of program components ^b									
Single component	6	0.09	4	-0.26 to 0.43					
Multiple components	20	0.11 ***	4	0.07 to 0.15					
Whether professional development provided to school staff ^b									
Professional development included	14	0.14 ***	6	0.07 to 0.21					
Professional development not provided	13	0.09 **	4	0.03 to 0.15					
Type of artist support ^a									
None	11	-0.01	0	-0.10 to 0.07					
Varied levels of support	1	0.16 ***	6	0.10 to 0.21					
Arts specialists	1	0.86 ***	31	0.57 to 1.16					
Resident artists	4	0.33 ***	13	0.23 to 0.44					
Teaching artists	9	0.12 ***	5	0.06 to 0.19					
Resident artists with arts specialists	1	0.13 *	5	0.02 to 0.24					

Intervention Characteristics	Number of Studies ^b	Average Effect Size	Improvement Index	95% Confidence Interval	Favors Comparison Group			Favors Arts Integration	
					-1.0	-0.50	0	+0.50	+1.0
Types of program materials provided ^a									
None	11	0.14**	6	0.04 to 0.23					
Software	1	0.63	24	-0.19 to 1.45					
Lesson plans	4	-0.05	-2	-0.42 to 0.33					
Curriculum	8	0.09***	4	0.06 to 0.13					
Curriculum and lesson plans	1	0.51**	19	0.20 to 0.82					
Curriculum tools	2	0.17*	7	0.01 to 0.32					
Exposure to arts through field trip ^b									
Students do not take field trip	20	0.15**	6	0.08 to 0.23					
Students take field trip	7	0.05	2	-0.01 to 0.10					
Level of implementation ^a									
Not implemented schoolwide	26	0.09***	4	0.05 to 0.14					
Implemented schoolwide	1	0.86***	31	0.57 to 1.16					
Type of art that was integrated into instruction ^a									
Drama	4	0.25***	10	0.16 to 0.33					
Literary arts	3	0.31***	12	0.19 to 0.42					
Music	2	-0.19	-8	-1.69 to 1.31					
Theater	1	0.24*	9	0.02 to 0.47					
Visual art	7	0.06*	2	0.01 to 0.11					
Multiple types	10	0.13***	5	0.06 to 0.19					

Note. The midpoint of each diamond indicates the point estimate for average effect; the width of the diamond indicates interval between the lower bound and the upper bound of the 95% confidence interval (which reflects the amount of uncertainty about the average effect). Average effect sizes with diamonds that cross the line for 0 are not statistically significant at the .05 level. For each value of a given moderator, effect sizes were first averaged within study, allowing each study to contribute only one effect size to the average effect size across studies. Improvement index indicates the percentile point growth that would be expected for a student at the 50th percentile in the comparison group, had the student received the intervention.

^a Average effects across categories of moderator variable vary, per Hedges' Q statistic, $p < .05$.

^b Readers should exercise caution in interpreting effects based on single studies.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Source: Authors' analysis of effects from arts integration studies that meet design requirements for ESSA Tiers I–III.



AMERICAN INSTITUTES FOR RESEARCH®

0292_10/17