Cultivating Common Ground:
Integrating standards-based visual arts, math and literacy in high-poverty urban classrooms

Marisol Cunnington, Andrea Kantrowitz, Susanne Harnett, and Aline Hill-Ries

Abstract

The *Framing Student Success: Connecting Rigorous Visual Arts, Math and Literacy Learning* experimental demonstration project was designed to develop and test an instructional program integrating high-quality, standards-based instruction in the visual arts, math, and literacy. Developed and implemented by arts-in-education organization Studio in a School (STUDIO), in partnership with the New York City Department of Education, the *Framing Student Success* curriculum was designed by experienced professional artist instructors collaborating with school-based visual arts, math, and literacy specialists and classroom teachers. The *Framing Student Success* curriculum units were designed to make explicit connections between subjects (visual arts and ELA or math), while maintaining the integrity, depth and rigor of instruction in both subject areas. While students were receiving arts-integrated instruction during each of the twelve six-week units, classroom teachers and arts specialists were receiving embedded professional development. Regular cross-site professional development was also provided for teachers, specialists, and school administrators.

As a randomized control trial study, the three-year *Framing Student Success* study provides robust evidence of the potential impacts of an interdisciplinary, arts-integrated curriculum for students growing up in poverty. The mixed-method study assessed the effects of staff professional development and standards-based arts-integrated instruction in three urban, high-poverty elementary schools. Results indicate that rigorous interdisciplinary instruction that links visual arts, literacy, and math skills, and supports cognitive skill development, can increase students' literacy and math learning while nurturing their art making skills and enhancing their ability to meaningfully reflect on their own work and that of their peers. Qualitative findings suggest that interdisciplinary educator collaborations were critical to project success, and highlight the project's successful engagement of lower-performing students and students with disabilities. Survey and focus group results suggest that training can build the capacities of teachers, arts specialists, and administrators to implement an interdisciplinary curriculum, providing educators with additional tools to teach engaging, Common Core aligned lessons addressing academic and cognitive competencies.

Overview

Funded by a U.S. Department of Education Arts in Education Model Development and Dissemination (AEMDD) grant, the experimental demonstration project, *Framing Student Success: Connecting Rigorous Visual Arts, Math and Literacy Learning,* was designed to develop and test an instructional program integrating high-quality, standards-based instruction in the visual arts, math, and literacy. Developed and implemented by arts-in-education organization, Studio in a School (Studio),[1] in partnership with the New York City Department of Education (NYC DOE), the *Framing Student Success* curriculum[2] was developed by experienced professional artist/instructors with the guidance of school-based visual arts teachers, math and literacy specialists, and classroom teachers. The curriculum was taught in three New York City Title I elementary schools for three years (2009-2010 through 2011-2012) with a cohort of students moving from third to fifth grade.

The random assignment study of the three-year *Framing Student Success* project, in which three schools were assigned to receive the project (treatment schools) and three to serve as controls, assessed the impact of *Framing Student Success* instruction on students' literacy, math, and visual arts skills, and on the cognitive capacities exemplified by the Studio Habits of Mind (Hetland et al., 2007). Impact of staff professional development experiences on teacher, specialist, and administrator competencies and attitudes was also assessed over time. Thus, the project was designed to study the impacts of rigorous, standards-based arts integrated instruction in urban, high-poverty elementary schools.

"Arts integration" generally refers to various strategies to use arts activities to teach explicit skills and knowledge in other subject areas. In some cases, particularly in high-poverty settings, the rigor of arts instruction is sacrificed and made subservient to the other subject areas (Bresler, 1995; Mishook & Kornhaber, 2006). Efforts to integrate the arts with other subjects have been criticized as "instrumentalist," because they seem to justify the presence of the arts simply because they may aid instruction in domains perceived as more essential to the curriculum. Researchers and arts advocates have argued that arts integration obscures the position of the arts in schools as separate, intrinsically valuable subjects in their own right (Brewer, 2002; Russell & Zembylas, 2007) and maintain that arts programs should never be justified based on what they can do for other subjects (Hetland & Winner, 2004).

Comprised of 12 six-week curriculum units taught from third to fifth grade, with each unit followed by an exhibition of student work and reflection, the *Framing Student Success* curriculum was designed from the outset to make explicit connections between subjects (visual arts and English Language Arts [ELA] or math), while maintaining the integrity, depth, and rigor of instruction in both subject areas. This approach reflects Studio's longstanding practice of offering students a rich apprenticeship in the process of authentic art making, under the guidance of practicing professional artists. It is also designed to meet national and local arts standards, as defined in the *New York City Blueprint for Teaching and Learning in the Arts* (2004).[3] The *Blueprint,* which provides an example of a thorough, detailed framework for a K-12 sequential curriculum that encompasses multiple strands and grade-level benchmarks for teaching and learning in the arts, served as an important foundation for the *Framing Student Success* curriculum.

The project's focus on explicit connections between subject areas is based on the theory that connections between the arts and other subject areas need to be clear and well-defined for learning to transfer successfully from one domain to another (Perkins & Salomon, 1992). In

designing the curriculum units, Studio project staff and artist/instructors sought to create a rich and thorough curriculum that encouraged students to see connections and construct analogies among subject areas. Students were engaged in active formative and summative self-assessment through discussions and writing about their work in progress as well as finished art. This ongoing reflective process included their fellow students' work as well, through weekly class and peer-to-peer critiques.

In *Framing Student Success*, connections to other disciplines were made by emphasizing shared concepts and skills, while maintaining consistent and appropriate emphasis on visual arts learning goals, based on the five learning strands in the *Blueprint* (Art Making, Literacy in Art, Making Connections, Community Cultural Resources, and Careers and Lifelong Learning.). The math units explicitly reinforced and extended prior experiences with measuring, geometric reasoning, and other math skills and knowledge, providing real-world applications. For instance, in a fourth-grade unit, students constructed paper sculptures inspired by modernist artists, such as Anthony Caro and David Smith, and explored the multiple meanings of abstract art as they learned about the characteristics of basic Euclidean solids. ELA units incorporated writing skills throughout the art-making process, not simply to describe or elaborate upon finished pieces. For example, word webs were used as a way to generate and develop ideas for imaginary landscapes, and word lists were added to preparatory experiments with materials to describe specific colors or textures.

Some form of vocabulary practice, self-reflection, peer critique or class discussion of works of art was built into every lesson. Artist/instructors verbally modeled artists' thinking processes, eliciting students' self-reflection on their own learning. Students experienced the way artists authentically use language as they develop their craft, thereby realizing the Common Core State Standards (CCSS) expectation that all content area instruction supports students' literacy growth. When fourth- grade students explored different kinds of brushstrokes, they were asked to attend to the sensory experience of the brush's movement, the feel of the paint, and the experiences or images called up in their memories or imaginations. They were challenged to come up with interesting adjectives describing each brushstroke, such as feathery, wavy, or slashing, to help them to develop the habit of noticing and verbally articulating specific qualities. Students were then asked to use their enhanced vocabulary when they wrote imaginatively about their own work or described orally what they noticed in another student's painting.

The professional development provided by the *Framing Student Success* project for artist/instructors enabled the artists to maximize natural opportunities to incorporate important skills and concepts from ELA and math into their art units. During the collaborative curriculum development process, themes and concepts emerged that helped bridge subject areas across multiple units. The use of grids became a natural bridge between math and art. In a collage unit taught when *Framing Student Success* treatment students were in third grade (inspired by both African-American quilts and the paintings of Paul Klee), a grid was used to teach aspects of color theory as well as equivalent fractions. A fourth-grade printmaking unit inspired by Adinkra textiles from Ghana used a grid as an opportunity to explore area and perimeter, as students explored hidden meanings of abstract forms and developed their own personal symbol systems. In fifth grade, grids were used to scale up and transfer drawings of local school neighborhoods, and students learned how artists and craftsmen have used grids for this purpose as far back as ancient Egypt.

In almost every unit, students viewed works of art as artists taught descriptive language, analogic reasoning, and interpretive skills. Analysis and interpretation of works of art were

intended to help students develop skills and methods frequently used for the interpretation of written texts. In a landscape painting unit, students used a Venn diagram to compare and contrast two 19th century American paintings. An idyllic scene of the Rocky Mountains, by Bierstadt, with a Native American community in the foreground, was compared to a seascape painting by Homer, featuring a lone African American on a broken boat, encircled by sharks. In another unit, the complex, decorative, highly symmetrical canvases of abstract contemporary painter Phillip Taaffe inspired a painted paper collage. The unit, entitled "Come Fly With Me," engaged students in the study of ratio and symmetry through the construction of imaginary insects. Students were asked to think and write about the question, "How is a Phillip Taaffe painting like an insect?" This comparison stimulated a broad range of observations and interpretations: students noticed details that reminded them of antennae or other specific parts of insects, and mentioned ratios and symmetries in the relationships between larger shapes.

Drawing from close observation as a form of artistic, mathematical, and scientific research also was part of most *Framing Student Success* curriculum units. In third grade, students drew live plants as a kind of research for the invention of an imaginary plant, prior to painting and writing about their invented plants during subsequent lessons. In fourth grade, students learned basic skills in the areas of proportion and placement as they developed detailed self-portraits while viewing their own reflections in a mirror. These self-portraits became the basis of invented mythological creatures, who, in turn, became the protagonists in students' written stories and descriptions. And in fifth grade, drawing became a vehicle to investigate form and function in insects.

In developing the curriculum, the goal of the artist/instructors and Studio staff was to maintain the integrity and rigor of the *Blueprint* while addressing significant learning targets in math and ELA. Each of the 12 *Framing Student Success* curriculum units was developed by the artist/instructors with the guidance of Studio staff and input from classroom teachers, school arts specialists, and school literacy and math coaches. Each summer, after consulting with school-based art specialists, artists met as a team to assess students' visual arts needs relevant to the fifth grade benchmarks in the *Blueprint*. Referencing the New York State (NYS) grade-level standards in ELA and Math, as well as the schools' varying pacing calendars, the artists created a provisional sequence of art units designed to build age-appropriate visual arts skills and understandings. Artists were careful to address all five strands of arts learning in the *Blueprint,* and both unit learning objectives and rubrics for formative and summative assessment were based upon the grade-level benchmarks in the visual arts *Blueprint.* At the same time, the artist/instructors also designed the units to address the curricular priorities identified by the classroom teachers and coaches and informed by item analysis of NYS test results and aggregate reports on school NYS ELA and math achievement test performance. Priorities identified by the schools included expanding academic vocabulary and addressing the important concepts involved in learning fractions and the relationship between 2- and 3-D geometry. Descriptive language was identified as a significant weakness for students at all three treatment schools, which led artist/instructors to pay particular attention to eliciting and nurturing rich, descriptive vocabulary at every opportunity.

Curriculum units also incorporated the CCSS for ELA and math in the later years of the project, after the CCSS were adopted by the state of New York. David Coleman, one of the architects of the CCSS notes that there is close alignment between the arts and the skills and competencies called for in the CCSS, such as "careful observation, attention to evidence and artists' choices, and the love of taking an artist's work seriously" (2013). CCSS priorities, such as

modeling the real world with math, and the development of verbal and written analytical skills, were easily accommodated within the *Framing Student Success* curriculum.

In each school, a Studio artist/instructor partnered with all classroom teachers in the target grade to teach four six-week units per year, thus spreading the 12 units across the three years. Each unit was designed to address learning standards in visual arts and ELA or math, while emphasizing interdisciplinary skills and concepts. Lessons were taught by artist/instructors with the support of classroom teachers, who helped to differentiate instruction for specific students and to keep students engaged and on-task, and sometimes modeled participation in the lessons for the students. School visual arts specialists were invited to co-teach the lessons once each week. As they supported the lessons, teachers and specialists were also learning how to teach standards-based, arts-integrated visual arts lessons by observing the teaching techniques of the artists. Through this ongoing exposure to the arts-integrated instruction of the *Framing Student Success* project, teachers and specialists experienced job-embedded professional development, a type of teacher learning that is grounded in day-to-day teaching practice and is designed to enhance teachers' content-specific instructional practices with the intent of improving student learning (Darling-Hammond & McLaughlin, 1995; Hirsh, 2009).[4]

Teachers also supported the teaching of the units by continuing lessons in between artist/instructor classroom sessions; in some cases, they used class time to continue the writing portions of lessons or reinforced the math concepts introduced, and in some cases, teachers also helped students to continue their art making activities. Throughout each unit, teachers and artists together helped students reflect on their work and connect it to ideas and concepts in other subject areas. After each unit, a meeting of teachers and artists allowed time for reflection on instruction. During these post-unit meetings, artists shared the results of their assessments of student art work with teachers, helping to build common understandings of the visual arts standards presented in the *Blueprint*.

During the school year, artist/instructors met at least once per unit to assess and refine lessons and conferred frequently between meetings through emails of in-progress photos of student work and informal phone calls. Prior to each unit during the year, hands-on cross-site professional development sessions introduced classroom teachers, arts specialists, and literacy or math coaches to the proposed visual arts unit, and generated ideas for allied ELA and math lessons to be conducted by teachers in between artists' visits. The sessions also provided information on topics including the *Blueprint*, connections between visual arts and content areas, and assessment of arts instruction. School administrators were invited to these cross-site professional development sessions, as well as to special sessions on arts integration for school leaders. Finally, within each treatment school, prior to each unit, artist/instructors convened *all* classroom teachers and ELA and math specialists to plan for differentiation of lessons to address student skill levels.

Literature Review

Previous research has documented the benefits of connecting arts learning with learning in other subjects, highlighting the positive impact of arts integration on academic achievement in reading, mathematics, social studies, and science (Burnaford et al., 2007; Ingram & Reidell, 2003; Ingram & Seashore, 2003; Werner, 2002). It has been found that arts integration may enhance cognitive skills such as creativity, elaboration, and expression (Horowitz, 2005), and problem-solving skills such as flexibility and resource recognition (Randi Korn & Associates,

2010). Arts-integrated instruction also has been associated with larger achievement gains for academically struggling students and students from socioeconomically disadvantaged backgrounds (Ingram & Seashore, 2003; Rabkin & Redmond, 2004). Research also documents that instruction that emphasizes higher-order thinking skills may improve academic achievement (Wenglinsky, 2000). This evidence, along with ample evidence on the benefits of arts-integrated instruction (Burnaford et al., 2007; Ingram & Reidell, 2003; Ingram & Seashore, 2003; Werner, 2002; Perkins, 1994), led to the expectation that student exposure to the rigorous *Framing Student Success* arts-integrated curriculum would positively impact the arts, ELA and math skills of treatment students. Moreover, because control students received *Blueprint* visual arts instruction that was not linked to other subjects, it was also expected that the study would provide additional evidence on the effectiveness of explicit connections across subject areas for the transfer of cognitive skills.

Research has also documented the positive impact of arts integration on students' cognitive skills and attitudes toward learning. By their nature, the arts are excellent vehicles for fostering higher-order thinking skills, because they encourage students to closely examine, reflect on, and analyze works of art, and promote thoughtfulness, creativity, and the formulation of rich connections (Perkins, 1994). It has been found that arts-integrated instruction in particular may improve students' persistence, engagement, and positive attitudes toward learning (Ingram & Meath, 2007). Based on this evidence, and especially on the seminal work of researchers at Harvard's Project Zero (Hetland et al., 2007), it was expected that the standards-based, sequential art lessons in *Framing Student Success* would support the development of the Studio Habits of Mind[5] of Engaging and Persisting, Stretching and Exploring, Observing, Reflecting, and Envisioning among treatment students.

The study also assessed the impact of professional development experiences on the arts integration skills and knowledge of treatment and control school classroom teachers and visual arts specialists. It was expected that professional development on the *Blueprint* would enhance teachers' and specialists' knowledge of the NYC DOE arts standards. It was also expected that both classroom teachers and visual arts specialists would report greater confidence in their ability to engage in peer collaborations and communicate with students about arts learning as they gained experience with it. Expectations for improved collaboration were based on evidence on the importance of teacher professional learning communities (PLCs), which have been found to foster the collective capacity of staff to work together to improve teacher practice and student learning (Darling-Hammond, 1994). Several research studies provide robust support regarding the impact of PLCs on teacher practice (Louis & Marks, 1998), school culture (Bolam et al., 2005) and student achievement (Berry et al., 2005; Bolam et al., 2005; Hollins et al., 2004; Louis & Marks, 1998; Phillips, 2003; Strahan, 2003; Supovitz, 2002; Supovitz & Christman, 2003). Collaborative experiences were also expected to positively impact the self-reported job satisfaction of participants, based on evidence linking teacher collaborations and supportive school culture with teacher job satisfaction (Lee et al., 1991).

As noted above, the *Framing Student Success* project also included professional development for school administrators and invited them to contribute to program planning, based on research evidence that administrators are a key component of effective arts integration efforts (Catterall & Waldorf, 1999). Expected project outcomes for administrators included improvements in their abilities related to supporting and supervising an arts-integrated curriculum program, as they gained experience over the three years of the project.

Methodology

The *Framing Student Success* study was designed to answer the following research questions:

- How does a rigorous, standards-based arts integration curriculum, teaching visual arts, literacy, and math skills, impact the ELA, math, and arts skills and cognitive competencies (habits of mind) of students in urban, high-poverty elementary schools?
- How does an arts integration professional development program impact the skills and competencies of educators?

As a cluster randomized control trial, the study of the *Framing Student Success* project study was designed to document project implementation and assess impacts on participating students, classroom teachers, school-based visual arts specialists, school administrators, and Studio artist/instructors. To assess impacts, the study used an experimental design, which is considered by the Institute of Education Sciences (IES) to be the "gold standard" for evaluating the effectiveness of educational interventions. Outcomes were assessed for both treatment and control students and school staff members, in order to enable comparisons of change over time between the groups.

Study Design

The study was conducted in six NYC public elementary schools, all of which had been designated as Schools in Need of Improvement (SINI), identified as Title I schools, and served sizeable English Language Learner and special education student populations at baseline.[6] Each school also had a full-time visual arts specialist on staff who was responsible for teaching visual arts lessons aligned to the *Blueprint.* Prior to project implementation, the six schools were randomly assigned to either the treatment or control conditions. In the three treatment schools, the project was first implemented with a cohort of third-grade students in 2009-2010 and continued through the subsequent two school years, until the end of the students' fifth-grade year (2011-2012). Table I displays unduplicated counts of students who participated in one year, two years, or in the full three years of the project. A total of 545 treatment and 456 control students participated in *any* of the three project years, with a total of 266 treatment and 227 control students participating in *all* three project years.

Whereas treatment students received all components of the intervention, control group students and staff did not participate in any *Framing Student Success* project activities. School staff and students in target grades in both the treatment and control schools participated in evaluation activities, as detailed below. Approval for the collection of evaluation data in treatment and control schools, including collection of student demographic and achievement data, was obtained from Metis's internal Institutional Review Board (IRB), as well as the NYC DOE's IRB prior to each year of the study.

Table I
Framing Student Success Student Participation by Number of Years (Unduplicated Counts)

Study Group	1 Year	2 Years	3 Years (Full Study)	Total
Treatment	173	106	266	545
Control	148	81	227	456

As shown in Table II, students in each of the participating schools were demographically similar. Most participating students in both treatment and control schools were from racial and ethnic minority backgrounds, and approximately half were female. To establish baseline equivalence of the treatment and control groups, independent-samples *t*-tests were conducted to test whether schools in the treatment condition and those in the control condition were equivalent on school-level baseline measures (e.g., demographics and ELA and math achievement). The results indicate that there were no statistically significant differences between the treatment and control schools at baseline. Given that random assignment was conducted at the school level, school-level baseline measures are appropriate for demonstrating evidence of baseline equivalence when student-level measures are not available (What Works Clearinghouse, 2014).

Table II
Baseline Demographic Profiles of Framing Student Success Treatment (T) and Control (C) Schools (2008-2009)

School	Male	White	Black	Asian	Hispanic	Other	ELL	Special Education	Free/ Reduced Lunch
T1	52.5%	5.8%	28.4%	4.3%	61.6%	0.0%	7.7%	28.6%	78.7%
T2	53.5%	0.0%	36.2%	1.6%	62.2%	0.0%	18.1%	43.2%	100.0%
T3	50.1%	1.3%	36.4%	22.1%	40.2%	0.0%	15.9%	17.2%	80.0%
Total	**51.7%**	**3.3%**	**21.5%**	**10.8%**	**56.2%**	**0.6%**	**13.2%**	**6.7%**	**84.7%**
C1	51.1%	1.1%	18.1%	2.1%	78.2%	0.5%	16.5%	23.4%	85.5%
C2	52.6%	3.4%	24.5%	9.6%	62.2%	0.3%	31.3%	15.9%	88.3%
C3	21.7%	0.4%	22.9%	0.4%	75.8%	0.4%	26.3%	53.8%	94.1%
Total	**53.4%**	**1.7%**	**29.1%**	**3.6%**	**71.9%**	**1.2%**	**21.6%**	**12.1%**	**89.1%**

Table III
Baseline Achievement Profiles of Third-Fifth Grade Students in Framing Student Success Treatment (T) and Control (C) Schools (2008-2009)

School	% Proficient ELA	% Proficient Math
T1	64.4%	83.1%
T2	64.3%	84.1%
T3	72.1%	88.1%
Treatment Total	**66.9%**	**85.1%**
C1	68.9%	93.5%

C2	59.9%	88.2%
C3	48.1%	73.1%
Control Total	**58.9%**	**82.4%**

Sixty-six classroom teachers participated in the project across the three treatment schools, while 52 teachers participated across the three control schools. The majority of classroom teachers participated for one year; however, a small number of teachers who were assigned to different grades participated over multiple years. Treatment school visual arts specialists and administrators were invited to participate in professional development and research activities in all three project implementation years, and most did so (N=3 visual arts specialists and 15 administrators). Likewise, in control schools, a total of three visual arts specialists and 15 administrators participated in evaluation activities.

Measures

Project implementation was measured through: reviews of project documentation, including curriculum and professional development materials; observations of *Framing Student Success* classroom lessons, using a locally-developed rubric; and observations of professional development sessions. Focus groups and interviews also were conducted with samples of treatment school staff (at the end of each year), treatment students (at the end of the final project year), control school staff (at the end of the project), and project artist/instructors to gather details on project implementation and anecdotes elucidating examples of potential impact.

To measure project impact on student academic achievement in literacy and math, three years of student NYS ELA and math test scores were collected. After each project implementation year, researchers obtained individual standardized test scores (performance levels and scale scores) for participating students in both the treatment and the control groups. Spring 2010, spring 2011, and spring 2012 NYS ELA test scores were available for 84% of fifth-grade treatment group students (N=315) and 88% of fifth-grade control group students (N=292). Spring 2010, spring 2011, and spring 2012 NYS math test scores were available for 87% of fifth-grade treatment group students (N=329) and 89% of fifth-grade control group students (N=296).[7]

A sample of treatment students, consisting of two classrooms in each of the three treatment schools when students were in third grade, was selected to have their artwork assessed using rubrics developed by Studio staff and artist/instructors to accompany each curriculum unit. Sample students were tracked and assessed through the remainder of the project as they moved on to different grades and classrooms. Each year, following implementation of the arts-integrated units, artist/instructors completed assessment rubrics (for students in one of the two schools in which they did not teach) for the selected students. At the end of the project, three years of visual arts rubric data were available for 63 treatment students.[8]

At the end of the third, and final, project year, when students were in fifth grade, the NYC Visual Arts Benchmark Arts Assessment was administered to all treatment and control students. A tool developed by the federally-funded *Arts Achieve* project, the Benchmark Arts Assessment is an assessment of student visual arts skills conducted in a two-hour session that includes art making activities.[9] The internal consistency of the 31 items on the spring 2012 Visual Arts Benchmark Arts Assessment was 0.85, and inter-rater reliability ranged from 0.43 on the "Using Shapes" sub-task of the art-making activity to 0.70 on the "Visual Arts Vocabulary"

and "Writing Skills" sub-tasks of the written reflection activity. A total of 109 treatment and 100 control school students took the Benchmark Arts Assessment, providing a snapshot of treatment and control students' visual art skills at the end of the *Framing Student Success* project.

Students' Studio Habits of Mind, including Engaging and Persisting, Stretching and Exploring, Observing, Reflecting, and Envisioning (Hetland et al., 2007), were assessed by classroom teachers in treatment and control schools using the Studio Habits of Mind rubric and rating tool, a locally-developed rubric[10] designed collaboratively by project evaluators and Studio staff. The instrument was revised and finalized with the guidance of a committee of Studio Habits of Mind assessment developers, including Lois Hetland, one of the developers of the Studio Habits of Mind.

Treatment and control school classroom teachers used the Studio Habits of Mind rubric to assess students' Studio Habits of Mind in each year of project implementation. Teachers were instructed to assess students based on their behaviors over the previous 30 days in the classroom. The rubric was completed by third-grade teachers in spring 2010, by fourth-grade teachers in fall 2010 and spring 2011, and by fifth-grade teachers in fall 2011 and spring 2012. Teachers rated each student on a five-point scale, where 1=Beginner and 5=Expert for each of the five habits of mind. Studio Habits of Mind data collection rates for the treatment group ranged from 55% of students in spring 2012 to 87% of students in fall 2010; control group data collection rates ranged from 48% in spring 2010 and fall 2011 to 74% in fall 2010.

In order to assess the impact of the *Framing Student Success* project activities on educators' skills, collaborations, and job satisfaction, surveys of classroom teachers, visual arts specialists, school administrators, and Studio artist/instructors were developed collaboratively by evaluators and Studio staff through an iterative process involving multiple reviews and revisions. Survey items on job satisfaction were drawn from the Maslach Burnout Inventory-Educator Survey[11] (Maslach et al., 1996) and the Professional Quality of Life Scale[12] (Stamm, 2005). Surveys were administered to staff in the treatment and control schools at the beginning and end of each project year to measure change over time. Matched pre-post treatment school staff response rates ranged from 71% in 2009-2010 to 63% in 2010-2011 to 65% in 2011-2012. Matched pre-post control school staff response rates ranged from 65% in 2009-2010 to 47% in 2010-2011 to 53% in 2011-2012.

Analyses

Qualitative data from staff surveys, interviews, and focus groups were summarized and content-analyzed to elucidate participant experiences and program impacts, and then triangulated with quantitative survey data and project documentation.

Descriptive analyses were conducted on all quantitative data, including data from achievement tests (NYS ELA and NYS Math tests), the Benchmark Arts Assessment, the Studio Habits of Mind rubric, and the visual arts rubric. Within-group analyses were conducted for all measures.

Between-group analyses were also conducted on Benchmark Arts Assessment data, Studio Habits of Mind data, and achievement data. Chi-square tests of independence were used to compare the percentages of treatment and control students achieving proficiency on each sub-task of the Benchmark Arts Assessment. An independent samples *t*-test was used to assess differences in the means of the overall Benchmark Arts Assessment scores (weighted totals) for each group. Repeated measures analyses of variance were conducted on Studio Habits of Mind

data to assess changes over time and to contrast these changes between the treatment and control groups to ascertain impact on project participants. Multiple regression analyses were conducted on NYS ELA and NYS math scale scores to compare treatment and control group student outcomes in 2011-2012, after controlling for multiple factors potentially related to student achievement outcomes, such as demographic factors (e.g., race, special education status, and free/reduced price lunch eligibility) and prior achievement (2009-2010 scale scores). The regression analyses included 2011-2012 fifth-grade students who participated in any number of project years, in order to allow for the inclusion of indicators of years of participation. It should be noted that each of these data points (e.g., Benchmark Arts Assessment scores, Studio Habits of Mind ratings, and ELA and math scale scores) was used to assess the success of the intervention. The Benchmark Arts Assessment was the primary measure of between-group differences in arts achievement; the Studio Habits of Mind rubric was the primary measure of growth in Studio Habits of Mind for the two groups; and the NYS ELA and Math assessments were used to assess between-group differences in ELA and math learning.

Results

Implementation Study Findings

The implementation study of the *Framing Student Success* project highlights several lessons learned from this three-year experimental demonstration of rigorous, co-equal, arts-integrated instruction in the visual arts, literacy, and math. These include the importance of collaborations and communication among artist/instructors and teachers, the ongoing need for differentiation of the curriculum units, and the challenges posed by busy schedules and the curricular shift to the CCSS beginning during project implementation.

The artist/instructors (including one of the authors of this article) reported that ongoing collaborations with Studio staff, classroom teachers, school-based arts specialists, and math and literacy coaches were a vital component of the project in that they allowed for the continuous re-alignment of the units in real time, as the units were being taught. It was also critical that the units were taught by the artist/instructors, all of whom were practicing, exhibiting professional artists with extensive experience and training in teaching elementary school children. Throughout all lessons, artists were able to model the creative process and artists' ways of seeing, thinking, and working with materials. Studio Habits of Mind were embedded seamlessly into their teaching and references to other artists' work as inspiration reflected genuine enthusiasm, authentic modeling, and their deep content knowledge. Teachers' contributions were equally critical: their ongoing involvement informed day-to-day lessons as well as the design of subsequent units. They helped artists tailor the lessons to the needs of their students, whenever possible. Differentiation was balanced with a continual effort, coordinated by Studio staff, to teach the units in the same way across each school, in order to maintain fidelity of implementation. Achieving this balance required frequent communication among the three artist/instructors and ongoing support from Studio staff. The artists found that the complexity of the integrated curriculum necessitated ongoing, informal communication with each other to solve unforeseen challenges and to share student work in progress. This communication aided a process of continual, formative assessment and refinement of the units as they were being taught.

Artist/instructors found it necessary to tailor the pacing and content of the curriculum units to the skill levels of the high-needs student populations served by the target schools. Some of the units were particularly challenging for classes serving special education students, and the artists found they had to break the lessons down into smaller chunks of information in order to reach students effectively. In some cases, they found they had to spend time re-teaching a skill that students had not mastered in earlier grades, such as cutting with scissors or measuring with a ruler. Classes facing such challenges often needed more than the allotted six weeks to complete the units, and the artists sometimes offered extra sessions at lunch time or after school to give students struggling with their motor skills additional time to practice. Often, insufficient time remained at the end of the unit to engage in planned discussions offering opportunities for reflections on lessons learned. In contrast, some classes completed the units relatively quickly and had plenty of time left for reflective discussions.

Another implementation lesson concerns the extent to which artist/instructors had to develop their own instructional skills to reinforce literacy and math skills in order to successfully collaborate with classroom teachers, after previously having focused their professional experience and teaching on visual arts skills and concepts. Some of the Studio staff and artist/instructors initially saw more natural overlap between visual arts and literacy skills (e.g., observation and reflection). However, artist/instructors reported that they learned to seize opportunities to make explicit, natural connections between visual arts and math, particularly because visual and spatial reasoning[13] are essential to both domains. Some of the artist/instructors felt less comfortable co-teaching math than they did literacy, and they requested support and mentoring from the artists who were more comfortable incorporating math skills into art instruction. The artists also worked with classroom teachers to teach the math and literacy skills in a manner aligned with their daily classroom instruction. Most classroom teachers were engaged co-teachers, but often struggled to find enough time to teach planned supplemental lessons between sessions (e.g., having students engage in writing assignments related to their art work).

As planned at the outset of the project, collaborations among teachers and visual arts specialists were encouraged when specialists were able to observe and support the arts-integrated lessons as they were taught by the artist/instructors. Although the busy schedules of specialists, often responsible for all visual arts instruction in their schools, sometimes prevented their regular participation in *Framing Student Success* lessons, both visual arts and classroom teachers reported that they are more likely to collaborate to implement an arts-integrated unit after participating in the project.

Two of the three treatment school visual arts specialists continued to teach the *Framing Student Success* curriculum units after the project moved on to the next grade level, and after the project ended completely. In some cases, the arts specialists taught the units on their own, without any collaborations with classroom teachers, whereas, in other cases, classroom teachers supported the arts specialists' teaching of the arts portion of the units by teaching the ELA portion of the unit (e.g., by having students write about their art work). Arts specialists reported that some teachers were more interested in teaching the units than others, and they felt that the extent of their collaborations with teachers depended on teacher interest and motivation.

Several teachers indicated that they had gained a new appreciation for arts integration, particularly after seeing how the *Framing Student Success* units successfully engaged academically struggling students and students with disabilities. Still, by the end of the project, teachers felt that they would not be able to teach the arts portion of the lessons with the same

level of rigor as a trained arts educator, nor were they expected to do so. Follow-up interviews with teachers revealed that only a few have continued to teach the *Framing Student Success* curriculum units or lessons from them. Those teachers who have continued teaching the units tend to emphasize the literacy or math skills and often teach an abbreviated version of the arts lesson to enhance the literacy or math learning. However, several teachers who could not find the time to teach the units reported integrating visual arts activities into classroom lessons on their own, sometimes after discussing ideas with the school visual arts specialist.

Follow-up interviews also revealed that many teachers remained interested in collaborating with arts specialists, but few were able to do so given scheduling conflicts, such as when teacher preparation and meeting time conflicted with specialists' teaching times, and the additional demands of professional development and curriculum alignment work in preparation for the transition to the CCSS. Both teachers and specialists noted that scheduling constraints and heavy teaching loads would continue to pose a challenge to their collaborations.

Impact Study Findings

Overall, the *Framing Student Success* impact study findings indicate that the project improved treatment students' visual arts skills, literacy and math achievement, and the Studio Habit of Mind of reflecting. Findings also suggest that the project had positive impact on the arts integration skills and knowledge of treatment school classroom teachers and visual arts specialists, and on the arts integration supervisory and support skills of school administrators. Specific results for each area of impact are provided in the paragraphs below.

Student ELA and math achievement. Figure I displays mean scale scores on the NYS ELA and NYS math tests for both the treatment and control groups during each year of the project. As shown, the treatment group achieved higher mean scale scores than the control group during each year of the project in both ELA and mathematics. In ELA, the performance gap between the two groups increased slightly from 2010 to 2011 and then decreased from 2011 to 2012. In math, the performance gap between the two groups increased greatly (by almost 100%) from 2010 to 2011 and then decreased slightly from 2011 to 2012. It should be noted that math scores declined, on average, across all NYC public schools from 2010 to 2011, due to a revision of assessment scoring procedures.[14]

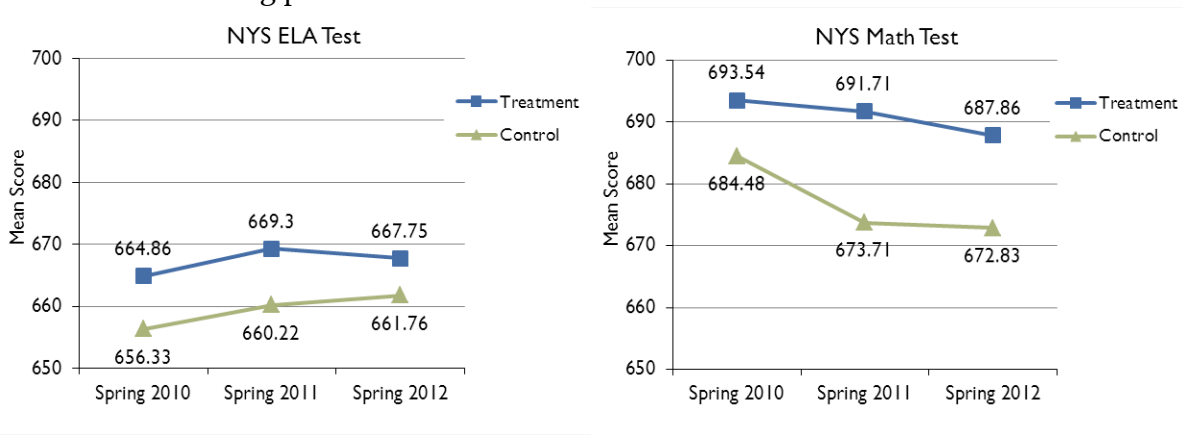

Figure I *Results of Repeated Measures Analyses of Variance: Spring 2010, 2011, and 2012 NYS Achievement Test Mean Scores*

Multiple regression analyses were conducted to assess whether there were significant differences between the treatment and control groups in 2012 ELA and math performance, holding constant 2010 (Year 1) ELA and math test scores, 2010 student demographic characteristics (race, gender, free/reduced price lunch eligibility [FRL], average daily attendance, and ELL and special education status), and years of participation in the project [dosage]). The results of these analyses indicate that, after controlling for demographics, dosage, and prior achievement, treatment group students made greater learning gains than control group students in ELA (ES=0.121 SDs; $p<0.05$) and math (ES=0.240 SDs; $p<0.001$).

Table IV
Results of Regression Models Predicting ELA and Math Scores of 5th Grade Framing Student Success Study Participants

	ELA	Math
Intercept	0.684 **	0.114
3rd Grade NYS ELA Scale Score 2010	0.437 ***	0.487***
Gender	0.059	0.040
English Language Learner 2010	-0.142 *	-0.064
Special Education 2010	-0.539 ***	-0.568***
Free or Reduced Price Lunch Eligible 2010	-0.164 **	-0.075
Average Daily Attendance 2010	0.000	0.001
Hispanic[a]	-0.262	0.045
Black[a]	-0.455 *	-0.027
Asian[a]	0.129	0.490*
Other Race[a, b]	0.228	0.286
Dosage	-0.056	-0.065
Treatment Group	0.121 *	0.240***
R^2	0.496	0.470
F	50.067	45.877

Note: Table presents unstandardized regression coefficients. Dependent variables are standardized student test scores (scale scores) from spring 2012, when students were in fifth grade.
*p<0.05, **p<0.01., ***p<0.001
[a] Dummy variable indicators of student race; comparison is to White students
[b] Other race category includes Native Americans, Native Alaskans, and Multi-Racial individuals.

In focus groups, students themselves noted that the project helped them learn math concepts, such as ratio, symmetry, and fractions, and practice ELA-relevant skills such as looking carefully at objects and talking about an author's or artist's purpose. In classroom teacher focus groups, some teachers concurred with these improvements, reporting that they observed positive changes in students' critical thinking, listening, and descriptive writing skills.

Student Studio Habits of Mind. During the third and final project year (2011-2012), treatment students demonstrated significantly more growth than control students in the skill of reflecting, according to the results of a repeated measures analysis of variance $F(92, 274) = 7.550$, $p<0.01$; ES=0.33). During the second project year (2010-2011), repeated measures analyses of variance revealed no significant differences between the treatment and control group students in fall 2010 to spring 2011 gains for any of the five Studio Habits of Mind.

Although the quantitative data did not reveal significant differences in student growth on the Studio Habits of Mind, qualitative data suggest that treatment students made gains in the habits of observation, reflection, and persistence skills. In focus groups, students reported that they developed their observation skills and gained experience reflecting on their artwork; data

also indicate that students may have learned to persist with a task after making a mistake. Students described learning to look carefully at objects, and several talked about how helpful it was to share and discuss their artwork with their peers. A few students also noted that they learned through the project that it was okay to make mistakes, which would also help them to try again and persist through completion of any given task. Given the usefulness of these "soft skills" for all types of learning, gains in these Studio Habits of Mind may support students' achievement in core academic subjects.

Qualitative data also highlighted the project's unintended impact on student engagement and self-confidence. In focus groups and interviews conducted at the end of each of the three project years, school staff consistently reported the positive impact of *Framing Student Success* participation on students' socio-emotional skills and school engagement. In focus groups, classroom teachers often commented that students were highly engaged during *Framing Student Success* lessons, resulting in a reduction in classroom behavioral problems. Several teachers also felt that students benefited from opportunities to work together as a team, as well as from the exposure to new ideas. Several treatment school staff members noted that they had observed improvements in students' self-esteem as a result of the project, and reported that it seemed to help some struggling students to become more engaged in school. Teachers also felt that students may have benefited from a sense of accomplishment, and also gained confidence, which they believed would ultimately lead to academic gains.

Student visual arts skills. Students' visual arts skills were assessed through visual arts skills assessment rubrics that were implemented as part of the treatment at the end of each curriculum unit, and through the Benchmark Arts Assessment, administered in both treatment and control schools at the end of the final project year, 2011-2012.

As shown in Figure II, 62 percent of students in the three-year visual arts skills rubric sample (N=63) scored at proficient ("meeting expectations") or advanced ("exceeding expectations") in 2009-2010 at the end of the first project year, whereas 75 percent of students in the sample achieved proficiency by the end of the third year of the project, according to frequency distributions. When disaggregated by school, the data show that the majority of students assessed in each treatment school achieved proficiency in their visual arts skills by 2011-2012. In focus groups, teachers described seeing students' arts skills and arts vocabulary improve over time. However, it should be noted that in two of the three treatment schools, T1 and T2, fewer students in the visual arts rubric sample demonstrated proficiency in the second project year. Studio staff theorized that this dip could be due to the fact that the rubrics created to accompany each unit were more rigorous in the second year, as artists became more familiar with assessment development processes. Artists may also have become more critical raters as they used the rubrics to assess each other's students, as described above.

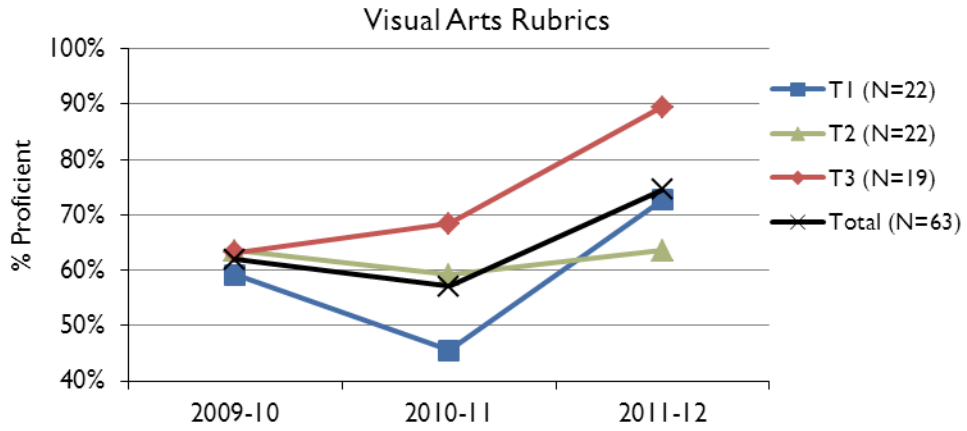

Figure II *Percentage of Treatment Student Visual Arts Rubric Data Sample Achieving Proficiency (2009-2010 to 2011-2012)*

In order to analyze the results of the Benchmark Arts Assessment, chi-square tests of independence were conducted to determine whether there were differences in the percentage of treatment and control group students performing at or above the proficient level on individual assessment items. Although the two groups performed similarly on many items, significantly greater proportions of treatment group students than control group students demonstrated proficiency on seven visual arts skills, including creating visual textures, using lines to create a drawing, knowledge of primary and secondary colors, and writing coherent reflections on artwork (X^2 range from 3.48 to 20.32; $df = 1$; $p<0.05$). However, a significantly higher proportion of control group than treatment group students demonstrated proficiency on the "handles materials competently" portion of the art making component of the Benchmark Arts Assessment ($X^2=5.46$; $df = 1$; $p<0.05$), which could be due to the fact that control students continued to receive regular arts education classes during the project, whereas many treatment students received art instruction only through the *Framing Student Success* project However, it is possible that the broad scope of this integrated curriculum diverted some of the students' attention away from the basics of working with materials. Further research would need to be conducted to confirm whether or not this is a necessary trade-off. The results for all items reflecting statistically significant differences between groups are displayed in Figure III below.
Figure III *Percent of Students Scoring Proficient on Select Spring 2012 Benchmark Arts Assessment Items*

The group means of the overall Benchmark Arts Assessment scores (weighted totals) were compared across the treatment and control groups using an independent samples *t*-test to assess overall differences in visual arts skills proficiency between the groups. Treatment group students achieved a mean total score of 66.54, which was 2.83 points higher than the mean total score of control group students. However, this difference was not found to be statistically significant (p=.959).

School staff outcomes. Survey data indicated that *Framing Student Success* positively influenced the skills and knowledge of classroom teachers and visual arts specialists. At the end of each of the three years of the project, the majority of classroom teachers agreed or strongly agreed on the post-survey that *Framing Student Success* influenced their skills related to

communicating with students about arts achievement. In addition, some treatment teachers reported in focus groups that they were more likely to mention students' arts skills during parent-teacher conferences. Comparisons of pre-post data revealed that approximately half of teachers had greater knowledge of the visual arts curriculum, i.e., the *Blueprint*, after the project. In focus groups, teachers reported that they became more comfortable teaching visual arts over time and began to see the value of arts integration, as they saw how well it could engage students and help them understand academic subjects. They reported that the project made them more aware of the value of art as an "access point" for other subject areas and helped them see opportunities to incorporate visual arts within the school curriculum. Some teachers reported using specific teaching strategies they had learned from the artist/instructors, including showing students how to "zoom in" and focus on details, which they connected to writing activities, and explaining to students that making mistakes is OK. Finally, several teachers reported in focus groups that working with the teaching artist taught them to be more patient with students and to appreciate diversity in their students' choices towards art making.

In each year of the project, the visual arts specialists in all three treatment schools reported on surveys that the project influenced their skills related to communicating with students about arts achievement and using assessment rubrics. They also reported that the project improved their knowledge of the upper elementary school ELA and math curricula, particularly in the areas of writing and math skills. All three visual arts specialists indicated on surveys that the project positively influenced their job satisfaction and peer collaboration skills. In interviews, visual arts specialists reported that they learned new teaching techniques from the artist/instructors, such as having students go on "gallery walks" to view each other's work and gathering students in a group to give them a clear, close-up view of demonstrations showing how artists can work with each medium.

School administrators indicated on surveys and in interviews that *Framing Student Success* benefited their schools' arts curriculum and their own supervisory skills. Treatment school administrators reported positive impact on their skills related to supervising and supporting a standards-based arts-integrated curriculum program. On surveys, 90 percent of administrators indicated they are now better equipped to provide feedback to teachers on arts-integrated lessons, to assess student artwork, and to communicate with students about their achievement in the arts. They also have a better understanding of the *Blueprint*, after participating in the three-year *Framing Student Success* project. Furthermore, all administrators reported that the project influenced their overall support for arts integration in their schools.

Discussion/Conclusions

As a randomized control trial study, the *Framing Student Success* project provides an uncommon example of rigorous research on interdisciplinary lessons linking arts, literacy, and math standards-based instruction, and demonstrates the potential impact of such lessons for students growing up in poverty. Results indicate that rigorous interdisciplinary instruction that teaches visual arts, literacy, and math skills, and supports cognitive skill development, can increase students' literacy and math learning while nurturing their art making skills and enhancing their ability to reflect meaningfully on their own work and that of their peers. When appropriately supported, students may see the connections among visual arts, math, and literacy skills and concepts.

The *Framing Student Success* project also provides an unusual example of lessons in which math skills were used to create art, in contrast with the more common practice of presenting art skills as subservient to other disciplines. For example, students applied their prior knowledge of fractions to create a composition based on halves or thirds and used their familiarity with scalene and isosceles triangles to help them draw more accurately a butterfly's wings.

Framing Student Success students may have gained new ways to think about and explore other subjects through art and art making, while developing their verbal and written descriptive language skills. This study shows that through the integration of math and literacy with art making, students may have developed a greater appreciation for the relationships among domains. As one student explained, "I never realized before how art was not just making things, but about learning and understanding stuff, not just about art, but science and social studies and math and ELA…..how everything is connected."

Despite its limitations, among them a small sample size, high levels of student mobility, and teachers' limited availability for professional development and collaborative curriculum design, the *Framing Student Success* study provides evidence that, when characterized by high-quality arts teaching and standards-based instruction in all subject areas, rigorous arts integration can positively impact student learning. The study findings support the claim that explicit conceptual and skill-based connections between subject areas can facilitate transfer and impact learning in multiple areas.

Findings also highlight the importance of collaborative relationships between arts specialists and other educators in dealing with the complex tensions and opportunities that arise when crossing disciplinary boundaries. Moreover, the study shows that training and embedded professional development can build the capacities of teachers and arts educators to implement an interdisciplinary curriculum and provide additional tools to teach engaging lessons addressing multiple capacities. Possible directions for further research on rigorous, co-equal, visual arts, ELA, and math instruction include replication with a larger sample size and testing of the effects of more explicit teaching of Studio Habits of Mind. Future studies could also investigate factors facilitating the sustainability of similar interventions, including the characteristics of successful cross-disciplinary, collaborative working relationships among arts educators and classroom teachers.

References

Bresler, L. (1995). The subservient, co-equal, affective, and social integration styles and their implications for the arts. *Arts Education Policy Review*, *96*(5), 31-37.

Brewer, T. M. (2002). Integrated curriculum: What benefit? *Arts Education Policy Review*, *103*(4), 31-36.

Burnaford, G. (2007). Arts Integration Frameworks, Research & Practice. A Literature Review. *Arts Education Partnership*.

Burnaford, G., Brown, S., Doherty, J., & McLaughlin, J. (2007). *Arts integration frameworks, research and practice: A literature review*. Washington, DC: The Arts Education Partnership.

Burton, J. M., Horowitz, R., & Abeles, H. (2000). Learning in and through the arts: The question of transfer. *Studies in Art Education*, *41*(3), 228-257.

Catterall, J.S., & 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: The Arts Education Partnership.

Coleman, D. CCSS architect, president, College Board, *ARTSblog*, 17 September 2013.

Darling-Hammond, L., & McLaughlin, M. W. (1995). Policies that support professional development in an era of reform. *Phi Delta Kappan*, 76 (8), 597–604.

Hetland, L., & Winner, E. (2004). Cognitive transfer from arts education to nonarts outcomes: Research evidence and policy implications. *Handbook of research and policy in art education*, 135-162.

Hetland, L., Winner, E., Veenema, S., & Sheridan, K. M. (2007). *Studio Thinking: The Real Benefits of Arts Education*. Teachers College Press. 1234 Amsterdam Avenue, New York, NY 10027.

Horowitz, R. (2005). *Connections: The Arts and Cognitive, Social and Personal Development.* Presented at the annual meeting of the American Educational Research Association, April 2005.

Ingram, D., & Reidell, E. (2003). *Arts for academic achievement: What does arts integration do for students?* Minneapolis, MN: Center for Applied Research and Educational Improvement.

Ingram, D., & Seashore, K. (2003). *Arts for academic achievement: Summative evaluation report.* Minneapolis, MN: Center for Applied Research and Educational Improvement.

Lee, V. L., Dedrick, R.F., & Smith, J.B. (1991). The Effect of the Social Organization of Schools on Teachers' Efficacy and Satisfaction. *Sociology of Education (64)* 3, p. 190-208.

Maslach, C., Jackson, S. E., & Leiter, M. P. (1996). Maslach burnout inventory manual (3rd ed.). Palo Alto, CA: Consulting Psychologist Press.

Hirsh, S. (2009). A new definition. *Journal of Staff Development*, 30(4), 10–16

Ingram, D. & Meath, J. (2007). *Arts for Academic Achievement: A Compilation of Evaluation Findings from 2004-2006*. Center for Applied Research and Educational Improvement: St. Paul, MN.

Mishook, J. J., & Kornhaber, M. L. (2006). Arts integration in an era of accountability. *Arts Education Policy Review*, *107*(4), 3-11.

New York City Department of Education. (2004). *Blueprint for Teaching and Learning in the Arts: Grades K-12*.

Parsons, M. J. (1998). Integrated curriculum and our paradigm of cognition in the arts. *Studies in Art Education*, 103-116.

Perkins, D. N., & Salomon, G. (1992). Transfer of learning. *International encyclopedia of education*, *2*.

Rabkin, N., & Redmond, R. (2004). Putting the arts in the picture. In N. Rabkin & R. Redmond (Eds,), *Putting the arts in the picture: Reframing education in the 21st century*. Chicago, IL: Columbia College Chicago.

Randi Korn & Associates (2010). *Educational Research: The Art of Problem Solving*. Prepared for Guggenheim Museum, New York, NY. Randi Korn & Associates.

Russell, J., & Zembylas, M. (2007). Arts integration in the curriculum: A review of research and implications for teaching and learning. *International handbook of research in arts education*, 287-312.

Stamm, B. H. (2005). The ProQOL manual. Retrieved July 16, 2007 from http://www.isu.edu/~bhstamm.

Wenglinsky, H. (2000). How teaching matters: Bringing the classroom back into discussions of teacher quality. Princeton, NJ: Educational Testing Service.

Werner, L.R. (2002). *Artist, teacher and school change through Arts for Academic Achievement: Artists reflect on long-term partnering as a means of achieving change*. Minneapolis, MN: Center for Applied Research and Educational Improvement.

What Works Clearinghouse (WWC) *Procedures and Standards Handbook* (v 3.0, 2014)

Winner, E., & Cooper, M. (2000). Mute those claims: No evidence (yet) for a causal link between arts study and academic achievement. *Journal of Aesthetic Education*, *34*(3/4), 11-75.

1 Studio links NYC public schools with local professional artists to provide high-quality visual arts programs for students in grades pre-K through 12.

2 A tool kit for implementation of the *Framing Student Success* project, including videos and unit plans, is available on the Studio in a School website at www.studioinaschool.org.

3 In 2003-2004, STUDIO's President, Thomas Cahill, co-chaired with Barbara Gurr, Director of Visual Arts for the NYC Department of Education, an extensive collaborative effort with representatives of other cultural organizations, museums, universities, and art schools, resulting in the NYC *Blueprint for Teaching and Learning in the Arts* (Visual Arts).

4 Job-embedded professional development is distinct from teacher professional development that occurs in a workshop or class format outside of the classroom. In this case, teachers were given the opportunity to learn new skills while working with their students in the classroom, supporting and observing the artist/instructors as they led the lessons.

5 The five specific Studio Habits of Mind that are the focus of the *Framing Student Success* project were drawn from a broader set of meta-cognitive skills; the five habits selected for the study were selected because they were most likely to show up in overall classroom behavior (and classroom teachers were to do the assessment here), while the other three habits—"develop craft," "express," and "understand art world" would be assessed by trained artists through other methods. The Studio Habits of Mind were researched and developed by Project Zero at Harvard University, in a project led, in part, by Lois Hetland. A detailed description of the Studio Habits of Mind and the research behind them can be found in: Hetland, Winner, Veenema, & Sheridan (2007). *Studio thinking: The real benefits of visual arts education*. Teachers College Press.

6 Six schools meeting this set of eligibility requirements were identified during the project planning year and invited to participate in the study. All six schools signed a memorandum of understanding agreeing to participate as a treatment or control school prior to the random assignment process.

7 The NYC DOE provided all available student data for the treatment and control students. Those missing test scores could have been absent on testing dates or excused from the assessments by their parents.

8 Each of the three artist/instructors was assigned to assess students at another site and was not involved in assessing his or her own students. Note that visual arts rubric assessment data were obtained for a sample of *Framing Student Success* treatment school students (126 in 2009-2010, 84 in 2010-2011, and 80 in 2011-2012). Students in two classrooms in each of the three treatment schools were selected for this sample in 2009-2010 and tracked and assessed in 2010-2011 and 2011-2012. Not all students in the original sample were assessed due to student mobility and other issues.

9 Arts Achieve is a NYC Department of Education project supported by a U.S. Department of Education Investing in Innovation ("i3") grant under the Race to the Top initiative.

10 Inter-rater reliabilities were not obtained for the Studio Habits of Mind rubric, and teachers were not trained, in order to assure that treatment and control group teachers had the same level of knowledge about the rubric.

11 The Maslach Burnout Inventory-Educator Survey was originally developed by Maslach and Jackson in 1981 and was updated by Maslach, Jackson, and Leiter in 1996. The inventory examines symptoms of burnout in teachers. The MBI has 22 items that factor into three subscales—Emotional Exhaustion, Personal Accomplishment, and Depersonalization. Respondents use a seven-point Likert-type scale to indicate how frequently they feel the way the statement indicates (e.g., "I feel emotionally drained from my work."), where 0 is "Never" and 6 is "Everyday." Coefficient alpha reliabilities are strong for the three subscales, with the Emotional Exhaustion scale being the most internally consistent (.88 and .90 for Emotional Exhaustion, .76 and .74 for Depersonalization, and .76 and .72 for Personal Accomplishment in two large studies) (Iwanicki & Schwab, 1981). Test-retest coefficients based on a 2- to 4-week interval range from .60 to .82 (mean r = .74) (Maslach & Jackson, 1981). Furthermore, the convergent validity of the instrument was demonstrated through significant correlations between scores on the MBI-ES and external criteria, including observations, dimensions of job experience, and personal outcomes (Maslach & Jackson, 1981).

12 The Professional Quality of Life Scale (ProQOL) measures participants' perceptions of the quality of their professional lives. The items were reworded for the present study as per the author's directions to specifically address the teaching profession. The ProQOL is comprised of three distinct scales: Compassion Satisfaction, Burnout, and Compassion Fatigue/Secondary Trauma. These scales do not yield an overall composite score. Compassion Satisfaction relates to the pleasure that an individual derives from helping others through his or her work. Higher scores indicate a greater degree of satisfaction that is derived. Burnout is associated with negative feelings about one's work that suggest hopelessness, lack of effectiveness, and low levels of support. Higher scores indicate a greater risk for

burnout. Compassion Fatigue/Secondary Trauma indicates exposure to traumatic events through the individuals with whom one works. Higher scores on this subscale indicate a greater amount of compassion fatigue or secondary trauma. Coefficient alpha reliabilities are .87 for Compassion Satisfaction, .80 for Compassion Fatigue/Secondary Trauma, and . 72 for Burnout. According to Stamm (2005), the scales do in fact measure different constructs, with low levels of collinearity.

13 Visual and spatial reasoning involves mental operations on 2- dimensional shapes and 3-dimensional forms in space.

14 http://www.oms.nysed.gov/press/Regents_Approve_Scoring_Changes.html