



Museum Visitor Studies, Evaluation & Audience Research

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Solomon R. Guggenheim Museum
Teaching Literacy Through Art

Final Report:
Synthesis of 2004-05 and 2005-06 Studies

Executive Summary and Discussion

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EXECUTIVE SUMMARY

This report presents findings from the 2004-06 *Teaching Literacy Through Art* research study of the *Learning Through Art* program (*LTA*) conducted by Randi Korn & Associates, Inc. (RK&A), for the Solomon R. Guggenheim Museum in New York, New York. The Guggenheim Museum received a three-year Arts in Education Model Development and Dissemination grant from the U.S. Department of Education to study the impact of the *LTA* program on students in the New York City public school system. This is the final report of the study, and it synthesizes data from both the 2004-05 and 2005-06 school years.

Selected highlights of the study are included in this summary. Please consult the body of the report for a detailed account of the findings.

RESEARCH DESIGN

Sample

RK&A employed a quasi-experimental design to examine *LTA*'s impact on students and teachers, selecting four schools along specific demographic, socioeconomic, and literacy criteria: P.S. 86 and P.S. 94 in the Bronx and P.S. 148 and P.S. 149 in Queens¹. To minimize variability and afford the opportunity to examine standardized test scores, third-grade classes from each school were selected at random to participate in the study (see Table A).

Table A
Sample Description

School	Group	Definition	Number of Third-Grade Classes
P.S. 86	Treatment A	Students received <i>LTA</i> program	6
	Treatment B	Students received <i>LTA</i> program and teachers received <i>LTA</i> professional development	6
P.S. 148	Treatment A	Students received <i>LTA</i> program	6
	Treatment B	Students received <i>LTA</i> program and teachers received <i>LTA</i> professional development	6
P.S. 94	Control	Students and teachers did not participate in <i>LTA</i> program	9
P.S. 149	Control	Students and teachers did not participate in <i>LTA</i> program	3

¹In the 2005-06 school year, P.S. 149 was not eligible to act as the control school because students participated in an arts program provided by another organization—contrary to the agreement the school had with the Guggenheim Museum. Instead, for the second year of the study, additional classes at P.S. 94 served as the control group. The socioeconomic and academic performance of P.S. 94 matched both P.S. 86 and P.S. 148. Additionally, in the 2004-05 study, no statistically significant differences were found between P.S. 94 and P.S. 149.

Study Objectives and Research Hypotheses

RK&A designed the research plan to measure two sets of *LTA* program outcomes: the teacher, teaching artist, and student outcomes of the program (e.g., whether *LTA* met its stated goals and objectives) and critical thinking and literacy-related teacher and student outcomes (e.g., whether *LTA* impacted the way teachers teach and students' abilities).

To summarize, RK&A hypothesized that Treatment Group students would have more positive school- and art-related attitudes as well as higher literacy achievement than would Control Group students. In terms of specific treatments, the evaluators hypothesized that the combination of the *LTA* program and extended teacher professional development (Treatment Group B) would have a greater impact on students' attitudes toward reading, literacy skills, and scores on the Third Grade Citywide English Language Arts Test than would the program alone (Treatment Group A).

Data Collection and Analysis

RK&A hired and trained research assistants—who did not know the research hypotheses—to conduct observations and interviews as well as code and enter data. When appropriate, two research assistants independently and simultaneously collected or analyzed data to enable RK&A to test inter-rater reliability. To compare experimental groups and program elements, RK&A performed chi-square tests, analyses of variance, analyses of covariance, and multiple regressions. **In the Executive Summary and throughout the report, only statistically significant differences are reported.**

I. PRINCIPAL FINDINGS: STUDENT QUESTIONNAIRES

The combined data set includes 605 third-graders who completed questionnaires: 215 from Treatment Group A, 190 from Treatment Group B, and 200 from the Control Group.

Student Characteristics

- 51 percent of students were female and 49 percent were male.
- The median age of students was nine years.
- 75 percent speak English and one other language at home (most often Spanish).
- 89 percent of Treatment Group students and 88 percent of Control Group students had never visited the Guggenheim Museum with their families.

Student Attitudes and Perceptions

- Overall, students expressed positive attitudes toward school, reading, and class participation.
- There were no statistically significant differences between the Treatment and the Control Groups' students' attitudes toward school and reading; however, more Treatment Group students said they enjoyed working with their classmates on projects than did Control Group students.
- Overall, students expressed positive attitudes about making, looking at, and discussing works of art.
- More Treatment Group students agreed with the statement, "I enjoy talking about artwork by well-known artists," than did Control Group students.
- Overall, students accurately described making artwork as process-oriented. Nearly all stated that if they were to make a mistake while working on an art project at school they would "keep working on it and try to fix it" or problem-solve with their teacher or classmates.
- More Control Group students than Treatment Group students inaccurately described the artistic process—stating they would "feel sad," "feel mad," "throw away their project and start over," and/or "give up and do something else" if they made a mistake on an art project. In total, Treatment Group students had a higher artistic process score (i.e., more positive perceptions of the artistic process) than did Control Group students.
- About one-half of students described an artist as someone who "works hard and practices."
- However, more Control Group students described an artist as someone who "draws really well" and "makes beautiful things" than did Treatment Group students. Conversely, more Treatment Group students described an artist as someone who "has good ideas" and "experiments with different materials" than did Control Group students.

- Overall, students expressed positive attitudes toward art museums. However, more Treatment Group students indicated that they would bring their families to an art museum than did Control Group students.
- Additionally, Treatment Group students had a higher total art museum attitude score (i.e., a more positive attitude toward art museums) than did Control Group students.
- Nearly all Treatment Group students had positive attitudes toward *LTA*.
- Treatment Group students most often selected “taking a field trip to the Museum,” “getting to use different materials,” and “working with a real artist” as their favorite aspects of *LTA*.

II. PRINCIPAL FINDINGS: STUDENT INTERVIEWS

A total of 565 third-graders completed interviews: 207 from Treatment Group A, 188 from Treatment Group B, and 170 from the Control Group.

Word Count and Grade Level

- On average, students’ interviews were at a sixth-grade reading level. Treatment Group students’ responses were at a higher grade level than were those of Control Group students.
- Students used, on average, 551 words during the entire interview, 264 words in the discussion of the Gorky painting, and 288 words in the discussion of the Kadohata text.
- Treatment Group students used more words during the entire interview and in the discussion of the Gorky painting than did Control Group students.

Interview Content Analysis

- When the content of students’ responses to the Gorky painting were scored for six literacy characteristics², RK&A found that Treatment Group students scored higher on five of the six characteristics compared with Control Group students.
- For the Kadohata text, Treatment Group students scored higher on five of the six literacy characteristics than did Control Group students.
- The stepwise multiple regression model³ that predicts a higher Gorky painting score includes three significant variables: a high word count, participating in *LTA* (i.e., being in the Treatment Group), and a more positive attitude toward art (i.e., a higher total score on six art attitude scales).

² For a description of the literacy characteristics measured, see Appendix Q for the student interview scoring rubric.

³ RK&A conducted stepwise multiple regression analyses to identify the models that predict the characteristics of students who had higher interview scores (i.e., demonstrated greater literacy skills).

- The stepwise multiple regression model that predicts a higher Kadohata text score includes two significant variables: a high word count and participating in *LTA* (i.e., being in the Treatment Group).

III. PRINCIPAL FINDINGS: STUDENT TEST SCORES

In 2005 and 2006, the four schools provided New York Citywide English Language Arts Test (ELA) performance level scores for 472 third-graders: 338 from the Treatment Groups and 134 from the Control Group.

- 62 percent of students scored at levels three and four on the ELA test, while 38 percent scored at levels one and two. There were no statistically significant differences between the ELA performance levels of the Treatment and Control Groups.
- RK&A found correlation between the ELA test and the *LTA* metrics. Students who achieved level three and four scores on the ELA test received higher total interview scores for both the Gorky painting and the Kadohata text than did those who achieved level one and two scores.

In 2006, the four schools also provided ELA scale scores for 214 third-graders: 160 from the Treatment Groups and 54 from the Control Group.

- The mean ELA scale score of Treatment Group students (mean = 667.1) did not differ significantly from the mean ELA scale score of Control Group students (mean = 672.6).
- Stepwise multiple regression analysis found that a higher total Kadohata text interview score was associated with a higher ELA scale score.

IV. PRINCIPAL FINDINGS: STUDENT CASE STUDIES (2005-06 ONLY)

Throughout the 2005-06 school year, RK&A conducted case studies of four treatment school students. Each case study consisted of two to four observations of the students, two to four in-depth interviews with the students, and in-depth interviews with the students' classroom teacher, teaching artist, and parent

Case Study One

Student one, a nine-year-old girl, was a third-grade student at P.S. 86 identified as high-achieving.

- Observations and interviews indicate that Case Study One functions best when working independently on assignments with specific rules and guidelines. Nevertheless, though Case Study One performed well in structured lessons, she displayed little enthusiasm for her school work.

- Though Case Study One is high-achieving by conventional academic pen-and-paper standards, she appeared challenged by open-ended assignments—a hallmark of *LTA*. She had a difficult time starting and completing art-making assignments, and showed little enthusiasm for these activities.
- Inquiry lessons also challenged Case Study One because of the open-ended nature of the questions (no right or wrong answers) and the fact that she had to speak in front of a group.
- Though Case Study One appeared relatively untouched by *LTA*, there were some hints that at least one aspect of the program had influenced her. The classroom teacher noted that the student had developed visual literacy skills by looking at works of art.

Case Study Two

Student two, a nine-year-old girl, was a third-grade P.S. 86 student who was identified as low-achieving.

- Observations and interviews indicate that Case Study Two is a student with low self esteem who struggles to do well in school. She demonstrated difficulty staying on task, and was easily distracted during regular classroom and *LTA* sessions.
- Crediting *LTA*, the teaching artist and classroom teacher noticed that Case Study Two's self esteem and critical thinking abilities improved during the year. The teaching artist recalled Case Study Two as an easily frustrated student—especially in the beginning of the year—but she noticed a marked improvement in the student's persistence during the program.
- The classroom teacher said that *LTA* had positively impacted Case Study Two in two ways: it gave her a chance to use her visual learning abilities, which may have been a new experience for her; and it allowed her to speak in class without others judging her response.

Case Study Three

Student three, a nine-year-old boy, was a third-grade P.S. 148 student who was identified as high-achieving.

- Interviews and observations indicate that Case Study Three is a high-achieving student with strong analytical and comprehension abilities, yet inconsistent in his classroom performance.
- Case Study Three was highly enthusiastic about *LTA*. His mother said he talked about the program often, and the classroom teacher said Case Study Three thrived in *LTA*. She explained that he performed best when allowed to express himself verbally, and *LTA* gave him many opportunities to do so.
- The classroom teacher and teaching artist agreed that Case Study Three was most

influenced by *LTA* inquiry lessons. They explained that the approach was ideal for his verbal willingness and analytical skills, especially when it came to his own artwork. The teaching artist said she believed the predictability and structure of questioning in inquiry helped Case Study Three access his reflective abilities.

Case Study Four

Student four, a nine-year-old girl, was a third-grade P.S. 148 student who was identified as low-achieving.

- Though described as a low-achieving student, Case Study Four demonstrated just the opposite in all four observations. In fact, Case Study Four appeared to be a model student in every sense of the word.
- The classroom teacher confirmed that Case Study Four had been labeled as low-achieving based on her low reading levels and comprehension in the second grade, but that she has dramatically improved throughout her third grade school year. The teacher said Case Study Four showed great confidence in her skills by always wanting to show and read her work to her peers.
- The teaching artist and classroom teacher talked at length about Case Study Four's critical thinking abilities as displayed in *LTA* inquiry lessons. The classroom teacher said that inquiry has helped her in all her subjects. Additionally, she said that *LTA* has helped Case Study Four develop better reading and comprehension skills by improving her decoding and focusing skills.

V. PRINCIPAL FINDINGS: TEACHER QUESTIONNAIRES

In May 2005 and May 2006, RK&A surveyed all participating third-grade classroom teachers. Of twenty-six teachers in the study, eight participated only in the 2004-05 school year (two teachers in Treatment Group A and six teachers in the Control Group), ten participated in the 2004-05 and 2005-06 school years (four teachers in Treatment A and six teachers in Treatment B), and eight participated only in the 2005-06 school year (two teachers in Treatment A and six teachers in the Control Group).

Class and Teacher Characteristics

- In 2004-05 and 2005-06, teachers had an average class size of 22 students. In both study years, Treatment classes had a smaller average class size than did Control classes.
- In 2004-05 and 2005-06 the majority of students were considered mainstream. In 2005-06, there were more ESL students in the Control Group than in the Treatment Group.
- In 2004-05, Control Group teachers had more experience than did Treatment Group teachers (12 years vs. six years). In 2005-06, Control and Treatment Group teachers had

similar teaching experience (six years).

- For both 2004-05 and 2005-06 teachers, the average number of years teaching at their current school was five years. For both 2004-05 and 2005-06 teachers, the average number of years teaching third grade was three years. Among 2004-05 teachers, Control Group teachers had taught third grade for more years than had Treatment Group teachers (five years vs. two years).
- The 2004-05 teachers reported spending an average of 12 hours a week on literacy and literacy-related activities, and 2005-06 teachers reported spending an average of 11 hours a week on literacy and literacy-related activities.

Experiences with the Arts

- In 2004-05 and 2005-06, none of the Control Group classroom teachers were participating in any visual arts programs, and *LTA* was the only visual arts program in which Treatment Group classroom teachers were participating.
- In 2004-05, teachers in the Treatment and Control Groups reported having similar levels of training in the visual arts. On a scale from 1 (I have no training in the visual arts) to 7 (I have a lot of training in the visual arts), the 2004-05 teachers' overall mean rating was 3.1. In 2005-06 Treatment Group teachers reported having more training in the visual arts than did Control Group teachers (Treatment mean = 3.5 vs. Control mean = 1.7).
- The 2004-05 and 2005-06 teachers expressed positive attitudes toward art museums and about interacting with works of art on a series of seven-point scales.
- The 2004-05 and 2005-06 Treatment Group teachers gave the teaching artists' lessons high ratings on a series of seven-point scales. They reported that the art-making projects were a high-quality experience and the art discussions worked well for their students. Treatment teachers also said the teaching artists' lessons supported the curriculum.
- The 2004-05 and 2005-06 Treatment Group teachers also gave the *LTA* program high ratings on a series of seven-point scales. They reported that the *LTA* program increased their confidence in discussing artwork with their students and was enriching for their students. They also reported that they learned new strategies for teaching with art and indicated that they would participate in the program again.
- Nearly all of the 2004-05 and 2005-06 Treatment Group teachers said having a professional, working artist in the classroom was their favorite aspect of *LTA*.

VI. PRINCIPAL FINDINGS: OBSERVATIONS (2004-05 ONLY)

Throughout the spring 2005 semester, data collectors observed the two teaching artists 35 times—17 times with Treatment Group A classes and 18 times with Treatment Group B classes. The six Treatment Group B classroom teachers were observed 22 times during *LTA*-related lessons.

Teaching Artist Observations

- During the teaching artists' lessons, the majority of students demonstrated six of the ten behaviors in the *LTA* rubric, including engagement while making artwork, enthusiasm when responding to works of art, and active participation in class discussions about art. Problem-solving related to the art-making process and three aspects of active listening—asking questions, restating comments, and building on comments during class discussions—were observed less often.
- Teaching artists incorporated active listening, positive classroom climate, and art-making demonstration at the most accomplished level during more than one-half of their lessons. They incorporated critique/reflection of students' artwork and art-making problem solving at less accomplished levels.
- During discussions about works of art, teaching artists asked open-ended questions, used wait time and follow-up questions, and asked for evidence during more than one-half of their lessons. They encouraged thorough description, integrated factual information, and asked questions that supported curriculum-based themes during less than one-half of their lessons.
- For all of the categories described in the two previous bullet points, Teaching Artist One received higher observation scores for all student and teaching artist behaviors compared with Teaching Artist Two. However, no correlations among teaching artists and students' questionnaire responses and interview scores existed.
- Of the behaviors teaching artists displayed during discussions about how to create artwork, they frequently modeled art techniques and processes as well as referenced works of art that students had viewed, but infrequently made connections to the classroom curriculum.
- During 40 percent of the teaching artists' lessons, classroom teachers were highly active and effective.

Classroom Teacher Observations

- During the classroom teachers' inquiry lessons, students demonstrated hypothesizing, extended focus, evidential reasoning, and building schema at moderate to high degrees; whereas, their demonstrations of multiple interpretations and thorough description varied.
- During more than one-half of the classroom teachers' inquiry lessons, teachers elicited multiple responses, accepted/validated many interpretations, asked for interpretations, showed enthusiasm for the lesson, demonstrated schema building, and asked appropriate,

open-ended questions at the accomplished level.

- During more than one-half of the classroom teachers' inquiry lessons, teachers summarized and linked skills used for looking at works of art and reading text (i.e., demonstrated transfer) at the beginning level.
- Teachers' implementation of inquiry varied; however, none of the differences were statistically significant.

VII. PRINCIPAL FINDINGS: TEACHING ARTIST AND CLASSROOM TEACHER INTERVIEWS (2004-05 AND 2005-06)

2004-05 Interviews

In June 2005, two teaching artists and 11 Treatment Group classroom teachers participated in telephone interviews.

Teaching Artist Interviews

- Both teaching artists had positive experiences working with their assigned schools, describing their interactions with the classroom teachers as productive and collaborative.
- Teaching artists also appreciated the Guggenheim staff for their logistical and material support as well as their reflective natures and willingness to make changes to the program.
- When asked how they might modify their lessons next year, both teaching artists said they would try to integrate their lessons with the curriculum earlier in the planning process.
- Both teaching artists complimented *LTA*'s professional development, describing it as useful and noting that they had applied what they had learned in their lessons.
- Both teaching artists said *LTA* had positively impacted them, the classroom teachers, and the students. In particular, the two teaching artists said that learning inquiry strategies was powerful for them and for the classroom teachers. Additionally, they said students had developed a relationship with art and gained confidence in interacting with works of art.

Classroom Teacher Interviews

- All classroom teachers praised *LTA* for providing their students with engaging and enjoyable experiences, in particular having the opportunity to work with the teaching artist and visit the Guggenheim Museum. Teachers also described the program as well-managed.
- Most classroom teachers said the teaching artists' lessons and projects connected to the curriculum. In contrast, two teachers from Treatment Group A saw no relationship

between the teaching artists' lessons and the curriculum; however, they still said the program benefited their students.

- All Treatment Group B teachers who received the extended professional development found it highly useful, noting that they had gained experience and confidence in using inquiry both with works of art and with texts. This is particularly noteworthy, as teachers were selected at random.
- Nearly all classroom teachers said *LTA* had positively impacted their teaching practice. All Treatment Group B teachers said they had gained skills to integrate inquiry and art in their curriculum. Two Treatment Group A teachers said the program had encouraged them to interact more with their students, while another said she felt more comfortable with art. In contrast, two teachers in Treatment Group A said *LTA* had no impact on them.
- All classroom teachers said *LTA* had enhanced their students' personal and intellectual development including—for a few Treatment Group B teachers and one from Treatment Group A—improvements in students' communication and reading skills.

2005-06 Interviews

In June 2006, three teaching artists and 11 Treatment Group classroom teachers participated in telephone interviews.

Teaching Artist Interviews

- All the teaching artists said *LTA* was important, because, aside from its direct impact on students, it: improves schools, provides enriching opportunities to young people who would otherwise not have them, and presents a model of excellence.
- Regarding the program's administration, teaching artists praised the Guggenheim's organization and recognized it as a model for best practices.
- Teaching artists expressed some frustration about their collaborations with classroom teachers. Two of the teaching artists said their classroom teachers were not invested in the collaboration.
- Overall, teaching artists most appreciated *LTA*'s professional development for giving them the opportunity to share with and learn from one another.
- All the teaching artists said *LTA* had positively impacted them, the classroom teachers, and the students. They said *LTA* has led them to try things with students that they had never done before, and that they have changed their teaching styles as a result of their positive experiences. Teaching artists also said the program allows classroom teachers to discover hidden talents in their students and learn new methods for reaching those who have been known to be non-participatory or below-average in their performance. And finally, they said that by looking at and creating art, students learned to observe, appreciate, interact with, and contribute to everything that surrounds them.

Classroom Teacher Interviews

- All classroom teachers praised *LTA* for providing their students with engaging and enjoyable experiences, in particular having the opportunity to work with the teaching artist and visit the Guggenheim Museum. Teachers also described the program as well-managed.
- When discussing how well the teaching artists' activities connected with their curricula, classroom teachers were, for the most part, pleased. Most classroom teachers provided examples of where connections were made. Of these examples, most were concrete and determined by the content of the curriculum or available artwork.
- Overall, classroom teachers who participated in the extended professional development had positive experiences. They said they found the opportunity to share ideas with other *LTA* teachers, planning and researching time with teaching artists, learning to lead inquiries, and establishing a rapport with the program's leaders especially helpful.
- Classroom teachers said that their Guggenheim experiences had noticeable impacts on their teaching. Most said that since participating in the program, they have found more ways to incorporate art and creativity into their classrooms, enabling them to reach more students—including some who had been difficult to engage—in more subjects, including math and reading.
- When speaking about their students' participation in the program, most classroom teachers excitedly related the "positive," "profound," and "tremendous" impacts it has had on them simply by exposing them to so many new experiences at once. Among these experiences, classroom teachers most frequently repeated that creating art and visiting the Guggenheim were especially momentous.

DISCUSSION

The Guggenheim Museum's *Learning Through Art (LTA)* is a highly successful program. It achieved its stated program goals and met objectives regarding relevant New York State English Language Arts Learning Standards. Furthermore, *LTA* positively impacted participating students and classroom teachers—in terms of their learning and personal development. Most strikingly, RK&A found strong correlations between students' participation in *LTA* and improved critical thinking and literacy skills in their discussions of both a work of art and a text selection. In other words, students who participated in *LTA* demonstrated they had transferred critical thinking skills learned in discussing works of art to interpreting texts.

PROGRAM IMPLEMENTATION

Prior to receiving the Arts in Education Model Development and Dissemination grant, staff at the Guggenheim Museum worked with RK&A to articulate the goals and objectives of *LTA* and develop criteria for success. The resulting rubric was used by Guggenheim Museum staff to assess the teaching artists' performance and by the teaching artists for their own self-reflection. The assessment of teaching artists' performance indicated that certain aspects of the program were being implemented better than others and Museum staff used these findings to provide teaching artists with additional training and guidance in those areas.

At the beginning of the grant-funded research study, RK&A again examined the implementation of *LTA*. Through observations of the teaching artists, classroom teachers, and students, RK&A found that the program was being executed as intended. Observers noted that students, in general, were actively engaged in *LTA*-related discussions and art-making activities. Similarly, classroom teachers and teaching artists expressed enthusiasm for the lessons and cultivated a positive classroom climate that encouraged student participation. One subset of teachers (Treatment Group B) experienced a new *LTA* program element: extended professional development for using inquiry with works of art and texts. These teachers effectively used most of the inquiry strategies during the majority of the observed art- and text-based lessons. Concordantly, during Treatment Group B teachers' lessons, students demonstrated four of the six literacy-related, creative thinking behaviors at a moderate to high proficiency. Teaching artists also received additional inquiry-based professional development sessions and used many of the inquiry strategies when discussing works of art. In addition, teaching artists modeled different techniques, encouraged experimentation, and emphasized critical thinking and communication skills while they engaged students in sustained, process-oriented experiences during art-making activities. Students' questionnaire data further corroborate the teaching artists' approach, as more Treatment Group students accurately described the art-making process than did Control Group students.

When asked their opinions of *LTA*, classroom teachers and students praised the program for providing high quality experiences. *LTA* received favorable ratings in both the teacher and student questionnaires. In particular, students and teachers selected having a professional, working artist in the classroom and visiting the Guggenheim Museum as favorite aspects of *LTA*. During interviews, classroom teachers described *LTA* as having a positive effect on students'

self-esteem and cognition because the program encouraged class participation and fostered analytical thinking skills. The case studies concur with these findings. In addition to the positive impact on students, classroom teachers said they benefited from *LTA* as well. They described the program as well-organized and well-managed and appreciated the logistical and material support that Guggenheim Museum staff provided, which made participation in the program trouble-free for teachers. Treatment Group B teachers spoke highly of the professional development sessions, noting that the inquiry methods they learned were eye-opening and valuable teaching techniques. In fact, these teachers perceived the professional development as having a substantial impact on the way they interact with students and structure class discussions. Furthermore, they said the professional development sessions were so successful in balancing theory and practical applications that they could not offer suggestions for improving them. These responses are particularly noteworthy, as Treatment Group B teachers were selected at random to participate in these professional development sessions (rather than opting into the program).

RESEARCH HYPOTHESES

Once the program evaluation determined that *LTA* was successfully implemented, RK&A conducted research to assess the program's impact on students. The design of the *LTA* research study accounted for multiple factors that impact students' attitudes and abilities, including students' participation in the *LTA* program and having teachers who received *LTA* professional development. The research hypotheses along with relevant findings follow, and tables summarizing statistically significant differences are presented after the narrative.

Attitude Hypotheses

- Students who participate in *LTA* will have more positive attitudes toward school, art, and art museums than those who do not participate in *LTA*.
- Students who participate in *LTA* and have teachers who receive *LTA* professional development will have more positive attitudes toward reading than those whose teachers do not have such training.

LTA did not impact students' attitudes toward school or reading—that is, there were no statistically significant differences between the school-related attitudes of Treatment and Control Group students (see Table B, page 20). Additionally, attitudinal differences did not exist between Treatment Group A and Treatment Group B students. In general, students already had positive school-related attitudes, making it difficult to definitively determine the program's affective impact on students. Such a finding is not altogether surprising, considering that other studies have shown that negative attitudes toward school tend to develop in middle school (Hogsten and Peregoy, 1999; Anderman and Midgley, 1998; Eccles and Midgely, 1989), and the students in this study were third graders. Furthermore, a multitude of factors unrelated to the program contributed to students' opinions, as demonstrated by the fact that other variables—gender or attendance at a particular school—positively impacted students' attitudes about school and reading.

LTA moderately influenced students' attitudes toward art and art museums (see Tables C and D, pages 21-22). Participation in *LTA* was correlated with one art attitude scale—more Treatment Group students responded that they enjoyed discussing works of art than did Control Group students—and one art museum attitude scale—more Treatment Group students responded that they would like to bring their families to an art museum than did Control Group students. Additionally, Treatment Group students' total art museum attitude scores were more positive than were those of Control Group students. Again, students, overall, expressed positive attitudes about art and art museums, which may have obscured possible program outcomes. Moreover, RK&A found in a study for the National Gallery of Art that students' attitudes toward art were heavily influenced by family and demographic characteristics rather than a museum school program (RK&A, 2002). For example, both in this study and the one for the National Gallery of Art, females had a more positive attitude towards art than did males. Similarly, RK&A found in the National Gallery of Art study and in this one that positive museum-based experiences can contribute to a more positive attitude toward art museums, but that demographics are still an important factor (RK&A, 2002).

While having moderate effects on students' attitudes toward art and art museums, *LTA* greatly enhanced students' understanding of art as a process-oriented activity (see Table C, page 21). Control Group students were more likely to express frustration when encountering problems during artmaking compared to Treatment Group students. Additionally, Control Group students were more likely to describe an artist in terms of their product—for example, as someone who creates beautiful things—whereas Treatment Group students were more likely to describe an artist in terms of process—for example, as someone who has good ideas and experiments with materials. Such findings are noteworthy, as a key criticism of other studies that explore the connection between the arts and learning core curriculum is that none demonstrated whether students learned about art (Baker, 2002). Not so for this study; *LTA* clearly provided quality arts instruction.

In addition to examining differences between the Control and Treatment Groups, RK&A also explored whether the classroom professional development sessions that one subset of Treatment Group teachers received (Treatment Group B) had any impact on students' attitudes toward school, art, and art museums or on their perceptions of art. Interestingly, there were no differences between Treatment Groups A and B. In other words, the *LTA* professional development for classroom teachers did not affect students' attitudes towards or perceptions of art. As noted earlier, non-school variables are more likely to influence third-graders, which is important to know when designing programs for this age group, so as not to set unrealistic goals.

Literacy Abilities Hypotheses

- Students who participate in *LTA* will demonstrate greater abilities to discuss works of art and texts (i.e., will have higher interview scores) than those who do not participate in *LTA*.
- Students who participate in *LTA* and have teachers who receive *LTA* professional development will demonstrate greater abilities to discuss works of art and texts (i.e., will have higher interview scores) than those who do not.

LTA greatly enhanced students' abilities to discuss works of art and texts (see Tables E and F,

pages 23-24). During the interview Treatment Group students were more talkative and used more complex language than did Control Group students. Additionally, participation in *LTA* was correlated with higher total content scores for responses to both the Gorky painting and Kadohata text. Furthermore, Treatment Group students scored higher than Control Group students on five of the six literacy characteristics in their responses to the Gorky painting and Kadohata text. More impressively, RK&A found that the stepwise multiple regression models that predict higher Gorky painting and Kadohata text scores include only two significant variables: word count and Treatment or Control Group. That is, students with higher word counts achieved higher scores for their response to the Gorky painting and Kadohata text than did those with lower word counts. Once the regression models controls for word count, the models predict that students in the Treatment Group achieved higher scores for their response to the Gorky painting and Kadohata text than did those in the Control Group. Word count and Treatment Group explain 38.7 percent of the variance in the Gorky Painting total scores and 31.0 percent of the variance in the Kadohata text total scores—high percentages considering the myriad of variables that could impact students’ scores. None of the other large-scale museum school program evaluations RK&A has conducted have demonstrated such a strong correlation between a program and student knowledge (RK&A, 1999, 2002, and 2004). The findings of this study demonstrate that Treatment Group students were able to better articulate their thoughts and had more sophisticated responses to both a work of art and text than Treatment Group students. More importantly, students who participated in *LTA* were able to apply skills they learned in the program—specifically, using inquiry to decipher a work of art—to text.

While the teaching artists’ lessons clearly impacted students’ literacy abilities, the effect of the teacher professional development is more complicated. In terms of the total content scores and individual literacy characteristics for the Gorky painting and Kadohata text, no statistically significant differences exist between Treatment Groups A and B, suggesting that the teacher professional development that Treatment Group B received did not have an impact on students’ literacy. That said, *LTA* professional development should not be viewed as unsuccessful. During interviews, teachers in Treatment Group B described the *LTA* professional development as having a significant impact on their teaching—an encouraging finding, since the first step to changing teacher practice is having teachers acknowledge the benefits of a new method. Education researchers acknowledge that it takes time to change teacher practice (Cook, 1997 and Fullan, 1985). The *LTA* teacher professional development was introduced in 2004-05, so this study may have taken place too soon for teachers to fully integrate what they learned into their lessons and for the researchers to see any student impact.

It is worth discussing some of the other variables that did not impact students’ interview scores, including demographic characteristics, speaking English at home, and attitudes. Interestingly, while gender frequently impacted students’ attitudes, it rarely influenced the content of their interview responses. Additionally, speaking English at home positively impacted students’ scores on the English Language Arts test (ELA), but it did not affect students’ interview scores. That is, *LTA*’s inquiry method and focus on verbal abilities worked equally well for students who do not speak English at home and those who do. Students’ attitudes toward school, art, and art museums also did not have any impact on interview responses. As noted earlier, students were generally positive, so their attitudes had a neutral effect on their learning.

One of the challenges of conducting educational research is isolating and studying the countless variables that contribute to student knowledge. RK&A designed this study to take into account not only participation in *LTA* but also student characteristics. This approach acknowledges the authentic complexity of impacting student learning and also recognizes the difficulty of measuring transfer (Baker, 2002 and Catterall, 2002). In light of the research design, the fact that *LTA* was found to have a positive impact on students cannot be overstated. The study's findings demonstrate *LTA*'s strength—that dedicating class time to create and discuss artwork and using an inquiry method to facilitate those discussions can positively affect students' abilities to decipher works of art and transfer those skills to interpreting texts.

Standardized Test Score Hypothesis

- Students who participate in *LTA* and have teachers who receive *LTA* professional development will have higher scores on the Third Grade Citywide English Language Arts Test than those who do not.

LTA did not impact students' performance levels on the New York Citywide English Language Arts Test (ELA)—that is, there were no statistically significant differences between the scores of Treatment and Control Group students (see Table G, page 25). Additionally, there were no differences between the scores of Treatment Group A and Treatment Group B students. RK&A proposes several explanations for the findings. First, the *LTA* study and the ELA test measured slightly different aspects of literacy. High ELA scores were associated with three literacy characteristics for the Gorky painting and four for the Kadohata text, so for these characteristics the ELA test and *LTA* metrics seem to correlate. Conversely, high ELA scores did not correlate with evidential reasoning, for example—one of the higher level thinking skills that is a hallmark of *LTA*. Second, students who do not speak English at home were at a disadvantage with the ELA test. Such students performed more poorly on the ELA compared with students who speak English at home. This was not the case for *LTA* scores, as there were no differences between students who speak English at home and those who do not. Third, the testing experience greatly differed. The ELA test is a standardized, multiple choice exam; whereas, for the *LTA* study, students were interviewed and their verbatim transcripts analyzed—the former focuses on the written word, the latter on aural and oral communication skills. Finally, a few methodological issues arose during the analysis of the ELA test scores: many students were exempt from the test as first-year immigrants even though they were not classified as ESL students; and only performance levels were released to RK&A for the 2004-05 school year, preventing additional statistical analysis that scale scores would have afforded. These findings will be examined and the relevant issues addressed in the new research study RK&A and the Guggenheim Museum are working on to further examine the impact of *LTA* on student academic performance.

Even though the Control Group and Treatment Group students' test scores did not differ, the enhanced literacy abilities that the Treatment Group students demonstrated in the interviews bolsters the case for integrating an inquiry-based approach to the visual arts. This study provides solid data that demonstrates that the arts positively impact student academic performance.

IMPACT FOR THE FIELD

The U.S. Department of Education's Arts in Education Model Development and Dissemination (AEMDD) grant funded research studies to examine the impact of the arts on student academic performance, in part, because of the paucity of rigorous studies in this area. *Champions of Change* and *Critical Links* highlight a number of studies that show the positive effects of arts programming on student learning. However, many of the large-scale, quantitative studies examined the impact of multi-arts programming. For example, Burton, Horowitz, and Abeles (2000) showed that students attending arts-rich schools outscored students in arts-poor schools in measures of creative thinking. Catterall and Waldorf (1999) found that students who were highly involved in the arts outperformed students who had low arts involvement on a variety of academic measures. Of the four visual arts program studies that met the rigorous criteria to be included in *Critical Links*, each avowed varying degrees of transfer. However, only one clearly established that students transferred skills gained during arts instruction to a core curriculum area—that is, skills used in deciphering works of art were applied to examination of a scientific image (Tishman, MacGillivray, and Palmer, 1999). While other AEMDD grantees are in the process of preparing their findings, at the time of this report submittal RK&A is unaware of any other studies that demonstrate students who participated in a visual arts program transferring skills from viewing and creating art to interpreting and discussing texts. As such, this study makes a significant, original contribution to the field of arts education research and *LTA* provides a model for quality arts education.

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Table B
Summary: Statistically Significant Differences in Attitudes and Perceptions about School (2004-06)

Finding	Significant Variables ¹			
	Treatment/ Control	Treatment Group A/B	School	Other ²
Agreed with “I like school.”				Female 2004-05 data set
Disagreed with “School is boring.”				Female
Agreed with “I like to read.”				Female
Agreed with “When I read a book, I enjoy talking about it.”				Female
Disagreed with “I do not like working with my classmates on projects.”	Treatment			
Agreed with “When I have an idea to share my classmates listen to me.”			P.S. 86	2004-05 data set
Disagreed with “I never share my ideas when we are talking about something in class.”			P.S. 86	
Agreed with “I learn more when I work on projects with my classmates.”				2005-06 data set
Higher total score on 9 school attitudes			P.S. 86	Female

¹The variables listed in each column have a statistically significant relationship with the finding as determined by cross-tabs, analysis of variance, analysis of covariance, and/or stepwise multiple regression.

²Other variables tested included: gender, age, whether English was spoken in the student’s home, prior visits to the Guggenheim Museum with school and family, cumulative score on nine school attitude scales, cumulative score on six art attitude scales, cumulative score on eight artistic process scales, cumulative score on five art museum attitude scales, and school year.

Table C
Summary: Statistically Significant Differences in Attitudes and Perceptions about Art (2004-06)

Finding	Significant Variables ¹			
	Treatment/ Control	Treatment Group A/B	School	Other ²
Agreed with “I enjoy talking about artwork by well-known artists.”	Treatment			Female
Agreed with “I enjoy looking at artwork by well-known artists.”				Female
Disagreed with “I think looking at artwork made by well-known artists is boring.”			P.S. 86	
Agreed with “I like making artwork in class.”				English at home Female
Agreed with “I concentrate when I’m doing an art project.”				Female
Higher total score on six art attitude scales ³				Female
“When I am working on an art project at school and make a mistake, I . . .” “Keep working on it and try to fix it.”				Female
“Feel mad.”	Control			
“Feel sad.”	Control			
“Give up and do something else.”	Control			
“Throw away my project and start over.”	Control			
“Talk about how to fix it with my teacher or other students.”			P.S. 86	
“Ask the teacher for help.”				2005-06 data set
Higher total score on eight art process scales ⁴	Treatment			Female
“A good artist is somebody who . . .” “Experiments with different materials.”	Treatment			2005-06 data set
“Has good ideas.”	Treatment		P.S. 148	
“Draws really well.”	Control			2004-05 data set
“Makes beautiful things.”	Control			
“Is famous.”				Male

¹The variables listed in each column have a statistically significant relationship with the finding as determined by cross-tabs, analysis of variance, analysis of covariance, and/or stepwise multiple regression.

²Other variables tested included: gender, age, whether English was spoken in the student’s home, prior visits to the Guggenheim Museum with school and family, cumulative score on nine school attitude scales, cumulative score on six art attitude scales, cumulative score on eight artistic process scales, cumulative score on five art museum attitude scales, and school year.

³The sixth scale, “I know how to talk about artwork made by well-known artists,” was not included in the table because no statistically significant relationships were found among the variables tested.

⁴The seventh scale, “Ask another student for help,” was not included in the table because no statistically significant relationships were found among the variables tested.

Table D
Summary: Statistically Significant Differences in Attitudes about Art Museums (2004-06)

Finding	Significant Variables¹			
	Treatment/ Control	Treatment Group A/B	School	Other²
Agreed with “I like art museums.”				Female 2005-06 data set
Disagreed with “I think art museums are boring.”				Female
Agree with “I would like my class to visit an art museum.”				Female
Disagreed with “I feel uncomfortable in art museums.”				Female 2005-06 data set
Agreed with “I would bring my family to an art museum.”	Treatment			2005-06 data set
Higher total score on five art museum attitude scales	Treatment			Female 2005-06 data set

¹The variables listed in each column have a statistically significant relationship with the finding as determined by cross-tabs, analysis of variance, analysis of covariance, and/or stepwise multiple regression.

²Other variables tested included: gender, age, whether English was spoken in the student’s home, prior visits to the Guggenheim Museum with school and family, cumulative score on nine school attitude scales, cumulative score on six art attitude scales, cumulative score on eight artistic process scales, cumulative score on five art museum attitude scales, and school year.

Table E

Summary: Statistically Significant Differences in Word Count and Total Interview Scores (2004-06)

Finding	Significant Variables¹			
	Treatment/ Control	Treatment Group A/B	School	Other²
Higher total interview word count	Treatment			2005-06 data set
Higher total interview grade level	Treatment			Female
Higher Gorky painting word count	Treatment			2005-06 data set
Higher Kadohata text word count				Female 2005-06 data set
Higher total Gorky painting score (all students)	Treatment			High word count Level 3 and 4 ELA scores
Higher total Gorky painting score (Treatment only)	-----			High word count Female
Higher total Kadohata text score (all students)	Treatment			High word count Level 3 and 4 ELA scores
Higher total Kadohata text score (Treatment only)	-----			High word count

¹The variables listed in each column have a statistically significant relationship with the finding as determined by cross-tabs, analysis of variance, analysis of covariance, and/or stepwise multiple regression.

²Other variables tested included: gender, age, whether English was spoken in the student's home, prior visits to the Guggenheim Museum with school and family, cumulative score on nine school attitude scales, cumulative score on six art attitude scales, cumulative score on eight artistic process scales, cumulative score on five art museum attitude scales, and school year.

Table F
Summary: Statistically Significant Differences in Interview Literacy Characteristics (2004-06)

Finding	Significant Variables ¹			
	Treatment/ Control	Treatment Group A/B	School	Other ²
Higher score Gorky painting extended focus	Treatment			2004-05 data set Level 3 and 4 ELA scores
Higher score Gorky painting thorough description				2004-05 data set Level 3 and 4 ELA scores
Higher score Gorky painting hypothesizing	Treatment			2005-06 data set Level 3 and 4 ELA scores
Higher score Gorky painting evidential reasoning	Treatment			2004-05 data set
Higher score Gorky painting building schema	Treatment			Female 2005-06 data set
Higher score Gorky painting multiple interpretations	Treatment			2004-05 data set
Higher score Kadohata text extended focus	Treatment		P.S. 148	Level 3 and 4 ELA scores
Higher score Kadohata text thorough description	Treatment			2004-05 data set Level 3 and 4 ELA scores
Higher score Kadohata text hypothesizing	Treatment		P.S. 148	2005-06 data set Level 3 and 4 ELA scores
Higher score Kadohata text evidential reasoning	Treatment			2004-05 data set
Higher score Kadohata text building schema				Female 2005-06 data set
Higher score Kadohata text multiple interpretations	Treatment		P.S. 148	Male 2004-05 data set Level 3 and 4 ELA scores

¹The variables listed in each column have a statistically significant relationship with the finding as determined by cross-tabs, analysis of variance, analysis of covariance, and/or stepwise multiple regression.

²Other variables tested included: gender, age, whether English was spoken in the student's home, prior visits to the Guggenheim Museum with school and family, cumulative score on nine school attitude scales, cumulative score on six art attitude scales, cumulative score on eight artistic process scales, cumulative score on five art museum attitude scales, and school year.

Table G
Summary: Statistically Significant Differences in the
New York Citywide English Language Arts Test Scores (2004-06)

Finding	Significant Variables¹			
	Treatment/ Control	Treatment Group A/B	School	Other²
Achieved high score (levels three and four) on New York Citywide English Language Arts exam			P.S. 148 P.S. 149	English at home

¹The variables listed in each column have a statistically significant relationship with the finding as determined by cross-tabs, analysis of variance, analysis of covariance, and/or stepwise multiple regression.

²Other variables tested included: gender, age, whether English was spoken in the student's home, prior visits to the Guggenheim Museum with school and family, cumulative score on nine school attitude scales, cumulative score on six art attitude scales, cumulative score on eight artistic process scales, cumulative score on five art museum attitude scales, and school year.