

A group of diverse young people, including students and adults, are walking through a historic brick archway. The architecture features red brick walls, arched windows, and ornate ironwork. The group is moving from left to right, with some individuals looking towards the camera. The scene is well-lit, suggesting daytime.

THINKING THROUGH ART

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A TRANSFORMATIVE MUSEUM-SCHOOL PARTNERSHIP

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Isabella Stewart Gardner Museum, Boston

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DEDICATION

This report is dedicated to the incredible teachers and students who have participated in Thinking Through Art since 2017: all of our work is for you.

Thank you to the Boston Public Schools teachers who participated in *Thinking Through Art: A Transformative Museum-School Partnership*:

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THINKING THROUGH ART: A TRANSFORMATIVE MUSEUM-SCHOOL PARTNERSHIP

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PREFACE

It's a bright morning in May, and for a moment 5th-grade teacher Elizabeth Kaplan is able to forget about the tasks waiting for her back at school and tune into how her students are discussing a 16th-century sculpture in the Dutch Room at the Isabella Stewart Gardner Museum in Boston, Massachusetts. Ms. Kaplan has been building towards this conversation all school year, leading discussions about art in the classroom where her students' ideas take center stage. Their interpretations have become more complex since September, and each month they have become increasingly able to incorporate each others' perspectives into their own understanding. Ms. Kaplan has found that her own teaching has transformed as well, as she has honed her ability to listen and respond.

Ms. Kaplan is one of over 300 teachers from Boston Public Schools who have participated in Thinking Through Art at the Gardner Museum since 2017. This year-long professional development program is for Boston Public Schools teachers of all grades and subject areas, who learn instructional practices grounded in whole-class conversation about visual art. The Museum provides diverse artworks for monthly in-class discussions and two guided visits to the Gardner for each class, as well as family passes for teachers and students. By investing in teachers, Thinking Through Art aims to expand the presence of visual art and student-centered instructional practices in this urban school district, resulting in student outcomes that support district learning and teaching goals as well as a citizenry that values art and cultural organizations.

We had reason to believe that Thinking Through Art could achieve such ambitious aims. The program's emphasis on carefully facilitated, open-ended discourse for collaborative meaning-making of artworks asks students to stretch their communication, social, and critical thinking skills. Previous research (available at www.gardnermuseum.org/organization/education/research) had confirmed that students participating in the Gardner Museum's partnership with Boston Public Schools increase their critical thinking skills and connection with the Museum. We had also observed changes beyond critical thinking, affecting the whole child. Students who struggle to participate in class come to life in Thinking Through Art lessons. Teachers describe their students' growth in Thinking Through Art in glowing terms – students are more confident, observant, and thoughtful. They describe a different energy in the room when they explore an image together; a slowed-down, shared space of possibility and wonder, where all interpretations are possible and all ideas are equally welcome.

The Gardner Museum launched this impact study to explore the elements that create the magical learning environment of Thinking Through Art lessons in classrooms and in the Gardner's galleries, and

how this impacts students and teachers. We wondered whether the Thinking Through Art program's investment in Boston Public Schools teachers was succeeding in providing them with a set of practical pedagogical tools to center their students' diverse experiences, and promote safe, yet rigorously critical discourse among students. We also wanted to know if Thinking Through Art really did have an effect, not only on students' critical thinking skills, but also on their social-emotional learning. Was the crackle of excitement and deepness of contemplation in the room during Thinking Through Art lessons measurable and *real*?

The study is a holistic evaluation of the impact of the Thinking Through Art school partnership program offered by the Isabella Stewart Gardner Museum to Boston Public Schools teachers and students. A team of practitioner-researchers from the Isabella Stewart Gardner Museum worked to design its contours and instruments, collect, analyze, and interpret data, and write this report, while delivering the Thinking Through Art program to Boston Public Schools teacher participants and their students. This team includes museum education professionals, former classroom teachers (including a former Thinking Through Art program participant), as well as Museum Teachers (paid educators who lead tours at the Gardner). A thorough understanding of the pedagogical frameworks undergirding the Thinking Through Art program and first-hand knowledge of the experiences of teachers and students as they engaged with the program's curriculum, were necessary in evaluating its impact. With the guidance of experienced researcher Mary Ellen Munley we were able to examine the impact of the program using mixed qualitative and quantitative research methods.

While a good magician never explains her tricks, the purpose of this report is to go behind the curtain to understand how each element of Thinking Through Art works together to transform teaching and learning. We invite you to adopt components of this program into your own work, and to use our protocols and instruments to understand the power of thinking with and through art, together.

“Through my participation in the program, I have been surprised by and learned to appreciate how deeply my students can think about art, its creation, and the ideas hiding inside it. My teaching has improved as a result, and I am hopeful that these lessons will foster an attitude towards art that will enrich my students' lives far into the future.”

–Kindergarten Teacher, Thinking Through Art participant

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Thinking Through Art is a product of collaboration across multiple institutions and individuals, and the study *Thinking Through Art: A Transformative Museum-School Partnership* benefited from additional partners and advisors. We are grateful for our sponsors, especially lead Thinking Through Art sponsor the Vertex Foundation, for supporting this project. We want to thank *Norma Jean Calderwood* Director Peggy Fogelman for her visionary insistence that Thinking Through Art could transform learning experiences for students and teachers across the city of Boston. We are grateful to current and former Isabella Stewart Gardner Museum leadership and staff who contributed to this study, including Maria Antifonario, Dyango Chávez Cutiño, Lily Dearing, Rebecca Ehrhardt, Arthurina Fears, Megan Govin, Michelle Grohe, Donna Hardwick, Eileen Hughes, Kate Milazzo, and all of the Museum Teachers who have sparked wonder for Thinking Through Art classes.

Our partners in Boston Public Schools were instrumental in bringing this project to life. We are thankful for the support of Superintendent Mary Skipper and our district sponsor Christine Landry, as well as Sharon Abraham, Anthony Beatrice, Julie Calderone, Apryl Clarkson, Dr. Angela Hedley-Mitchell, Monica Hogan, Amy Wedge, and Stacie Withington. Your insights into Boston Public Schools priorities and the alignment between our work has been invaluable.

This project was made immeasurably stronger by the strength of our research team, who brought their multiple areas of expertise to bear on the design and implementation of this project while demonstrating care and respect for the students and teachers. The contributions of Mary Ellen Munley have shaped our approach to research, building the capacity and confidence of our team to analyze Thinking Through Art. Claire Tratnyek was the glue that held this project together and ensured that we always centered the teachers and students who are at the heart of this project. The team of Research Assistants acknowledged on the following page brought gusto and rigor to all aspects of their work.

Above all, we thank the principals, teachers, and students who participated in the study *Thinking Through Art: A Transformative Museum-School Partnership*. They shared their thoughts and experiences with us with incredible generosity. We are humbled and grateful to partner with you and welcome you into the Gardner Museum community. Thank you!

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INTRODUCTION

Thinking Through Art: Program Model at a Glance

Since 2017, the Isabella Stewart Gardner Museum has offered Boston Public Schools teachers the opportunity to learn alongside colleagues from across the district in Thinking Through Art. The program is open to teachers of all grades and disciplines, who apply for a spot in the program. Thinking Through Art has four key components, all covered by a low materials fee paid by each teacher.

Intensive Professional Development

Thinking Through Art participants attend a five-day teacher institute at the Gardner Museum, then reconvene twice during the school year for a fall and spring workshop. In all Thinking Through Art professional development sessions, teachers are treated as professionals with expertise, as well as asked to put themselves in the mindset of learners. The Gardner Museum staff aim to make teachers feel respected and nourished, developing connections across school contexts and supporting their personal and professional growth.

Teachers spend the majority of their time in Thinking Through Art workshops learning how to facilitate conversations about art using Visual Thinking Strategies (VTS), an open-ended discussion method. VTS is a cognitively demanding pedagogy that uses a student-centered facilitation method to create inclusive discussions about works of art using three carefully formulated prompts:

- 1) What's going on in this picture?
- 2) What do you see that makes you say that?
- 3) What more can we find?

Thinking Through Art teachers are trained to use these questions, as well as the VTS components of silent looking time, paraphrasing, pointing, and validating student comments, to engage students in discourse that explicitly engages critical thinking and fosters social-emotional learning. During Thinking Through Art workshops, teachers also learn developmental theory, anti-bias practices, and strategies for engaging multilingual learners and students with disabilities. Each cohort of teachers works towards classroom implementation of Thinking Through Art, with support from each other and Museum staff. Teachers can earn graduate credit or professional development points for completing Thinking Through Art workshops and written assignments, including a final paper reflecting on student and teacher growth.

Classroom Thinking Through Art Lessons

Participating teachers facilitate monthly conversations about art in their classrooms using Visual Thinking Strategies. After each lesson, the teacher submits a written reflection and receives feedback from Museum staff.

The Gardner Museum provides teachers with digital curriculums of visual art, sequenced into 8-10 lessons of 2-3 artworks per lesson. The curriculums are tailored to each grade level, aligned with Boston Public Schools' adopted curriculum, and lessons progress in difficulty throughout the school year. Images are not solely from the Gardner Museum's collection, but rather represent diverse cultures, eras, genres, and geographic regions. They exemplify the characteristics of enabling texts that develop students' critical consciousness, including providing positive depictions of diverse communities that resist stereotypes and represent many identities and lived experiences within a vast array of cultures and eras.

“I appreciate that the Gardner strives to be culturally responsive and anti-racist in their practices, which is deeply meaningful for the community of children I work for. They have thoughtfully chosen diverse pieces of art that my 3rd graders can see themselves in and are willing to have challenging conversations about how to be anti-racist when delivering a Thinking Through Art lesson. That is something that matters a lot to me as a teacher of primarily children of color.”

—Elementary School Special Education and English as a Second Language Teacher, Thinking Through Art participant

Thinking Through Art-trained teachers start each Thinking Through Art lesson by welcoming all students to share their thoughts, and reminding students that there are many “correct” answers about the artwork. Students spend a silent minute looking closely at the image, focused processing time that provides students with the opportunity to regulate their behavior and organize their thoughts. Students then have opportunities throughout the discussion to grow their social awareness as they listen to their peers' observations and interpretations. Teachers probe each comment, asking for evidence that supports students' claims. Since the artworks in the Thinking Through Art curriculum are carefully chosen to offer multiple plausible interpretations that can be supported by visual evidence, students will have multiple occasions in a lesson where they agree or disagree with classmates' ideas. Thinking Through Art teachers are trained with sentence frames and nonverbal cues to teach students how to signal agreement or respectfully disagree and hold as valid more than one possible interpretation as they continue to explore the image, building a sense of community throughout the discussion. All students' ideas are warmly acknowledged and paraphrased by Thinking Through Art-trained teachers, who also use conditional language (such as “might” or “could be”) to keep open multiple interpretations and encourage students to exercise flexible thinking during the conversation. Each student who is part of the discussion leaves having heard myriad supported observations and interpretations, any of which may be compelling, intriguing, ‘correct.’ They feel satisfied by the groups' collaborative meaning-making process, and confident that their own understandings of the complex visual text are valid and worth sharing.

Museum Visits

Each participating teacher is eligible to bring their students for two guided visits to the Gardner Museum. The Museum covers all costs, including transportation. Professionally trained Museum Teachers facilitate these visits, leading Visual Thinking Strategies discussions in the permanent collection and/or temporary exhibitions. Students transfer the skills and behaviors they've used in the classroom into this new environment, and experience the power of original works of art in context.

Students in pre-kindergarten through 2nd grade experience choice-based artmaking in the Gardner Museum's Bertucci Education Studio in addition to time in small groups in the galleries. They explore materials and art-making processes that are developmentally appropriate.

Museum Access

Teachers in Thinking Through Art receive household Gardner Museum memberships, and all students who participate in the Classroom Lessons or Museum Visits receive family passes to the Gardner, covering the admissions costs for up to four adults for the entirety of the school year and summer.

Thinking Through Art in Context

For a full literature review and list of sources consulted, please reference the materials at www.gardnermuseum.org/organization/education/research or email education@isgm.org.

Schools and art museums share a vision of learning that is inquiry-based and student-centered, valuing multiple perspectives and active discourse (Terrassa et al, 2016). Research from art education, as well as studies conducted by the Gardner Museum, demonstrate the alignment between Thinking Through Art and Boston Public Schools' goals ([Boston Public Schools 20/25 Strategic Plan](#), 2020). As an equity-focused program in which all learners can experience success, Thinking Through Art trains teachers to engage all students through meaningful, cognitively-demanding speaking and listening tasks about culturally sustaining works of art. Teachers enrolled in Thinking Through Art successfully implement the program in classrooms that reflect the range of learners across Boston Public Schools, including Dual Language, Sheltered English Immersion, Students with Limited or Interrupted Formal Education, fully and partially inclusive classrooms, Substantially Separate programs for students with disabilities, and general education classrooms.

A key practice of Boston Public Schools Instructional Focus for Equitable Literacy calls on teachers to provide students with regular access to "complex" and "enabling" texts, and the monthly Thinking Through Art lessons support this goal ([Boston Public Schools Equity & CLSP Toolkit](#), 2021). The content of a Thinking Through Art lesson is a visual text rather than one that requires the ability to read in English, so all students including those who are pre-literate, multilingual, and students with disabilities, have access to rigorous

discourse that supports the development of “sophisticated ideas and language” and “intentional knowledge and language activation across disciplines” (BPS, 2021).

Thinking Through Art’s core pedagogy, Visual Thinking Strategies (VTS), was developed by cognitive psychologist Dr. Abigail Housen and museum education leader Philip Yenawine. Dozens of research studies have shown that VTS supports the development of creative and critical thinking skills, and that the gains transfer to subject areas other than art (DeSantis & Housen, 2007). Schools across the country, often in partnership with their local museums, have adopted VTS to support student-centered inquiry instruction that result in gains in critical thinking and visual literacy.

The Isabella Stewart Gardner Museum is an international leader in the practice and research of VTS. The Gardner Museum has conducted regular research on its programs with Boston Public Schools, and determined repeatedly that students who experienced the VTS-based program had greater increases in critical thinking than did the students in control groups. In 2003, The Gardner Museum contracted with the Institute for Learning Innovation, and with funds awarded by the U.S. Department of Education undertook a three-year study that concluded that students who experienced the Museum’s partnership program did have greater increases in critical thinking skills than did the students in control groups (Adams, et. al., 2006). Another Gardner Museum study, conducted with funding from the Institute of Museum and Library Services, found that 8th-grade students participating in a one-year partnership with the Gardner tripled their critical thinking skills in oral language and doubled them in writing about an artwork (DeSantis, 2009). A follow up of this study four years later showed that these gains were maintained as the students graduated high school (Egan & Grohe, 2013). Another case study with high school students found that critical thinking transferred from discussion to writing, with an 84% increase from fall to spring, and that both teachers and students in that study felt more connected to the Gardner Museum at the end of the school year (Isabella Stewart Gardner Museum, 2019).

Thinking Through Art also models an approach to closing the opportunity gap limiting urban students' access to cultural organizations. Since 2017, over 18,000 students have participated in Thinking Through Art in their classrooms and 11,000 students have experienced the Gardner Museum through class visits, and each year about 300 students and their families use the Thinking Through Art family passes to visit the Gardner outside of school time.

Study Design

Thinking Through Art: A Transformative Museum-School Partnership was conducted during a time of great need in public education, when partners’ ability to maximize their resources became increasingly crucial to support students in and out of school time. When the Gardner Museum developed the study in 2022, students were returning to classrooms after remote learning. Many had experienced trauma due to death and illness caused by COVID-19, loss of employment and/or housing, social isolation, and the ongoing impacts of racism and discrimination that were brought to light nationwide after the killing of George Floyd. Boston Public Schools teachers had experienced these same hardships, and also dealt with

the burnout caused by the pivots to remote learning and then back to the classroom. The Gardner Museum was acutely aware of the strains on Boston Public Schools teachers and students, and developed this study to investigate ways in which Thinking Through Art could directly address and alleviate many of these issues.

To understand the impact of Thinking Through Art, the Gardner Museum identified outcomes that are priorities both for the Museum and for Boston Public Schools: culturally responsive instruction, social-emotional learning, and critical thinking.

Culturally Responsive Instruction

Culturally responsive instruction invites students to share their lived experiences and prior knowledge, thus allowing students to learn from each other and create a community of learners. It “is a frame of mind, more than a set of strategies or practices that guides the...decisions that teachers make” (Weinstein et al., 2004, p. 27). These decisions include creating a physical setting that supports academic and social goals, establishing expectations for behavior and communication that are caring and respectful of cultural difference, working with families, and using appropriate interventions to assist students with behavior problems (Weinstein et al., 2003). The [Culturally Responsive Instruction Observation Protocol](#) (Powell, et. al., 2017) adopted by Boston Public Schools operationalizes the district’s commitment to Culturally and Linguistically Sustaining Practices, outlining indicators that are explicitly supported by the Thinking Through Art professional development and classroom curriculums.

This impact study, *Thinking Through Art: A Transformative Museum-School Partnership*, hypothesizes that Thinking Through Art teachers’ capacity for culturally responsive instruction will increase from the beginning of the school year to the end of the school year, and also that the behaviors exhibited by teachers participating in Thinking Through Art will be more culturally responsive than those exhibited by the control group teachers by the end of the school year. We also hypothesize that teachers who are most active in Thinking Through Art, meeting or exceeding program expectations, will have the highest gains.

Culturally Responsive Instruction in Thinking Through Art includes:

- ***Classroom Relationships:*** teachers’ ability to create a learning environment in which classroom relationships demonstrate caring and respect
- ***Instructional Practice:*** teaching practices are equitable and open-ended
- ***Student Centered Teaching:*** teaching centers students’ lived and learned experiences
- ***Culturally Responsive Discourse:*** classroom discourse encourages the interrogation of assumptions and the exploration of diverse perspectives

Social-Emotional Learning

Social-emotional learning describes an environment in which individual learners thrive and collaborate to learn from each other, intentional and essential features of Thinking Through Art. Boston Public Schools places social-emotional learning among its top strategic priorities. District documents define social-emotional learning as, “a process whereby young people, and adults build strong, respectful, and lasting, relationships that facilitate co-learning to critically examine root causes of inequity, and to develop collaborative solutions that lead to personal, communal and societal well-being” (Boston Public Schools SEL Competencies & Skills, 2019).

This study hypothesizes that students’ social-emotional learning skills will increase when comparing students’ interactions from the beginning of the school year with the end of the school year, and also that the skills exhibited by the students in the Thinking Through Art classes will be stronger than those exhibited by the control group classes by the end of the school year.

Social-emotional learning in Thinking Through Art includes:

- ***Self Confidence and Belief in Capacity to Learn:*** a student’s belief that they can contribute something meaningful to a discussion
- ***Relationship Skills:*** a student’s ability to connect with others by communicating clearly and demonstrating respect for others
- ***Empathy:*** a student’s capacity to understand and share the feelings of others
- ***Respect for Multiple Perspectives:*** a student’s ability to acknowledge and value diverse interpretations
- ***Participation in a Community of Learners:*** a class that learns collaboratively by building on each other’s thoughts and experiences to collectively construct meaning and reach deeper understanding

Critical Thinking

Our team sought to explore how a variety of critical thinking skills not previously studied by the Gardner Museum improved during their year-long participation in the Thinking Through Art program. Boston Public Schools defines critical thinking as involving applying, synthesizing, and evaluating information to reach an answer or conclusion, and the district prioritizes increasing depth of knowledge in student critical thinking (Webb, 2005).

This study hypothesizes that Thinking Through Art students’ critical thinking skills will increase when comparing the beginning of the school year with the end of the school year in individual responses to an art or narrative image. In addition, we hypothesize that the Thinking Through Art classes will have higher levels of critical thinking at the end of the school year than control group students.

Critical Thinking in Thinking Through Art includes:

- *Identifying information* within an image, and describing that information with adjectives and adverbs
- *Making associations* to stored knowledge and personal experience
- *Constructing meaning* based on observation, association, and evidence in the image
- *Considering multiple perspectives* and interpretations
- *Reasoning* by ascribing meaning to an image based on synthesizing observations, associations, inferences, multiple perspectives and inductive and/or deductive reasoning

In this Report

- **Inclusive Study Design:** Understand how a team of researcher-practitioners developed the study *Thinking Through Art: A Transformative Museum-School Partnership* using a Universal Design framework to draw out the richest thinking from all participants
- **“Becoming The Teacher I Want To Be” The Impact of Thinking Through Art on Teachers’ Culturally Responsive Instructional Practices:** Explore findings demonstrating how Thinking Through Art improves teachers’ culturally responsive instruction, enabling them to center students’ ideas and experiences in the classroom and facilitate critical discourse.
- **“What Meaningful Learning Looks Like” The Impact of Thinking Through Art on Students’ Social-Emotional Learning and Critical Thinking Skills:** Delve into the ways in which Thinking Through Art improves students’ social-emotional learning, particularly their self-confidence and curiosity and ability to create a community of learners. Consider findings of how Thinking Through Art increases students’ capacity to construct meaning and use critical reasoning.
- **Conclusions:** Analyze the ways in which stronger teacher engagement with Thinking Through Art positively affects teacher instruction and student outcomes, how Thinking Through Art teaches student skill development, and the remarkable outcomes of this program for Boston’s youngest learners.
- **Implications:** Based on this study’s findings, we make recommendations for the design of the Thinking Through Art program, suggestions for future research, and considerations for ways in which the Gardner Museum and Boston Public Schools can further their collaborations to shape positive futures for Boston’s students.



INCLUSIVE STUDY DESIGN

This study investigates areas previously under-studied in museum-school partnerships. We wanted to determine whether data would support the overwhelmingly positive anecdotal evidence we observed and heard regularly from teachers participating in Thinking Through Art about their students' gains – not only in critical thinking, which has been demonstrated in previous studies, but also in social-emotional learning. We knew that students were performing at a level in the Museum and in the classroom that had not been fully captured by previous instruments, in part due to the wide diversity of language skills and abilities in Boston Public Schools. By partnering with Boston Public Schools administrators and teachers, the Gardner Museum team created an inclusive study design that underscores the commonalities between the goals of the school district and the goals of the Thinking Through Art program for teacher practice and for student outcomes.

Strengths of the Study

A 360° Look at Thinking Through Art

The Thinking Through Art program is made up of just a few key components and pedagogical frameworks, but what goes on in a Thinking Through Art lesson has a magic that is more than the sum of its parts. Our team took a holistic approach to evaluating the impact of the program on teachers and students by incorporating both qualitative and quantitative analyses of a variety of types of data. We wanted to know whether Thinking Through Art played a particular role in supporting both teacher and student growth over the course of a school year, so we created a quasi-experimental study where we compared pre-program and post-program data for participants in the Thinking Through Art with data collected from a group of control teachers and students who had no other interaction with Thinking Through Art or the Gardner Museum. The control group was matched with the Thinking Through Art group demographically, and we elicited recommendations from current Thinking Through Art teachers of similarly excellent colleagues to achieve comparable teacher quality in both groups.

Universal Design

We embedded the tenets of Universal Design for Learning to lower barriers to access for both students and their teachers: by designing study instruments that can be used by *all* students, including students with disabilities, multilingual learners, and students who are not able to read and write, we were able to support the diverse array of learners in participating in our study (CAST, 2018).

Attention to Classroom Learning

Even though the Thinking Through Art program includes multiple student visits to the museum space, the classroom is where most of the teaching and learning happens for teachers and their students. We visited each participating teachers' classroom to collect data, resulting in a picture of how the experience of Thinking Through Art takes hold in the public school classroom.

Compliance with Protection of Rights for Human Subjects

The research team underwent an IRB exemption review process, and received approval to conduct research with teachers and students in a school setting with Boston Public Schools, both in 2021. All members of the research team underwent a CORI background check. All students who participated in the study actively assented to participate and had parents or guardians give consent for their participation. Study data was anonymized, with each student assigned an alpha-numeric code by their teacher, and all student and teacher records have remained secure throughout this project.

Representative Sample

Boston Public Schools is a large urban public school district with 46,269 students in the 2022-23 school year, most of whom qualify as both "high needs" and "low income" according to the Commonwealth of Massachusetts (Department of Elementary and Secondary Education, 2022 [District Report Card](#)). The Thinking Through Art impact study included 38 teachers who voluntarily enrolled in Thinking Through Art for the 2022-23 school year, as well as 17 control teachers. The student sample is made up of the 714 students who provided consent to participate in the study as respondents. 272 students were in grades PreK–2, 312 students in grades 3-5, and 130 students in grades 6-12. These students are demographically aligned to the district as a whole, as illustrated in Table 1.

Table 1. COMPARING STUDENT DEMOGRAPHICS IN BOSTON PUBLIC SCHOOLS AND THINKING THROUGH ART: A TRANSFORMATIVE MUSEUM-SCHOOL PARTNERSHIP STUDY

Percentage of students in Race/Ethnicity and Selected Population Category	Boston Public Schools Students	Thinking Through Art Students	Control Group Students
African American and/or Black	28%	28%	26%
Asian American	9%	9%	4%
Hispanic	44%	43%	45%
Multiple Races (Non- Hispanic)	4%	2%	7%
Native American	1%	0.6%	0%
White	15%	14%	11%
Other / Blank	N/A	3%	7%
Multilingual Learners	32%	38%	31%
Students with Disabilities	22%	19%	15%

Collaboration with Teachers and School District

Our team could not have designed such accessible study instruments and methodologies without the support and counsel of collaborators within Boston Public Schools. Department directors and school leaders helped us design our study to align with evaluation methods and academic goals that teachers were already working towards, so that we could effectively demonstrate how the aims of this impact study support teaching and learning within Boston Public Schools measures of success. A Research Advisory Group of five teachers who had already completed Thinking Through Art gave feedback on iterations of study instruments, data collection procedures, and analytical frameworks for evaluating students' skills. They and their students pilot-tested our instruments. Thanks to our close relationship with classroom teachers, our team always held as a 'North Star' that participation in the research should never feel onerous for teachers or students – and made every attempt to lighten their load as we designed instruments and procedures. The Gardner team used all of these insights and their own experiences as researcher-practitioners to define research questions and operational definitions, then create manuals and instruments to surface the intricate characteristics of culturally responsive instruction, social-emotional learning, and critical thinking.

Research Questions

Teachers' Culturally Responsive Instruction

- Do Thinking Through Art teachers, over the course of the school year, increase their use of culturally responsive instruction practices?
- At the end of the school year, do Thinking Through Art teachers use culturally responsive instruction practices more frequently and more consistently than teachers who have not participated in Thinking Through Art professional development and taught Thinking Through Art lessons to students?

Students' Social-Emotional Learning

- Do Thinking Through Art students increase their positive social-emotional learning skills from the beginning to the end of the school year?
- At the end of the school year, do Thinking Through Art students have larger gains in social-emotional learning skills than students who did not participate in Thinking Through Art instruction?

Students' Critical Thinking

- Do Thinking Through Art students increase their critical thinking skills from the beginning to the end of the school year?
- At the end of the school year, do Thinking Through Art students have larger gains in critical thinking skills than students who did not participate in Thinking Through Art instruction?

Methodology

The research team chose two images to use in this study: one figurative painting, and one narrative photojournalistic image (see below).

Art Image



Fernand Leger (1881-1955), *Les Loisires—Hommage à Louis David*, 1948-1949
© 2024 Artists Rights Society (ARS), New York
/ ADAGP, Paris
Digital Image © CNAC/MNAM, Dist.
RMN-Grand Palais / Art Resource, NY

Narrative Image



D. Gordon, *Untitled*, 1978

Assessing Teachers' Culturally Responsive Instruction

The research team assessed culturally responsive instruction by observing the behavior of teachers as they facilitated a student-centered, image-focused, whole-class discussion of a reproduction of a painting or narrative photograph in their classroom. Our team video- and audio-recorded a classroom lesson at the beginning and end of the school year in both Thinking Through Art and control group classes. The recordings ranged from seven to 15 minutes in length. Trained coders viewed the recordings twice and used the *Thinking Through Art Culturally Responsive Instruction Observation Instrument* to take notes on teachers' behaviors during the lesson. Coders referred to the *Thinking Through Art Culturally Responsive Instruction Manual*, a coding system designed for this study, to provide a rating from 0-5 to describe the degree of presence of each indicator of culturally responsive instruction. These categories are: *Classroom*

Relationships, Instructional Practices, Student-Centered Teaching, and Culturally Responsive Discourse. Changes in teachers' culturally responsive instruction skills were assessed by comparing ratings of teacher behaviors at the beginning and at the end of the school year. We calculated an overall culturally responsive instruction score for each teacher in the Thinking Through Art and control groups by adding together the four category scores, then scaling these total scores into a 0-5 point scale. Differences between Thinking Through Art and control groups, and between the beginning and end of the year, serve as a measure of the effect of Thinking Through Art on teachers' culturally responsive instruction. All data was subject to statistical analysis, including chi-square tests and Mann-Whitney U tests, to determine statistical significance.

At the beginning and end of the school year, the research team also asked teachers in both the Thinking Through Art group and the control group to fill out a brief survey about their teaching practices, educational philosophies, comfort with using art in their teaching practice, and familiarity with the Isabella Stewart Gardner Museum.

Assessing Students' Social-Emotional Learning

The research team assessed students' social-emotional learning skills by observing the behavior of students during a classroom discussion of a reproduction of a painting or a narrative photograph, once at the beginning and once at the end of the school year. Researchers video- and audio-recorded class discussions. Trained coders viewed the recordings twice and used the *Thinking Through Art Social-Emotional Learning Observation Protocol* to take notes on students' behaviors during the lesson. Coders referred to the *Thinking Through Art Social-Emotional Learning Coding Manual*, a coding system designed for this study, and noted instances of verbal and nonverbal behavior related to five categories of social-emotional competencies that are investigated in this study: *Possesses Self Confidence and Belief in Capacity to Learn, Demonstrates Relationship Skills, Expresses Empathy, Respects Multiple Perspectives, and Creating a Community of Learners*. Coders provided a rating from 0-4 that reflects the extent to which each of the five social-emotional categories were present during the discussion. We calculated an overall social-emotional learning score for each class by adding together the five category scores, then scaling these total scores into a 0-4 point scale. Differences between Thinking Through Art and control groups, and between the beginning and end of the year, serve as a measure of the effect of Thinking Through Art on students' social-emotional learning. All data was subject to statistical analysis, including chi-square tests and Mann-Whitney U tests, to determine statistical significance.

Students also completed a survey at the beginning and end of the school year, with questions designed to elicit individual social-emotional learning.

Assessing Students' Critical Thinking

The research team assessed students' capacity for critical thinking by systematically coding students' written, spoken, or signed responses to a reproduction of a painting or a narrative photograph. After participating in the whole class discussion about the art or narrative image, students individually responded to the question: *"What's going on in this picture?"* Students and their teachers chose the mode of response that they deemed most appropriate for each student, whether that meant handwriting their response in their native language, speaking into an audio recorder, or, in the case of students who are deaf or hard of hearing, recording video of themselves signing their responses. All responses were transcribed (and if needed, translated into English) and then trained coders used the *Critical Thinking Coding Manual* to code responses. All data was subject to statistical analysis, including chi-square tests and Mann-Whitney U tests, to determine statistical significance.

For details, please refer resources at www.gardnermuseum.org/organization/education/research. To request access to additional materials, including instruments, coding manuals, spreadsheet templates, and more, please email education@isgm.org.

“*The process is academic gold, in that it exercises so many of the skills that students must attain fluency with in other courses. Namely, the ability to examine an object for a sustained period of time, be comfortable with holding one's attention still for the sake of letting the brain process fully, and the wherewithal to offer substantiation for whatever claims one makes.*”

– High School Math Teacher, Thinking Through Art participant



“BECOMING THE TEACHER I WANT TO BE”

The Impact of Thinking Through Art on Teachers’ Culturally Responsive Instructional Practices

The Thinking Through Art program begins before the start of a new school year with a Summer Institute - a week of intensive professional development for teachers, led by Gardner Museum staff. Cohorts of PreK-12 teachers from across Boston Public Schools spend five days in the Museum’s Education Studio and galleries. It is an immersive experience for the teachers, who get to experience the vulnerability of learning something new within a community of their peers. The Thinking Through Art staff gives whole-group instruction and targeted small group coaching using the program’s core pedagogy, Visual Thinking Strategies (VTS), while also modeling best practices of relationship-building, effective learner-centered instruction, and facilitating critical yet culturally responsive discourse. Thinking Through Art staff also introduce teachers to the curriculum of diverse and developmentally appropriate art images for use in the classroom, and set up protocols for reflective practice to use throughout the school year.

After the Summer Institute, teachers return to their classrooms ready to teach six classroom lessons using the Thinking Through Art curriculum, to reflect on these experiences and get feedback from a Museum Teacher designated as their coach, and to return four times to the Gardner Museum throughout the school year: twice with their students for class visits, and twice for teacher workshops. Teachers frequently remark that they wish the feedback they received from school administrators was as useful and supportive as the coaching they get in Thinking Through Art, and that the conversations in Thinking Through Art workshops around culturally sustaining practice are more meaningful than those at school. Reflecting upon her week at the Gardner Museum with the other teachers in her Summer Institute cohort, one teacher articulated that she felt like the pedagogical and curricular tools Thinking Through Art was giving her were helping her *“become the teacher I want to be”*.

In this section, we focus on Boston Public Schools teachers – the Thinking Through Art participants who elect to join the program and receive direct instruction from the Isabella Stewart Gardner Museum education staff – and demonstrate how Thinking Through Art improves participating teachers’ growth as culturally responsive instructors and effective facilitators of critical student discourse. Our findings indicate that Thinking Through Art significantly improves teachers’ overall culturally responsive instruction, as well as

their abilities to center students' ideas and support rigorous and critical student discussion. What's more, after a year of participation in Thinking Through Art, teachers report that they and their students feel more connected to the Gardner Museum, and more comfortable looking at and discussing art together.

Thinking Through Art Improves Teachers' Culturally Responsive Instruction

“Thinking Through Art really encouraged me to give students more opportunities to engage in discourse throughout the year. It really encouraged me to give students the chance to share their ideas and lead with them.”

– Third Grade Teacher, Thinking Through Art participant

Teachers who are highly skilled in culturally responsive instruction actively and consistently demonstrate an ethic of caring for their students, both as individuals and as a group. These teachers successfully create an atmosphere of mutual respect in the classroom through direct instruction, nonverbal signaling, and active listening. Culturally responsive teachers aim for equitable participation and establish a norm that all students can learn, supporting diverse learners by effectively establishing productive classroom procedures for students to learn in a variety of ways. They center classroom discussions on students' ideas and questions, honoring the diversity of students' prior knowledge and personal experiences and encouraging students to explore issues that matter to them. Finally, they encourage their students to build a habit of mind to interrogate their assumptions – they consistently ask students to provide evidence to support their claims, and they put the onus of intellectual rigor on their students' shoulders by asking follow-up questions that are specific and that prompt students to deepen their thinking.

As the research team designed this study, we were especially curious how Thinking Through Art professional development instruction and coaching for the teachers would be visible in teacher *growth* from the beginning to the end of the school year, and in teacher *outcomes* at the end of the year. We expected that we would be able to see both direct and indirect evidence of teachers' culturally responsive instruction in video-recorded classroom lessons.

We found our hypotheses about the growth, outcomes, and dosage of Thinking Through Art to be true:

- Teachers in Thinking Through Art improve from the beginning to the end of the school year across four key areas of culturally responsive instruction.
- Teachers in Thinking Through Art end the year with higher overall scores in these four areas of culturally responsive instruction than their control group counterparts.
- Teachers who met or exceeded all the participation requirements of the Thinking Through Art program have the strongest teacher practice scores at the end of the school year.

On average, Thinking Through Art teachers grew in culturally responsive instruction about 20% from the beginning to the end of the school year (average score increasing from 38.37 to 46.18). The control group teachers average growth was much lower: only about 5% (average score increasing from 28.59 to 29.88). A closer look at teacher scores in the four categories of culturally responsive instruction – *Student-Centered Teaching*, *Culturally Responsive Discourse*, *Classroom Relationships*, and *Instructional Practices* – is in Table 2 on the next page. In each category, Thinking Through Art teachers demonstrated more growth from the beginning to end of the school year than the control group teachers, who even decreased their mean score in one category. In three of the four categories of culturally responsive instruction, the differences between Thinking Through Art and control teachers are statistically significant, which likely indicates that the higher gains in teacher scores are indeed due to teachers' participation in Thinking Through Art.

In addition to this significant growth, we also found that the year-end outcomes in culturally responsive instruction for the teachers who participated in Thinking Through Art were significantly higher than their counterparts in the control group. At the end of the school year, nearly all – 95% – of Thinking Through Art teachers had high total culturally responsive instruction scores (3, 4, and 5 on a scale of 0-5, representing “often”, “frequently”, and “highly” descriptive of classroom behavior). In contrast, only 47% of control teachers scored in this high range and the other 53% of control teachers had low scores (1 and 2 on a scale of 0-5, representing “seldom” and “sometimes” descriptive of classroom behavior).

Table 2. AT A GLANCE: Teachers' Culturally Responsive Instruction

Culturally Responsive Instruction Category	Thinking Through Art Teachers (n=38)			Control Group Teachers (n=17)		
	Mean pre score (range 0-15)	Mean post score (range 0-15)	% Growth from pre to post	Mean pre score (range 0-15)	Mean post score (range 0-15)	% Growth from pre to post
<i>Student-Centered Teaching</i> (Mann-Whitney U: P=.003) ($\chi^2= 20.856^a$, df=4, P<.001)	7.89	10.26	30%*	4.82	5.12	6%
<i>Culturally Responsive Discourse</i> (Mann-Whitney U: P<.001) ($\chi^2= 23.498^a$, df=4, P<.001)]	8.34	10.82	30%*	5.29	5.47	3%
<i>Classroom Relationships</i> (Mann-Whitney U: P=.039) ($\chi^2= 13.810^a$, df=3, P<.003)	11.79	13.03	11%*	10.00	9.94	- 0.6%
<i>Instructional Practices</i> (Mann-Whitney U: P=.054) ($\chi^2= 14.283^a$, df=4, P<.006)	10.34	12.08	17%	8.47	9.35	10%

* Denotes statistically significant findings

Thinking Through Art Enables Teachers to Center their Students' Ideas and Experiences

“An area of my teaching practice that has improved as a result of my participation in Thinking Through Art is increasing student-to-teacher talk ratios. The structure of Thinking Through Art lessons is such that students talk more than I do, and I in turn affirm what they said without correcting them or providing any “right” answers. I believe that this practice accounts for an increase in student talk and student-initiated and led conversations about other curricular topics.”

– Kindergarten Teacher, Thinking Through Art participant

Thinking Through Art teachers had significant growth in the culturally responsive instruction category *Student-Centered Teaching*, which includes the ways in which teachers prioritize their students' funds of knowledge and experiences in the classroom. We took a closer look at two indicators within this category to better understand how Thinking Through Art supports centering learners. In analyzing the first indicator, *Follows students' lead to facilitate a deep investigation*, our team considered the degree to which teachers asked rigorous, developmentally appropriate questions based on the content of students' comments, and demonstrated they understood the meaning of what the students were communicating. Thinking Through Art teachers improved their scores in this indicator by nearly 27%, while their control group counterparts became *less* likely to follow their students' ideas and questions by the end of the school year, *decreasing* by about 3%. By the end of the school year, 97% of Thinking Through Art teachers had high scores on this indicator, compared with just 23% of control group teachers with high scores.

97%

**of Thinking Through Art
teachers scored high**
in following students' lead at
the end of the school year

For the second indicator, *Supports students' ability to learn about issues that matter to them*, we looked for instances where teachers encouraged students to introduce and talk about sensitive topics (such as race, gender, and safety) in age-appropriate and supportive ways. Thinking Through Art teachers improved their scores in this indicator by over 35% during the school year, compared with control teacher growth of about 13%. Because the Thinking Through Art teacher's higher growth in these two indicators was statistically significant, as shown in Table 3, we can conclude that Thinking Through Art professional development and classroom lesson structures help teachers stay student-centered and create a learning environment conducive to discussing challenging topics.

Table 3. Highlights of Student-Centered Teaching Category Indicators

Student Centered Teaching Category Indicator	Thinking Through Art Teachers (n=38)			Control Group Teachers (n=17)		
	Mean pre score (0-5)	Mean post score (0-5)	% Growth from pre to post	Mean pre score (range 0-5)	Mean post score (0-5)	% Growth from pre to post
<i>Supports students' ability to learn about issues that matter to them</i> (Mann-Whitney U: $P=.038$) ($\chi^2= 10.061^a$, $df=5$, $P<.074$)	1.95	2.63	35%*	1.41	1.59	13%
<i>Follows the students' lead</i> (Mann-Whitney U: $P<.001$) ($\chi^2= 36.142^a$, $df=5$, $P<.001$)	3.08	3.89	27%*	1.76	1.71	- 3%

* Denotes statistically significant findings

Thinking Through Art Gives Teachers Effective Tools to Facilitate Critical Classroom Discourse

“By the end of the year, students generated many ideas about the works of art discussed. Increasingly they seemed to connect with their peers and build on the discussion of others, but they also would disagree or offer another perspective and give their reasoning or evidence for their thinking.”

– Second Grade Teacher, Thinking Through Art participant

Thinking Through Art teachers' growth in the category Culturally Responsive Discourse was ten times higher than that of control teachers. This finding, which is statistically significant, indicates that Thinking Through Art trains these teachers to facilitate conversations where students are both free to express their ideas, and accountable for backing them up with appropriate evidence and reasoning.

Three indicators within this category point to how teachers achieved this aim, enumerated in Table 4. First, in the indicator *Build a habit of mind of interrogating assumptions*, we looked for teachers to consistently ask students to back up their ideas with visual evidence from the image, using questions designed to deepen students' thinking and employing conditional language to help them challenge their implicit assumptions. Thinking Through Art teachers were incredibly consistent in asking nearly all of their students follow-up questions, even at the start of the school year, and their scores improved more than 24% over the course of the year as they got better at asking more specific and more rigorous questions.



95%

of Thinking Through Art teachers had high scores in *encouraging students to interrogate assumptions* by the end of the school year

By the end of the school year, 95% of the Thinking Through Art teachers had high scores in *Build a habit of mind of interrogating assumptions*. Comparatively, the teachers in the control group inconsistently asked questions or pressed students to critically examine their impressions. Control teachers started and ended the school year with much lower scores in this category indicator, with only about 24% of control group teachers achieving high end-of-year scores.

For the second indicator, *Explore diverse perspectives*, we considered the extent to which teachers encouraged a wide array of student interpretations, including contradictory or oppositional ones, as well as how often students actually brought diverse perspectives into the conversation. To evaluate the third indicator, *Respectfully discusses disagreements*, we examined whether teachers made space for debate to enrich the discussion by emphasizing that it's okay to see things in different ways and calling positive attention to revisions in students' thinking. Both of these indicators showed statistically significant growth among the Thinking Through Art teachers, and decline among the control teachers.

Across all three of these indicators of culturally responsive discourse, it is important to note that the Thinking Through Art teachers also began the school year with noticeably higher scores than their control group counterparts, then went on to increase their scores by the end of the school year. These high scores at the start of the school year can likely be attributed to the training Thinking Through Art teachers received over the summer before the new school year began, while the increase in scores during the school year can be attributed to their regular facilitation practice as they taught Thinking Through Art lessons each month.

These findings suggest that Thinking Through Art helps teachers become much more adept at demonstrating high expectations for students to introduce novel ideas, as well as accountability in supporting their observations and interpretations with evidence, and habitually pressing students to deepen their thinking and interrogate their assumptions.

Table 4. Highlights of Culturally Responsive Discourse Category Indicators						
Culturally Responsive Discourse Category Indicator	Thinking Through Art Teachers (n=38)			Control Group Teachers (n=17)		
	Mean pre score (0-5)	Mean post score (0-5)	% Growth from pre to post	Mean pre score (0-5)	Mean post score (0-5)	% Growth from pre to post
Respectfully discuss disagreements (Mann-Whitney U: $P=.007$) ($\chi^2= 19.638^a$, $df=5$, $P<.001$)	2.03	2.95	46%*	1.76	1.71	- 3%
Explore diverse perspectives (Mann-Whitney U: $P=.007$) ($\chi^2= 19.608^a$, $df=5$, $P<.001$)	3.05	3.82	25%*	2.35	2.24	- 5%
Build a habit of mind of interrogating assumptions (Mann-Whitney U: $P=.106$) ($\chi^2= 35.579^a$, $df=5$, $P<.001$)	3.26	4.05	24%	1.18	1.53	30%

* Denotes statistically significant findings

Teacher Culturally Responsive Instruction Examples

Two discussions recorded for this study illustrate the differences between classrooms in which teachers score low and high on culturally responsive instruction. The following transcripts are excerpted from full discussions that each lasted about twelve minutes; in each case, the portion reproduced here began around the halfway point. Both students responded to *Les Loires-Hommage à Louis David*, by Fernand Leger (reproduced on page 22 of this report).

Read through the control class transcript on page 34, then compare with the Thinking Through Art class transcript on page 36, noting the ability of the teacher to support student discourse and the kinds of learning environments the teachers established in their classrooms. A discussion of the observable instances of culturally responsive instruction follows each example.

Control Group High School Class (End of School Year)

Teacher: *I challenge each of us, as we talk about what we see here, see if you can find things that others may not have noticed – that's where we benefit most in discussion. What do you think?*

[Student motions to speak]

Teacher: *Do you have something to share? Great - go ahead up to the board.*

[Student shakes head - inaudible]

Teacher: *Do you have to [go up to the board]? No. Are you saying you want to say it from your chair? 'Cause we need details. Okay, go ahead and answer from there.*

[Student points at the image from their seat with "speaking stick"]

Abraham: *It seems like everyone else was white, and like one black or brown girl.*

Teacher: *Yep.*

Abraham: *Yeah.*

Teacher: [Long pause] *Okay, let's go to the next person. I also want to shift this towards inviting us – if you have an idea about whether there's a story, or message lurking in there, it doesn't have to include everything – let's start thinking about some of that, too. Jose, what do you think?*

Jose: *I notice the detail of the plants and the cactus spikes, suggesting that the setting is the southern part of the United States or maybe even Central America. The only reason I say that is that the art is very distinct in Central America, 'cause I'd see that a lot when I used to travel down there.*

Teacher: *Good, good.*

[Jose passes "speaking stick" to another student]

Teacher: *What do you think?*

Alicia: *I notice that the brown skinned girl seems to be the only one that has, a child, that's holding onto the back of her. And it doesn't seem to be her daughter, it's different from, like, the white man that is holding onto his daughter.*

Teacher: *Okay, good. Yeah, I like that comparison.*

Tayana: [takes "speaking stick"] *I just want to say it's curious that she's the only one in the bike, and she's dark skinned. The other ones are white, looking at her like she's a clown. The man who is smoking – everyone is looking at her at this point, and she was the one looking at her like weird, or even judge-y... [pause] I just wanted to say that. Yeah.*

Teacher: *Awesome!*

Teacher favors novel observations as having high value in the discussion

Teacher expects students to leave their seats when they participate

When student doesn't want to get up, teacher encourages them to, but ultimately lets them stay in their seat

Teacher responds neutrally to student's comment about a perceived racial disparity in the image

Teacher directs students to look for an overarching interpretation

Teacher gives student's answer cursory praise

Teacher's personal opinion of the comment, rather than the validity of the student's argument, is what drives validation

Teacher responds to student with enthusiasm, but given the gravity of the topic the word choice is almost flippant

CULTURALLY RESPONSIVE INSTRUCTION ANALYSIS: Control Group High School Class

The control group teacher has established procedures for students to talk when they hold a 'speaking stick', and to leave their seats and go up to the board where the image is projected while they speak. The teacher gives the students a variety of prompts, asking for novel contributions and an overarching interpretation of the artwork. The first student to volunteer to talk hesitates to go up to the board to answer, perhaps because they had raised their hand before their teacher asked for new ideas. Maybe this student had been prepared to go deeper into something that had already been discussed, and is now unsure what to say. When this student brings up the (potentially loaded) idea of a single black or brown girl among a group of white people, the teacher does not embrace the opportunity for students to discuss this topic. Instead, the teacher pivots to a different prompt. The next student confidently applies prior knowledge from their personal experiences in Central America to details in the artwork. The teacher's response is positive, but superficial. When the last two students return to the idea of an uncomfortable racial imbalance in the image, and a situation where this single dark-skinned figure might be ostracized or even subject to potential violence, the teacher responds with an enthusiasm that seems both somewhat removed and inappropriate given the complex subtextual reading of the image posited by the students.

The teacher's demeanor is eager and warm throughout the discussion, but their instructional practices do not indicate real interest in, or curiosity about, what the students are saying. The teacher's repeated attempts to direct the discussion away from what the students seem to want to discuss, coupled with the bland responses and lack of follow-up questions, make the conversation seem stilted, surface-level, and unsatisfying for both the students (who don't get to dig into what they want to talk about) and the teacher (whose prompts and questions fall flat with the students).

This control group teacher had a low score of 1 (on a 0-4 point scale) in culturally responsive instruction, because there was little observable evidence of equitable, student-centered, culturally responsive teacher practice during the discussion of the image.

Thinking Through Art High School Class (End of School Year)

Teacher: What more can we find? Lindsay?

Courtney: Those red things on the girl's arm and shoulder – it looks like an octopus.

Teacher: You're noticing that there is some sort of red object over here – could look like an octopus. What do you see that makes you say that could be an octopus?

Courtney: Because the legs – the tentacles is like [pause]... no, I feel like it's a jellyfish because [pause]... an octopus doesn't look like that [pause]... maybe, but I don't think so.

Teacher: You're sort of pivoting to 'jellyfish' because noticing these legs, or could be tentacles or something are reminding you of what you know about jellyfish.

[Courtney nods head 'yes']

Teacher: We have time for one or two more comments – What more can we find? Alejandro?

Alejandro: I wanted to bring it back to seeming like a portrait. On the corner right there, looks like there's a date. So I would say it is like a portrait – they wanted to remember it. Or like, make a family picture, 'cause nothing is coordinated with each other: there are different objects, different types of plants, the birds. It's not really something you would see in the actual, real-world environment. So I just think it's a picture, and there's a date on it.

Teacher: So going back to this idea of a portrait, noticing something down here that could be a date, and also going back to these elements that seem disparate or unrealistic or unconnected, like the birds, and these things that don't seem like they line up. What do you see that makes you say it could be a family portrait?

Alejandro: Because they all are close together. The man is holding a child, there is another child on the bike. It looks like they are, you know, a real family together.

Teacher: Great. So noticing the proximity of the people in the picture, they're holding each other, they have contact the way that a family may, it seems like they are sort of all together, kids and something like that. Alright, thank you.

Teacher asks student a specific follow-up question that prompts student to find visual evidence to support their claim

Student works through their ideas and revises their interpretation as they keep looking

Teacher uses conditional language as they paraphrase

Teacher draws attention to the student's use of prior knowledge

Student directs the discussion back to an idea that had been explored earlier, then uses additional details to deepen and complicate the possible interpretations

Student walks through their thinking process, trying to make sense of what they are seeing by synthesizing ideas

Student provides evidence without being prompted, demonstrating they have internalized the need to support their assertions

Teacher consistently asks students follow-up questions that require them to provide visual evidence, even if some claims have already been supported

CULTURALLY RESPONSIVE INSTRUCTION ANALYSIS: Thinking Through Art High School Class

The Thinking Through Art teacher has established the procedure of calling on students who volunteer to share by raising their hands, and letting students know how many more people will have a chance to participate. By using students' names, paraphrasing their comments back to the group each time, and asking specific follow-up questions to prompt the students to share visual evidence, the teacher demonstrates a commitment to equity and to rigor. The Thinking Through Art teacher also uses conditional language, including "might be" and "could be" to keep multiple possible interpretations open; this allows the teacher to amplify the student's ideas without explicitly confirming or rejecting them.

In this environment, students work through their ideas aloud, in the company of their teacher and peers, and the teacher treats moments of revision as valuable parts of the process of figuring something out. The teacher follows the lead of students' comments; the second student sets up their response by noting that they want to return to an idea that had come up earlier and continue to build on it. The teacher acknowledges students' thought processes in their paraphrase, and the evidence they provided to support their idea, and yet continues to ask the student a follow-up question that requires them to look for more visual evidence that can support another of their claims.

This Thinking Through Art teacher had an overall high score of 4 (on a 0-4 point scale) in culturally responsive instruction, because they consistently demonstrated a wide variety of culturally responsive facilitation skills consistently throughout the discussion.

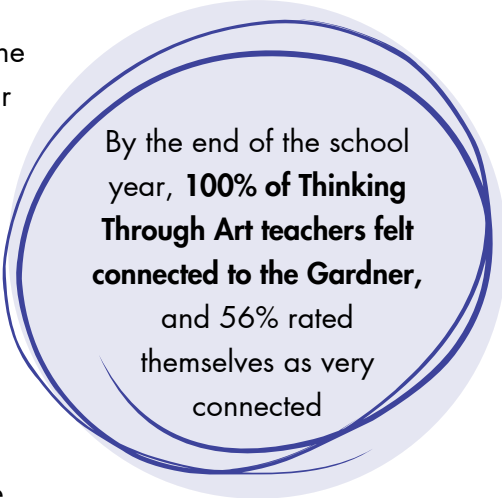
Thinking Through Art Connects Teachers and Students to Art and to the Gardner Museum

“Since attending the Thinking Through Art visits to the Gardner Museum, more students are raising their hands to ask about or point out the art materials used in the image, as well as making connections to Isabella Stewart Gardner herself and to other museums.”

– Elementary School Art Teacher, Thinking Through Art participant

In addition to the powerful culturally responsive instruction findings outlined above, the Gardner Museum wanted to know whether Thinking Through Art changed how teachers felt about using art in the classroom and about the Museum. On the surveys they completed at the beginning and end of the school year, the Thinking Through Art teachers reported a 32% increase in confidence in talking about art with their students; control teachers' average score increased by only 1% from the start of the school year. Recognition of the Gardner Museum as a resource also went up amongst teachers in the Thinking Through Art group after a year in the program – while 47% of Thinking Through Art teachers felt unfamiliar with the Gardner Museum's offerings prior to joining Thinking Through Art, by the spring 100% felt a connection with the Gardner and 56% rated themselves as very connected.

One of our most compelling findings is that the Thinking Through Art teachers who deeply engaged with the Gardner Museum and the Thinking Through Art program by meeting or exceeding its requirements (attending the Summer Institute and two mid-year workshops, teaching six Thinking Through Art lessons in the classroom, and bringing their students for two museum visits) tended to have overall higher year-end scores. Nearly three-quarters (74%) of the teachers who met or exceeded Thinking Through Art program requirements also had high scores in culturally responsive instruction by the end of the school year. Our findings show a clear trend that teachers with higher scores in culturally responsive instruction have students with higher critical thinking scores: when teachers prioritize deepening students' thinking, following students' lead, cultivating respectful relationships, and establishing equitable expectations, their students develop and demonstrate a stronger ability to think for themselves. In addition, 63% of Thinking Through Art teachers who met or exceeded program expectations had classes with high scores in the social-emotional learning category of students' ability to *Create a Community of Learners* by the end of the school year. These findings indicate that the teachers' increased skills and positive attitudes about their students, art, and museums developed through Thinking Through Art are transferred to their students.



By the end of the school year, **100% of Thinking Through Art teachers felt connected to the Gardner,** and 56% rated themselves as very connected

“Being in a collegial environment surrounded by teachers from different schools, backgrounds, grade levels, and subjects was invigorating and reassuring. Knowing that we were all going through the same experiences, same struggles, and wonders was comforting. The energy level that was in the room was high, and all of the participating teachers shared one commonality: the desire to learn about how to get our students excited about expressing their thoughts, substantiating their thinking based on what they see, and thinking critically about the content and context of the images, using art as the foundation for learning.”

– Third Grade Teacher, Thinking Through Art participant

When our team set out to explore the ways in which the elements of Thinking Through Art impacted participating teachers’ instructional practices, we found that our program model of high-quality, year-long professional development for teachers provided teachers with the skills and tools they need to reconnect with their educational values and teaching ideals. Not only do our findings indicate that Thinking Through Art significantly improves teachers’ overall capacity to deliver culturally responsive instruction, but also that the program supports teachers’ efforts to truly center discourse on the ideas and experiences the students themselves bring into their classrooms. We also found that Thinking Through Art gives teachers a sense of comfort with using art as a focal point for whole-class discussions, along with a feeling of connection to the Gardner Museum – a site for both teachers and students to engage in rigorous learning. In the next section, we will shift our focus from the teachers participating in Thinking Through Art to their students, and investigate the program’s impact on student social-emotional learning and critical thinking outcomes.



Photo by Emily Katz.

“WHAT MEANINGFUL LEARNING LOOKS LIKE”

The Impact of Thinking Through Art on Students’ Social-Emotional Learning and Critical Thinking Skills

During Thinking Through Art workshops in the fall and spring, the teachers participating in the program share stories about how the Thinking Through Art lessons have gone in their classrooms. Thinking Through Art teachers tell anecdotes about multilingual learners gaining confidence in their developing language skills in the low-stakes discussion protocol, and of social hierarchies being upended by once-reserved students whose insights steer entire conversations into new interpretive territories. Teachers take the opportunity to ask for advice from their colleagues across the district and from the Museum staff – their own ‘community of learners’ – and to share approaches to the curriculum and pedagogy. In the words of one high school teacher in the program, they are able to envision “*what meaningful learning looks like*” in their classrooms.

In this section, we turn our attention from teachers to their students, and focus on how Thinking Through Art positively impacts participating students’ growth across both social and cognitive domains. Our findings indicate that Thinking Through Art does indeed increase students’ social-emotional learning, particularly their self-confidence, curiosity, and interest in learning collaboratively with and from their peers, as well as their ability to think critically about images, and to synthesize evidence into reasoned interpretations.

Thinking Through Art Builds Students’ Social-Emotional Learning Skills

“*The Thinking Through Art lessons made my students feel smart (which they ARE, but don't always give themselves credit for), and the shy students were able and willing to volunteer by the end of the year. One student wrote "this is the only class where I confidently knew every person's name" - Thinking Through Art totally contributed to that.*”

– High School English Language Arts and English as a Second Language Teacher, Thinking Through Art participant

When a class is made up of students with high social-emotional skills, they establish a group culture of respect and empathy where students are able to listen attentively to a variety of perspectives and express themselves with confidence. These students demonstrate sustained focus and show a propensity to identify patterns and underlying ideas or principles, finding connections between new content and their own lived experiences. Ideas are synthesized and reasoned out, as classmates evaluate and build on each others' arguments. Most students participate, verbally and/or nonverbally, and there is an observable shared willingness and desire to learn collaboratively and interdependently, rather than in isolation or competition. These classes do not require their teacher to supply them with the "right answer", as students are responsible for their own learning.

After hearing again and again from Thinking Through Art teachers about the growth they saw in their students' confidence, relationship skills, empathy, openness, and collaborative learning due to their participation in the program, our team was eager to examine data of students' social-emotional learning. We were interested in assessing student growth over the course of the year, as well as final outcomes at the end of the year. We expected that a range of observable student behaviors would be present during these lessons in both the Thinking Through Art classes and control group classes, and sought to isolate specific social-emotional learning skills and behaviors that the Thinking Through Art program might support or enhance. We evaluated students' collective participation and behaviors within the ecosystem of the whole-class discussion, rather than focusing on individual students in isolation; social-emotional learning scores are reported by class.

84%

of Thinking Through Art classes had higher Social-Emotional Learning scores at the end of the school year than at the beginning

We found both of our hypotheses about student growth and outcomes to be true:

- **Students in Thinking Through Art classes improve from the beginning to the end of the school year across five key areas of social-emotional learning.**
- **Students in Thinking Through Art end the year with higher overall scores in these five areas of social-emotional learning than their control group counterparts.**

“My students have developed an immense amount of confidence and independence.”

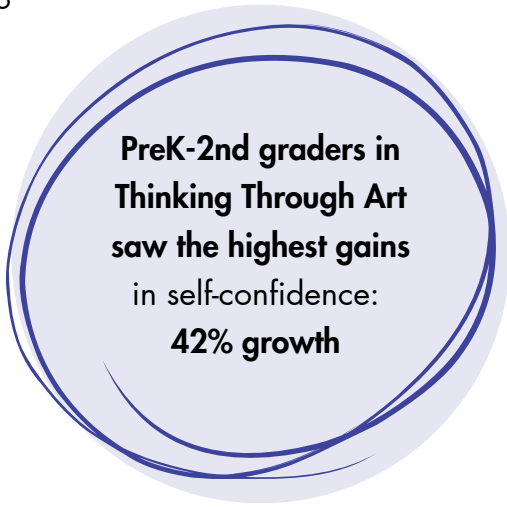
– Elementary Art Teacher, Thinking Through Art participant

The majority of both Thinking Through Art and control group classes showed improvement in overall social-emotional learning skills from the beginning to the end of the school year. The average total social-emotional learning scores for Thinking Through Art students increased 27%, from 2.34 to 2.97, while the average total social-emotional learning scores for the control group students increased 16%, from 2.18 to 2.53. Notably, this higher rate of growth in Thinking Through Art classes is statistically significant, indicating that it is due to Thinking Through Art that participating students experienced such substantial growth.

When we break down the overall social-emotional learning scores for each class into our five analytical categories, as shown in Table 5, we find that Thinking Through Art classes improve more than their control group counterparts in every category: *Creates a Community of Learners*, *Respects Multiple Perspectives*, *Demonstrates Relationship Skills*, *Possesses Self-Confidence and Belief in Capacity to Learn*, and *Expresses Empathy*. The differences between Thinking Through Art and control groups' growth in the first four of these categories are statistically significant, which suggests that these gains are indeed related to students' participation in Thinking Through Art.

The social-emotional category that aims to encapsulate the classroom ecosystem holistically, *Creates a Community of Learners*, represents a stark difference between Thinking Through Art classes and control classes. In this category, Thinking Through Art classes exhibited the strongest growth – about 48% – from the beginning to the end of the year. In contrast, control group classes grew only about 9% in this category. In the category *Respect for Multiple Perspectives*, we see most dramatic divide between Thinking Through Art classes and control group classes' growth: Students who engaged in open-ended Thinking Through Art discussions all year showed more than seven times the growth of students in the control group in their ability to respond positively to novel and oppositional opinions from others (40% growth for Thinking Through Art compared to 6% for control). Students' *Self Confidence and Belief in Capacity to Learn* and *Relationship Skills* in Thinking Through Art classes grew 34% and 36% respectively, about three times the growth of the control group classes from the beginning to the end of the school year (11% and 12%, respectively).

Our team was excited to find that the youngest learners who participate in Thinking Through Art – students in pre-kindergarten through grade two – had the most consistently high growth across all the categories of social-emotional learning. These classes averaged 37% growth across social-emotional learning scores, compared to the 27% growth of all Thinking Through Art grades combined. In the category *Self Confidence and Belief in Capacity to Learn*, Thinking Through Art classes in PreK-2 grew 42% from the beginning to the end of the school year, about seven times the 6% growth shown by the control classes from grades PreK–2nd.



**PreK-2nd graders in
Thinking Through Art
saw the highest gains
in self-confidence:
42% growth**

Table 5. AT A GLANCE: Students' Social-Emotional Learning

Social-Emotional Learning Category	Thinking Through Art Classes (n=38)			Control Group Classes (n=17)		
	Mean pre score	Mean post score	% Growth from pre to post	Mean pre score	Mean post score	% Growth from pre to post
	(score range 0-4)			(score range 0-4)		
<i>Creating a Community of Learners</i> (Mann-Whitney U: P=.002)	1.87	2.76	48%*	1.94	2.12	9%
	(scaled score range 0-12)			(scaled score range 0-12)		
<i>Respects Multiple Perspectives</i> (Mann-Whitney U: P=.044)	4.37	6.11	40%*	5.00	5.29	6%
<i>Demonstrates Relationship Skills</i> (Mann-Whitney U: P=.011)	5.47	7.45	36%*	5.29	5.94	12%
<i>Possesses Self Confidence and Belief in Capacity to Learn</i> (Mann-Whitney U: P=.010)	6.71	9.00	34%*	6.88	7.65	11%
<i>Expresses Empathy</i> (Mann-Whitney U: P=.300)	3.16	3.87	23%	2.53	3.06	21%

* Denotes statistically significant findings

Thinking Through Art Creates a Community of Learners

“I believe my students’ relationship with the Gardner Museum made them feel valued, special, and important.”

– Elementary School Art Teacher, Thinking Through Art participant

In a classroom where students are *Creating a Community of Learners*, teachers structure learning as a social endeavor benefitting all students individually and collectively, and students have a shared willingness to learn interdependently. To analyze the extent to which this was taking place, researchers scored the gestalt of recorded discussions and examined the degree to which students interacted with one another in ways that acknowledged the value of others’ knowledge and perspectives to drive meaningful and relevant conversations.

Thinking Through Art classes gained almost a full point, on a 0-4 scale, in this social-emotional learning category during the school year. This is significantly higher growth than their control group counterparts. Thinking Through Art classes also ended the year with higher scores: by the end of the school year, 66% of Thinking Through Art classes had high scores in this category, with 16% of classes reaching the highest rating of exemplary, or 4 out of 4. In contrast, only 29% of control classes achieved high scores, and none of them were exemplary.

68%

of Thinking Through Art
classes increased their
Community of Learners
scores during the school year

Thinking Through Art students in pre-kindergarten through second grade grew in leaps and bounds in *Community of Learners*, compared to both their control group counterparts of the same age, and even compared to the older students in the Thinking Through Art program. Control group classes in PreK–2 grew only 8%, and Thinking Through Art students in grades 3-5 and grades 6-12 had growth of 34% and 33% respectively. The PreK-2 students participating in Thinking Through Art increased their average score in *Creating a Community of Learners* by an eye-popping 81% from the beginning to end of the school year. For these youngest students, Thinking Through Art significantly and dramatically enhances their social-emotional skill development, giving them the advantage of practicing being a part of collaborative learning environments at the start of their school careers, and being able to draw upon these life skills as they grow.

Thinking Through Art
students in PreK-2
increased their
Community of Learners
score by 81%

Thinking Through Art Builds Students' Confidence and Curiosity

“The whole idea of there not being a correct answer to ‘What’s going on in this picture?’ brought my more hesitant students out of their shells. Students who seldom raise their hands, were eager to share their thoughts.”

– First Grade Teacher, Thinking Through Art participant

Teachers’ observations of improvement in students’ willingness to speak up and engage during Thinking Through Art (particularly during visits to the Gardner Museum) are supported by findings from social-emotional learning indicators about confidence and curiosity shown in Table 6. Within the category *Self Confidence and Belief in Capacity to Learn*, we looked at the indicator *Contributes ideas and guides the direction of the discussion*, which measures the degree to which students participate and introduce novel ideas. We found that by the end of the school year, 87% of Thinking Through Art classes had high scores in this indicator, compared to 59% of their control group counterparts, a statistically significant difference suggesting that Thinking Through Art makes a difference in students’ comfort participating in class.

87%

of Thinking Through Art classes had high scores in willingness to contribute ideas and guide the direction of the discussion

Within the category *Respects Multiple Perspectives*, we looked at the indicator *Demonstrates curiosity*, because we hypothesized that students who regularly participated in Thinking Through Art lessons would be better trained in sustained close looking than their control group counterparts who were not regularly encountering the core VTS question, “What more can we find?”. The control classes actually started the school year more curious than their Thinking Through Art counterparts, but their scores in this area *decreased* by more than 5% on average by the end of the school year while Thinking Through Art classes increased their scores in curiosity by over 36%. This finding indicates that the regular engagement with artworks through Thinking Through Art lessons helped build stamina and they internalized the skill of persistently searching the images beyond a cursory glance.

“Thinking Through Art helped students internalize the idea that multiple thoughts about a single subject can coexist, and they were able to develop threads of discussion in which they respectfully linked their ideas to those of fellow classmates, whether agreeing or disagreeing.”

– Elementary School Art Teacher, Thinking Through Art participant

Table 6. Highlights of Students' Social-Emotional Learning Indicators

Social-Emotional Learning Indicator	Thinking Through Art Classes (n=38)			Control Group Classes (n=17)		
	Mean pre score (0-4)	Mean post score (0-4)	% Growth from pre to post	Mean pre score (0-4)	Mean post score (0-4)	% Growth from pre to post
<i>Contributes ideas and guide the direction of the discussion</i> (Mann-Whitney U: $P=.031$)	2.34	3.08	32%*	2.41	2.71	12%
<i>Demonstrates curiosity</i> (Mann-Whitney U: $P=.016$)	1.61	2.18	36%*	2.24	2.12	- 5%

* Denotes statistically significant findings

Student Social-Emotional Learning Examples

Two exchanges amongst students and their respective teachers from one Thinking Through Art and one control group Kindergarten class at the end of the school year illustrate the differences between high and low overall social-emotional learning scores. These two transcripts on the following pages are excerpted from full discussions that each lasted about twelve minutes; in each class, about two-thirds of the students shared ideas verbally.

Read through the control group transcript on page 48, then the Thinking Through Art group transcript on page 50, looking for similarities and differences between the conversations. Note student curiosity, readiness to contribute to the discussion, their comfort with ambiguity or ideas that differ from their own, and to what extent the conversation comprises a web of interconnected ideas. A discussion of the observable social-emotional learning skills follows each excerpt.

Control Group Kindergarten Class (End of School Year):



Teacher: *What do you see?*

Oscar: [raises hand] *On the plate, there's money.*

Teacher: *It does look like there's some money in there. These are coins.*

Ebeline: [calling out] *That's cat food.*

Teacher: *I think because you're back there it might look like cat food, but Oscar is a lot closer. Those are called coins. Does anyone else want to say something about the picture?*

Anthony: [raises hand] *Um, the bike. The bike seat.*

Teacher: *There is a seat there. I wonder if it is for these people or the boy...*

[Several students call out: *For the boy!*]

Ebeline: *It's for the cat!*

Anthony: *No! It's for the boy!*

[Many students talk at once, arguing this point]

Teacher: *The cat can't drive. Monica, you haven't had a turn yet. Is there anything you want to say about this picture?*

Monica: [had raised hand, lowers it slowly, does not answer]

Josue: [gets up from seat, walks up to the image, pointing] *I see something here!*

Teacher: *Right here? What is the boy doing with the cat?*

[Several students call out: *He's playing with it!*]

Teacher: *Yeah? You think so?*

Student provides an observation, which the teacher immediately confirms as the "right" answer

Another student disagrees with the first student's interpretation and shouts out their counterpoint

Teacher dismisses the second student's idea and reinforces the first student's idea again

Teacher asks a question that can't be answered by looking at the image

Students yell out answers, talk over one another, and argue

Teacher dismisses the same student's dissenting opinion a second time

Student has their hand up, but isn't prepared to contribute once called by the teacher

Student fills the void when their classmate isn't ready to share, by getting up and starting to talk even though they haven't been called on

SOCIAL-EMOTIONAL LEARNING ANALYSIS: Control Group Kindergarten Class

In the control group kindergarten class, many students speak during this part of the discussion, but without the ability to follow established group discussion norms. They call out instead of taking turns, and sometimes talk over one another instead of demonstrating active listening. The teacher confirms one student's interpretation, shutting down any other students' different ways of seeing the image. Subsequently, students search for one correct answer and argue with one another rather than considering others' views as credible. Some students volunteer by raising their hands and waiting to be called on, but in one instance they aren't ready to speak when they are called – a sign that they may be lacking the confidence to participate. Instead of giving this student a little more time to collect their thoughts, the teacher lets another student take the opening. The teacher prompts students to turn their attention to specific elements in the image that they hadn't mentioned, and asks them questions about these elements instead of those the students brought to the fore. There is little rigor or cohesion across students' comments in this class, and students are more interested in sharing their own ideas than listening to one another.

The control group class had a low score of 1 (on a 0-4 point scale) in social-emotional learning at the end of the year, because there was little observable evidence of social-emotional learning skills apparent in students' behaviors throughout the discussion of the image.

Thinking Through Art Kindergarten Class (End of School Year):



Teacher: What more can we find?

Paris: Birds flying in the sky.

[A few other students use nonverbal signal to show that they agree]

Teacher: You're looking up here and to you that looks like some birds flying in the sky. What do you see that makes you say those are birds?

Paris: Because I see the wings and heads.

Teacher: You are thinking about the anatomy of birds, you see some shapes that look like wings to you, shapes that look like bird heads to you, and that's what makes you think that these are birds. What more can we find?

Jorge: So I kind of agree with Paris, that there are birds up there, but I think they're something else. I think they're on the beach holding their breath because they're underwater.

Teacher: Whoa! So you kind of agree, cause you think that these are birds, but they may be something else. You think these figures may be underwater and they're holding their breath. What do you see that makes you say they could be underwater?

Jorge: Because the back is blue right there and down is sand on the bottom and seaweed.

Teacher: So you see blue in the background, and you see what looks like sand to you on the bottom and you're agreeing that this looks like seaweed, and that to you looks like they must be underwater. Thank you, Jorge.

Students use nonverbal signals to show agreement and disagreement, so multiple students can participate simultaneously

Teacher paraphrases student's comment, then asks a specific follow-up question, prompting them to find visual evidence from the image to support their idea

Student gives two pieces of specific evidence to answer the teacher's follow-up question

Student articulates that they somewhat agree with another student's interpretation, and credits the original commenter by name

Student acknowledges that while they see the same detail, they also think what they are seeing can be interpreted in a different way

Student shares a novel interpretation

Student is ready to provide multiple pieces of visual evidence, a habit established through the practice of consistently answering specific follow-up questions

Teacher paraphrases each student's comment and evidence, linking it to previous comments, and thanks the student by name

SOCIAL-EMOTIONAL LEARNING ANALYSIS: Thinking Through Art Kindergarten Class

In the Thinking Through Art group kindergarten class, fewer students share aloud in this part of the discussion than in the control group class, but each student exhibits comfort participating when called, and other students can actively participate by using nonverbal signals. The teacher asks each student to support their idea with evidence from the image, and students explain what they see that informs their thinking. Thinking Through Art students in this class explore the image with a comfort with ambiguity, looking for any and all possible interpretations and demonstrating curiosity by exploring parts of the artwork that appear strange or confusing. Students demonstrate active listening and interest in their peers' perspectives, citing classmates by name as they reference each others' ideas. When a student in this class shares a novel idea, the teacher does not confirm or argue the different interpretation, but asks a rigorous follow-up question that shows the student how carefully the teacher listened, and pushes them to connect evidence with their reasoning. The discussion goes beyond observation to analysis and collaborative interpretation, and is characterized by a predictable structure and mutual respect amongst teachers and students.

The Thinking Through Art class had a high score of 4 (on a 0-4 point scale) in social-emotional learning at the end of the year, because students consistently demonstrated a wide variety of SEL skills during the discussion.

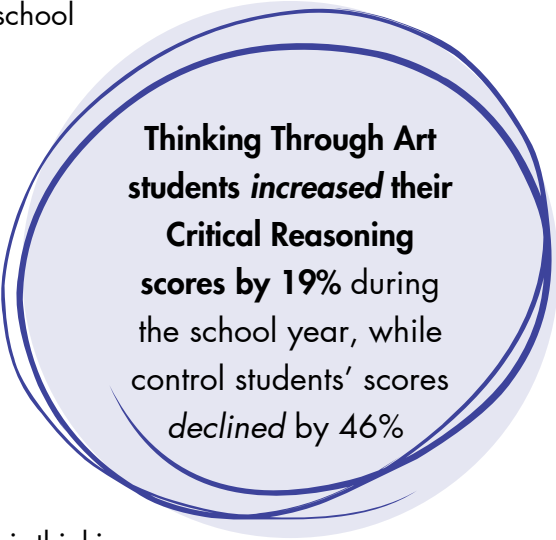
Thinking Through Art Increases Students' Capacity to Critically Reason and to Construct Meaning

“The more my students start providing evidence of their thinking, the more it becomes a habit. More than once, I heard a student making a statement about the picture being analyzed and immediately adding ‘and I said that because...’ as if they were anticipating my follow up question. But more importantly, it made evident that this way of thinking had become more natural.”

– Elementary School Art Teacher, Thinking Through Art participant

Amongst students who participated in Thinking Through Art, our research found a substantial gain in *Critical Reasoning* scores from the beginning to the end of the school year, as shown in Table 7. We defined *Critical Reasoning* as a gestalt category characterized by students’ forming ideas about and/or ascribing meaning to an image based on synthesizing observations, associations, inferences and interpretive claims. Recognizing that there are differences in capacity for reasoning across ages, we designed four different Thinking Through Art Reasoning Rubrics to evaluate students within grade bands (grades PreK–2, 3-5, 6-8, and 9-12). Note that unlike the whole-class scoring we used to evaluate social-emotional learning, for critical thinking we evaluated a sample of individual student responses from each classroom at the beginning and end of the school year.

On average, Thinking Through Art students increased their *Critical Reasoning* scores by more than 19% from the beginning to the end of the school year. In contrast, students in the control group declined in their *Critical Reasoning*, with average scores decreasing nearly 46%. Control group students have not had practice closely looking at, wondering about, and discussing images with the pedagogically robust tools of the Thinking Through Art program, and their responses are characterized by simple observations and claims without evidence. This difference between the Thinking Through Art students and control group students is statistically significant, and suggests that through regular engagement with Thinking Through Art lessons students practice synthesizing and reasoning, and are therefore better equipped to explain their thinking.



Thinking Through Art students *increased* their *Critical Reasoning* scores by 19% during the school year, while control students’ scores *declined* by 46%

Table 7. Highlights of Students' Critical Thinking Indicators

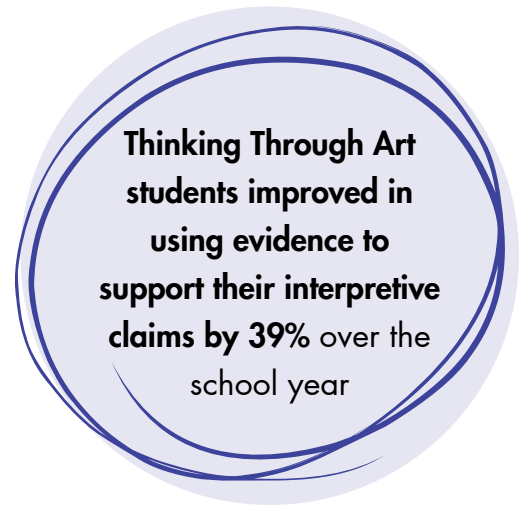
Critical Thinking Indicator	Thinking Through Art Students (n=236)			Control Group Students (n=151)		
	Mean pre scaled score (range 0-4)	Mean post scaled score (range 0-4)	% Growth from pre to post	Mean pre scaled score (range 0-4).	Mean post scaled score (range 0-4)	% Growth from pre to post
<i>Interpretive claim supported by evidence from the image</i> (Mann-Whitney U: P=.007)	.79	.94	19%*	0.88	0.48	- 46%
	(score range 0-4)			(score range 0-4)		
<i>Critical Reasoning</i> (Mann-Whitney U: P<.001)	1.61	2.23	39%*	1.85	1.84	- 0.4%

* Denotes statistically significant findings

“Students are providing evidence in their comments. I am proud of them for backing up their thinking without being asked and it is pushing me to think more deeply about what they say to ask a follow up question. Students are thinking about the setting and the meaning behind the art as well.”

– Middle School English Teacher, Thinking Through Art participant

In addition to this gain in reasoning, we found that Thinking Through Art students also had statistically significant gains in *Interpretative Claims*, particularly when using evidence to support their claims. We defined interpretive claims as statements where students went beyond observation to make inferences to construct meaning, including relationships among elements, actions, emotions, or the gender, status, age, or race of figures. The students in Thinking Through Art classes scored higher in providing evidence from the image to support these interpretations at the end of the school year than did students in the control group, with an increase of 19% in the indicator *Interpretive claim supported by evidence from the image*, while control group students' scores declined slightly, as shown in Table 7. This is a statistically significant difference, leading us to conclude that students internalized the Thinking Through Art practice of asking students to provide evidence to support the ideas they share during discussions.



In critical thinking skills overall, we found that in some demographic groups the students in Thinking Through Art outperformed their counterparts in the control group. Black and African American students who participated in Thinking Through Art improved their overall critical thinking scores slightly by the end of the school year (3% growth), but Black and African American control group students' critical thinking scores decreased by 10%. Hispanic students in Thinking Through Art also increased their overall critical thinking scores more than their counterparts in the control group: 12% growth for Thinking Through Art students, compared to 9% growth for control students. Though these findings are not statistically significant, it is encouraging that Thinking Through Art might contribute to decreasing the persistent achievement gaps for Black, African American, and Hispanic students in public school systems like Boston. Amongst other demographic groups, including multilingual language learners and students with disabilities, we did not find statistically significant differences between students in the Thinking Through Art program and the control group in critical thinking.

“Throughout the year, there was a significant increase in the quality of the writing as students included more examples of evidentiary reasoning and flexible thinking in their writing.”

– Elementary School Art Teacher, Thinking Through Art participant

Student Critical Thinking Examples

In the following section, you will find student response samples from two fourth grade students, one in the control group (pages 56 and 57) and one in Thinking Through Art (pages 58-60). For each student, we've shared examples from the beginning and end of the school year. These will help illustrate the differences scores in *Interpretive claim supported by evidence from the image* and *Critical Reasoning*. Both students responded to *Les Loisires-Hommage à Louis David*, by Fernand Leger (below).

As you read the samples, consider whether and when the student means to inform, to explain, to narrate, or to argue, instances where the student uses precise language and descriptive elaboration, and evidence of the student's use of an organizational schema to convey their meaning.



Control Group Examples

The control group fourth grade student's teacher determined that the best way to capture the student's thinking was to audio record their response, so to collect examples 1. and 2. below, a researcher sat with the student and recorded them verbally responding to the prompt, "What's going on in this picture?". The recordings were transcribed for analysis, using ellipses to indicate where the student paused.

1. Control Group 4th Grade Student Response (Beginning of School Year)

There is... like I think in the picture those people are not like real. I just think that they're like statues....
What's even scarier is that there's also like three black things like there and there and there. And I think that those are scuba diving clothing, like to go in the water. And also what I saw weird was the fact that I see that the toddler's hand is big. Also, the one with the.... there's the girl with the bike, has green skin. There's also fences in the background. And after when I looked at the plants, I think that I see eyes on them. Like eyes on the plants.

Student interprets the figures, using prior knowledge to consider their realism

Student describes unidentifiable details in visceral, emotive terms

Student makes an interpretive claim, without providing evidence

Student describes elements of the image that strike them as strange

Student makes an observation

Student describes interplay among aspects of the image

2. Control Group 4th Grade Student Response (End of School Year)

I feel like there are 6 family members ... going to a place at night-time to take a family photo. They look like they are in the country, not the city. They brought their bikes. There is something black down there – I wonder what that is. Why did the crabs, like actual crabs, going up on that girl!? The girl in the orange shirt is holding a paper, not sure why. There is a gate there, too. And I think that is it.

Student makes observations and interpretations responding narratively to the prompt, “what’s going on in this picture?”, without providing evidence

Student makes an interpretive claim about the figures, applying stored knowledge or personal experience, without providing evidence

Student makes an observation and claim about the bicycles in the image

Student makes observations and expresses uncertainty

CRITICAL THINKING ANALYSIS: Control Group 4th Grade Student

In the sample from the beginning of the year, the control group fourth grade student informs the researcher about what they see going on, but their analytical lens is limited and their thoughts hop from one element in the image to another. The students’ statements contain unexamined assumptions about age and gender. The strangeness or lack of realism that the student perceives appears to be of greatest interest. They are not looking methodically or trying to construct an argument or an overarching interpretation for the image.

In the sample from the end of the year, this student says less than they did in the fall, but makes more interpretive claims and speaks in a more organized way. This sample is characterized less by emotion and confusion than the first sample, and more by explanation of recognizable elements and why they might be there as well as identification of the student’s lingering questions.

While this student in the control group demonstrates a variety of critical thinking skills in both the beginning and end of year samples, their work is an example of mid-range *Critical Reasoning* scores and of low growth from the beginning to the end of the school year across *Critical Reasoning* and *Interpretive claim supported by evidence from the image*.

Thinking Through Art Group Examples

The Thinking Through Art fourth grade student chose to write their response to the image, in response to the prompt “What’s going on in this picture?”. Their handwritten responses were transcribed for analysis.

3. Thinking Through Art 4th Grade Student Response (Beginning of School Year)

It looks like a family is at the beach. All the birds above the family look like they are in a fight over some food. Maybe they are from a while back because no body walks around it suits any more.

Student makes observations and interpretations responding to the prompt, “what’s going on in this picture?”, without providing evidence

Student makes an interpretive claim without providing evidence

Student expresses uncertainty with the conditional word “maybe”

Student applies prior knowledge to make an interpretive claim, supported by evidence from the image and prior knowledge

4. Thinking Through Art 4th Grade Student Response (End of School Year):

I think they are maybe smiling for a picture, or they are on a trip to the beach somewhere. I think they are smiling for a picture because they are not looking at each other, they are all looking forward. I also say they could be at a beach because like Sam said there is some sort of seaweed stuff and the floor looks leveled differently than concrete. Also the color of the floor makes it look like sand. I also think this took place a long time ago because people now a days don't wear suits in public unless it is a special occasion. I also see on the four girls are bathing suits but they also don't look like bathing suits that we wear now a days.

Student uses conditional language ("maybe")

Student identifies multiple possible interpretations

Student makes an interpretive claim, supported by evidence from the image

Student makes an interpretive claim, supported by evidence from the image, and cites another student in the class from the discussion by name

Student applies prior knowledge and multiple points of evidence from the image to support interpretive claim

Student applies prior knowledge to make an interpretive claim, supported by evidence from the image.

Note that this is the same claim and evidence as in the students' fall sample, but in this example there is an additional inference working out what would be true if a different condition were present

Student applies prior knowledge to make an interpretive claim, supported by evidence from the image and prior knowledge

CRITICAL THINKING ANALYSIS: Thinking Through Art Group 4th Grade Student

In the sample from the beginning of the year, this Thinking Through Art fourth grade student demonstrates some critical reasoning skills by synthesizing prior knowledge and assumptions based on details in the image, and they organize their thoughts into readable sentences. Compared to the control group student's first sample, this Thinking Through Art student's first sample is short. This is likely because the Thinking Through Art student hand-wrote their response, while the control student dictated theirs; both these choices for mode of response were informed by the students' and teachers' understanding of what would allow for the most robust form of student expression. Like the control group fourth grader, this Thinking Through Art student's beginning of year sample provides an example of a mid-range or "developing" *Critical Reasoning* score.

In stark contrast to their fall sample, as well as to either of the control student's samples, the Thinking Through Art fourth grade student at the end of the school year synthesizes a number of critical thinking skills together in a well-reasoned response. This Thinking Through Art student also demonstrates comfort with sustained looking at the image, looking for and finding more to discuss in this (much longer) response than they did in their fall response. They synthesize interpretations and associations, supported by visual evidence and prior knowledge, connect different ideas, use vivid details from the image, organize their thoughts clearly, and consider multiple possible interpretations. The Thinking Through Art student's end of year sample is an example of a high *Critical Reasoning* score, achieving an "exemplary" score on the *Critical Reasoning Rubric*. The Thinking Through Art student's set of samples exemplify substantial growth in *Critical Reasoning*, increasing by 2 points from the beginning to the end of the school year.

As we endeavored to learn how the Thinking Through Art program impacted participating students' growth in both critical thinking and social-emotional learning, our team found that by providing teachers with tools to support instruction in the classroom, and opportunities to bring their students to the museum' for student-centered learning in the galleries, our program does indeed increase students' social-emotional learning, as well as their ability to think critically about images. By holistically investigating students' growth across both cognitive and social-emotional domains, we can identify with specificity "*what meaningful learning looks like*" and provide evidence that demonstrates that Thinking Through Art helps students become more self-confident, more curious, more adept at constructing meaning, and more collaborative after a year in the program.

BE KIND BE BRAVE

VTS Expectations

- * Be kind & respectful
- * One minute of silent looking
- * Raise your hand to participate
- * One voice at a time
- * Share your thinking with evidence
- * Take risks: there is no wrong answer!
- Have fun!

Let's build a sentence!

Capitalize your MINTS

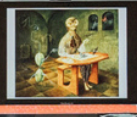
Months and Days

the pronoun 'I'

names - people places paper nouns

ES - books moments T.V. shows

f sentences



CONCLUSIONS

“THANK YOU for reminding me how to teach with a sense of joy and discovery.”

– 12th Grade English and English as a Second Language Teacher, Thinking Through Art participant

The Thinking Through Art Impact Study aimed to capture a holistic view of the partnership between the Isabella Stewart Gardner Museum and Boston Public Schools, to understand how multiple components work together for the benefit of teachers and students. We found that Thinking Through Art improves teachers' ability to practice culturally responsive instruction and center their students, and that in turn the students who benefit from these high-quality teacher practices increase both individual and group facets of social-emotional learning and critical thinking. Thinking Through Art lessons create classroom communities in which students feel the psychological and emotional safety to work together to decode the complex visual text at hand. Teachers use Thinking Through Art lessons as informal formative assessments, eliciting information about students' knowledge and their ability to transfer content and skills to and from the discussion about the artwork, as well as developing a deeper understanding of each students' thinking processes and worldview. The carefully selected artworks and the instructional practices, like paraphrasing and open-ended facilitation, that Thinking Through Art teachers are trained to use in these lessons ensure that all students are engaged in inquiry-based learning. The discourse that emerges is culturally sustaining, as all points of view are validated and all students understand that their ideas will be carefully considered by their classmates, and the experience promotes the development of students' critical consciousness through the disruption of negative stereotypes and the insistence on centering diverse student interpretations of the artwork.

Stronger teacher engagement in Thinking Through Art leads to stronger positive student outcomes.

As detailed in the section on teacher outcomes above, the more that teachers participated in Thinking Through Art, the higher they and their students scored on important measures of culturally responsive instruction and critical thinking. Furthermore, Thinking Through Art teachers noted how participation in this program led to an increase in comfort talking with students about art, as well as their feeling of connection with the Gardner Museum. The idea of building a ‘community of learners’ applies as much to Thinking Through Art teachers learning together with their colleagues and Museum staff as it does to their students in the classroom. As an intensive, graduate-level program, Thinking Through Art asks a lot of teachers for whom time and energy are short. This study’s findings conclude that the efforts that teachers put into the professional development, classroom, and museum components of Thinking Through Art contribute to outcomes that are vital to student success.

Thinking Through Art is an effective way to teach complex, holistic areas of student skill development.

In both the social-emotional learning and critical thinking categories in this study, our study found that Thinking Through Art students’ most significant improvements were in the synthesis categories *Community of Learners* and *Critical Reasoning*. These higher-level behaviors and skills are often the most challenging to teach explicitly and yet are the most important for wellbeing and college and career readiness. Schools and teachers who are struggling with social-emotional learning or increasing the depth of knowledge of students’ thinking can turn to Thinking Through Art to achieve significant gains.

Thinking Through Art’s impacts are greatest for students in the early grades, contributing to learning how to be an engaged, collaborative student.

Thinking Through Art students in grades PreK–2 had more substantial growth than their control group counterparts in every social-emotional learning category. There are particularly stark differences in scores for *Respects Multiple Possibilities* and *Creating a Community of Learners*. Thinking Through Art only expanded to these grades in 2021, so this finding that the program was significantly effective at increasing young students’ social-emotional learning skills only a year after first welcoming them to the Museum is extremely encouraging. Moreover, explicit social-emotional learning is most prevalent in these early grades within Boston Public Schools so our findings are all the more extraordinary. The significant differences between growth in Thinking Through Art and control group classes across social-emotional learning categories indicates that Thinking Through Art has a transformative impact on Boston’s youngest students that can outperform other initiatives that have been adopted by the district.



IMPLICATIONS

The resounding take-away from this study is that the museum-school partnership design of Thinking Through Art is highly successful in ways that transcend the obvious benefits of giving students and teachers greater access to works of art. This 360-degree study of the impact of the Thinking Through Art program provides a wealth of information for those who care about and make decisions about what resources and opportunities are available to public schools, and in particular, Boston Public Schools administrators, teachers, and students. The findings suggest implications for the design of the Thinking Through Art program, directions for future research, and longer-term considerations for a deeper partnership between Boston Public Schools and the Isabella Stewart Gardner Museum.

Implications for Thinking Through Art:

Thinking Through Art recognizes the central role of teacher quality in determining students' success. Therefore, it should highlight its ability to provide professional development centered on skill development that results in teachers' capability to define and affirm their roles and create safe, effective learning environments for their students.

The extensive collaboration between researchers and teachers required by this study, especially concerning data collection, was potentially a challenge for developing positive relationships between Gardner Museum staff and the participating Thinking Through Art teachers. Quite the opposite occurred. The feeling of connection fostered by classroom data collection and increased engagement with Thinking Through Art overall led teachers to request a stronger in-school presence of Museum staff. In response, Thinking Through Art will add an optional classroom coaching visit to its program model, supporting teachers in their school environments and building relationships with students.

The strength of the findings for *Community of Learners* and relatively modest growth in *Instructional Practices* for Thinking Through Art teachers indicate that future teacher professional development should emphasize specific classroom management protocols like raising hands and calling on all students, to support equitable participation, as well as facilitation strategies such as linking ideas in paraphrasing, to promote community building.

The research team was surprised and delighted by the jaw-dropping findings for grades PreK–2. While Thinking Through Art is relatively new to the early education sphere, based on this study we look forward to continuing our work with these younger grades.

Finally, the Museum staff involved in this study benefited immensely from their researcher-practitioner stance. They honed their teaching skills as they learned from the best practices in facilitation strategies and culturally responsive instructional methods they were observing and analyzing. This points to the value of involving all museum teaching staff in regular observation and evaluation practices.

Implications for Future Research:

Holistic evaluation of observed social-emotional learning

Social-emotional learning has frequently been measured using student responses to a set of questions in the form of a survey, or by teachers' global accounts of students' capacity to stay on task, to follow instructions, and to manage emotions. This study took a different approach. We focused on social-emotional skills that prepare a student to create rewarding school and life experiences. Such skills development is not necessarily conscious and is not best captured by an individual responding to survey questions. The time-consuming recording of actual classroom lessons provided, we believe, a richer and more accurate picture of social-emotional skills like listening, participating with confidence, showing compassion, and acknowledging the value of others' contributions.

Explore methods to evaluate expressions of empathy

To our surprise, we did not find significant gains in Thinking Through Art's students' empathy responses. There were, in actuality, few expressions of empathy during a 12-minute facilitated group discussion about art. We suspect that the visual images selected for this study did not offer opportunities for empathic responses. This suggests an opportunity for future research - with different kinds of images - to determine how programs like Thinking Through Art can better support and measure characteristics of empathy.

Continue to refine the categories of critical thinking

We are not satisfied that the indicators of critical thinking specified in the Critical Thinking Coding Manual developed for this study are the most pertinent indicators. Based on previous research on critical thinking in programs using Visual Thinking Strategies, we designed the Critical Thinking Coding Manual to look for types of critical thinking that would be rare but exciting, such as students' use of simile and formulating hypotheses. In fact, these forms of critical thinking did not appear frequently enough to generate statistically significant findings. Further investigation of the specific indicators of critical thinking in a Thinking Through Art context is warranted.

Use Universal Design principles, with some parameter controls

We highly recommend consideration of Universal Design for Learning guidelines in research design, considering accessibility essential for research in and with schools. Providing options for the way students expressed themselves (writing or speaking, communicating in whichever language or modality is most comfortable and appropriate for each student, etc.) respected each student and provided opportunities to more fully share their thoughts. There are, however, some parameters that should be standardized. The amount of time allowed for written responses and the amount of time a child speaks, and the use of the same mode of response for both pre and post samples, are examples of these necessary consistencies.

Build trust with student communities and special populations

The rate of parent consent to participate in the study was noticeably higher for students with no recognized disabilities than for students with disabilities. To get greater participation from student populations who may be wary of participating in research studies – including multilingual learners and students with disabilities – special efforts will need to be made to reach their families / guardians and answer their questions about the purpose of the study, the methods used, and how their child will be treated.

Study the impacts of Thinking Through Art for grades 6-12 and for teachers as learners

Due to the happenstance of the Thinking Through Art cohort during 2022-23, the sample population of this study skewed heavily towards the younger grades. We recommend replicating this study with a larger proportion of middle and high school students to clarify the outcomes for older learners. We also recommend applying the methods that were here used to analyze student social-emotional learning to understand the dynamics of individual and group learning among teachers who are participating in programs like Thinking Through Art.

Investigate art museums as distinctively effective learning spaces

This study shows that teachers who participate in Thinking Through Art had a greater capacity for culturally responsive instruction than teachers who do not partner with an art museum, and that in the classroom students in Thinking Through Art demonstrated gains in social-emotional learning and critical reasoning. Research into the experience in the museum galleries would clarify the extent to which the museum visit contributes to student gains, as well as provide opportunities to evaluate the effectiveness of museum educators in modeling culturally responsive instruction.

Implications for Boston Public Schools:

The Thinking Through Art program embeds known educational best practices in its design. The striking, positive results of Thinking Through Art participation for teachers as well as for students suggest that examination of the program's key elements is a worthwhile investment of time for all who care about public education. Using these findings, we can now move beyond marveling at the magic of Thinking Through Art to harnessing its strategies. Study findings affirm that there are concrete, purposeful, well-informed elements of the Thinking Through Art model that, if recognized, could be influential in addressing some of the challenges facing our public schools.

Art is the focal point of the Thinking Through Art program, and when that art is accompanied by a dedication to student-centered, social learning, student outcomes go far beyond remembering names of artists or learning the elements of art. Thinking Through Art uses visual art as the open-ended stimulus to level the playing field for students and inspire everyone to believe they can learn, that some things do spark their curiosity, and that they have something to offer to their community of learners. While Boston Public Schools has made incredible gains in student access to the arts, they have primarily focused on art-making. This study demonstrates the impact that would result from giving more students regular opportunities to ponder and discuss visual art together.

Thinking Through Art is an example of a holistic, intentional approach to museum-school partnerships – an approach that sees beyond the walls and distances that physically separate extraordinary educational resources in the city from the classrooms of public school teachers and students. The Thinking Through Art museum-school partnership is grounded in an expansive view of what resources a museum has to offer that are aligned with the priorities and needs of public schools.

Boston is known for its wealth of artistic, cultural, and scientific educational institutions. When those organizations are willing to offer their resources in the service of Boston Public Schools goals, as the Gardner Museum has demonstrated with Thinking Through Art, they provide teachers and students with exceptional, high-quality learning resources. The current norm for museum-school partnerships revolves around field trips to a museum. Exposing students to art and art museums is a sound educational practice. It does not, however, take full advantage of what museums and other community institutions can contribute to public education. Integrating community artistic, cultural, historical and scientific resources into teacher professional development and school curriculum provides a great advantage for teachers and students in urban public schools. Too often, our urban public schools are seen as lesser than the better-resourced suburban and private schools. The results of this study strongly suggest that there are unsurpassed resources in Boston that can, with conscious effort, become available to public school teachers and students.



RECOMMENDATIONS

- **Share the study findings - and the design of the Thinking Through Art program - with decision-makers at all levels of Boston Public Schools. Provide opportunities to observe Thinking Through Art in action in classrooms and to experience conversations about art at the Isabella Stewart Gardner Museum.**
- **With the support of Boston Public Schools, increase the number of teachers and schools participating in Thinking Through Art to maximize access to these impacts across the city.**
- **Continue to study and evaluate teacher and student outcomes to further establish the positive effects of Thinking Through Art.**
- **Convene a group of museum and school district stakeholders to imagine what it would look like to activate the currently untapped power of museum-school partnerships.**

The results of this study strongly support the continuation of the Isabella Stewart Gardner Museum's Thinking Through Art program in partnership with Boston Public Schools. Teachers can enroll confident that they will add effective elements to their teaching practice and that their students will benefit. The results are consistent and strong enough to warrant Boston Public Schools considering ways to support, endorse, or even adopt the program more broadly.

There are the seeds of desired transformational change here. Beyond continuing and growing the current Thinking Through Art program, if desired, both Boston Public Schools and the Gardner Museum could use the findings from this study to seriously collaborate, recognize shared goals, and combine their resources in totally new ways.



Isabella Stewart Gardner Museum, Boston. Photo by Carlie Febbo.