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IMPACT STUDY

the EFFECTS *of* FACILITATED SINGLE-VISIT ART MUSEUM PROGRAMS *on* STUDENTS GRADES 4-6

TECHNICAL REPORT

Prepared for the
National Art Education Association &
Association of Art Museum Directors

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*Cover photo taken by Amanda Krantz at the Orlando Museum of Art

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Sincerely,
RK&A
Stephanie Downey, Randi Korn, Amanda Krantz;
Katie Chandler, Erin Wilcox, Emily Skidmore, & Sam Theriault

ABSTRACT

Spearheaded by the Museum Education Division of the National Art Education Association (NAEA) and the Association of Art Museum Directors (AAMD) with funding from the Institute of Museum and Library Services (IMLS) and the Samuel H. Kress Foundation, RK&A conducted a national study of the effects of facilitated single-visit art museum programs on students in grades 4-6. The results of this study are critical. Facilitated single-visit programs are the most common way art museums serve K-12 students; yet, there is a dearth of rigorous research about the effects of these programs.

In this study, facilitated single-visit programs are defined as one-time museum field trips in which students engage with original works of art within the physical setting of an art museum. Students are led by a representative of the museum (trained volunteer docent or staff member) who uses inquiry-based pedagogies to guide students in discussions about works of art. The study team hypothesized that "though short in duration, single-visit programs affect students in complex, multi-dimensional ways; there is not one direct effect, but rather potentially multiple, interrelated effects that are central to the education of young people in particular: creative thinking, critical thinking, sensorial and affective responses, human connections, and academic connections."

Through a quasi-experimental study, we measured the effects of facilitated single-visit art museum programs on students. Ultimately, we found that a facilitated single-visit program in an art museum affects students in grades 4-6 in four ways:

QUESTIONING: Students ask more complex questions about works of art

MULTIPLE INTERPRETATIONS: Students are more accepting of multiple interpretations of a work of art

PHYSICALITY OF ART: Students are more likely to think about art in terms of its material properties

EMOTIVE RECALL: Students experience greater emotive recall of the program

The above benefits are the result of a facilitated single-visit program in an art museum; please note we did not find these same benefits for students who received a similar one-time classroom program. A close examination of the data, which are elaborated upon in this document, reveals the nuances and complexity inherent in these results. The graphic on the next page begins to clarify the relationship between teaching and learning during facilitated single-visit art museum programs, although further discussion is necessary to identify its many implications.[1]

[1] The academic connections capacity is intentionally omitted from the graphic on the following page because we found no direct benefits in that area; however, we acknowledge there may be indirect benefits.

CONDITIONS

What happens during a facilitated single-visit program in an art museum?

Observations indicate average conditions:

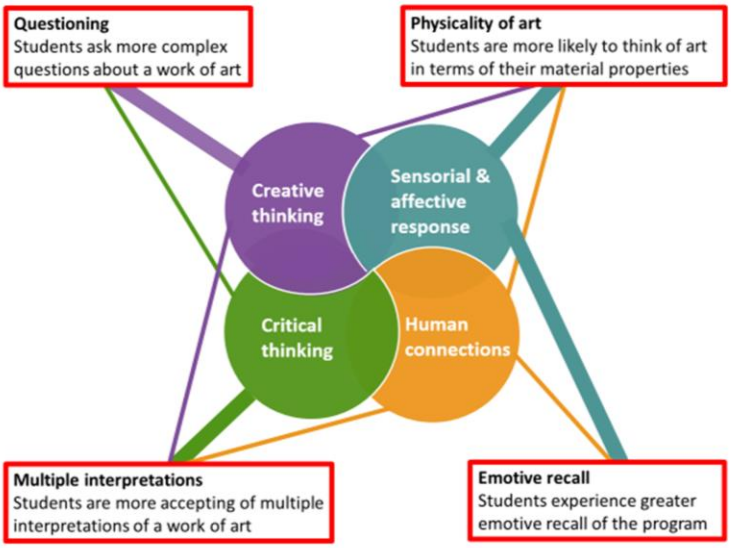
- 73-minute program
- Mostly facilitated by trained volunteer docents
- Student-to-facilitator ratio is 10:1 or less
- Includes stops at 7 original works of art
- Artwork is mostly representational (vs. abstract); largely 2D, some 3D & media

Observations show that pedagogy frequently supports students in:

- Interpreting
- Connecting observations to previous knowledge
- Recognizing multiple interpretations
- Questioning and investigating
- Experiencing captivation
- Connecting to human experience

RESULTS

What are the results of a facilitated single-visit art museum program on students in grades 4-6?



STUDY MOTIVATIONS

Awareness of the need for this study emerged from simultaneous discussions within the Museum Education Division of the National Art Education Association (NAEA)[2] and the Association of Art Museum Directors (AAMD) during 2010 and 2011. Both groups identified a lack of rigorous research to respond to questions about the effects of facilitated single-visit art museum programs on students. While there are several studies that explore the effects of multi-visit art museum programs, there was a dearth of information about single-visit programs or "field trips." This was considered extremely problematic as facilitated single-visit programs are the most common way in which art museums serve school students.

Therefore, in 2013, NAEA and AAMD forged a formal partnership to launch this study with NAEA serving as the lead organization. Funding from the Samuel H. Kress Foundation in 2014 supported planning, and a three-year grant from the Institute of Museum and Library Services (IMLS) supported implementation. Since then, notably, studies at the Crystal Bridges Museum of American Art started to fill this research need (Bowen, Greene, & Kisida, 2014; Greene, Kisida, & Bowen, 2014; Kisida, Bowen, & Greene, 2016). However, Crystal Bridges' studies focus on the teaching at one specific museum. By contrast, this NAEA/AAMD study was intentionally designed to examine and understand programs that represent art museums nationwide; and as such, findings would be generalizable to the field at large. Our approach has its benefits and limitations, as does any study:

WHAT THIS STUDY IS

This study takes a macro approach to facilitated single-visit art museum programs. From it, we can understand the effects these programs have on students in grades 4-6. Furthermore, it raises additional specific and targeted questions about facilitated single-visit programs.

WHAT THIS STUDY IS NOT

We prioritized generalizability. Thus, this study does not explore the effects of individual aspects of facilitated single-visit programs on students in grades 4-6. For instance, this study does not prescribe best practices for pedagogy, selection of art works, or other program specifics.

[2] The Museum Education Division of NAEA will be referred to hereafter as NAEA.

RESEARCH DESIGN

We dedicated an entire year exclusively to planning the study. NAEA, AAMD, RK&A, and a working group of art museum educators representing a range of art museum types, sizes, and communities collaborated to determine the research question and hypothesis. This collaboration included much discussion about what might be the potential effects of facilitated single-visit art museum programs on students and what aspects of the programs might influence those effects.

RESEARCH QUESTION

What are the benefits of facilitated single-visit art museum programs – specifically, those programs guided by inquiry-based pedagogies – on students in grades 4-6?

RESEARCH HYPOTHESIS

Though short in duration, facilitated single-visit programs affect students in complex, multi-dimensional ways; there is not one direct effect, but rather, there are potentially multiple, interrelated effects that are central to the education of young people in particular: creative thinking, critical thinking, sensorial and affective responses, human connections, and academic connections.

STUDENT CAPACITIES

Critical to this research study is the framework developed for describing and theorizing the potential benefits to students of facilitated single-visit art museum programs. In line with recent research and based on input from art museum educators about the purpose of their work, we chose to focus this research on five capacities[3]: creative thinking, critical thinking, sensorial and affective responses, human connections, and academic connections. To identify and

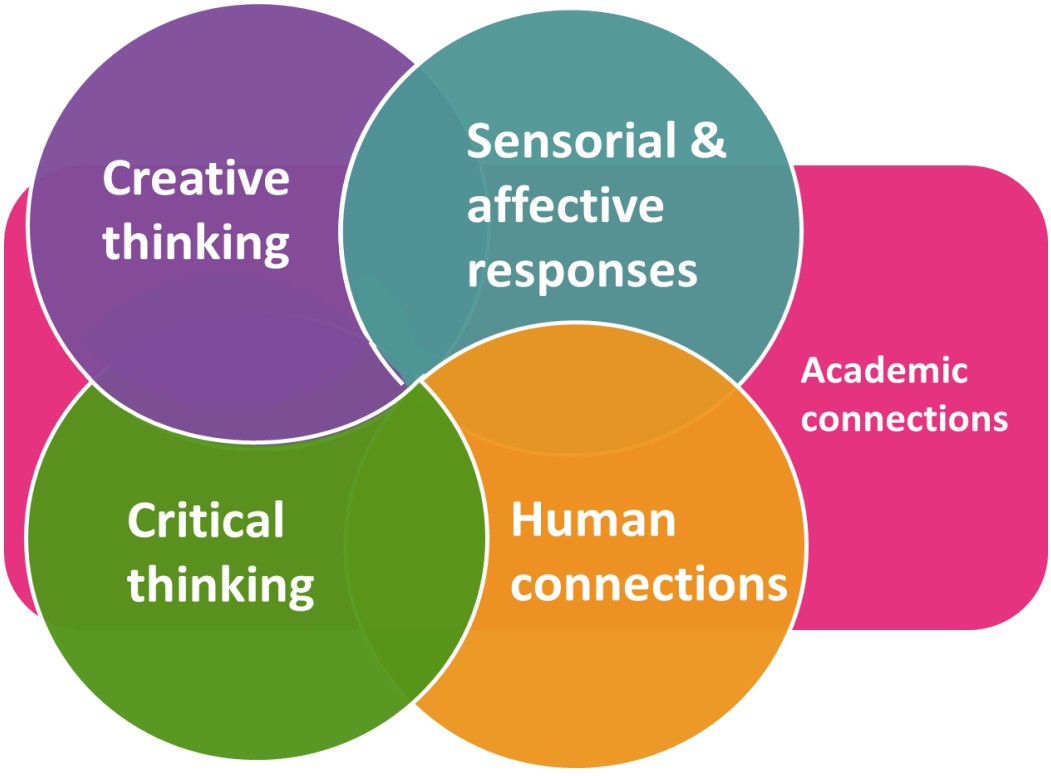
[3] Please note that the team deliberately chose the word "capacities" to describe the five areas, instead of another word, such as "competencies" or "skills." Our intent is to acknowledge that these five areas may be activated or given the opportunity to develop in a student, as opposed to being mastered, in the brief encounters with art during facilitated single-visit programs.

operationalize these five capacities, art museum educators drew from their experiences in the field—including the purpose of facilitated single-visit programs at their own museums as well as how others in the field describe the effects of facilitated single-visit programs. We also drew from the literature review conducted during the planning process; it includes a robust examination of all five areas, drawing from psychology, philosophy, art history, pedagogical theory, etc. to characterize and understand each capacity.

The illustration below depicts our framework for examining the impact of the facilitated single-visit museum program on students. The top layer shows four capacities—each is distinct and overlapping because cognitive psychology and neuroscience indicate that these capacities do not occur in isolation from one another—instead they are interconnected (Terrassa et al., 2016). All four are essential to cognition—or the process of acquiring and constructing knowledge—and we believe they are activated simultaneously during engagements with original works of art. Academic connections—the fifth capacity—is depicted as a layer beneath the four capacities because we conceptualize that growth in the former mentioned capacities can help students connect museum experiences to in-school learning.

For the purpose of developing research measures, we operationalized each capacity separately and describe them on the next page, pointing out ways in which they overlap.

FRAMEWORK OF STUDENT CAPACITIES



CREATIVE THINKING

Creative thinking has received much attention among art museum educators as a skill nurtured in facilitated single-visit programs. This may not be a surprise since creativity has long been associated with the arts—both in art making and in thinking about art. There is loose agreement among academics and practitioners about what constitutes creative thinking. Definitions vary, dependent on the context in which creative thinking takes place (Batey, 2012). Processes linked to creative thinking are questioning and probing, divergent thinking, metaphorical thinking, flexibility, play, exploration, risk-taking, imagination, and challenging conventions, among several others (Csikszentmihalyi, 1996; Foley, 2014; Gardner, 2007; Greene, 1995, 2001). For the purposes of this study, we have operationalized creative thinking as questioning, imagining possibilities, and comfort with ambiguity; each are defined here (in no particular order):

- **Questioning** is students' proclivity to ask questions about a work of art in relationship to their interpretation of it; the questions are complex, asking "why" and/or "how"
- **Imagining possibilities** is students' ability to provide a second interpretation of a work of art that is divergent from their first interpretation
- **Comfort with ambiguity** is students' awareness that art is not immediately understandable (and requires close looking and investigation)

Noticeable here is creative thinking's close alignment with critical thinking, and the two are frequently referred to together, as they represent two capacities central to cognition (Foley, 2014). Nevertheless, critical thinking emphasizes logic and analysis, while creative thinking stresses imagination and the unknown (Forrester, 2008).

CRITICAL THINKING

Critical thinking has become increasingly important in schools and, as a result, it is a valued outcome of facilitated single-visit art museum programs. Critical thinking can be conceptualized in different ways, and we subscribe to Willingham's (2007) definition, whereby critical thinking involves "deducing and inferring conclusions from available facts" (p. 8) and calls for "demanding that claims be backed by evidence," as well as "seeing both sides of an issue [and] being open to new evidence that disconfirms your ideas" (p. 8).

This definition aligns with our two measures of critical thinking: evidential reasoning and multiple interpretations, defined here:

- **Evidential reasoning** is students' ability to provide relevant visual evidence from a work of art to explain their interpretation of what is going on in that work of art.
- **Multiple interpretations** is when students recognize there is more than one way to understand or interpret a work of art.

SENSORIAL AND AFFECTIVE RESPONSES

Sensorial and affective responses is the most elusive of the five capacities. It refers to students' heightened perceptual, kinesthetic, or emotional responses when experiencing artworks and museum spaces. While most art museum educators would argue that facilitated single-visit programs activate students sensorially and/or emotionally, little evidence exists to demonstrate what this looks like. As outlined in the literature review (Terrassa et al., 2016), various disciplines have emphasized the value of sensorimotor responses in encounters with works of art. For example, psychologist Rudolf Arnheim (1969) contended that visual perception involves an active structuring of information and is in itself a form of thinking. Also, from a philosophical perspective, John Dewey (1980; 1934) hypothesized that engagements with art can intensify viewers' senses and stimulate their motor channels of response, making them more awake to the world and themselves.

Admittedly, we were limited in our ability to measure this capacity because of its subtle qualities, and a more comprehensive examination would be beneficial. For the purposes of this study, our measures investigated students' emotional, as opposed to sensorial, responses to the museum experience. Nevertheless, we view the two (emotion and the senses) as linked, as maintained by neuroscientist Jamie Ward (2014) who explained the way experiences that involve multiple senses, as museum experiences do, activate different neural systems, resulting in richer memories. This connection is implicit in our two measures, emotive recall and captivation, defined here:

- **Emotive recall** is students' demonstration of strong emotions in the recollection of a facilitated single-visit program, as indicated by the vividness of description, robustness of detail, and use of words or phrases that convey emotion of any kind (not just positive)
- **Captivation** is defined as students' belief that art is "amazing"

Sensorial and affective responses has strong ties to the other capacities. For instance, recent studies in cognitive science and neuroscience indicate that sensorial and affective systems are critical to cognition, such as critical and creative thinking (Damasio, 2005; Immordino-Yang, 2008; Kiefer & Barsalou, 2013; Lakoff & Johnson, 1999; Yob, 1998). Sensorial and affective responses is also inextricably linked to the human connections capacity, which is explained below.

HUMAN CONNECTIONS

Human connections, as well as empathy, are of great interest to many educators, not just those in art museums. Museums, through their collections of artifacts and objects, are ideal settings for stimulating visitors' sense of connection to others and the self. The domain of human connections is quite broad, describing connections with other people, cultures, eras, and/or artists. Empathy is part of human connections, and it can include bodily empathy set off by a physical experience or cognitive empathy based on learning about another's situation. The RAND Corporation identified empathy as when individuals are drawn into the experiences of "people vastly different from themselves" through art (McCarthy et al., 2004, p. xvi), thereby increasing their receptivity to unfamiliar people, attitudes, and cultures.

For the purposes of this study, we defined human connections in terms of three measures:

- **Connection to lived experience** is students' ability to connect to human experiences across culture, time, and place through a work of art
- **Connection to the artist** is students' feeling of being personally connected to artworks or their makers
- **Connection to self/community** is students' deepening sense of self in their community.

Human connections is closely tied to sensorial and affective responses in terms of "bodily and emotional empathy." According to the neuroscience research of Freedberg and Gallese (2007), viewers can experience bodily and emotional empathy in front of works of visual art, which may manifest as a sense of awe, captivation, and/or inspiration. Their studies argue that the physiological origin of this kind of empathy happens as result of mirror neurons, a special class of brain cells that allows us to replicate other people's actions in the brain.

ACADEMIC CONNECTIONS

Art museum education departments often frame their programs as supporting students' academic studies. As described in the literature review, (and in practice), the connection between museum and school learning is framed mainly in two ways—one focused on skills and the other focused on content. The first relates to students' ability to apply classroom knowledge in a new context; practice skills that are part of local, state, and/or national standards; and transfer skills from a museum setting to academic learning. The second focuses on students' development of content knowledge in a museum setting that enhances curricular content in academic learning, assuming that the contextual information shared in the museum is indeed relevant to school curriculum (Burnham & Kai-Kee, 2011; Mayer, 2014).

We conceived the relationship between academic connections and the other four capacities as inherently about the transfer of the capacities from the museum to school, and vice versa. Therefore, as shown in the illustration on page 9, we placed academic connections beneath the other four capacities, to respect our theory that growth in the other four capacities would transfer down to in-school learning. This theory is aligned with many school districts' strategic goals to help students develop holistically for success post-graduation. However, for the purposes of this study, we measured academic connections in terms of students' perceptions of their academic life, as follows:

- **Academic connections** is students' perceived relevance of what they learn in the museum to what they learn in school.

This measure relied on students to think about and articulate connections between museum and in-school learning, which is a developmental challenge for the lower age-range of the students we studied, and thus a limitation of this study.

METHODOLOGY

RK&A's goal was to conduct a methodologically rigorous study that could measure the effects of facilitated single-visit art museum programs on students. As shown in the diagram below, RK&A conducted a quasi-experimental study that included three study groups: one that received a museum program (Treatment A), one that received a classroom program (Treatment B), and one that did not receive any art museum program (Control). The purpose of including the Treatment B study group was to pinpoint differences between an inquiry-based art museum program in the museum with original works of art versus an inquiry-based art museum program in a school classroom with reproductions of works of art[4]. Six methodologies, described beginning on the next page, were used to understand the results from different perspectives.

QUASI-EXPERIMENTAL RESEARCH DESIGN

STUDY GROUP	TREATMENT A museum program	TREATMENT B classroom program	CONTROL no program
Program Intervention	Single-visit museum program facilitated by a trained docent or museum educator in which students view original works of art	Single-visit school classroom program facilitated by a trained docent or museum educator in which students view reproductions of works of art	None
Pre-measure	Student questionnaire	Student questionnaire	Student questionnaire
Program measure	Observation of program	Observation of program	N/A
Post-measure	Student questionnaire Student interview Teacher questionnaire Teacher interview Program facilitator interview	Student questionnaire Student interview Teacher questionnaire Teacher interview Program facilitator interview	Student questionnaire Student interview Teacher questionnaire Teacher interview

[4] Please note that the purpose of Treatment Group B is specifically to examine the difference between a program in a museum with original works of art versus one outside a museum with reproductions. The study did not seek to draw conclusions about or test the efficacy of classroom programs.

PROGRAM OBSERVATIONS

To provide an objective account of the program and teaching practices, RK&A observed 101 museum and classroom programs for students in grades 4-6. Data collectors were trained to conduct observations using a list of teaching practices believed to support each capacity; the list was extensive and included examples of instructions, explanations, and modeling behaviors (see excerpt below for examples of teaching behaviors and see the appendix for all behaviors). Observations were both standardized and naturalistic. That is, observers took notes during the program, writing down exactly what facilitators said and did during the program. The observer then completed a standardized observation guide within 24 hours of the program, providing ratings for the extent to which facilitators supported students in the five capacities as well as examples from their observation notes to explain their ratings. Ratings were analyzed statistically, including cross-tabulations and analysis of variance using a 0.05 level of significance.

FACILITATOR TEACHING BEHAVIOR EXAMPLES

Facilitator Teaching Behaviors that Support Students in Creative Thinking	
Facilitator helps students question and investigate	• When student asks a question about what the work means, the facilitator directs him to find an answer in the work of art (e.g., Student: "What is this black thing?" Facilitator: "Are there other clues in the painting to help you figure that out?") • Asks students questions to pose other curiosities (e.g., Facilitator: "What else do you want to know about this work of art?" or Facilitator: "What questions do you have about this work of art?") • Models questioning and investigation: (e.g., Facilitator: "I have always wondered about this figure in the corner? What is his relationship to the group?")
Facilitator helps students envision alternative possibilities (different ways of seeing and responding)	• Asks students to place themselves in a scenario and consider different ways of seeing or responding (e.g., Facilitator: "Imagine you were the artist. What choices might you have made about the composition?" or "Why might someone want a piece of art like this in his house?") • Challenges students to come up with an alternate possibility after s/he provides one (e.g., Facilitator: "That is an interesting thought. What else might this character be thinking?") • Acknowledges a current condition and challenges students to think of other possibilities (e.g., Facilitator: "This is here in the museum now, but how might this artifact have been used originally?")

STUDENT QUESTIONNAIRES

To measure change in students' perceptions as a result of the museum or classroom program, RK&A administered questionnaires to students in all three study groups pre- and post-program. The questionnaire included mostly rating statements that pertain to the student capacities being explored, as well as a few background questions about students' relationships to art and art museums. To administer the questionnaire, a data collector distributed one questionnaire to each student. The data collector read each question aloud; students were asked to follow along at the pace of the data collector. A total of 4,134 questionnaires were collected, about one-half pre-program and one-half post-program (they were not paired for analysis). Questionnaires were analyzed statistically using linear regression with a 0.01 level of significance.

STUDENT INTERVIEWS

To measure the effects of the program on students' abilities in the five capacities, RK&A conducted 627 interviews with students in all three study groups after the program intervention. Students were asked a standardized set of questions while looking at *The Red Rooster* by Marc Chagall, which was printed on standard 8.5" x 11" paper (see below).

THE RED ROOSTER BY MARC CHAGALL, FROM CINCINNATI ART MUSEUM

The work of art was chosen because it is representational but not realistic. The representational qualities of the work of art were important in measuring the five capacities we sought to explore, in particular evidential reasoning as part of critical thinking. The surreal qualities were also important because the figures in the painting are not overtly representative of one race or ethnicity. Additionally, the surreal qualities suited measuring creative thinking, particularly comfort with ambiguity.

The questions students were asked about *The Red Rooster* mimicked inquiry-based facilitation strategies, and included "What do you think is going on in this painting?" and "What makes you say that?" Students who had a program experience whether in the museum or in the classroom were also asked to recall the program at the end of the interview. All questions were open-ended, and interviewers were trained to ask all questions in the same order without adding other probing questions. Interviews were scored on 4-point rubrics pertaining to student capacities; see the example below. To generate interrater comparisons, interviews were scored by two separate coders. Rubrics received an interrater agreement of 70 percent or better.

RUBRIC FOR QUESTIONING			
1 – No achievement	**2 – Emerging**	**3 – Developing**	**4 – Accomplished**
The student does not ask questions or wonder about the artwork or artist.	The student asks limited questions or wonders minimally about the artwork or artist. Questions are mostly limited to who, what, where, or when questions and do not touch on why.	The student asks several questions or wonders moderately about the artwork or artists. Questions explore "why," but do not connect to an interpretation/ hypothesis.	The student asks several questions or wonders moderately about the artwork or artists. Questions explore "why," and connect to an interpretation/hypothesis about the artwork/artist.

TEACHER QUESTIONNAIRES

To provide background information about the students and teaching in schools that may affect differences among treatment and control groups (e.g., other field trips, etc.), RK&A administered questionnaires to all teachers whose students participated in the study; 92 teachers completed the questionnaires. The questionnaire collected information about teaching practices and students' exposure to cultural institutions. The questionnaire also asked teachers to rate what they value about art museum programs for their students.

TEACHER INTERVIEWS

To explore what teachers value about facilitated single-visit programs, RK&A conducted interviews with 13 school teachers, including those who teach general subjects and those who teach art. The interviews complement the questionnaire results in a qualitative approach, which further clarifies what teachers expect of and value about art museum programs.

PROGRAM FACILITATOR INTERVIEWS

To explore what program facilitators value about art museum programs for students and the challenges they encounter when facilitating them, RK&A conducted 19 interviews with museum educators and trained docents.

MUSEUM SELECTION

To enhance the relevance of this study, museum partners were selected because their facilitated single-visit programs specifically matched criteria set forth by the team. The criteria are based on what were determined as **prevalent practices** in facilitated single-visit art museum programs based on the results of the 2015 state-of-the-field survey conducted by RK&A. For instance, we focused the study on programs that apply inquiry-based teaching methods, including asking open-ended questions and allowing group dialogue to evolve in response to students' comments and questions—two of the most prevalent teaching behaviors reported (see the stats below).

PREVALENT TEACHING PRACTICES IN FACILITATED SINGLE-VISIT ART MUSEUM PROGRAMS

Of art museums that responded to the state-of-the-field survey about facilitated single-visit programs:

98% indicated that the facilitator asks open-ended questions

95% indicated group dialogue evolves in response to students' comments and questions

67% indicated program content emerges organically from the group

Criteria also reflected program format. For example, we studied museum programs that reported an average student-to-facilitator ratio of 20:1 or less. We also focused on museum programs that reported an average of 5 stops or less at works of art or groups of artworks during programs. These two criteria are prevalent practices per the state-of-the-field results (RK&A, 2015) and are considered necessary by the team for facilitating inquiry-based teaching.

PREVALENT FORMAT FOR FACILITATED SINGLE-VISIT ART MUSEUM PROGRAMS

Of art museums that responded to the state-of-the-field survey about facilitated single-visit programs:

86% reported a student-to-facilitator ratio of 20:1 or less

55% reported making 5 stops or less at works of art or groups of works of art

Additional criteria were applied to promote program consistency. For example, the state-of-the-field study asked about training facilitators in more than one area, such as in art history *and* inquiry, articulating and applying student outcomes to train facilitators, and conducting evaluations. Finally, as part of our museum-partner selection process, we applied practical

considerations, such as ensuring the potential museum partner served an ample number of students in grades 4-6 in school districts whose regulations for conducting research with students were not prohibitive given the study timeline. Importantly, we eliminated core team members' museums from the list of potential partners.

The six selected museums have different types of collections (e.g., encyclopedic, contemporary), are of different sizes (i.e., small, medium, and large, based on operating budget, staffing), are in different community surroundings (e.g., urban, suburban), and two are affiliated with universities. Please note that museums are not identified by name in the remainder of the report. However, we considered the unique context of each museum in our analysis and described it as applicable.

MUSEUM PARTNERS

Hammer Museum
Los Angeles, CA

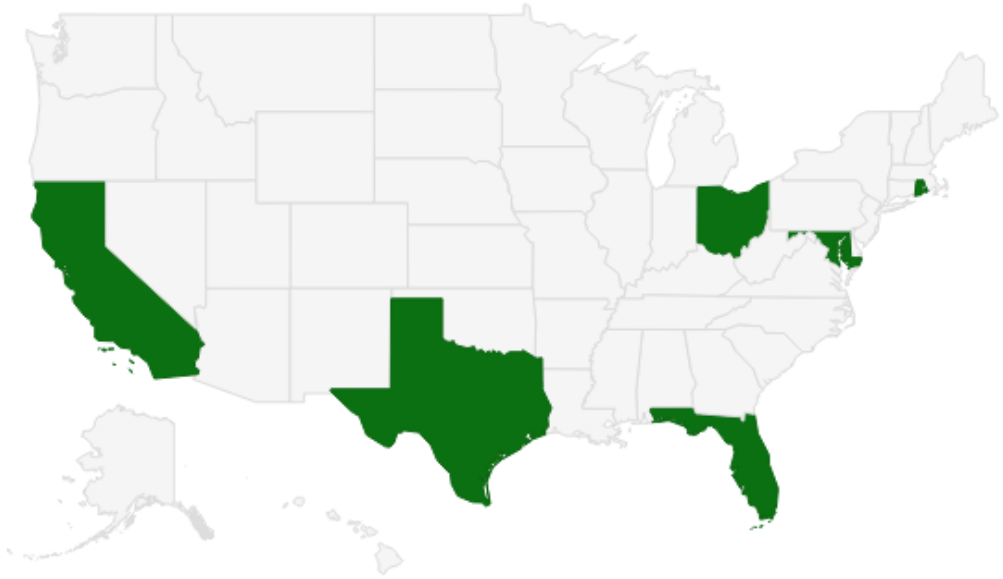
Columbus Museum of Art
Columbus, OH

Rhode Island School of Design Museum
Providence, RI

Museum of Fine Arts, Houston
Houston, TX

Orlando Museum of Art
Orlando, FL

Walters Museum of Art
Baltimore, MD



We requested that museum partners lead facilitated single-visit programs as they normally would with two caveats: refrain from offering (1) pre-visit outreach experiences (i.e., a facilitator could not visit the students at school before the museum visit, although museums could send pre-visit, printed materials to teachers to use at their discretion); and (2) separate studio art-making components with programs (although drawing or modest gallery activities were permissible). We understood that imposing few program restrictions might limit our ability to correlate nuances of teaching practices to student outcomes, yet we considered the benefit to understanding the impact of the most prevalent type of facilitated single-visit museum program on students nationwide as paramount. Were the teaching practices in our sample consistently exemplary? No. Did every program go off without a logistical hitch? Of course not. But this is the reality we wanted to understand.

SCHOOL SELECTION

The same care taken to identify museum partners extended to school selection as well. Participating schools were recruited from the dominant public-school districts served by the museum partners. Permissions from all school districts were secured via their formal research review process or through communications with the school superintendent. With permissions from school district administrators, the NAEA Project Manager recruited schools within those districts. Some of the participating schools had an existing relationship with the museum partner, but some did not. Schools were invited if:

- Free or reduced lunch percent for the school is 40% or greater (Title I status).[5]
- English Language Learner percent for the school is less than 25% (since the study was administered in English).

RK&A assigned schools and/or classrooms across the study groups (A, B, or C). Designations were not randomized, but determined based on a number of factors, including schools' scheduling limitations and efforts to evenly distribute students across study groups and museum partners.[6] A total of 180 classrooms participated in the study, with individual museum partners serving between 19 and 42 classrooms. As such, this study represents the classrooms of suburban and urban students who live within an hour of small- to large-sized cities across the United States.

[5] The majority of art museums actively reach out to Title 1 schools (57 percent) (RK&A, 2015).
[6] Because schools were not randomly assigned to a study group, regression analysis was used to determine if any school-related variables affected the results of study group comparisons.

HUMAN SUBJECTS' PROTECTION

This study was approved by an independent Institutional Review Board (IRB). The table that follows describes the measures in place to protect students, teachers, and museum educators or docents who participated in the study. Note that school district requirements varied, which impacted consenting requirements for students and therefore our sample size. In particular, four of the seven school districts that participated in the study required active consent for the student questionnaire, which required signed parent or guardian permission. By comparison, three districts allowed passive consent, so an information sheet was sent to parents and guardians about the student questionnaire with the option to opt their child out of the study. As a result, the sample of student questionnaires collected in passive consent districts is higher than active consent districts.

HUMAN SUBJECTS' PROTECTIONS BY METHODOLOGY

Observations	Consent was not required since observations focus on facilitator behaviors and the names of students, teachers, and facilitators were not recorded. Observations did not include audio or video recording.
Student questionnaires	Active consent was required by four school districts. Parents or guardians in these districts were required to sign and return a permission form in order for their child to participate in the questionnaire. Students also had to agree to the study by completing an assent form. Passive consent was required by three school districts. Parents or guardians received an information sheet about the questionnaire with an option to opt their child out. Students also had to agree to the study by completing an assent form.
Student interviews	Since interviews were audio recorded, active consent was secured. Parents or guardians were required to sign and return a permission form in order for their child to participate in the interview. Students also had to agree to the study by completing an assent form.
Teacher questionnaires	Teachers received a consent form they were required to sign and return in order to participate in the questionnaire.
Teacher interviews	Teachers received a consent form they were required to sign and return in order to participate in the interview and be audio recorded.
Facilitator interviews	Facilitators received a consent form they were required to sign and return in order to participate in the interview and be audio recorded.

FINDINGS: PROGRAM OBSERVATIONS

RK&A identified museum partners to participate in the study based on how they characterized their school programs on a state-of-the-field survey. Selected museums offer inquiry-based programs in which (a) group dialogue evolves in response to students' comments and questions; (b) facilitators ask open-ended questions; and (c) content emerges organically from the group. Observations were conducted to provide an objective account of the programs and teaching strategies as context for student questionnaire and interview results.

KEY TAKE-AWAYS

1. **Programs observed in the museum differed from those in the classroom in a few important ways.** First, museum programs were generally longer and included more works of art, while classroom programs were shorter and included fewer works of art. Also, museum programs were generally taught by trained volunteer docents and had low student-to-facilitator ratios, whereas classroom programs were generally taught by staff educators and had high student-to-facilitator ratios.

2. **When comparing teaching behaviors that support the five capacities:**
   - **Teaching behaviors that support critical thinking are strongest.** In particular, facilitators' support of students to interpret visual images, speculate, and draw conclusions is robust.
   - **Teaching behaviors that support creative thinking, sensorial and affective responses, and human connections are stronger in museum settings than in classroom settings.**
   - **Teaching behaviors that support academic connections are weakest.** Note this does not mean the content being taught does not connect to school curriculum, but that explicit teaching practices to help students connect what they learn in school to the program are limited and/or cursory.

METHODOLOGY

RK&A collected 101 program observations, which include 66 observations of the programs provided to Treatment A study group (received museum program) and 35 observations of the programs to Treatment B study group (received classroom program). Observations were both standardized and naturalistic. That is, observers took notes naturalistically during the program, writing down what facilitators said and did during the program as well as how students and teachers responded. The observer then completed a standardized observation guide within 24 hours of the program, providing ratings for the extent to which facilitators supported students in the capacities and examples from their observation notes to explain their ratings.

> The emphasis of the observation was on how the facilitator (a staff educator, docent, or student docent) led the program. In particular, observers looked for teaching behaviors used to support students in the five capacity areas: creative thinking, critical thinking, sensorial and affective responses, human connections, and academic connections. Observers were trained with an extensive behavior key to define teaching behaviors aligned to the student capacities. These teaching behaviors were identified as part of the research design and can be found in the appendix. Teaching behaviors are also provided as examples in the presentation of results to follow.

Because the purpose of adding a Treatment B study group to the research design was to compare the results of a museum program with original works of art to a classroom program using reproductions—the difference being original works of art—RK&A requested that Treatment A programs (museum programs) and Treatment B programs (classroom programs) mimic each other to reduce the variables that would explain any differences. In other words, facilitators were asked to teach in the same manner they would in the museum during the classroom program, the one difference being the use of original works of art versus reproductions.[7] In the Treatment B (classroom) programs, facilitators either used projected images or printed reproductions of works of art.

[7] We emphasize that the classroom programs delivered to Treatment B students are a false construct for the study. That is, these classroom programs are not ones that museum educators might design had they not been asked to mimic the facilitated single-visit programs offered in museums.

Treatment A
museum program

Example: Students during museum program at the Hammer Museum

Treatment B
classroom program

Example: Students during classroom program in Columbus with projected reproductions of works of art (more visible in classroom than shown in photograph)

Example: Students during classroom program in Orlando with printed reproductions of works of art

ANALYSIS

Because observers completed a standardized observation guide providing ratings for facilitator behaviors, among other variables, the analysis is quantitative. RK&A used inferential statistics to examine the relationship among variables by museum versus classroom program. The types of analyses include cross-tabulations and analysis of variance:

- **Cross-tabulations** show the joint frequency distribution of the variables, and the chi-square statistic (X^2) tests the significance of the relationship.
- **Analysis of variance** (ANOVA) was performed, and we used the F-statistic to test the significance of the difference in means.

Statistically Significant Relationship or Difference
RK&A has reported all applicable statistically significant relationships from inferential statistics. A 0.05 level of significance (p) was employed to preclude findings of little practical significance.[8] Statistical relationships indicate that the differences in the results among two or more groups are unlikely to be due to chance. For example, in the case of this data set, statistical relationships indicate differences in results between museum and classroom programs that are unlikely to be due to chance.

REPORTING

In the results that follow, we describe:

1. The context for the museum and classroom programs, such as program length;
2. Prevalence of best practice teaching behaviors, such as openness and enthusiasm; and
3. Prevalence of teaching behaviors in support of the student capacities.

[8] When the level of significance is set to $p = 0.05$, any finding that exists at a probability (p-value) ≤ 0.05 is "significant." When a finding (such as a relationship between two variables) has a p-value of 0.05, there is a 95 percent probability that the finding exists; that is, in 95 out of 100 cases, the finding is correct. Conversely, there is a 5 percent probability that the finding would not exist; in other words, in 5 out of 100 cases, the finding appears by chance.

CONTEXT OF MUSEUM AND CLASSROOM PROGRAMS

The intent was for the museum and classroom program to mimic each other, with the only variable being the use of original works of art versus reproductions. Critically, all programs utilized inquiry-based teaching strategies, and 96 percent of the museum and classroom programs were facilitated with open-ended questions. However, there are a few contextual differences between the programs (described below and as seen in the table on the following page).

Statistically Significant Relationships
There are four statistical differences in museum and classroom program structure:

- **Program length** – The length of programs ranged from 25 minutes to 1 hour 51 minutes. Museum programs observed were longer than classroom programs (mean length of museum programs = 73 minutes versus mean length of classroom programs = 56 minutes; $p = .000$).
- **Number of works of art viewed** – With the exception of one museum partner's programs, students viewed fewer works of art in the classroom programs than in the museum programs (51% of museum programs view ≤ 5 works of art versus 83% of classroom programs view ≤ 5 works of art; $p = .000$).[9]
- **Facilitator type** – Classroom programs were more likely to be taught by staff members than museum programs. While 51 percent of classroom programs observed were taught by staff members, 23 percent of museum programs were taught by staff members ($p = .003$).
- **Student-to-facilitator ratio** – Classroom programs had a higher student-to-facilitator ratio than museum programs. For instance, 51 percent of museum programs had a student-to-facilitator ratio of 10:1 or less; no classroom program had a ratio that low ($p = .000$).

[9] Note that both museum and classroom programs viewed more works of art during the program than anticipated, based on what museums reported in the state-of-the-field survey. To explain, RK&A had selected museum partners that prioritize inquiry-based teaching strategies and that reported the average number of "stops" made by students during the program was just 4 to 5 (the rationale being that effective inquiry requires ample time in front of single works of art). Yet, observations show that the number of works of art viewed during the majority of museum and classroom programs in this study exceeds five. Only one museum partner viewed five works of art or less in each of their programs. Please also note that there is no statistical relationship between program length and number of works of art viewed.

DIFFERENCES IN MUSEUM AND CLASSROOM PROGRAMS

	Mean time in minutes		
Program Length	**Museum** (*n* = 66)	**Classroom** (*n* = 35)	**Total** (*n* = 101)
Length in minutes	73	56	67

	% of observations		
Number of works of art viewed[10]	**Museum** (*n* = 53)	**Classroom** (*n* = 23)	**Total** (*n* = 76)
≤ 5 works of art	51	83	61
6 or more works of art	49	17	40

	% of observations		
Facilitator type	**Museum** (*n* = 66)	**Classroom** (*n* = 35)	**Total** (*n* = 101)
Staff	23	51	33
Other	77	49	67

	% of observations		
Student: Facilitator Ratio	**Museum** (*n* = 66)	**Classroom** (*n* = 35)	**Total** (*n* = 101)
10:1 or less	49	0	32
11:1 or more	52	100	68

[10] One museum that visited 10 plus works of art in both types of programs was omitted from comparison.

BEST PRACTICE TEACHING BEHAVIORS

Observers rated six best practice teaching behaviors exhibited by program facilitators on a scale from 1 to 7, where 1 is "Not at all" and 7 is "Very much" to assess the frequency of teaching behaviors that are generally associated with best practices in art museum teaching. Overall, facilitators frequently asked open-ended questions during both museum and school programs (total mean = 6.2). Relative to the other behaviors, facilitators less frequently allowed program content to emerge organically or evolve from group dialogue during museum and school programs (total mean = 4.5). There are no statistical relationships for the museum versus classroom setting.

BEST PRACTICE TEACHING BEHAVIORS	Mean rating on scale: 1 = Not at all / 7 = Very much		
Teaching behaviors	**Museum** (*n* = 66)	**Classroom** (*n* = 35)	**Total** (*n* = 101)
The educator asks open-ended questions. *Examples: Asks a variety of open-ended questions throughout program; probes deeper into student responses*	6.2	6.3	6.2
The educator validates students. *Examples: Affirms students' responses; repeats students' responses aloud; encourages differing responses to works of art*	5.9	6.0	5.9
The educator is open and attentive. *Examples: Maintains eye contact and uses open body language; encourages and affirms student responses; reads student engagement and adjusts program activities accordingly*	5.3	5.9	5.5
The educator is enthusiastic. *Examples: Verbally expresses enthusiasm and excitement about art and students' responses; physically expresses enthusiasm (e.g., smiles, gestures)*	5.3	5.5	5.4
The educator checks for understanding/knowledge. *Examples: Checks for previous knowledge of terms and concepts; waits for students to respond; paraphrases and expands on responses*	5.0	5.2	5.1
The educator allows program content to emerge organically/evolve from group dialogue. *Examples: Allows students' interest to direct selection of the works of art discussed; allows students' questions to direct discussions around works of art*	4.6	4.3	4.5

TEACHING PRACTICES IN SUPPORT OF STUDENT CAPACITIES

While the study team believes there to be overlap among the capacities, for the purpose of the study, we have tried to isolate them and the teacher behaviors that support each capacity. The graph on the following page shows the total mean rating for facilitators' teaching behaviors in support of the capacities on a scale from 1, "Weak," to 7, "Strong." We have used the total mean for all programs (museum and classroom) to understand the emphasis of teaching. The best way to consider this data is to look at how the teaching behaviors rank relative to each other (highest rating to lowest) rather than focusing on the mean rating alone.

CRITICAL THINKING

The five teaching behaviors that support critical thinking have the highest ratings, meaning they are the strongest teaching behaviors in support of the capacities. Among these teaching behaviors, facilitators' support of students' interpretation is most prevalent.

CREATIVE THINKING

When considered together, the three teaching behaviors that support creative thinking have the highest ratings after critical thinking, meaning they are the second strongest. Among these teaching behaviors, facilitators' support of students in questioning and investigating is strongest.

SENSORIAL & AFFECTIVE RESPONSES

The three teaching behaviors that support sensorial and affective responses are just slightly weaker than those supporting creative thinking. Facilitators' support of students to experience captivation, absorption, and sustained attention is strongest among the behaviors.

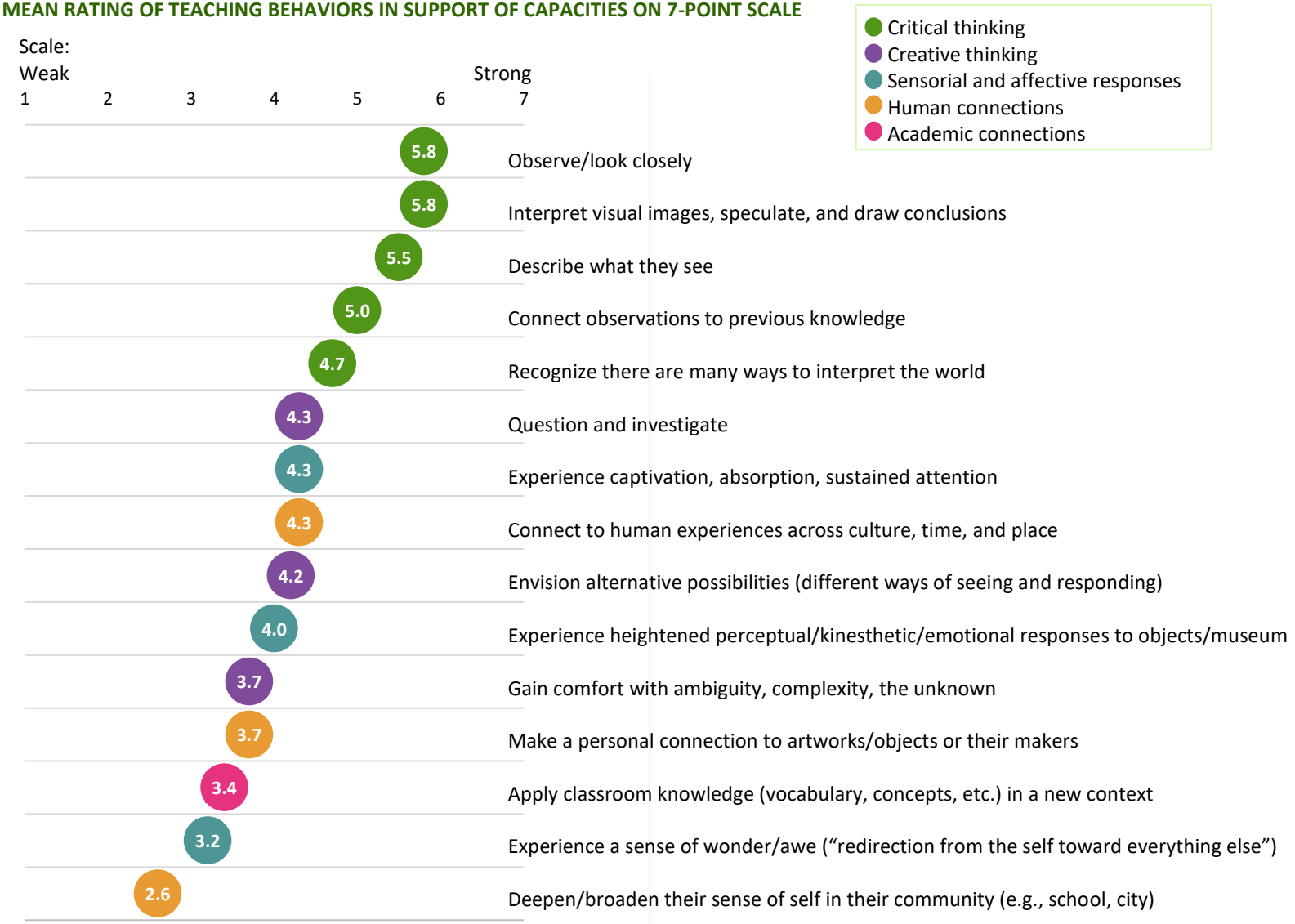
HUMAN CONNECTIONS

Teaching behaviors in support of human connections are weaker than the aforementioned three capacities. Among the teaching behaviors, supporting students to connect to human experiences across cultures, places, and time is strongest.

ACADEMIC CONNECTIONS

One teaching behavior was identified as supporting academic connections, and it had the third lowest rating among all the teaching behaviors.

MEAN RATING OF TEACHING BEHAVIORS IN SUPPORT OF CAPACITIES ON 7-POINT SCALE



CRITICAL THINKING TEACHING BEHAVIORS

Observers noted five teaching behaviors that support critical thinking. The strongest behaviors observed were "facilitator helps students to observe/look closely" (mean = 5.8) and "facilitator helps students interpret visual images, speculate, and draw conclusions" (mean = 5.8). The weakest two teaching behaviors to support critical thinking are: "facilitator helps students connect observations to previous knowledge" (mean = 5.0) and "facilitator helps students recognize there are many ways to interpret the world" (mean = 4.7). There are no statistical relationships for the museum versus classroom setting.

CRITICAL THINKING	Mean rating on scale: 1 = Weak / 7 = Strong		
Teaching behaviors	**Museum** (*n* = 66)	**Classroom** (*n* = 35)	**Total** (*n* = 101)
Facilitator helps students to observe/look closely. *Examples: Provides 20+ seconds for observing; suggests strategies for close-looking*	5.9	5.7	5.8
Facilitator helps students interpret visual images, speculate, and draw conclusions. *Examples: Asks questions that encourage interpretation of works of art; models interpretation for students*	5.8	5.9	5.8
Facilitator helps students describe what they see. *Examples: Asks students to describe specific details; suggests types of details to observe; models description*	5.5	5.6	5.5
Facilitator helps students connect observations to previous knowledge. *Examples: Asks questions to encourage connections to prior knowledge/observations; helps students make comparisons to works of art they have already seen*	4.8	5.3	5.0
Facilitator helps students recognize there are many ways to interpret the world. *Examples: Tells students more than one interpretation is acceptable; asks questions to elicit multiple perspectives*	4.8	4.6	4.7

CREATIVE THINKING TEACHING BEHAVIORS

Observers noted three teaching behaviors that support creative thinking. The strongest teaching behavior was "facilitator helps students to question and investigate" (mean = 4.3), followed by "facilitator helps students envision alternative possibilities" (mean = 4.2). The weakest behavior observed was "facilitator helps students gain comfort with ambiguity, complexity, the unknown" (mean = 3.7).

Statistically Significant Relationship
Facilitators in museum programs are more likely to help students question and investigate than facilitators in classroom programs (museum mean = 4.6 versus classroom mean = 3.6; p = .023).

CREATIVE THINKING	Mean rating on scale: 1 = Weak / 7 = Strong		
Teaching behaviors	**Museum** (n = 66)	**Classroom** (n = 35)	**Total** (n = 101)
Facilitator helps students to question and wonder *Examples: Encourages asking questions and wondering about the work of art; models questioning and investigating*	4.6	3.6	4.3
Facilitator helps students envision alternative possibilities (different ways of seeing/responding). *Examples: Uses strategies, activities, or questions to help students envision alternative scenarios, such as imagining what might happen before or after the story in a work of art*	4.2	4.0	4.2
Facilitator helps students gain comfort with ambiguity, complexity, the unknown. *Examples: Models comfort with ambiguity; acknowledges that works of art can be strange or confusing*	3.9	3.4	3.7

SENSORIAL AND AFFECTIVE RESPONSES TEACHING BEHAVIORS

Observers noted three teaching behaviors that support sensorial and affective responses. The strongest behavior observed was "facilitator helps students experience a heightened perceptual, kinesthetic, or emotional response to objects/museum spaces" (mean = 4.7), and the weakest behavior observed was "facilitator helps students experience a sense of wonder/awe ('redirection from the self toward everything else')" (mean = 3.2).

Statistically Significant Relationships
There are two statistical differences:

- Facilitators in museum programs are more likely to help students experience a heightened perceptual, kinesthetic, or emotional response to objects/museum spaces than those in classroom programs (museum mean = 4.7 versus classroom mean = 2.7; p = .000).
- Facilitators in museum programs are more likely to help students experience captivation, absorption, sustained attention than those in classroom programs (museum mean = 4.8 versus classroom mean = 3.4; p = .001).

SENSORIAL AND AFFECTIVE RESPONSES	Mean rating on scale: 1 = Weak / 7 = Strong		
Teaching behaviors	**Museum** (n = 66)	**Classroom** (n = 35)	**Total** (n = 101)
Facilitator helps students experience a heightened perceptual, kinesthetic, or emotional response to objects/museum spaces. *Examples: Uses physical activities, such as posing and acting, or prompting emotional and sensory responses*	4.7	2.7	4.0
Facilitator helps students experience captivation, absorption, sustained attention. *Examples: Allows time for close looking; uses activities to prolong engagement with a work of art*	4.8	3.4	4.3
Facilitator helps students experience a sense of wonder/ awe ("redirection from the self toward everything else"). *Examples: Selects awe-inspiring works of art (e.g., very large works of art, works of art created from many different objects); tells stories*	3.4	2.8	3.2

HUMAN CONNECTIONS

Observers noted three teaching behaviors that support human connections. The strongest behavior observed was "facilitator helps students connect to human experiences across culture, time, and place" (mean = 4.3), and the weakest behavior observed was "facilitator helps students deepen/broaden their sense of self in their community" (mean = 2.6).

Statistically Significant Relationships
There are two statistical differences:

- Facilitators in museum programs are more likely to help students connect to human experiences across culture, time, and place than are facilitators in classroom programs (museum mean = 4.6 versus classroom mean = 3.7; p = .027).
- Facilitators in museum programs are more likely to help students deepen/broaden their sense of self in their community than are facilitators in classroom programs (museum mean = 2.8 versus classroom mean 2.1; p = .037).

HUMAN CONNECTIONS	Mean rating on scale: 1 = Weak / 7 = Strong		
Teaching behaviors	**Museum** (n = 66)	**Classroom** (n = 35)	**Total** (n = 101)
Facilitator helps students connect to human experiences across culture, time, and place. *Examples: Makes comparisons between contemporary and past experiences; invites students to imagine themselves as part of another culture, time, or place*	4.6	3.7	4.3
Facilitator helps students to make a personal connection to artworks/objects or their makers. *Examples: Asks questions designed to relate students' personal experiences and interests to the work of art*	3.6	3.9	3.7
Facilitator helps students deepen/broaden their sense of self in their community (e.g., school, city). *Examples: Uses activities, asks questions, or provides information designed to connect works of art to the community*	2.8	2.1	2.6

ACADEMIC CONNECTIONS

Observers noted one teaching behavior that supports academic connections, "facilitator helps students to apply classroom knowledge (vocabulary, concepts, etc.) in a new context." On average, this behavior was relatively weak (mean = 3.4). There is no statistical relationship for the museum versus classroom setting.

ACADEMIC CONNECTIONS	Mean rating on scale: 1 = Weak / 7 = Strong		
Teaching behaviors	**Museum** (*n* = 66)	**Classroom** (*n* = 35)	**Total** (*n* = 101)
Facilitator helps students to apply classroom knowledge (vocabulary, concepts, etc.) in a new context. *Examples: Asks students what they have already learned about a specific topic or person; makes explicit connections to what students are learning in school*	3.6	3.0	3.4

FINDINGS: STUDENT QUESTIONNAIRES

RK&A administered questionnaires to all students who completed an assent form to explore their perceptions of and attitudes toward works of art. Questionnaires were administered pre- and post-intervention (or pre- and post-program). Keep in mind that questionnaire results are attitudinal (whereas interview data presented later are performance-based).

KEY TAKE-AWAYS

1. **The pre-intervention questionnaire establishes that, before program intervention, study groups are the same in all but two ways.** First, Treatment B (classroom program) students are most likely to have visited an art museum with their school prior to intervention. Also, Treatment B (classroom program) students are most likely to agree with this statement: "Looking at works of art can give me new ideas."

2. **Looking at how pre-intervention questionnaire statements rate relative to each other indicates the prevalence of opinions about art, which provides insight about capacities that facilitated single-visit programs might be most or least able to affect.** For instance:
   - Related to students' capacity for **creativity thinking**, pre-intervention questionnaire results show that students across study groups are curious about art and think it can give them new ideas. However, they do not agree as strongly that works of art can help them look at something familiar in a new way.
   - Related to students' capacity for **academic connections**, pre-intervention questionnaire ratings show that students are relatively unclear on how works of art connect to their school learning, although they generally recognize that things they learn in school can help them understand works of art.
   - Related to students' capacity for **human connections**, pre-intervention questionnaire ratings indicate that students already feel that works of art can show them what life was like in another time and place; however, they less strongly agree that works of art can help them imagine what life is like for someone else. They also generally do not perceive works of art as helping them understand themselves or classmates better.

3. **Post-intervention questionnaire results indicate one change in attitude as a result of the program intervention.** Results show that Treatment A (museum program) students are most likely to disagree with the statement: "All people should understand a work of art in the same way." This suggests that museum programs help students recognize that different people can have different interpretations of a work of art (or multiple interpretations).

METHODOLOGY

RK&A administered questionnaires to an entire classroom of students at once. A data collector distributed one questionnaire to each student. The data collector read each question aloud; students were asked to follow along at the pace of the data collector.

The proportion of questionnaires completed pre- and post-intervention by study group is similar. However, please note that the student questionnaire sample was greatly impacted by the active consent requirements of four of the seven school districts, which required signed parent or guardian permission for student participation in the questionnaire. As shown below, the percent of the sample for museum partners that serve districts requiring active consent (Museums C, D, E and F) is much smaller than the percent for museum partners that serve districts allowing passive consent (Museums A and B).[11]

DESCRIPTION OF STUDENT QUESTIONNAIRE SAMPLE

Study group	% of pre-questionnaires (*n* = 2311)	% of post-questionnaires (*n* = 1823)
A (Museum program)	44	42
B (Classroom program)	22	24
C (Control)	34	34

Museum	% of pre-questionnaires (*n* = 2311)	% of post-questionnaires (*n* = 1823)
Museum A	34	36
Museum B	26	25
Museum E	15	13
Museum D	11	12
Museum C	8	9
Museum F	7	6

[11] Note that the districts requiring active consent and passive consent were each distributed approximately equally across the study groups.

ANALYSIS

RK&A used three types of statistical analyses to examine relationships between the results and study groups—cross-tabulations, analysis of variance, and linear regression:

- **Cross-tabulations** show the joint frequency distribution of the variables, and the chi-square statistic (X^2) tests the significance of the relationship.
- **Analysis of variance** (ANOVA) was performed, and we used the F-statistic to test the significance of the difference in means.
- **Linear regression** was performed to explore whether variables other than study group impacted results from the ANOVAs.

Please note that, for rating-scale questions, we have presented the results of the ANOVAs. However, cross-tabulations with a dummy variable (two choices with "strongly disagree" and "disagree" rating combined versus "strongly agree" and "agree" rating combined) were also run and corroborate the results of the ANOVAs. Also, results of the linear regressions are referenced as applicable, but, for this study, the purpose of the regression analysis is to understand whether other variables are affecting the results of the study group comparison (and not to understand those variables and the magnitude of their effect).

Statistically Significant Relationship or Difference
RK&A has reported all applicable statistically significant relationships from inferential statistics. A 0.01 level of significance (p) was employed to preclude findings of little practical significance.[12] Statistical relationships indicate that the differences in the results among two or more groups are unlikely to be due to chance. For example, in the case of this data set, statistical relationships indicate differences in results between museum and classroom programs that are unlikely to be due to chance.

REPORTING

In the results that follow, we describe:

1. Pre-intervention questionnaire findings to establish a baseline;
2. Summary of pre-questionnaire findings to indicate prevalence of opinions about art; and
3. Post-intervention questionnaire findings to identify differences by study group.

[12] When the level of significance is set to $p = 0.01$, any finding that exists at a probability (p-value) ≤ 0.01 is "significant." When a finding (such as a relationship between two variables) has a p-value of 0.01, there is a 99 percent probability that the finding exists; that is, in 99 out of 100 cases, the finding is correct. Conversely, there is a 1 percent probability that the finding would not exist; in other words, in 1 out of 100 cases, the finding appears by chance.

PRE-INTERVENTION QUESTIONNAIRE FINDINGS

Pre-intervention (or pre-program) questionnaires were administered to all students prior to treatment (participation in a program intervention, if designated). All pre-intervention questionnaires were administered over two months (between January 20 and March 17, 2017) to limit variation that may result from students' development over time.

ART AND ART MUSEUM INCLINATION[13]

On the pre-intervention questionnaire, students were asked a few background questions about their relationship with art and art museums. As shown in the table on the following page, overall students have positive feelings about art museums. And, about one-third of students recall visiting an art museum with their school, while about one-half recall visiting an art museum outside of school time (i.e., with family, friends, etc.).

Students' self-reported art-making experiences are relatively high in frequency. While only about one-third of students have taken an art class outside of school, the majority of students indicate that they make art at least a few times a week.

Statistically Significant Relationship
There is one statistical difference in art background by study group. Students in Treatment B (classroom program) were more likely to have visited an art museum with their school than those in Treatment A (museum program)—the relationship is indicated by an * in the table on the next page. Treatment B (classroom program) students were also more likely to have visited an art museum with their school than Control (no program) students—the relationship is indicated with an ^ in the table on the next page. That is, 48 percent of Treatment B students said they had visited an art museum with their school versus 34 percent of Treatment A and 36 percent of the Control (p = .000).

[13] The results from pre-intervention to post-intervention did not change and, thus, they are not reported.

ART AND ART MUSEUM INCLINATION FROM PRE-INTERVENTION QUESTIONNAIRE

	% of questionnaires by study group		
Feelings about art museums (select one)	**Treatment A** museum program (*n* = 988)	**Treatment B** classroom program (*n* = 605)	**Control** no program (*n* = 719)
Fascinated	52	52	53
Good	38	38	36
Bored	8	8	8
Uncomfortable	2	2	2

Visited an art museum <u>with school</u>	**Treatment A** museum program (*n* = 974)	**Treatment B** classroom program (*n* = 597)	**Control** no program (*n* = 708)
Yes	34*	48*^	36^
No	47	39	49
Unsure	20	14	15

Visited an art museum <u>outside of school</u>	**Treatment A** museum program (*n* = 982)	**Treatment B** classroom program (*n* = 599)	**Control** no program (*n* = 709)
Yes	42	47	40
No	44	40	45
Unsure	14	13	16

Taken an art class outside of school in past 2 years	**Treatment A** museum program (*n* = 985)	**Treatment B** classroom program (*n* = 603)	**Control** no program (*n* = 713)
Yes	26	26	24
No	65	62	64
Unsure	9	12	12

How often do you make art outside of school	**Treatment A** museum program (*n* = 986)	**Treatment B** classroom program (*n* = 603)	**Control** no program (*n* = 714)
Every day	20	23	19
A few times a week	35	33	36
Once a week	10	9	12
Once a month	10	9	9
Never/rarely	26	27	24

PRE-INTERVENTION RATING STATEMENTS FOR OPINIONS ABOUT ART

On the questionnaire, students were asked to rate 16 statements about art on a scale from 1, "Strongly disagree," to 4, "Strongly agree." Intentionally, 12 statements were positively phrased while 4 statements were negatively phrased to check the attentiveness of responses.[14] On the following page, we present the mean results for each statement by study group. Statements are shown in the order they appeared to students on the questionnaire.

Statistically Significant Relationship
Note that the mean ratings differ by study group on one statement. Treatment B (classroom program) students were more likely to agree with the statement "Looking at works of art can give me new ideas" than those in Treatment A (museum program)—the relationship is indicated with an * in the table on the next page. Treatment B (classroom program) students were also more likely to agree with that same statement than Control (no program) students—the relationship is indicated with an ^ in the table on the next page. That is, Treatment B's mean rating of 3.60 is statistically higher than Treatment A's mean rating of 3.47 and the Control's mean rating of 3.48 (p = .003).

What are the implications?
A similar statistical relationship for this statement in the post-intervention questionnaire is likely attributed to the difference found here in the pre-intervention questionnaire and not to the treatment (museum program, classroom program, or no program).

[14] Data from the four negatively-phrased statements are presented as recorded. That is, they were not reverse-coded and thus appear lowest on the scale.

MEAN RATINGS FOR PRE-INTERVENTION QUESTIONNAIRE STATEMENTS ON 4-POINT SCALE
Scale 1 = Strongly disagree / 4 = Strongly agree

Statements	Treatment A museum program (*n* = 988)	Treatment B classroom program (*n* = 605)	Control no program (*n* = 719)
A. I feel amazed when I look at works of art	3.36	3.44	3.36
B. Works of art should not be confusing	2.72	2.81	2.78
C. Things I have learned in school can help me understand works of art	3.09	3.03	3.01
D. Works of art have clues to help me understand what they mean	3.07	3.18	3.10
E. Works of art can help me understand what life was like in another time or place	3.30	3.39	3.29
F. Works of art are not related to my school work	2.39	2.51	2.53
G. I can learn about my classmates by listening to them talk about a work of art	2.67	2.64	2.73
H. All people should understand a work of art in the same way	1.92	1.97	2.05
I. Works of art help me imagine what life is like for someone else	3.11	3.17	3.13
J. When I look at works of art I use what I already know to understand it	3.16	3.15	3.15
K. I feel strong emotions when I look at works of art	2.63	2.77	2.66
L. When I look at works of art I feel bored	1.69	1.65	1.71
M. Looking at works of art can give me new ideas	3.47*	3.60*^	3.48^
N. Works of art that are complicated make me curious	3.12	3.20	3.15
O. Works of art can help me see something familiar in a new way	3.00	3.08	3.04
P. To understand what a work of art is about it is better to have someone tell me	2.52	2.52	2.51
Q. Looking at works of art can help me be a better student	2.61	2.49	2.57
R. Works of art can help me understand myself better	2.61	2.58	2.55
S. I can lose track of time when looking at works of art	2.61	2.48	2.48
T. Talking about works of art can help me understand things I learn in school	2.73	2.66	2.70

SUMMARY OF PRE-INTERVENTION QUESTIONNAIRE FINDINGS

The following summary graph presents results from highest to lowest mean rating to demonstrate the prevalence of opinions about works of art at baseline (before a museum or classroom program). We have used the total mean for all study groups. The best way to consider this data is to look at how statements rate relative to each other.

CREATIVE THINKING

Two of the statements related to critical thinking are among the four most agreed with statements. Students agree that looking at art can give them new ideas and that complicated works of art make them curious. However, they do not agree as strongly that works of art can help them look at something familiar in a new way.

SENSORIAL AND AFFECTIVE RESPONSES

Students strongly agree with one statement related to the sensorial and affective responses: "I feel amazed when I look at works of art." However, other sensorial responses, such as feeling strong emotions, are among some of the least agreed with statements.

HUMAN CONNECTIONS

The third most agreed upon statement is: "Works of art can help me understand what life was like in another time and place"; however, students less strongly agree that works of art can help them imagine what life is like for someone else. They also generally do not perceive works of art as helping them better understand themselves or their classmates.

CRITICAL THINKING

Critical thinking statements rated towards the middle, with the most agreed upon statement related to critical thinking being: "When I look at works of art I use what I already know to understand it." Most discouraging is how strong agreement is with the negatively phrased statement: "To understand what a work of art is about it is better to have someone tell me."

ACADEMIC CONNECTIONS

Students least agree with the academic connections statements. Students most agree that "Things I have learned in school can help me understand works of art," but least agree that "Looking at works of art can help me be a better student."

TOTAL MEAN RATINGS FOR PRE-INTERVENTION QUESTIONNAIRE STATEMENTS ON 4-POINT SCALE

POST-INTERVENTION QUESTIONNAIRE FINDINGS

Post-intervention (or post-program) questionnaires were administered to all students after intervention (participation in a program, if designated). All post-intervention questionnaires were administered over three months (between February 22 and May 31, 2017) to limit any variation that may result from students' development over time. As with the pre-intervention questionnaires, study groups received their post-intervention questionnaires at slightly different times. Control (no program) students were most likely to have their post-intervention questionnaire administered during the first half of the three-month window; Treatment B (classroom program) students were also more likely to have their pre-intervention questionnaire administered earlier than Treatment A (museum program) students.

Statistical Relationships
Students received the post-intervention questionnaire an average (mean) of 8 weeks after they received the pre-intervention questionnaire. There is a statistical difference by study group. On average, Treatment A (museum program) students completed their post-intervention questionnaire 11 weeks after the pre-intervention questionnaire, whereas Treatment B (classroom program) students did so 7 weeks after, and Control (no program) students did so 4 weeks after (p = .000).

What are the implications?
Time between the pre- and post-intervention questionnaires was considered in regression analysis.

On the following page are the mean results for each statement by study group. As in the presentation of pre-intervention questionnaire results, statements are shown in the order they appeared to students on the questionnaire.

Statistical Relationships
ANOVAs reveal that the mean ratings differ by study group on eight statements. Sometimes the relationship was between two study groups but not the third. However, when a linear regression was run with study group, grade level, museum partner, free and reduced lunch percent, ELL percent, and weeks between pre- and post-intervention questionnaires, only one statistical difference by study group remained:

- Treatment A (museum program) students were more likely than Control (no program) students to disagree with the statement "All people should understand a work of art the same way"—the relationship is indicated by an * in the table on the next page

What are the implications?
This finding suggests museum programs encourage students in the capacity of creative thinking, in particular that it is okay for different people to have different interpretations.

MEAN RATINGS FOR POST-INTERVENTION QUESTIONNAIRE STATEMENTS ON 4-POINT SCALE
Scale 1 = Strongly disagree / 4 = Strongly agree

Statements	Treatment A museum program (*n* = 725)	Treatment B classroom program (*n* = 548)	Control no program (*n* = 550)
A. I feel amazed when I look at works of art	3.19	3.35	3.24
B. Works of art should not be confusing	2.49	2.63	2.68
C. Things I have learned in school can help me understand works of art	2.95	2.88	2.86
D. Works of art have clues to help me understand what they mean	3.06	3.20	3.06
E. Works of art can help me understand what life was like in another time or place	3.24	3.32	3.24
F. Works of art are not related to my school work	2.34	2.52	2.50
G. I can learn about my classmates by listening to them talk about a work of art	2.47	2.54	2.55
H. All people should understand a work of art in the same way	1.65*	1.76	1.90*
I. Works of art help me imagine what life is like for someone else	3.08	3.19	3.00
J. When I look at works of art I use what I already know to understand it	3.07	3.16	3.08
K. I feel strong emotions when I look at works of art	2.48	2.62	2.52
L. When I look at works of art I feel bored	1.89	1.70	1.80
M. Looking at works of art can give me new ideas	3.28	3.43	3.36
N. Works of art that are complicated make me curious	3.09	3.23	3.13
O. Works of art can help me see something familiar in a new way	2.93	3.02	2.93
P. To understand what a work of art is about it is better to have someone tell me	2.45	2.42	2.51
Q. Looking at works of art can help me be a better student	2.37	2.38	2.41
R. Works of art can help me understand myself better	2.40	2.53	2.53
S. I can lose track of time when looking at works of art	2.55	2.48	2.50
T. Talking about works of art can help me understand things I learn in school	2.66	2.58	2.59

FINDINGS: STUDENT INTERVIEWS

RK&A conducted standardized, open-ended interviews with students across study groups to assess the effect of museum and classroom programs on students in the five capacity areas. Interviews were scored on a rubric by two coders and the resulting rubric scores were analyzed quantitatively.

KEY TAKE-AWAYS

1. **When asked what comes to mind when they think about art, students are most likely to think about the different materials or mediums of art.** However, Treatment A (museum program) students are more likely to think about materials and mediums than Treatment B (classroom program) students and Control (no program) students.

2. **There are two measurable effects of museum programs (Treatment A) on students**:
   - Related to the creative thinking capacity, Treatment A (museum program) students are more able to question and wonder (deeply) than Control (no program) students. **This indicates that facilitated single-visit museum programs have a positive effect on students' capacity to think creatively.**
   - Related to the sensorial and affective responses capacity, Treatment A (museum program) students are more likely to recall their program experience with emotion than Treatment B (classroom program) students. **This indicates that facilitated single-visit museum programs have a positive effect on students' capacity to have sensorial or affective responses.**

3. **There are no measurable effects of museum programs (Treatment A) or classroom programs (Treatment B) on measures of critical thinking, human connections, or academic connections.**

4. Looking at scores across all study groups together, the mean score for the human connections measure for "connects to lived experience" is high; this shows that there was little to room for student growth since the scores for all study groups are relatively high. Similarly, the scores for "imagines or envisions possibilities" are relatively high. By comparison, "uses evidential reasoning" is the lowest scoring measure of achievement, indicating great potential for student growth. Likewise, "interprets artist's feelings or thoughts," a human connections measure that also requires evidential reasoning, scores second lowest.

METHODOLOGY

RK&A conducted 627 one-on-one interviews with students. Students in all study groups were asked a standardized set of questions while looking at *The Red Rooster* by Marc Chagall, which was printed on standard 8.5 by 11-inch paper. Students in Treatment A and Treatment B groups were also asked to recall their program experience at the end of the interview. All questions were open-ended, and interviewers were trained to ask all questions in the same order without adding other probing questions. RK&A selected a random sample of students to be interviewed from those who had returned signed parent permission forms. Students also assented to the interview. Interviews were audio recorded and transcribed to facilitate analysis.

***THE RED ROOSTER* BY MARC CHAGALL, FROM CINCINNATI ART MUSEUM**

ANALYSIS

Interviews were scored on an analytical tool that includes four-level rubrics, where the lowest level is "1 - No Achievement" and the highest level is "4 – Accomplished." Rubrics include[15]:

- Uses evidential reasoning (critical thinking)
- Imagines or envisions possibilities (creative thinking)
- Questions and wonders (creative thinking)
- Connects with lived experience (human connections)
- Interprets artist's feelings or thoughts (human connections)
- Recalls experience with emotion (sensorial and affective responses)
- Connects program experience to learning in school (academic connections)

Researchers scored the interviews by reading the transcripts and listening to the audio recording. One researcher scored all interviews, and a second researcher scored one-quarter of the interviews for inter-rater comparison.

RK&A used three statistical analyses to examine relationships between scores and study groups—cross-tabulations, analysis of variance, and linear regression:

- **Cross-tabulations** show the joint frequency distribution of the variables, and the chi-square statistic (X^2) tests the significance of the relationship.
- **Analysis of variance** (ANOVA) was performed, and we used the F-statistic to test the significance of the difference in means.
- **Linear regression** was performed to explore whether variables other than study group impacted results from the ANOVAs.

Please note that, for the rubric scores, we have presented the results of the ANOVAs. However, cross-tabulations with a dummy variable (two choices with "No Achievement" and "Emerging" levels combined versus "Developing" and "Accomplished" levels combined) were also run and corroborate the results of the ANOVAs. Also, results of the linear regressions are referenced as applicable, but for this study the purpose of the regression analysis is to understand whether other variables are affecting the results of the study group comparison (and not to understand those variables and the magnitude of their effect).

[15] Some of the rubrics designed for the study have been omitted from this list because their reliability or validity was questionable. Note that omissions were made because of potential measurement error and not because the results were unfavorable.

Statistically Significant Relationship or Difference
RK&A has reported all applicable statistically significant relationships from inferential statistics. A 0.01 level of significance (p) was employed to preclude findings of little practical significance.[16] Statistical relationships indicate that the differences in the results among two or more groups are unlikely to be due to chance. For example, in the case of this data set, statistical relationships indicate differences in results between museum and classroom programs that are unlikely to be due to chance.

REPORTING

In the results that follow, we describe:

1. Students' top-of-mind impressions of art
2. Student capacity rubric results presented individually
3. Summary of student capacity rubric results

[16] When the level of significance is set to $p = 0.01$, any finding that exists at a probability (p-value) ≤ 0.01 is "significant." When a finding (such as a relationship between two variables) has a p-value of 0.01, there is a 99 percent probability that the finding exists; that is, in 99 out of 100 cases, the finding is correct. Conversely, there is a 1 percent probability that the finding would not exist; in other words, in 1 out of 100 cases, the finding appears by chance.

IMPRESSIONS OF ART

Prior to being asked about the Chagall work of art, students were asked a few background questions about their impressions of and interest in art. When asked what comes to mind when they think about art, students gave a variety of responses. They were coded into the following categories. Columns do not total 100 percent since responses may have been counted more than once or do not align with any of these categories.

Overall, students primarily talked about art in relation to materials and mediums, with 39 percent of Treatment A (museum program) students discussing art in this way. Additionally, students often thought about art as evoking emotion and involving creativity and imagination.

Statistical Relationships
Treatment A (museum program) students were more likely than Treatment B (classroom program) students and Control (no program) students to discuss art in terms of its materials or mediums (p = .001)—the relationship is indicated with a * in the table below. Treatment A (museum program) students were also more likely than Control (no program) students to discuss art in terms of its materials or mediums (p = .001)—the relationship is indicated in the table below with a ^.

What are the implications?
This finding suggests that seeing original works of art in museum programs influences students' likelihood to discuss art in terms of materials and mediums.

IMPRESSIONS OF ART

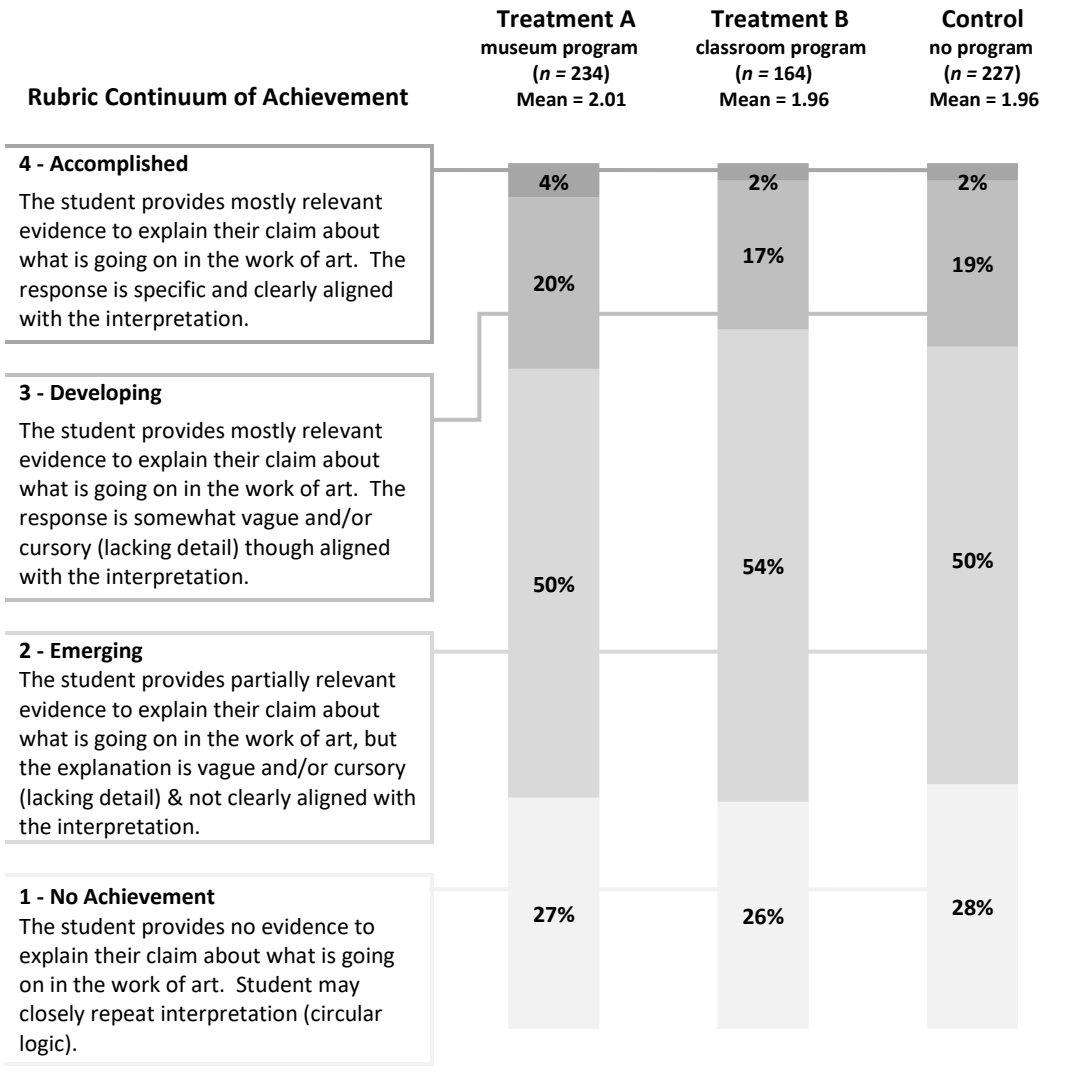
Top-of-mind thoughts about art	% of responses by study group Treatment A museum program (n = 235)	Treatment B classroom program (n = 167)	Control no program (n = 227)
Art can be made with different materials/in different mediums	39*^	28*	23^
Art evokes an emotion	20	24	24
Art involves creativity and imagination	14	15	14
Art is something I make	5	11	8
Art looks beautiful	7	7	8
Art is something artists/others make	9	5	5
I like art (in general)	5	6	5
Art involves craftsmanship or skill	5	2	2
I don't know/no impression	1	1	4
Art does not need to be beautiful	2	0	0

STUDENT CAPACITY RUBRIC MEASURES

USES EVIDENTIAL REASONING

Evidential reasoning, which relates to critical thinking, was measured based on students' responses to the question: "What do you think is going on in this painting?" after being asked to observe and describe the work of art. The rubric focuses on alignment and quality of evidence in support of interpretations and not the length of responses. The graph below shows the percent of students to score at each level of the rubric. There are no statistical differences by group. That means neither museum nor classroom programs have a measured effect on evidential reasoning.

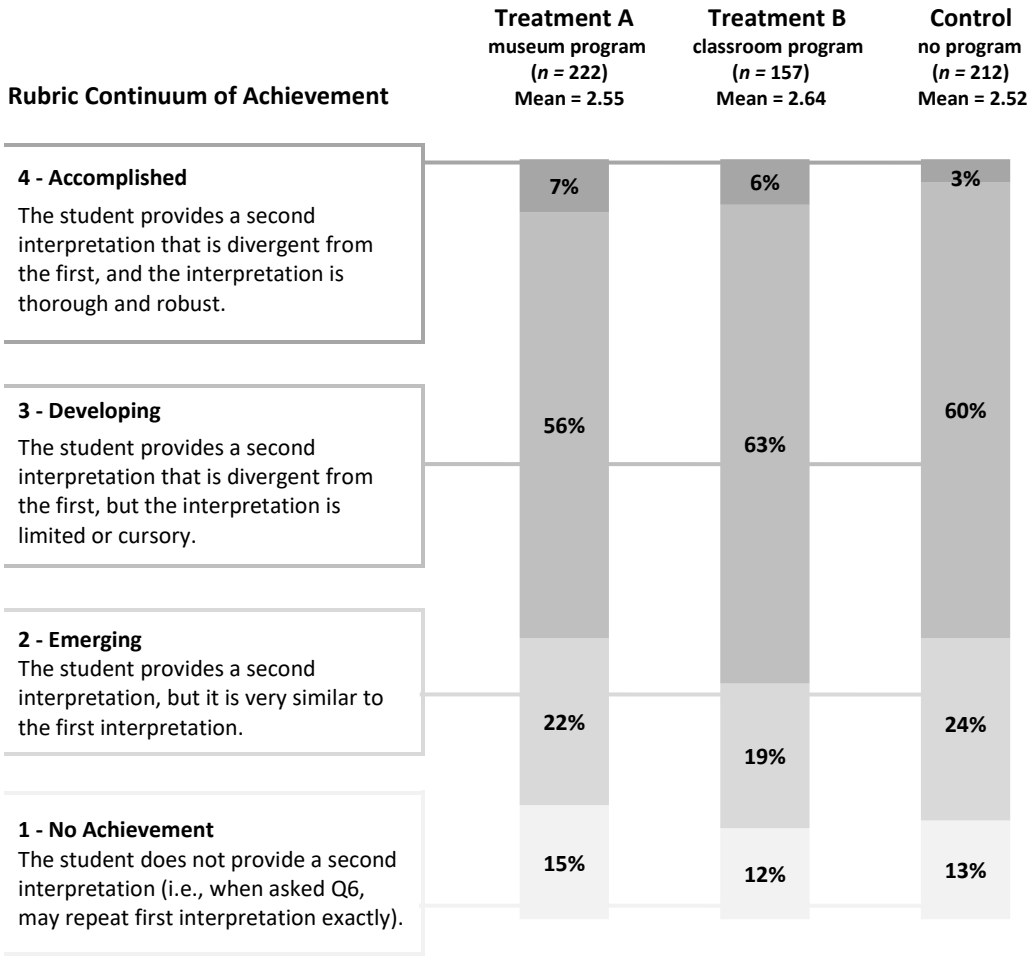
EVIDENTIAL REASONING RUBRIC AND SCORES



IMAGINES OR ENVISIONS POSSIBILITIES

Students' ability to imagine or envision possibilities, which relates to creative thinking, was measured based on whether students could generate two different interpretations of what might be happening in the work of art upon being prompted to do so. Emphasis was on the divergence of the second interpretation from the first and not how verbose the response was. Again, the graph below shows the percent of students to score at each level of the rubric. There are no statistical differences by group, even though more Treatment B (classroom program) students scored in the top levels of the rubric than Treatment A (museum program) students and Control (no program) students. This means neither museum nor classroom programs have a measured effect on students' ability to imagine or envision possibilities.

IMAGINES/ENVISIONS POSSIBILITIES RUBRIC AND SCORES



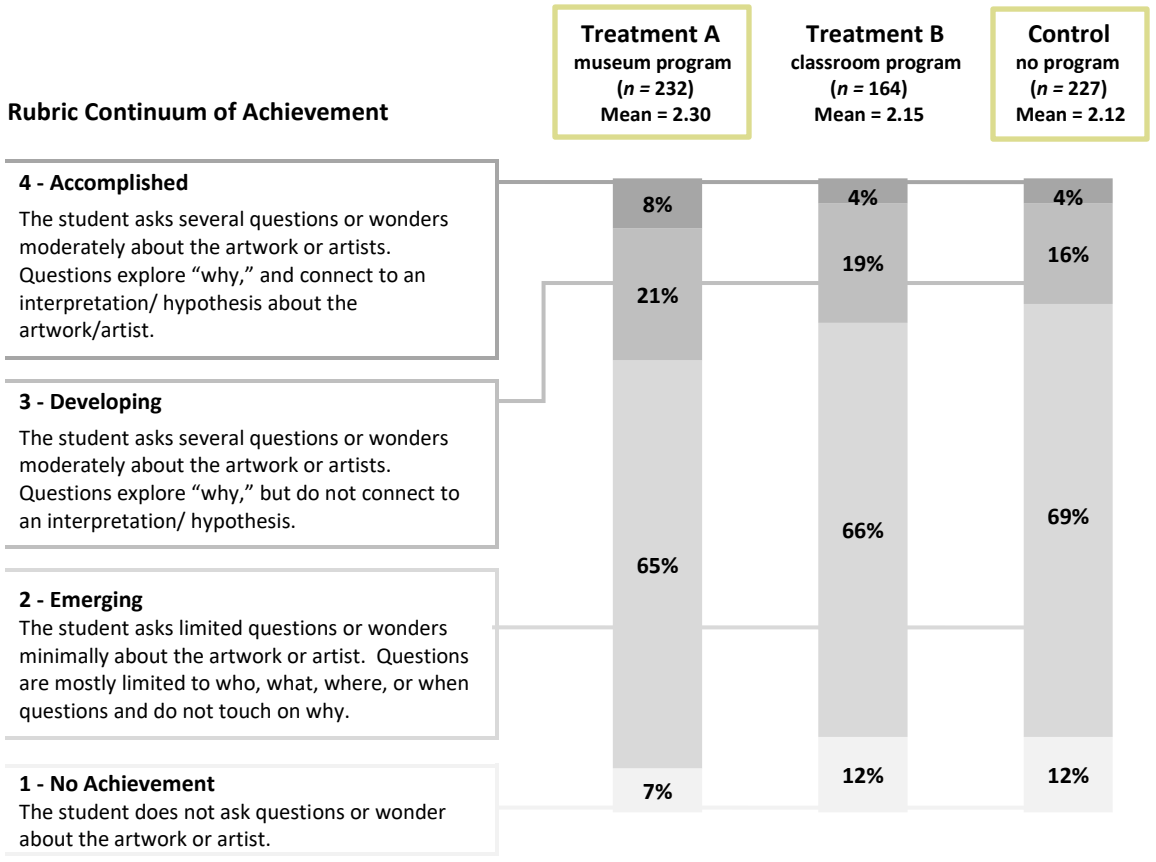
QUESTIONS AND WONDERS

Students' ability to question and wonder, which relates to creative thinking, was measured based on students' responses to the question: "What do you wonder about as you look at this painting?" The measure emphasizes the complexity of the queries (asks a "why" question) and not just the quantity of queries (see the rubric below).

Statistical Relationships
There is statistical difference by group for this measure. Treatment A (museum program) students scored statistically higher than Control (no program) students on this measure (p = .009). Note that the statistical relationship is only between Treatment A and Control groups (and not also between Treatment A and Treatment B groups).

What are the implications?
This finding suggests that facilitated single-visit museum programs have a positive effect on students' ability to question and wonder.

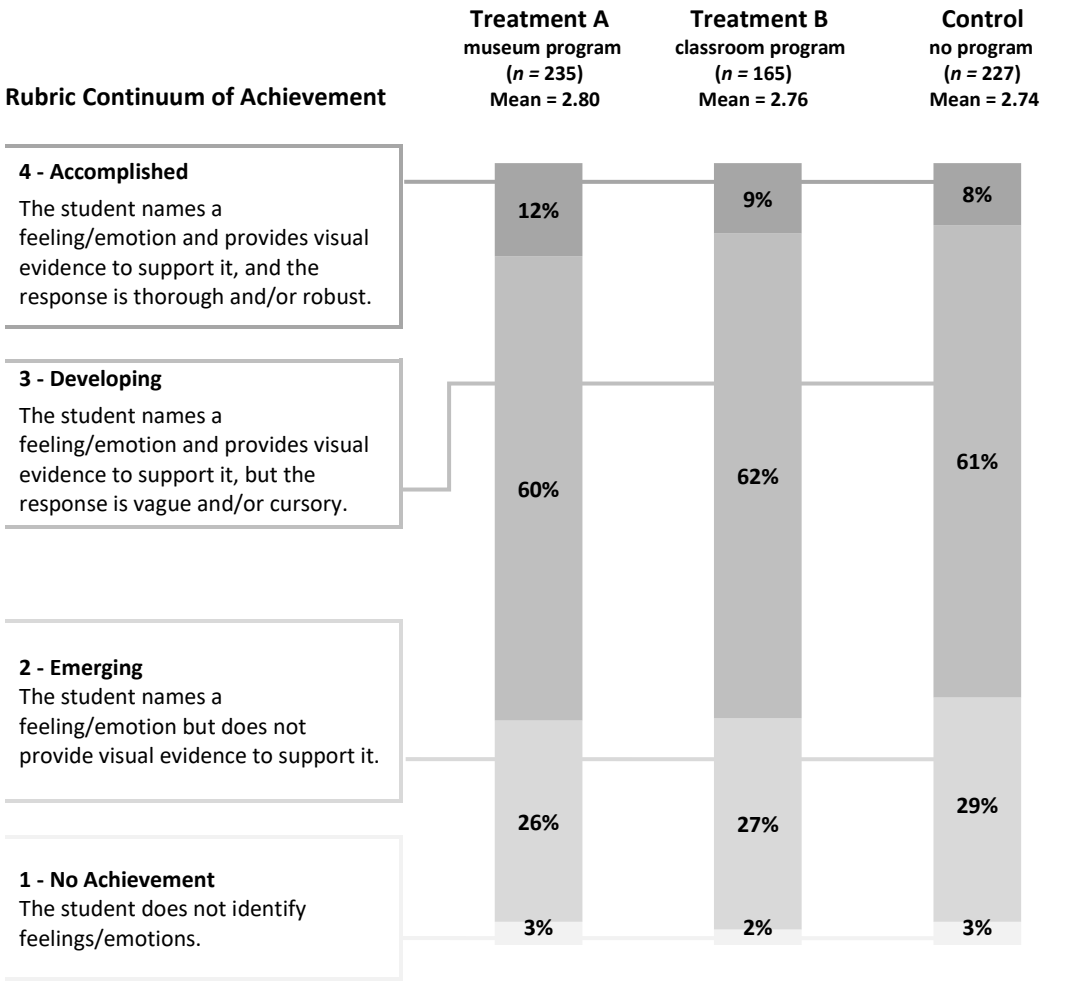
QUESTIONS AND WONDERS RUBRIC AND SCORES



CONNECTS TO LIVED EXPERIENCE

Students' ability to connect to the lived experience of others, which is related to the human connections capacity, was measured based on students' responses to two questions. The first question broadly asked students to think about feelings to determine if lived experience came to mind: "What feelings come to your mind when you look at it? What makes you say that?" The second question asked students to place themselves in the position of a figure in the work of art: "Imagine you are [point to blue man]. What do you think that figure is feeling?" There are no statistical differences by group. That is, we cannot say that museum programs have a measured effect on students' ability to connect to the lived experience of others.

CONNECTS TO LIVED EXPERIENCE RUBRIC AND SCORES

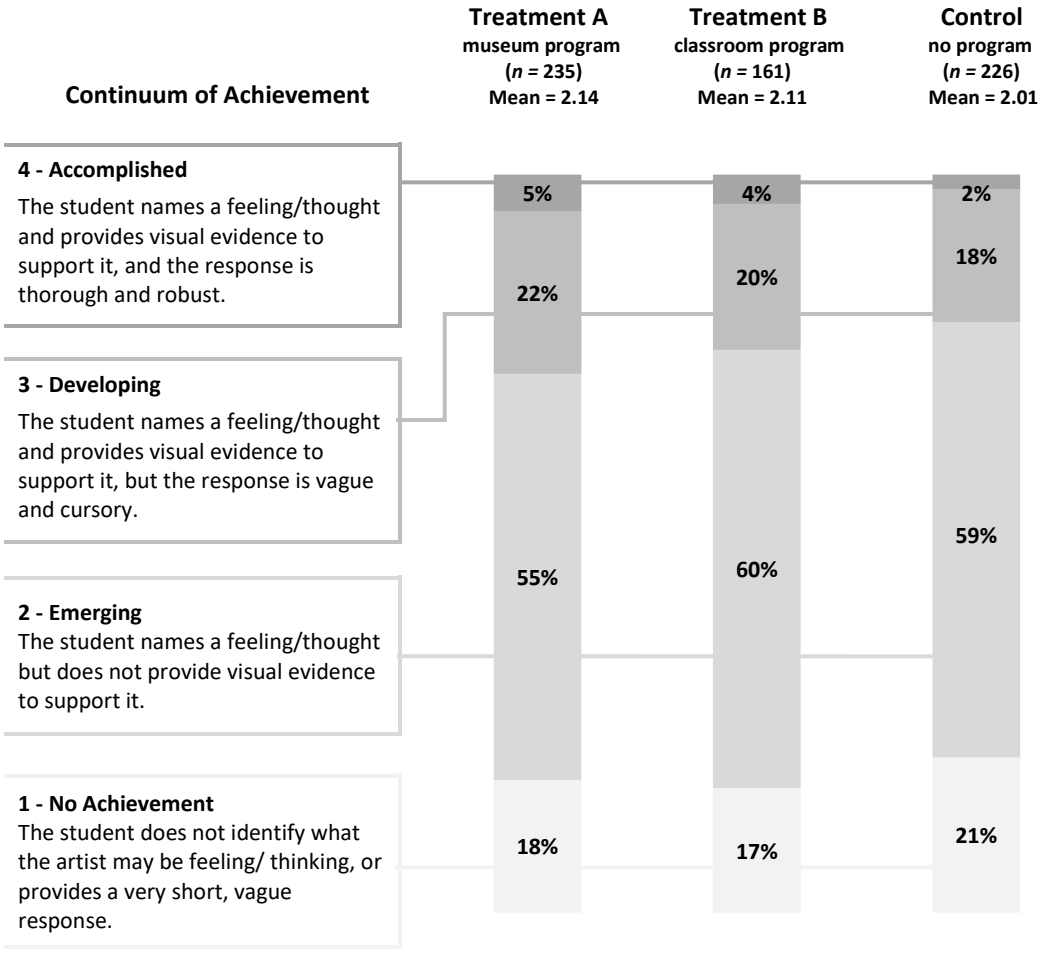


INTERPRETS ARTIST'S FEELINGS/THOUGHTS

Students' ability to interpret an artist's feelings or thoughts, which is related to the human connections capacity, was measured based on students' responses to the question: "What could you guess the artist was thinking about or feeling when painting this?" The measure emphasized being able both to connect with the artist in some way and to explain that connection based on evidence from the work of art.

While Treatment A (museum program) students and Treatment B (classroom program) students have mean scores higher than Control (no program) students, there are no statistical relationships. Therefore, we cannot say that museum programs have a measured effect on students' ability to interpret an artist's feelings or thoughts as we have defined it.

INTERPRETS ARTIST'S FEELINGS/THOUGHTS RUBRIC AND SCORES



RECALLS EXPERIENCE WITH EMOTION

The sensorial and affective responses capacity was measured based on treatment students' responses to two questions about their program experience. The first question ("What part of the visit stands out as the most memorable?") was open-ended to allow students to name any stand-out aspects of the program (e.g., the elevators, bus ride, etc.). A second question focused on the works of art: "I'd like you to think back and recall one work of art. Can you describe that work of art?" Scores did not privilege general experiences over experiences with works of art. Note that the scorer relied more heavily on the audio recording than on the transcripts when scoring in order to gauge emotion. Rapidness of response, tone of voice, and vividness of the description all informed the scoring.

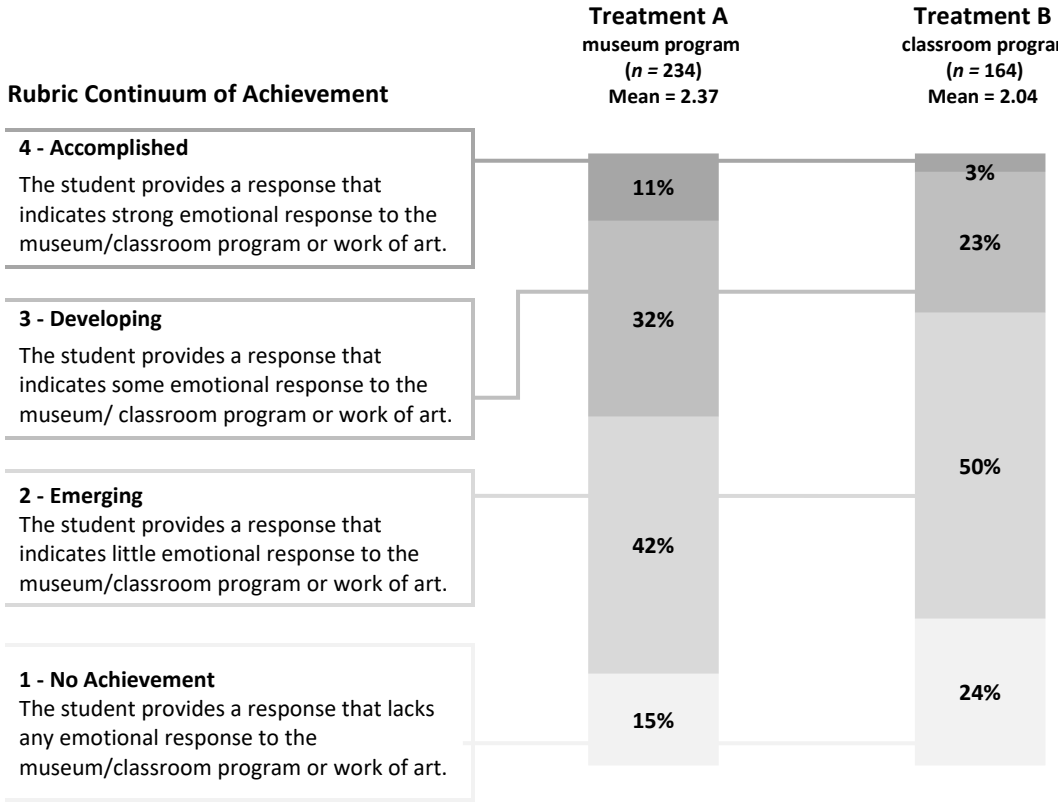
Statistical Relationships

There is statistical difference by groups for this measure. Treatment A (museum program) students scored statistically higher than Treatment B (classroom program) students on this measure (p = .000).

What are the implications?

This finding suggests that facilitated single-visit museum programs have a positive effect on students' capacity for sensorial and affective responses.

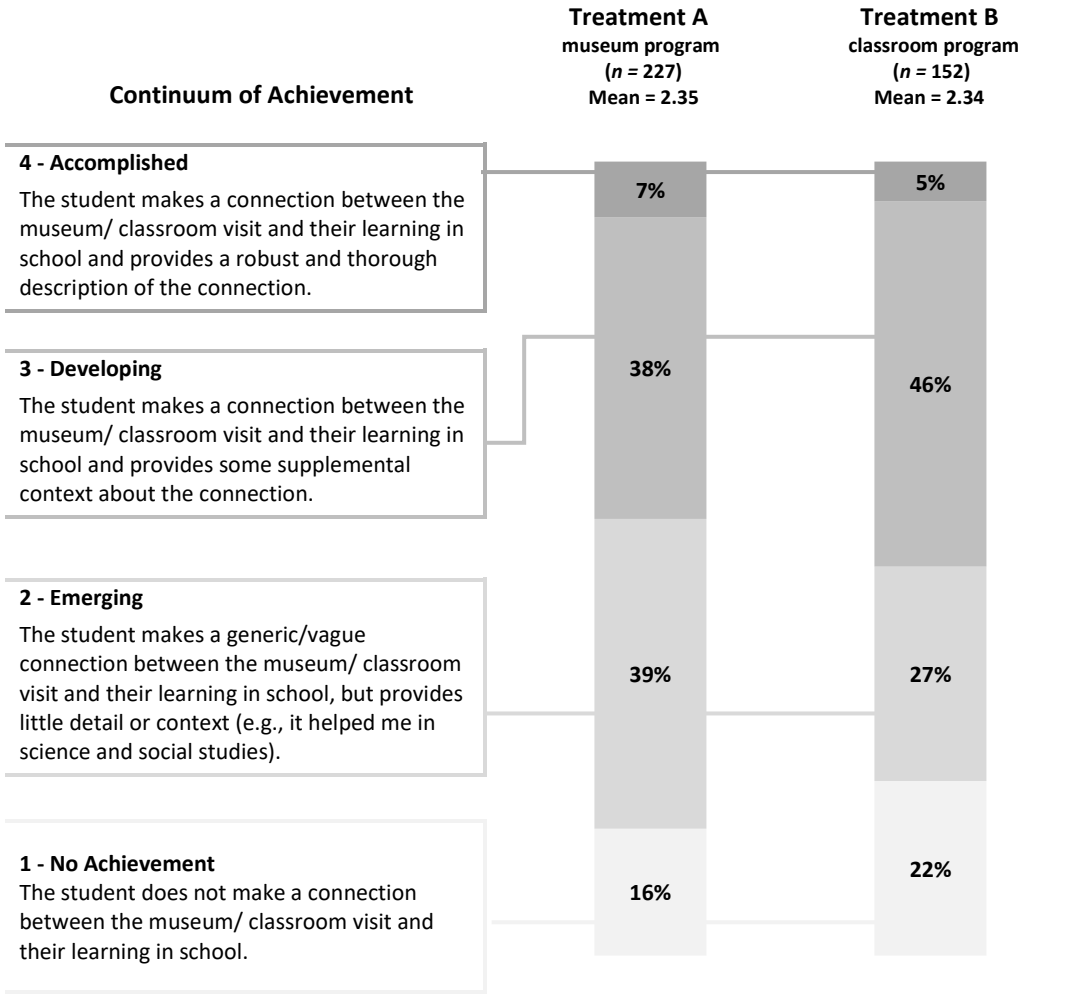
RECALLS EXPERIENCE WITH EMOTION RUBRIC AND SCORES



CONNECTS PROGRAM EXPERIENCE TO LEARNING IN SCHOOL

Academic connections was measured based on treatment students' responses to the question: "Can you tell me in what way your visit to the museum related to what you are learning in school?" The type of connection did not factor into the analysis—only the thoroughness with which the connection was described. There is no statistical difference between study groups, meaning the setting of the program—museum versus classroom—does not affect the likelihood that students will connect the program to their learning in school.

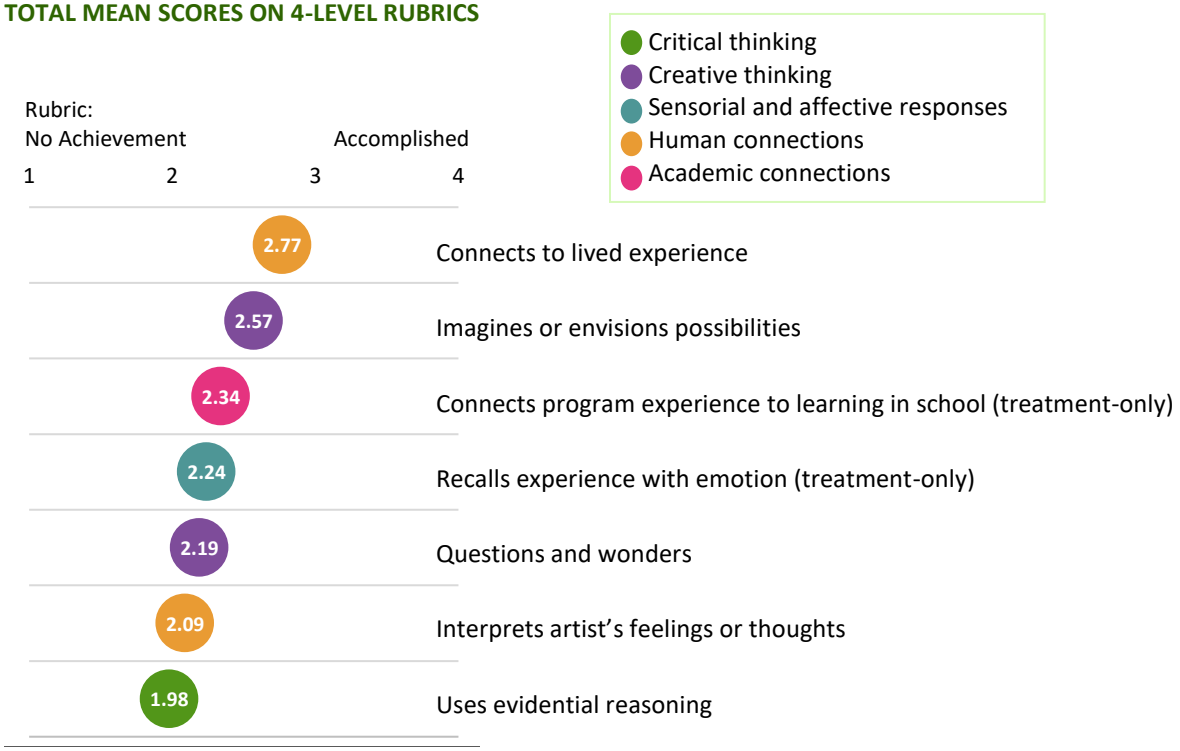
CONNECTS PROGRAM TO SCHOOL LEARNING RUBRIC AND SCORES



SUMMARY OF RUBRIC MEASURES

The following summary graph presents the results from highest to lowest mean rating to show achievement of the measures relative to each other. We have used the total mean for all study groups. Note that the human connections measure for "connects to lived experience" is high, meaning there is little room for student growth since all students score high. Similarly, the scores for "imagines or envisions possibilities" are relatively high. By comparison, "uses evidential reasoning" is the lowest scoring measure of achievement, indicating great potential for student growth. Likewise, "interprets artist's feelings or thoughts," a human connections measure that also requires evidential reasoning, scores second lowest. Furthermore, questions and wonders, a measure in which we saw a statistical difference also has a low score—indicating there is still room for growth.

TOTAL MEAN SCORES ON 4-LEVEL RUBRICS



FINDINGS: TEACHER QUESTIONNAIRES

Teacher questionnaires were distributed to all teachers participating in the study.[17] Questionnaires were intended to collect background information about the students and their art-related experiences. RK&A collected 92 questionnaires from teachers whose class(es) participated in the study. Questionnaires were administered during the spring of 2017 after each class completed its program experience. The participation rate for questionnaires was 55 percent.[18]

KEY TAKE-AWAYS

1. As reported by teachers, students' art participation in schools is moderate. The majority attend art classes taught by a certified art teacher weekly. Students engage in art making in other classroom activities less frequently though, and infrequently discuss reproductions of original works of art.

2. The majority of teachers had not been on another museum visit this year. Also, the majority reported that a museum or cultural institution had not visited their school this year either.

3. Of teachers whose students participated in a museum program (Treatment A) or classroom program (Treatment B), most had not conducted a pre-visit activity. More teachers conducted a post-program reflection.

4. First and foremost, teachers think art museum visits are important because they provide opportunities for their students to have an awe-inspiring experience. Teachers also place importance on their students thinking creatively and critically during art museum visits.

[17] There is one notable relationship regarding representation of the sample. Treatment B (classroom program) teachers were less likely than Treatment A (museum program) or Control (no program) teachers to complete the questionnaire.

[18] Participation rate is calculated by dividing the number of teachers who completed a questionnaire (n=92) by the total number of potential respondents (i.e., teachers who had a class participating in the broader study [n=167]).

FREQUENCY OF PARTICIPATION IN ART EXPERIENCES AT SCHOOL

Teachers were asked how often their students participate in different types of art experiences at school. Responses indicate that students most frequently participate in an art class taught by a certified art teacher—79 percent reported daily or weekly participation. Students participate less frequently in making art as a part of classroom projects (45 percent reported daily or weekly participation) or discussing reproductions of original works of art (30 percent reported daily or weekly participation).

FREQUENCY OF PARTICIPATION IN ART EXPERIENCES AT SCHOOL

Attend art class taught by a certified art teacher	% of questionnaires (*n* = 90)
Daily	8
Weekly	71
Infrequently	9
Never	12

Make art as part of classroom projects (e.g., dioramas, posters, etc.)	% of questionnaires (*n* = 89)
Daily	5
Weekly	40
Infrequently	54
Never	1

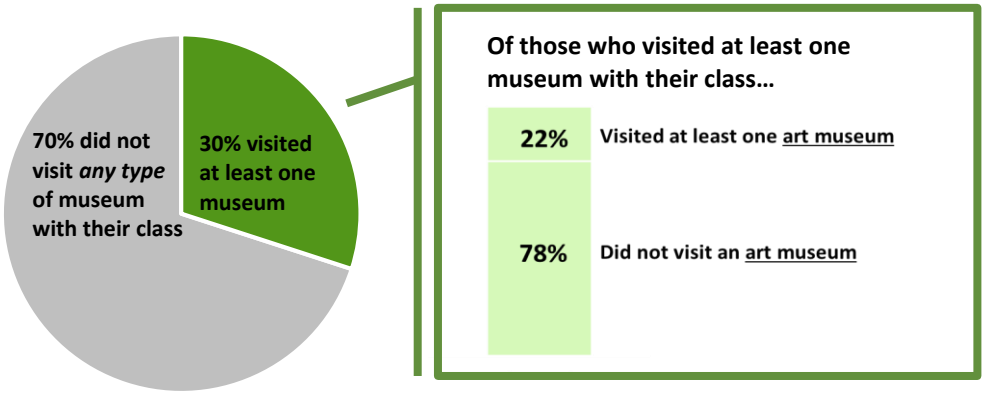
Discuss reproductions of original works of art	% of questionnaires (*n* = 89)
Daily	2
Weekly	28
Infrequently	46
Never	24

FREQUENCY OF VISITS TO MUSEUMS/MUSEUM PROGRAMS AT SCHOOLS

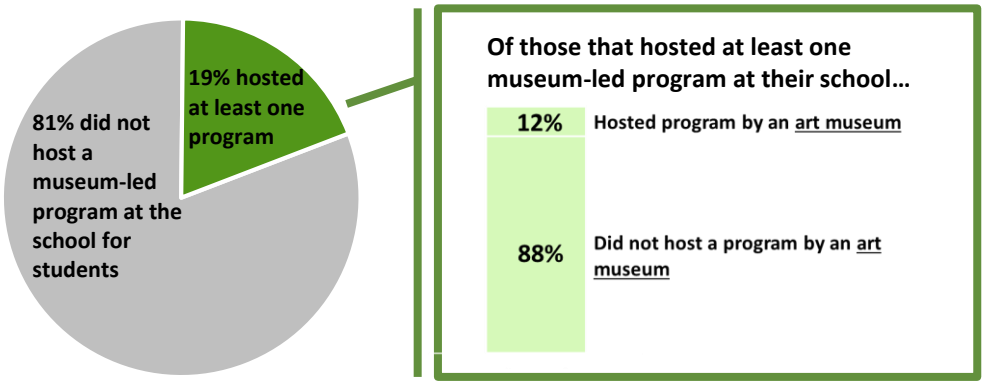
Teachers were asked which museums or cultural institutions their students had visited so far this year. Many said their students did not visit any museum or cultural institution (70 percent), and almost one-third said they visited at least one museum or cultural institution (30 percent). About one-fifth of museum visits were to an art museum.

Teachers were also asked which museums or cultural institutions came to their school so far this year to provide a program for their students. Many said there were no museum-led programs at the school for students (81 percent); several said their school hosted at least one museum program (19 percent). Few art museums hosted a program at the school.

VISITS TO MUSEUMS SO FAR THIS YEAR



MUSEUM PROGRAMS AT SCHOOL SO FAR THIS YEAR



PRE-VISIT PREPARATION AND POST-VISIT REFLECTION

Treatment A (museum program) teachers and Treatment B (classroom program) teachers were asked if they did anything to prepare for their museum visit or classroom program. More than one-half of respondents said they did not do any pre-visit preparation (57 percent). Activities or lessons provided by the museum (13 percent) or teacher-created activities or lessons (13 percent) were the most common pre-visit preparation for students.

Treatment A (museum program) teachers and Treatment B (classroom program) teachers were asked if they did anything with their students in the classroom to reflect on their museum visit or classroom program. The most common post-visit reflection was to refer back to the visit/ program during a classroom lesson (39 percent). One-quarter said they did not reflect back on the visit/program with their students (27 percent).

PRE-VISIT PREPARATION AND POST-VISIT REFLECTION

Before your visit to the museum/program, did you do anything to prepare? (select all that apply)	**% of questionnaires (*n* = 54)**
Nothing	57
Used activities/lessons provided by the museum to prepare students	13
Used my own activities/lessons to prepare students	13
Provided the museum information about what we are studying	11
Showed students images of what we might see	9
Requested the museum visit include certain works of art	4
Other: reviewed museum rules/etiquette	4
Other: reviewed vocabulary related to visit	4
Other: miscellaneous	4

After your visit to the museum/program, what did you do with your students to reflect back on the museum visit? (select all that apply)	**% of questionnaires (*n* = 52)**
Referred back to our museum/program during a classroom lesson	39
Nothing	27
Used my own activities/lessons with students	21
Other: led class discussion about visit/art	15
Used activities/lessons provided by the museum	10
Showed students images of works of art that we saw during the museum/program	10
Other: writing assignment about visit/art	6
Other: miscellaneous	4

IMPORTANCE OF ART MUSEUM EXPERIENCES FOR STUDENTS

Teachers were asked to rate a list of statements about the importance of different types of art museum experiences for students on a scale from 1 to 7, where 1 is "Not important to me" and 7 is "Very important to me." Ratings are best analyzed by looking at the relativity of ratings. Respondents rated all types of art museum experiences highly—all experiences have a mean rating of 6.0 or higher. The highest rated statement was about having an "awe-inspiring experience" at the art museum (mean rating 6.6). The lowest rated statements were about seeing original works of art (mean rating 6.0), learning from experts about works of art (mean rating 6.0), and applying classroom learning in the art museum (mean rating 6.0).

RATINGS OF THE IMPORTANCE OF ART MUSEUM EXPERIENCES

Rate the importance you place on each of the following possible art museum experiences for students Scale: 1 = Not important to me / 7 = Very important to me	**Respondents' Mean Rating (*n* = 90)**	**Ratings Range**
Students have an awe-inspiring experience at the art museum	6.6	4 - 7
Students think creatively at the art museum	6.4	4 - 7
Students think critically at the art museum	6.4	4 - 7
Students connect to human experience across culture, time & place during their art museum experience	6.3	2 - 7
Students develop knowledge/skills during the art museum experience related to school curriculum	6.1	4 - 7
Students see original works of art	6.0	2 - 7
Students learn from experts about works of art	6.0	1 - 7
Students apply classroom learning in an art museum	6.0	3 - 7

WHAT STUDENTS TOOK AWAY FROM VISIT/PROGRAM

Treatment A (museum program) teachers and Treatment B (classroom program) teachers were asked an open-ended question about what they thought students took away from the visit/program. Answers varied widely, and some mentioned more than one take-away. Note that several did not respond do this question (16 percent). One-fifth said students benefited from "exposure" to a museum and/or seeing works of art "in-person" for the first time (19 percent), gained information about art/art history, such as "the variety of arts," "different forms of art," and different art materials (19 percent), or took away a "greater appreciation of art" (18 percent). A few said their students came away with a desire to visit the museum again (11 percent) or a generally positive experience (9 percent).

STUDENT TAKE-AWAYS

What do you think students took away from their visit/program?	% of questionnaires (*n* = 57)
Exposure to a museum/works of art	19
Art information/art history	19
Art appreciation	18
Blank/did not respond	*16*
Creative/critical thinking skills	12
Understanding of human experience across culture, time, and place	12
Desire to return to the museum	11
Positive experience (general/vague)	9
Other: miscellaneous	9

FINDINGS: TEACHER INTERVIEWS

RK&A conducted in-depth interviews with 13 teachers who volunteered to participate—six who were in the Treatment A (museum program) group and seven who were in the Control (no program) group.[19] Of the teachers, 10 teach multiple subjects, such as science, social studies, math, and reading, to just one grade level of students (either fourth or fifth grade). Three others teach art in their classroom, and teach multiple grade levels from Kindergarten to fifth grade. Interviews were conducted from April to June of 2017. Interviews were audio recorded and transcribed for analysis.

KEY TAKE-AWAYS

1. Teachers' perceived three primary values of art museum programs:
   - First, the majority of teachers said art museum programs are valuable in that they expand students' worldview or mind.
   - The majority of teachers also valued the opportunity for their students to see original works of art in person, both to give students a better understanding of material, texture, and size, and to "awe" students.
   - The majority also value art museum pedagogies that foster observation and thinking skills.
2. Teachers' expectations for art museum programs include active discussion, viewing works of art students can relate to, and participating in hands-on activities.
3. The primary challenge for art museum programs is the lack of time.

[19] The original intent was to conduct interviews with three teachers from each study site, and with an even distribution of teachers in each study group. However, recruitment was difficult and, as a result, data collectors were unable to conduct any interviews with teachers from Treatment Group B. This mirrors results from the teacher questionnaire—Treatment B teachers were statistically less likely than other teachers to respond. However, at least one interview was conducted with a teacher from each museum partner location.

ART AS PART OF CLASSROOM TEACHING

Teachers were asked in what ways art is a part of their classroom teaching, including art-making experiences as well as looking at, and talking about, works of art.

- **Art viewing and discussion:** More than two-thirds of teachers said their students look at art (e.g., posters, book illustrations) and have discussions about art in their class. Three art teachers said they practiced art viewing and discussion frequently, but most said they look at artworks only occasionally.
- **Cross-curricular connections:** More than two-thirds of teachers said they use art to draw connections between subjects within the curriculum. Most often teachers talked about using artworks to help illustrate concepts in science, social studies, and math.
- **Art-making activities:** More than one-half of teachers said their students make art in the classroom, including making maps, creating models of planets, and painting murals.
- **Art is not part of the curriculum:** Two teachers said art is not part of their classroom curriculum. Both teachers said due to the intense focus on other subjects they had no time to explore art; they teach all academic subjects in their classroom.

Art viewing and discussion

"Looking at art, we do that once a week. I'll throw up a picture of a famous artwork or sculpture…it could be anything. And the kids have to write about it for about 20 minutes. What they see, what it makes them think. Sometimes the questions are, 'Put yourself in this painting. What are you hearing? What are you seeing? Why are you there? What do you feel?' When they finish writing, they then share in their groups or with the entire class."

PREVIOUS ART MUSEUM VISITATION

Teachers were asked if they had previously taken students on an art museum field trip.

- **Have not taken students on field trip to art museum**: Two-thirds said they had not taken students from their current school on a field trip to an art museum. These teachers were asked what has prevented them from doing so:
  - **Cost of the field trip:** Many said the cost of visiting an art museum and arranging for transportation is prohibitive.
  - **Organizing and receiving approval for the trip:** A few said organizing the details of the field trip and securing approval from the school administration is difficult and time-consuming.
- **Have taken students on field trip to art museum**: One-third said they had taken students on a field trip to an art museum.

PERCEIVED VALUE OF AN ART MUSEUM FIELD TRIP

Teachers were asked to describe, in their opinion, the value of art museum visits to their students. Data collectors asked follow-up questions, probing for information about how the field trip is valuable to students and which aspects of the art museum visit are most valuable.

- **Expanding students' worldview or mind:** More than one-half of teachers said a visit to an art museum was valuable for their students because it gave them an understanding of the world outside the classroom and their everyday life. Teachers said the visit exposed students to new ideas and broadened their horizons.
- **Experiencing artworks in person:** One-half said the opportunity to see artworks in person was valuable to students because it gave them a better understanding of the materials, textures, and size of different pieces. Teachers said these aspects are difficult to explain to students when showing them a reproduction. A few teachers also said their students were "in awe" seeing artworks in person.
- **Improving observation and interpretation skills:** Almost one-half of teachers said a visit to an art museum can help students hone their observation and interpretation skills. For example, one said the docents encouraged her students to practice these skills by asking questions and prompting students to have a conversation about the art.

Expanding their worldview or mind

"I think it broadens their horizon. It allows them to look at things in a different perspective, not to be so narrow minded, to be able to see something later in life and go, 'Oh, yeah. I remember that.' Beauty is in lots of different forms. It's almost like my job is to expose them to it, and they have to come up with their own interpretation of it whether they think it's cool."

TEACHER EXPECTATIONS FOR AN ART MUSEUM FIELD TRIP

Teachers were asked what, if any, expectations they have for what students should do on a visit to an art museum. Responses vary widely, with no dominant trend:

- **Participate in active discussion:** A few teachers said they expect students to participate in active discussions, asking questions and thinking critically about artworks.
- **View artworks students can relate to:** A few teachers expect the museum to choose works of art that would interest and excite students.
- **Hands-on activities:** A few teachers said they expect students to participate in hands-on or interactive activities, like art making during the field trip.
- **Connect art to classroom learning:** A few teachers expect the museum to show artwork that supports what their students are learning in the classroom.
- **Exposure to different art media:** Two teachers expect their students to see examples of different art media, for example painting, sculpture, and found objects.

Students participate in active discussion

"I think anything where they're able to answer questions, have discussions, have organized arguments. I think that would be more engaging for them instead of if they're going on a tour, or giving them a worksheet. And once students are engaged, they're going to be more likely to comprehend, understand, and critically think about what is actually being taught to them."

STUDENT TAKE-AWAYS

Teachers were asked to describe what they think their students took away from their field trip experience at the art museum.

- **Broadened understanding of art and media:** Four teachers said their students left the museum having a broader understanding of artwork after seeing new, different types of art. Teachers said the field trip expanded the students' understanding of art by showing them different media, such as drawing, painting, and sculpture.
- **Deeper engagement with artworks:** Three teachers said their students took away strategies to engage more deeply with artworks.
- **Appreciation of the museum:** Two teachers said their students left the museum with a sense of appreciation for the museum and possibly a desire to return to the museum.

CHALLENGES OF THE FIELD TRIP

Teachers were asked to talk about what did not work well for their students during the field trip experience.

- **Not enough time for the visit:** A few teachers said they wanted to have more time at the museum during the field trip. For example, one said her class's bus to the museum was late, which limited the amount of time students could spend in the museum.
- **Lack of opportunities for students to participate:** Two teachers said their students became restless during the visit because they were not given an opportunity to participate in any activities. For example, one said the docent did not allow students to participate in any active discussions—the docent spent a long time speaking in from of a few artworks and did not ask the students any questions.
- **Students saw few artworks:** Two teachers were disappointed that their students saw fewer works of art than they expected.

Not enough time for the visit

"You can't do the whole museum. That's just not the way you can go to a museum. You have to go to specific things. You can't see it all in one day. But I think a little longer, less rushed on each image would've been a lot more beneficial for each student – they would've absorbed more."

FINDINGS: PROGRAM FACILITATOR INTERVIEWS

RK&A interviewed 19 trained volunteer docents or museum educators who facilitated single-visit programs for K-12 students at the six museums participating in the study. A data collector interviewed three facilitators from each museum except the Columbus Museum of Art, from which there were four facilitators interviewed. Most facilitators interviewed are volunteer docents; however, two are paid museum staff members. Interviews were conducted in April and May of 2017. Interviews were audio recorded and transcribed for analysis.

KEY TAKE-AWAYS

1. **Asking open-ended questions arose as the most prevalent teaching strategy reported by facilitators.** Several also talked about activities, such as asking students to tell stories about what is happening in the work of art.

2. **The majority of facilitators believe visiting the museum is valuable for students because it helps give them a sense of the larger world or expand their idea of the world.** Some said visiting the museum gives students exposure to objects and ideas they do not encounter on a regular basis, in school or at home.

3. **The majority of facilitators indicated that generating participation among students is the greatest challenge of facilitating programs.**

MUSEUM FACILITATOR CONTEXT

Facilitators were asked two background questions about their prior experience in the field.

- **Experience facilitating single-visit art museum programs**: The number of years facilitating single-visit programs for K-12 students in an art museum ranged from less than one year to 16 years. The median number of years is six.
- **Experience in other educational settings:** Two-thirds said they had taught in a school setting prior to facilitating museum experiences. A few had varying experiences in informal education, including working at another museum or providing training sessions to peers in their previous career. A few had no previous teaching experience before facilitating school programs in museums.

MOTIVATIONS FOR MUSEUM TEACHING

Facilitators were asked how they became interested in museum teaching.

- **Interest in museums or art:** One-half said they had an interest in museums or art. They talked about visiting museums with their own children or on vacations.
- **Former teacher:** Several were former teachers and have experience educating youth. These museum educators were interested in continuing this work in an informal setting on a part-time schedule.
- **Encouraged by docents:** A few said they were encouraged to join the museum docent program by friends who were already practicing docents.
- **Led to museum teaching from another field:** Three studied or are currently studying subjects that led them to museum education. Two museum educators studied anthropology and another is currently studying formal K-12 classroom education.

MUSEUM EDUCATION TRAINING

Facilitators were asked about training they received to facilitate single-visit programs for students, and specifically what type of training was most helpful.

- **Training for new docents:** Many participated in museum-led training courses for new docents. Courses lasted a few months and included lessons in art history, educational theory, and group management techniques, shadowing experienced docents, and/or speaking with or attending lectures by other museum staff members. Notably, one-half said the new docent training program was the most helpful training they received.
- **On-going docent training:** More than one-half talked about on-going docent training at the museum. Museum educators said these sessions often explain new temporary exhibitions or new tour program materials.
- **Practice:** Several said the most helpful training was getting hands-on experience facilitating programs.
- **Self-reflection:** Three said self-reflection on teaching methods was part of their training (e.g., thinking critically about their actions and students' responses after a program).
- **Personal research:** Two talked about their own preparation for facilitating single-visit programs (e.g., researching works of art or best practices for museum education).
- **External training courses or conferences:** Two said they have pursued training outside of the museum. These educators chose to attend voluntarily; it was not encouraged or required by the museum.

STRATEGIES TO SUPPORT STUDENTS

Facilitators were asked what strategies they use during their tours to support students in their museum experience.

- **Asking open-ended questions:** Many talked about asking open-ended questions while facilitating the program. This is not surprising considering all of the museums participating in the study employ an inquiry-based model for facilitated single-visit programs for school groups.
- **Storytelling:** Several talked about using techniques to encourage students to tell the story of what was happening in a painting—for example, what happened in the story just before, during, or just after the scene in the painting.
- **Non-verbal activities:** Several said they employ activities in the galleries, like touchable objects, props, writing exercises, or drawing, as part of their program to help students in their museum experience.
- **Close-looking:** Several said they ask the students to look closely at works of art, sometimes for an extended period of time.
- **Using other senses:** Two said they encourage students to use their other senses when looking at works of art (e.g., imagining the sounds they might hear if they were inside the scene of the painting).
- **Positive reinforcement:** Two said they use positive reinforcement with students—for example telling students that there are "no wrong answers" when interpreting works of art and thanking students for participating in the conversation.

Asking open-ended questions

"Some strategies I use are starting broadly and, in my facilitation, going with the motion of the group—having it be a fairly student-led discussion, though I do kind of guide it around. I try to listen closely to what they are saying and noticing and ask follow-up questions to help them become deeper in their thought and also reflective on what others are saying."

WHAT FACILITATORS ENJOY MOST ABOUT PROGRAMS

Facilitators were asked what was the most enjoyable part of facilitating single-visit programs for K-12 students in an art museum.

- **Seeing students' enthusiasm for art:** Many said they most enjoyed seeing the students respond to art with enthusiasm and excitement.
- **New ideas and interpretation:** Many said they enjoyed hearing students' ideas and interpretations of artworks during the program, particularly those they never thought of or heard before.
- **Feeling connected to the group:** Several said they most enjoyed creating a relationship with students and encouraging a sense of connection among all the group members.
- **Sharing the museum with others:** Three said they most enjoyed sharing the museum with students. These museum educators said they felt a sense of ownership of the museum and encouraged the students to share that feeling.

Seeing students' enthusiasm

"When the kids get excited and connect with things, that's absolutely the best part…I love it when a student makes an observation that is totally unexpected that shows that they have really been paying attention and thinking and observing, and I'm always really enthusiastic about that."

PROGRAM CHALLENGES

Museum educators were asked what was the hardest part of facilitating single-visit programs for K-12 students in an art museum.

- **Generating participation among students:** More than one-half of museum educators said the hardest part of facilitating programs was getting the students to focus and participate in the discussion. The model of the inquiry-based programs relies on students actively participating in a group discussion, compared to a more lecture-style program approach.
- **Student behavioral issues**: A few said the hardest part of guiding programs was managing student behavior. They said while behavioral issues were not prevalent on their tours, they can have a huge negative impact.
- **Time**: Three said time management was the hardest part of facilitating programs. All of these museum educators felt the time allotted for facilitating the program was not enough to meet the goals the museum wanted the program experience to achieve.

VALUE OF ART MUSEUM VISITS

Museum educators were asked what is the value of art museum visits to students, particularly those in grades 4-6.

- **Expand their worldview or mind:** More than one-half said visiting the museum was valuable for students because it helped broaden their perception of the larger world. Some said visiting the museum gave students exposure to objects and ideas they do not encounter on a regular basis, in school or at home.
- **Opportunity for students to discuss and interpret artworks:** One-half said it was valuable for students to discuss and interpret works of art during their museum visit. These museum educators talked about the importance of students thinking about works of art on their own and discussing ideas about art in a group.
- **Students have a sense of wonder or excitement about art:** Several said it was valuable for students to feel a sense of wonder or excitement about art as a result of the museum visit.
- **Students learn visual literacy:** Two talked about the importance of students learning how to "read" works of art as part of their education.

Expand their worldview or mind

"Hopefully they're inspired by what they see. Especially at that age, it is a moment when their world is starting to open up a little bit more, and there is so much in art museums to see and get inspired by and think about things that are really, really old, or just really impressive, or how big the world is…"

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NOTE TO READERS

This study generated an immense amount of data. RK&A has prepared three separate report documents to help different readers find the study information they seek and make sense of the results.

SUMMARY & DISCUSSION

The Summary and Discussion, this document, highlights and interprets key findings from the study and discusses their implications for the field. We recommend reading this document for a top-level understanding of the study. Methodological details are abbreviated.

TECHNICAL REPORT

The Technical Report contains, from our perspective, all the necessary context for readers to interpret the findings. We describe the study's intentions and research design and report findings by methodology to help readers understand the results at a granular level (as opposed to the top-level approach of the summary report). Please note that, while we aim for this technical report to be comprehensive, we have relegated certain methodological or analytical details to the report appendix.

REPORT APPENDIX

This document includes study instruments (e.g., questionnaires, interview guides, etc.) and other supplemental information for those interested in interpreting or asking their own questions of the data.

For interested readers: two other publications instrumental to planning this study are: 1) Literature review prepared by several NAEA contributors; and 2) State-of-the-field survey of art museums conducted by RK&A.

HAVE QUESTIONS ABOUT THE STUDY?

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