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Irene Lopatovska Sarah Hatoum Saebra Waterstraub Lisa Novak Sara Sheer

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Not just a pretty picture: visual literacy education through art for young children

Not just a
pretty picture

Irene Lopatovska, Sarah Hatoum, Saebra Waterstraut,
Lisa Novak and Sara Sheer
School of Information, Pratt Institute, New York, New York, USA

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Abstract

Purpose – The purpose of this paper is to understand young children’s knowledge of visual literacy elements as well as their ability to comprehend newly introduced visual literacy concepts. The study also examined existing support for visual literacy programs from parents and educators.

Design/methodology/approach – The study explored the knowledge of basic visual literacy elements of young children enrolled in two private schools in the New York City metropolitan area. The authors interviewed 17 children, aged four to six years old, about fine art paintings using a semi-structured interview format. Children’s responses were qualitatively analyzed to determine their initial level of visual literacy and their ability to learn and retain the concepts of visual literacy after receiving basic instruction. The children’s educators and parents completed online questionnaires that were quantitatively analyzed to determine their level of support for visual literacy programs.

Findings – The findings show that young children exhibited extensive knowledge of simple visual literacy elements (color, shape, line), and limited understanding of more abstract elements (perspective and salience). Children’s knowledge of visual elements improved after instruction. Parents and educators expressed support for incorporating visual literacy instruction in early childhood education.

Research limitations/implications – The study relied on a sample of children and adults drawn from two private schools. The sample’s demographics might have affected study findings. More studies are needed using a larger and more diverse sample.

Practical implications – The study suggests that young children are ready to receive instruction on visual literacy elements using art images. Children reacted positively to the images and were engaged in the discussions about them, supporting the use of fine art paintings as an instrument to introduce visual literacy concepts to young children. Survey of children’s parents and teachers indicated strong interest in, and support for such programs.

Social implications – With the increase of visual information production and consumption, it is important to introduce visual literacy early in life. The study advances research in methods for developing visual literacy instruction for young children.

Originality/value – There are no previously reported studies that have examined pre-kindergarten children’s knowledge of basic visual literacy elements and reactions to visual literacy instruction.

Keywords Information literacy, Education, Schools, Literacy, Museums, Children (4-6 year old), Visual literacy

Paper type Research paper

Introduction

Contemporary culture is increasingly relying on visual communication offered through “the visually rich web, photo dependent social networks, video saturated media, and graphically sophisticated entertainment and gaming” (Metros, 2008, p. 102). At a time when young people spend more time with image-based media than ever before (Kaiser



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Family Foundation, 2010), it is important to teach them to interpret and create visual messages early in life (National Art Education Association, 2016; National Association for the Education of Young Children, 2016; Common Core State Standards Initiative, 2016).

Visual literacy is typically defined as the ability to evaluate, analyze, and interpret an image's compositional elements and cultural meanings (Hattwig *et al.*, 2011; Callow, 2008; Rice, 1989; Alper, 1996; O'Neil, 2011; Beatty, 2013; Gardner, 1970; Brill *et al.*, 2007) and is often viewed as a significant component of general literacy (Rice, 1988; Edwards and Willis, 2000).

While a number of initiatives have been developed to introduce visual literacy to older children (ages 7 and up) (Metros, 2008; The Metropolitan Museum of Art, 2016a, b; Prior *et al.*, 2012), educational programs for younger children ages 4-6 are lacking (Luehrman and Unrath, 2006). In order to understand internal and external factors influencing young children's readiness to engage with visual literacy instruction, our study examined: children's background knowledge of visual literacy elements, children's abilities to comprehend visual literacy instruction, and the level of support for visual literacy programs from parents and educators. The study intended to lay a groundwork for educators, information curators, technology developers, parents, and other stakeholders involved in the development of literacy programs for very young children.

Literature review

Children learn to understand visual information much earlier than they learn to interpret textual information. By the age of one children recognize familiar faces and objects, and by the age of three they start using visuals to communicate with and about the world (Bamford, 2003). As children grow older, they face the need to make critical judgments about information presented in a visual form as well as to effectively communicate information through visual forms. Addressing these challenges requires a higher level of visual literacy to understand visual elements that make an image (syntax) and represent its meaning (semantics). This higher level of visual literacy does not come naturally and needs to be developed (Ausburn and Ausburn, 1978; Rice, 1988). For example, researchers suggest that young children can independently identify objects, colors, and a few other basic visual elements (Gardner, 1970; Eckhoff, 2010; Yenawine, 2003), but require training to understand more complex elements, such as perspective, color temperature, technique, or style (O'Neil, 2011; Callow, 2008; Gardner, 1970; Alper, 1996). The importance and benefits of developing visual literacy in young children has been recognized by the National Association for the Education of Young Children and the National Art Education Association, yet there are very few programs aimed at developing basic visual literacy skills in pre-school children. Since our study explored the groundwork for the development of visual literacy skills in young children, we reviewed relevant literature on the common elements that constitute visual literacy, the visual literacy studies on children, and existing visual literacy programs for children.

Visual literacy elements

Various aspects of visual literacy has been studied over the years. Some researchers emphasize the importance of understanding the cultural context within which an image was made and in which it is being viewed (O'Neil, 2011; Ravas and Stark, 2012; Alper, 1996; Callow, 2008; Brill *et al.*, 2007), while others focus mainly on understanding the use of compositional elements and the creation of images (Hattwig *et al.*, 2011; O'Neil, 2011; Dow, 1913). Though the depth of analysis differs, researchers agree that interpreting and analyzing the compositional elements of an image is the basis of visual literacy (O'Neil, 2011; Rice, 1989; Thurston, 1945; Gardner, 1970; Callow, 2008; Ravas and Stark, 2012).

There are many classifications of visual literacy elements (The Paul Getty Museum, 2011; Hattwig *et al.*, 2011; College of Arts and Humanities, n.d.; O'Neil, 2011; Hattwig *et al.*, 2011; Rice, 1989; Callow, 2008; Alper, 1996). Most of them include:

- Color: knowledge of and ability to identify primary colors, color temperature (cool/warm), and color value (light/dark). Color is listed in many visual literacy elements classifications (O'Neil, 2011; Callow, 2008; Dow, 1913; Ravas and Stark 2012; Alper 1996; Rice 1989; The Visual Literacy Toolbox, n.d.). It is also one of the elements children tend to include in their descriptions of paintings (Gardner, 1970). Introducing more nuanced categories of color such as value and temperature creates familiarity with increasingly complex concepts and allows learners to “attend to the distinctive technique of the artist” (Gardner, 1970, p. 814; O'Neil 2011).
- Shape: knowledge of shapes, ability to identify basic shapes within images, and the way that shapes are used to construct objects within an image (O'Neil, 2011; Rice, 1989; The Visual Literacy Toolbox, n.d.; Understanding Visual Literacy, n.d). Identifying shapes and their uses within an image can lead to a better understanding of the basic construction elements as well as more complex concepts such as balance and symmetry (O'Neil, 2011; Rice, 1989; Thurston, 1945; Alper, 1996).
- Lines: identification of the varying types and functions of lines within an image (Hattwig *et al.*, 2011; Rice, 1989; Gardner, 1970; O'Neil, 2011; Ravas and Stark, 2012; Alper, 1996; Understanding Visual Literacy, n.d). Many authors explain the value of understanding basic lines that make up shapes and objects – it contributes to mastery of more complex concepts of texture and style (Thurston, 1945; O'Neil, 2011; Callow, 2008; Alper, 1996; The Visual Literacy Toolbox, n.d.). An explanation of the function of lines in an image can segue to an explanation of perspective and focal point (a point of intersection of a set of parallel lines).

In addition to lines, shapes, and color, another component that is often included in basic visual literacy skill sets is the ability to identify important elements and/or objects in an image in terms of stimulation of emotional responses. Some classifications include more complex visual elements, such as:

- Perspective: the ability to use object size to determine distance (foreground, middle ground, background) and to identify lines leading to a vanishing point or focal point (The Visual Literacy Toolbox, n.d.; Gardner, 1970; O'Neil, 2011; Callow, 2008; Ravas and Stark, 2012; Alper, 1996; Rice, 1989). Understanding lines and perspective provides the foundation for identifying direction, motion, rhythm, tone, and other complex concepts (Thurston, 1945; Gardner, 1970; O'Neil, 2011; Alper, 1996).
- Salience: the ability to identify the most important object in the image in terms of subject matter (Callow, 2008; O'Neil, 2011). In some images, salience overlaps with the focal point (The Visual Literacy Toolbox, n.d.; Ravas and Stark, 2012). Introducing salience prepares students for comprehending different functions of visual elements within the image and the image's main idea (O'Neil, 2011; Hattwig *et al.*, 2011; Callow, 2008; Ravas and Stark, 2012).

Additional elements often include balance, symmetry, style, and rhythm (Thurston, 1945; Alper, 1996; Gardner, 1970; O'Neil, 2011; College of Arts and Humanities, n.d.).

The Association of College and Research Libraries (ACRL) published their visual literacy competency standards for higher education in 2011, which lists seven criteria that define what it means to be visually literate:

- (1) understanding of the tools and materials used to create an image;
- (2) the ability to effectively locate useful visual media;
- (3) understanding of the cultural relevance at the time of an image's creation in comparison with the image's relevance in current culture;
- (4) understanding of the physical components of an image including color, line, shape, and size;
- (5) the ability to analyze an image's effectiveness and reliability;
- (6) use of images and image technology for effective communication; and
- (7) understanding of the ethics and legal and social implications of creating visual media.

Similar criteria were published by Alper (1996). Both standards primarily focussed on understanding of the compositional elements of an image and its social, cultural, and historic contexts as well as its modern-day interpretations (Alper, 1996; Hattwig *et al.*, 2011). However, Alper emphasizes the interactions between the basic compositional elements of the image and its aesthetic elements, while ACRL classification places emphasis on the practical understandings of visual literacy (e.g. image recreation and searching capabilities) (Hattwig *et al.*, 2011).

While the elements of visual literacy and criteria for what it means to be visually literate is somewhat disputed, the underlying definition of visual literacy is to understand the composition and meaning of an image through interpretation and analysis (Hattwig *et al.*, 2011; Callow, 2008; Rice, 1989; Alper, 1996; O'Neil, 2011; Beatty, 2013; Gardner, 1970; Brill *et al.*, 2007). In order to participate in an increasingly "visual culture," an individual must learn how to understand some to all of the mentioned visual literacy elements (Hattwig *et al.*, 2011).

Visual literacy studies focussing on children

A number of studies describe children's reactions to visual work as well as the benefits of and methods for developing visual literacy skills at an early age.

Gardner (1970) tested children's (i.e. first, third, sixth, and ninth graders) "sensitivity" to painting styles and their ability to identify certain visual elements (line, texture, composition). The author found that compared to other age groups, ninth graders performed best with visual elements identification, while the younger age groups tended to focus on subject matter of paintings. O'Neil (2011) studied the effects of visual elements of illustrations such as line, color, and salience on children's comprehension of broader contextual elements of stories in picture books. O'Neil determined that imagery in picture books allowed greater comprehension of plot lines and character development in young children. More specifically, with a help of color, line, and shapes, children were better able to grasp the emotional elements of the story that they otherwise missed (O'Neil, 2011). Picture books were also discussed by Prior *et al.*, (2012), who explored how children interpret visual language and how teachers can use book illustrations to develop children's visual literacy and literary skills. The authors suggest that children develop deep understanding of characters and

literary themes through not just verbal but also visual language of color, line, shape, and texture. Illustrators use these visual elements as well as the positioning of characters on the page to convey meaning about characters. After interviewing second-grade students from a rural school, the authors found that the children made character inferences from images of character actions, facial expressions, body posture, and positioning. Children were found to reference visual elements of color and line in supporting character inferences.

Williams (2007, p. 641) suggests that children should be more exposed to visual images in a way that allows them to “freely develop their critical thinking” and “their own meanings uniquely rooted in their personal experience.” Similarly, Callow (2008) finds that “affective and personal interpretation of viewing” is just as valuable as developing other literacy skills (e.g. “metalinguistic skills”) (p. 617). Tomaseviae-Daneeviae (1999) discusses the relationship between “language” and “visual language,” as well as a program in Croatia that integrates the teaching of English as a foreign language with the teaching of visual language for children ages 4 to 11. The author suggests that visual language, due to its universality, can support learning a foreign language (English) and help communication between different cultures. The author also suggests that fully developed visual literacy can help children in learning both academic subjects and life skills. Stewig (1994) asserts that visual literacy is necessary for the development of oral, reading, and writing literacy. The author conducted a study of first graders in two schools, one urban and one suburban, to determine how children responded to visual art before and after a year-long visual literacy program. The study concluded that visual literacy exercises allow students to talk about art in a way that bolsters their “language growth.”

Housen and Yenawine (2001) studied how children and adults view art in museums and how museums and educators promote visual literacy. One of the tools they created were Visual Thinking Strategies (VTS), which help cultivate a viewer’s individual understanding of art. The study found that VTS had long-term positive effects on developing critical thinking skills (Housen and Yenawine, 2001). Similar findings have been produced by Williams (2007), who studied second-grade students. The author found that introduction to the concepts of visual literacy through museum exhibits leads to improved abilities to verbalize understanding of the artwork meaning without having to read a description of the piece.

Luehrman and Unrath (2006) run art programs that help future educators understand children’s developmental stages in order to create age-appropriate art education programs. Researchers propose developing visual education programs based on the following stages of artistic development in children:

- The Mark-Making Stage (2-4), where scribbling and marking leads to discovery of shapes and the figure-ground relationship.
- The Early Symbol Making Stage (4-7), where children discover the representative and communicative power of symbols and develop their own individual visual vocabulary.
- The Symbol Making Stage (7-9), where children develop more detailed and differentiated symbols and expand their understanding of spatial representation.
- The Emerging Expertise Stage, where children move from seeing art as symbol making to seeing it as a creative endeavor and try to make things look “right.”

- The Artistic Challenges Stage (11-14), where preadolescents strive to meet their own standards of “good” art, usually meaning realistic art, and are frustrated when their skills fall short, sometimes abandoning art entirely.
- The Artistic Thinking Stage (14-17) where adolescents understand art as a creative process, not just representation. It is important for art educators to provide the necessary education in the Artistic Challenges Stage to help preadolescents mature to the Artistic Thinking Stage.

While understanding of the importance of visual literacy is growing, visual literacy education faces a number of challenges. Metros (2008) examines the state of visual literacy education within the US Kindergarten – 12th grade (K-12) system and concludes that while some schools are expanding their core curricula to include visual literacy, most education still predominantly relies on a word culture and lacks support infrastructure for developing visual literacy programs (Metros, 2008).

Examples of visual literacy programs

The literature outlines two major approaches for developing visual literacy skills. The first approach aims to develop a learner’s ability to interpret (or decode) a visual message while the second approach focusses on abilities to create (or encode) messages in a visual form (Stokes, 2002). Since many programs and curricula for pre-kindergarten/ kindergarten (pre-k/k) children focus on art making (The Metropolitan Museum of Art, 2016a; The Toledo Museum of Art, 2016b; The Whitney Museum of Art, 2015; The Museum of Modern Art, 2016b), our study focussed on the development of children’s abilities to interpret (decode) images and reviewed relevant programs in this area.

Museums are uniquely positioned to expose children to art at an early age, encourage creative thinking and develop the ability to interpret art (Yenawine, 2003). It is not surprising that many visual literacy programs for children are being developed in a museum setting. The Metropolitan Museum of Art offers audio guides for children ages 6 to 12, family programs, suggested itineraries, tours, art-making workshops, and festivals (The Metropolitan Museum of Art, 2016a, b). The Museum of Modern Art’s (MoMA’s) educators take groups of children and adults through a specific artist-themed gallery to view the work, then go into a studio and create their own artwork with materials provided by the museum (The Museum of Modern Art, 2016a, b). The Whitney Museum of American Art has developed and currently supports a wide range of programs for K-12 students, as well as adult and infant patrons (0-18 month olds) (The Whitney Museum of Art, 2016).

The Toledo Museum of Art has done innovative work incorporating visual literacy instruction into its educational programming (Toledo Museum of Art, 2016a, b). The museum offers programming for babies and toddlers (Kennedy, 2015). One of such programs, “baby tours,” teaches adults how to talk to babies about different visual element (e.g. color, shapes) when exposing them to art (Toledo Museum of Art, 2016a, b). According to Dr Kathy Danko-McGhee, who designed this program and serves as the museum’s Director of Education, “Being literate in the arts gives young children an advantage in learning to read and write” (Toledo Museum of Art, 2016a, b). Additionally, the museum offers a series called Gallery Hunt, which includes downloadable worksheets that educators can print for their students to take into the museum to “hunt” for basic visual elements across three themes: colors, lines, and texture.

In the virtual world, museums are establishing interactive ways for children to practice and hone their visual literacy skills. The MoMA’s Art Lab iPad app features

activities for those above the age of seven and allows users to create sound compositions and experiment with paint. The Paul Getty Museum's GettyGames website includes games such as Switch, which challenges players to find slight differences made to classic artworks; and Jigsaw, a game with varying levels of difficulty that allows a user to assemble an artwork from pieces of a puzzle (GettyGames, 2015). The Metropolitan Museum of Art's #MetKids website offers an interactive map of the Museum, behind-the-scenes videos of children asking questions and exploring the museum, fun facts, a "time machine" feature which lets children explore over 5,000 years of art history, and creative art project suggestions for children (primarily ages seven through 12) and their families to try at home (The Metropolitan Museum of Art, 2016a, b).

All aforementioned studies show the necessity of visual literacy and the variety of ways in which visual literacy skills can be explored and improved. However, all mentioned studies and many others in the literature target an older child demographic (as do most museum programs) and leave the gap in the work with younger children that our study aimed to address.

Methods

Very little is known about young children's knowledge of visual literacy elements, their ability to comprehend newly introduced visual literacy concepts as well as the support conditions that are currently available for the development of visual literacy programs. We designed a study to examine these topics by addressing the following research questions:

- RQ1.* How do four- to six-year old children describe visual artwork based on their pre-existing knowledge?
- RQ2.* How does four- to six-year old children's description of artwork change as they are introduced to basic visual literacy elements?
- RQ3.* What do educators of four- to six-year olds think about introducing basic visual literacy into pre-k/k curriculum?
- RQ4.* What do parents of four- to six-year olds think about introducing basic visual literacy into pre-k/k curriculum?

The first-two research questions were investigated using interviews with children about visual images. Data for *RQ3* and *RQ4* were collected from parents and educators using online questionnaires. The following sub-sections detail the two methods used in the study. The data for the study were collected over the course of one month in the fall of 2015.

Interviews with children about visual artworks

In order to understand how children's descriptions of images change before and after they are introduced to basic visual literacy elements (*RQ1* and *RQ2*), we developed a semi-structured interview protocol. The chosen method is commonly used in visual literacy research on young children (Arizpe and Styles, 2003; Housen, 2002) and allowed researchers to adjust the questions' wording and order to better assess individual's knowledge, provide appropriate level of instruction for children at various developmental stages, and allow each child to freely express his/her views. Children were recruited from the two private schools that offer kindergarten and pre-kindergarten education. With the help of the schools' administration, parents were invited to participate in the study and

provide consent for their children’s participation. The interviews were conducted in schools in the second halves of the school-day. Five- and six-year old children were interviewed by researchers individually in a separate schoolroom, while four-year old children had their parents present during the interviews. Interviews with children were conducted by two researchers: a facilitator and a note-taker. The conversations with children lasted approximately 20 minutes after which time children were able to return to their classroom or proceed with other activities.

Visual artworks, paintings, were selected to facilitate interview discussions with children. The decision to use paintings was made for several reasons:

- (1) Visual artworks offer rich examples for discussing visual elements since they utilize colors, lines, shapes, salient point, perspective, balance, hue, and other elements.
- (2) Exposure to, or in-depth experiences, with artworks have been shown to benefit children’s abilities to discern, create, and appreciate art (Savva and Trimis, 2005); therefore, the use of artwork for instruction may not only strengthen a learner’s visual literacy skills but also develop their art appreciation.
- (3) Many current examples of visual literacy programs can be found in museum/art environments; developers of such programs can benefit from understanding how young children react to visual literacy instruction using artworks.
- (4) While most of the reviewed studies used picture books and games to deliver visual literacy instruction, we selected paintings, a visual form that has been rarely examined.

As part of the artwork selection for the study, artworks that would stimulate interest and excitement in children ages 4-6 had to be identified. Based on the reviewed literature, we identified some general criteria for the appropriate image selection, including easily identifiable subject matter and colors (Gardner, 1970); subject matter that is meaningful and relevant to children’s everyday experiences (Eckhoff, 2010); and “fairly simple, even spare” images that would focus the discussion of the visual elements during the interviews (Yenawine, 2003, p. 11). During the selection phase of the sample images for the study, we ran a pilot test to determine which types of images generated the most interest in children. We picked landscape paintings from four distinct art movements: realism, impressionism, expressionism and pop art (Table I). We avoided using abstract art movements (e.g. cubism) where subject matter would be difficult for children to identify. We also tried to use samples from distinctly different

Art movement	Painter	Title	Year
<i>Phase 1: images used to identify art movement that stimulates the most interest in children</i>			
Realism	Albert Bierstadt	The Rocky Mountains, Landers Peak	1863
Impressionism	Paul Cezanne	Mount St Victoire	1902-1904
Expressionism	Hubert Roestenburg	Alpenzicht Buching Halbech	1980s
Pop art	Alejos Lorenzo-Vergara	The Cornfield	2014
<i>Phase 2: images used to introduce children the basic visual literacy elements</i>			
Impressionism	Paul Cezanne	Mount St Victoire	1902-1904
Impressionism	Vincent van Gogh	Cafe Terrace at Night	1888
Impressionism	Alfred Sisley	Street in Moret	c. 1890

Table I.
Artworks used
in study

art movements and avoided using artworks that might look very similar to an inexperienced viewer (e.g. fauvism and impressionism).

Seven children ages 4 to 6-years-old participated in the pilot study. Children were presented with color reproductions of four landscape paintings and asked which one was their favorite and second favorite. As a way to gauge children's interest in a painting, they were asked to describe it, discuss how it made them feel, provide reasons why they liked or disliked it, and explain what they would change in the painting. Art movements that were most favored by children represented realism (three children), pop art (two), impressionism (one), and expressionism (one). The second most favored paintings represented the impressionism (four) and expressionism (four) movements. Impressionism and expressionism landscapes generated the most interest in children which was evident in frequencies and content of their comments. While with realism and pop art landscapes, children mainly described the objects in the painting, impressionism and expressionism paintings evoked the most emotionally loaded descriptors: excited/ing, like, love, great (very), happy, cheerful, joy(ful). While both impressionism and expressionism generated equal levels of enthusiasm, most children had difficulty identifying the subject matter of expressionism paintings (e.g. describing a landscape as seascape). Based on these results, we chose to use impressionist images for introducing children to the basic visual literacy concepts in interviews because these images would center the discussion on the visual literacy elements and avoid confusion related to the subject matter of the paintings. As a result of a pilot study, a sample of three impressionist paintings representing different artists and subject matter were selected for the main study (Table I).

During the interview, a child was shown two images: the first image was used to test children's initial impressions and knowledge of shapes, color, and other elements of basic visual literacy and to introduce children to new elements. The second painting was used to examine whether children remembered and recognized newly learned visual literacy elements. The child was first asked to describe the image and identify whether s/he liked it, what the child felt about it and why. The aim of these questions was to provoke critical thinking and engage participants with the image (Cole and Schaefer, 1990; Danko-McGhee, 2006; Douglas *et al.*, 1981). Then, the interview questions focussed on the visual literacy elements that children most likely already knew (color, shape, line), as well as the more difficult and probably unknown concepts of perspective and salience (Dow, 1913; Beatty, 2013; O'Neil, 2011; Alper, 1996; Callow, 2008). Children were given an opportunity to discuss the visual elements they knew and could identify. Then they were introduced to unknown or undetected elements by a researcher and asked to identify newly learned elements in the initial and subsequent images. When the child was familiar with basic elements (e.g. lines, object size), a researcher built upon this knowledge to show the child how those elements support more complex concepts (e.g. perspective). Because young children at the pre-kindergarten age are still developing their vocabularies (Feeney and Moravcik, 1987), instruction was given in age-appropriate terminology. For example, warm and cool colors were explained as "sun colors" and "water or winter colors," respectively. Children were then asked to identify warm and cool colors in a painting without explicitly referencing the "color temperature" concept.

In addition to talking to children about basic visual literacy elements, we tried to encourage critical thinking and sustain their interests in the images. Previous research suggests that children's experiences with visual artwork are enhanced by making connections with their everyday experiences (Mayer, 2005; Danko-McGhee, 2006).

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By associating play and emotional attachment with each painting, a child intensifies his/her memory of the learning experience (Feeney and Moravcik, 1987) and his/her understanding of the message the artist intended to convey (Cole and Schaefer, 1990; Yenawine, 2003). For this reason, our interview protocol included questions about a child's willingness to be "in" the painting, what they be would doing, and what they would alter. These questions were not directly related to visual literacy elements but helped encourage critical thinking about artwork and established a safe environment for expression, by reassuring a participant that there were no incorrect responses (Cole and Schaefer, 1990).

Two out of three sample paintings were presented to children at random, with Cezanne and Sisley being shown 11 times and van Gogh 12 times, resulting in a total of 34 individual discussions. After the interview, participants were asked to describe colors, shapes, lines, and perspective in the schoolrooms where the interviews were conducted. By ending our interviews this way, students reinforced gained knowledge and were provided with a positive and playful atmosphere conducive to enhancing their learning experiences.

Appendix 1 contains the list of interview questions.

The content of the interview notes was analyzed using descriptive statistics and content analysis techniques to determine patterns in children's initial reactions to artwork as well as the changes in children's descriptions of artwork as they were introduced to visual literacy concepts by a researcher. Major themes and their frequencies in participants' responses are describes in the following section.

Educators' and parents' questionnaires

In order to understand the existing context in which children are exposed (or can be exposed) to visual literacy and fine art (*RQ3* and *RQ4*), we developed online questionnaires for participants' parents and teachers (Appendix 2). Parents were asked to respond to a series of questions aimed at understanding the extent to which their children are exposed to fine art, parents' awareness of the visual literacy concept, and their attitudes toward visual literacy education in and out of school. Educators were asked similar questions to gauge their interest in fine art, knowledge of visual literacy, and current and potential integration of visual literacy education in their curricula. The goal of the parent and educator questionnaires was to gain insight into existing support for incorporating visual literacy into the education of four- to six-year olds. Data from the surveys were analyzed using descriptive statistics and content analysis techniques, and reported in the following section.

Participants

The study relied on a convenience sample. Children, their parents, and educators were recruited from two private schools in New York and New Jersey, USA. A total of 17 ($n = 17$) children participated in a study: eight boys and nine girls ages four ($n = 7$), five ($n = 5$), and six ($n = 5$). Nine parents and six educators filled out the questionnaires. The demographic information on adults was deemed unnecessary and was not collected.

Findings

Pre- and post-instruction descriptions of visual artwork (RQ1 and RQ2)

Children's overall impressions of the artwork. The first set of interview questions was designed to engage participants with the artwork. The children were asked whether or

not they liked the painting they were looking at. In 28 out of 34 instances, children liked the paintings they saw: there were 4 participants who disliked the paintings, 1 who was unsure, and 1 participant who did not respond. When asked what they liked about paintings, children commented on van Gogh's and Cezanne's colors (e.g. "colors are really nice," "I like the colors") and made general comments about all three paintings. A few representative comments are included below:

- [...] "I liked the mountain"; "looks really cool"; "there is no scary stuff" (Cezanne).
- [...] "it's pretty"; "it is beautiful" (van Gogh).
- [...] "It looks like I like it"; "makes me want to go to the beach or pool" (Sisley).

Most of the children ($n = 15$) expressed the feeling of being happy while looking at the painting, and four children were sad. For example, one six-year old boy was sad because he could not be in the van Gogh painting while Cezanne made one four-year old boy feel dizzy.

When children were asked to describe the paintings, they mentioned a total of 37 objects across all three paintings. Girls offered more descriptions of the objects they saw in the paintings than the boys, 49 and 34 comments, respectively. The word "people" was mentioned most frequently ($n = 13$), followed by house (11), mountain (ten), trees (seven), and restaurant (six). Many descriptions focussed on actions such as sitting, walking, driving, going to a restaurant, eating, riding a horse, or sleeping.

To maintain children's interest in an artwork, at the end of the discussion about each painting participants were asked if they would change anything about the painting. Half of the children said they would not add anything to the painting, 14 children said they would change at least one of the paintings shown, one was unsure, and four did not respond. In all, 11 children wanted to add specific objects such as people, horses, trains, cars, trees, flowers, and stars to the paintings. For example, a four-year old boy wanted to add more people, chairs, and tables to the van Gogh painting. Four children wanted to add shapes, such as rectangles, triangles, hearts, and crescents to the paintings, but did not specify why they would add these elements.

In 22 instances participants wanted to be in the painting. Seven children did not want to be in the painting and five were unsure. Table II indicates that most of the children could see themselves in the Cezanne piece, followed by the van Gogh and Sisley paintings.

Responses related to color elements. Overall, children had no difficulty identifying several colors in each painting. Participant responses to the question of what colors they saw varied from basic blues, greens and yellows, to more nuanced color descriptions such as "coffee," "pancake," "golden," and "rainbow." On average, participants were able to name seven different colors, ranging from 3 to 12 colors per child.

Table II.
Frequency of
responses to the
question about
whether or not
participants could
see themselves in a
painting

Do you see yourself in this painting?	Yes	No	Unsure
Cezanne	9	2	2
van Gogh	7	4	2
Sisley	6	1	1

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The participants were measurably more verbal in describing the colors in the van Gogh painting, which received 64 color mentions, compared to the Cezanne (38 color mentions) or Sisley (35 color mentions) paintings.

When asked about primary colors, six out of 17 participants knew what they were and were able to identify them in the first painting they saw. After participants were introduced to primary colors, 16 children were able to identify them on the second image – the one child who did not identify primary colors was tired and did not wish to continue with the interview.

The concept of warm and cool colors proved to be a more difficult concept to grasp than primary colors. Although seven participants said they knew the difference between the warm and cool color temperatures, all of them needed an explanation and examples before they could correctly discern between warm and cool colors. Once participants were provided with instruction, they were better able to identify cool colors (13 correct responses) and warm colors (eight). After viewing the second picture, 14 were able to correctly identify warm colors and 12 were able to identify cool colors. One of the children who did not identify a cool color was tired, so the lack of response may not have been a true measure of the child's ability.

All participants were able to identify light and dark colors in the first painting they viewed. However, most were unable to explain the meaning of light and dark colors within the paintings. Two of the children were able to relate light and dark colors to the concept of day and night. One child responded that dark indicates that you cannot see and light indicates that you can see. For the second painting, after receiving instruction, nine of the children were able to relate light and dark colors with the subjects represented in the painting, such as night and day (van Gogh), emphasize focal point objects (Sisley) or a shadow (Cezanne).

The final questions about color gave children the opportunity to discuss whether or not they would want to alter the colors in the images they viewed. Most of the children (14 out of 17) said they would change the colors of the first image they viewed. That number dropped to 11 for the second image they viewed. Participants made the most comments about adding colors to van Gogh (29 total additional color suggestions), followed by Cezanne (23), and Sisley (six). Overall, the children who said they would change the colors in the paintings provided a range of responses concerning the colors they would add. Two trends emerged when reviewing the responses to this question along gender lines. First, the girls were more eager to add different colors to the paintings than the boys were. Girls named more than twice as many colors in response to this question than the boys (Table III). All of the girls focussed on what colors they would add to the paintings: some only named colors and some discussed objects of certain colors they would add. It might be worth noting

Table III.
Total suggestions of colors to be added to the first and second paintings, separated by gender

	Painting 1	Painting 2
<i>Girls</i>		
	21 colors added	19 colors added
	Colors mentioned: brown, black, gold, green, pink, purple, silver, white	
<i>Boys</i>		
	8 colors added	11 colors added
	Colors mentioned: black, brown, green, orange, purple	

that the addition of the color pink was mentioned by seven girls after the first and second viewing of the paintings. None of the boys mentioned the color pink. For example, one five-year old girl said she wanted to paint the buildings in the van Gogh piece pink. Overall, the girls talked about a wider variety of colors than the boys. While both boys and girls named the primary colors of red, blue, and yellow in their responses, the girls mentioned eight additional colors, whereas the boys only mentioned five additional colors (Table III).

We also found that the boys showed more of a willingness to talk about things other than color addition despite being asked specifically about colors. For example, when viewing Cezanne's painting, a six-year old boy said he would make it "brighter [...] and [he] would add some people and make them closer." Another six-year old boy, when viewing the Sisley piece, said the "houses need to be built again, so they look fancy."

All responses to what the children would change in an image illustrated a willingness to engage with the artwork beyond mere viewing.

Responses related to shape. On average, children knew and shared the names of four basic shapes (circle, square, rectangle, triangle) as well as more specific shapes such as crescent (three) and star (five). Most children knew at least five shapes. Squares, rectangles, and triangles were all mentioned 12 times, while diamonds and pentagons were mentioned three times with one child calling a "plus sign" a shape. Eight children knew at least one advanced shape, such as a hexagon (a four-year old boy) and an octagon (a six-year old boy).

Prior to instruction, all participants identified the most shapes in the Cezanne painting ($n = 16$), followed by van Gogh (12) and Sisley (six). After instruction, the number of shapes identified in van Gogh and Sisley paintings almost doubled (23 and 11 shapes per image, respectively), with 12 additional shapes identified in the Cezanne painting.

Children were also asked to locate areas of a painting where shapes were used to create objects (e.g. the use of circles to represent tables in van Gogh's painting). Without assistance, ten children were able to identify three or more composite objects, while two children could not identify any objects and five children were unsure about the question. Prior to instruction, the largest number of composite objects were identified in the Cezanne painting. After receiving instructions, all children were able to identify at least one additional composite object in the second image, with most additional objects being identified in van Gogh painting. In reference to the van Gogh piece, one four-year old girl even mentioned that "shapes make everything in the picture."

Overall, we noticed an improvement of children's abilities to identify elements from the first to the second images. Prior to instruction, children identified most of the shapes and composite objects in the Cezanne painting. After receiving instruction, children were able to find more shapes as well as identify more objects constructed by individual shapes across all three study images.

Line, horizon, and compositional elements. During interviews with children, various types of lines (short, curvy, long, straight, etc.) and a horizon line were discussed. This discussion laid the foundation for introducing more complex visual elements, which are examined in the following section. Children were first asked to identify any lines they saw within an image. Prior to instruction, seven children identified three or more lines, while ten children identified fewer than three lines. Six children showed improvements in their abilities to identify lines between the first and the second image. The most commonly mentioned lines were associated with objects (e.g. lines that made walls or the edges of buildings in Sisley's painting).

Only one participant was aware of the horizon line and was able to accurately identify it without instruction. Seven children were able to point out the horizon line before it was explained to them but did not know the technical name of “horizon” and simply identified it as another line within the image. After instruction, three participants were able to independently identify horizon in the second image while six children still needed assistance.

Additional lines were discussed with participants in order to introduce perspective and salience.

Perspective and salience. While participants were not explicitly introduced to the concept of perspective, they were introduced to large and small objects in the foreground and background as an indicator of distance, directional lines leading the eye to a certain point or object, and the salient object, introduced as “the most important object in a painting.”

Only one child could identify foreground objects that were more prominent than those in the background. After receiving an explanation, five more children were able to correctly identify foreground and background objects in the first image, and 15 were able to identify these elements in the second image. The greatest improvement in understanding perspective was noticeable at the end of the interview when children were asked to apply their new skills to their surroundings (see the following section for more details).

Participants were asked to show any lines that pointed to the distance and/or a vanishing point. For example, if participants were unable to identify lines in a “Cafe at Night” independently, they were shown lines of the road, sidewalk, rows of tables and edge of the cafe floor that point back to the horse on the road, or the vanishing point. Three children correctly identified perspective lines in the first image. After instruction, eight more children were able to identify directional lines in the subsequent images.

Following the discussion on perspective and the directions of lines, participants were asked to identify “the most important object in the image” (i.e. salient point). Three children were able to identify the salient object correctly in the first image by pointing at the mountain in the Cezanne painting or the cafe light in the van Gogh painting. When directed to an object other than their original choice, seven children were able to accept the idea. After discussing salient point, four more children were able to correctly identify the proposed salient point on the second image, while five children were reluctant to accept a point other than their own original choice of “the most important object.” For example, one five-year old girl argued that the most prominent object in the Cezanne painting was the red mill in the bottom right corner of the image and refused to change her opinion.

Applying new skills to surroundings. The final part of the interview was designed to measure how well children could relate the visual elements discussed after viewing the Cezanne, van Gogh, and Sisley paintings to their surroundings. In all, 13 participants were able to identify several visual elements in the interview room, including colors, shapes, lines, and in some cases, perspective; perspective was represented in comments about smaller size of distant objects compared to the close ones, or lines created by shelves that lead an eye into the distance. Two participants failed to identify visual elements and two more participants refused to continue the interview. At this stage, most children demonstrated signs of fatigue and a lack of interest in continuing any conversation.

Parents' and educators' perspectives (RQ3 and RQ4)

A total of nine parents completed the online questionnaire about their family's museum visitation routines and general attitudes toward visual literacy. Table IV contains a summary of parent responses.

All respondents reported positive feelings associated with museum visits, with 4 parents indicating that they felt comfortable while four felt engaged and three felt welcome.

All participants agreed upon the importance of their children being exposed to fine art and engaging in meaningful discussions about artworks. Five out of eight parents (with one parent not responding to this question) also agreed that it is important for children to understand art, not just create it.

Three parents were able to define visual literacy in the following statements:

- The language/vocabulary/terms used to describe, read, interpret, interact with and/or discuss objects that are experienced primarily through sight.
- Learning by looking at things.
- Knowing how to engage with and understand the meaning of a piece of visual art or media.

When given the definition of visual literacy as "the ability to interpret and construct meaning from visual images," all parents agreed that it should be incorporated into their children's education. Table IV describes some of the ways in which parents thought visual literacy should be taught. One parent shared a comment about the benefit of offering mini visual workshops for parents:

- During our 30 minutes with [researchers], I was reminded of how to talk about art with my daughter. Since then when we look at "art" or illustrations, we talk about the colors, their

Places where parents are most likely to take their children during spare time	Parents' responses Most likely (rated 4-5)/least likely (rated 1-3)	Educators' responses Most likely (rated 4-5)/least likely (rated 1-3)
Park/playground	7/2	
Bookstore/library	4/4	
Movie theater	3/5	
Sporting event	3/4	
Museum	0/8	
	Agree (rated 1-2)/disagree (rated 3-5)	
Agreement about the importance of children to be exposed to fine art	8/0	5/0
Agreement about the importance to engage child(ren) in meaningful discussions about artworks	8/0	
Agreement about the importance for children to understand art, not just create it	5/3	4/1
Ways in which visual literacy should be taught	More preferable (4-5)/less preferable (1-3) ^a	
In school	8/1	4/0
On-site museum program	6/3	3/1
By parents	2/7	1/3
Mobile phone app	1/8	0/4
Hired tutor	1/7	0/4

Note: ^aOne educator did not answer this question

Table IV.
Summary of parent
and educator
responses to the
online questionnaires

“temperature,” where does her eye want to go on the canvas or on the page; if she could insert herself into the image, where would she go; what would she do, if she could change the image or add to it. It was a short, fun and effective session for me, the parent!

When asked if they had any additional thoughts about introducing visual literacy to children, two parents shared that they were supportive of the idea of introducing visual literacy to young children. One parent expressed a preference for introducing children to fine art at the early age:

- I often feel like an idiot in modern art museums – [I] don’t want kids to grow up the same way.

Six educators responded to the online questionnaire. One educator indicated that s/he did not visit a museum in the last 12 months, the others reported between two to 10 museum visits in the past year. All participating educators agreed that it was important for children to be exposed to art. One respondent noted:

- Parents are obsessed with literacy narrowly defined, it is always great to affirm and appreciate the broader breadth of literacy, inclusive of visual literacy, which are all interrelated.

All but one agreed that it was important for children to understand art rather than just create it. The respondent who disagreed stated:

- Children are better at interpreting and constructing meaning from images than any adult – making them self-conscious about their art is the opposite of what we as teachers want to do. “What is art” is a conversation that is probably arbitrary and unproductive even for most adults. Don’t foist such a complex, impractical question on young, innocent kids!

Two respondents were familiar with the term “visual literacy,” and defined it as:

- Expression/communication through art.
- Interpreting a visual image, “reading” an image.

Three educators agreed that visual literacy should be incorporated into schools’ curricula and described how it is currently integrated into their school’s curriculum:

- We have drawings throughout the room that indicate where materials go. When we share ideas in meetings, we record them in word and picture.
- We ask [children] to discuss/describe their work all the time. We also read many “wordless books” and ask [children] to “read” the pages.
- [The visual literacy curriculum in my school consists of] reading wordless books, using fabric swatches as symbols for children, using pictures and words together in classroom print.

Overall, the feedback from parents and educators indicates interest in and support for developing visual literacy skills in children.

Discussion

Image selection

In preparation for the study and selection of the image sample, we found that children expressed more excitement and generated more comments about impressionist and expressionist paintings compared to realism and pop art. Presence of vivid colors and relatable subject matter were the main image elements that stimulated children’s

interests. These findings are in line with prior research (Gardner, 1970; Eckhoff, 2010) and suggest that colors and subject matter should be considered in the selection of artworks for children visual literacy programs. It is worth noting that children were highly engaged with the expressionist paintings even when they were unable to accurately identify objects and/or subject matter, suggesting that a more abstract artwork can stimulate children's excitement and imagination as much, if not more, than realistic pictures. This finding is supported by George Hein's theory of constructivism in which people make connections between art and their own life experiences (Mayer, 2005) and confirms that children like "making up stories about what they see" (Yenawine, 2003, p. 11).

Identifying appropriate art styles and artworks for visual programs was not the main focus of the study; we sampled a very small population of children in order to identify a sample of paintings for the study and our results are inconclusive. More work is needed to develop a list of criteria for selecting appropriate artwork for young children, criteria that would appeal to children's cognitive, emotional, and aesthetic needs. Future work might also focus on the methods for developing children's awareness of different art movements. For example, one of the ways to introduce children to art movements could be integrated into a video game/application that enables changes to stylistics of a given painting by modifying its original colors and strokes (from realism to impressionism to expressionism to cubism) – this would be similar to how some programs currently allow a user to modify image colors (Yang and Peng, 2008; He *et al.*, 2014).

Pre- and post-instruction descriptions of visual artwork

Overall, children demonstrated interest in the artworks and were able to describe and creatively interpret the images at various levels of detail. While most of the children liked the three paintings they saw, the paintings stimulated different reactions. For example, children talked about the colors of the van Gogh painting almost twice as much as the colors of the other two paintings, while the subject matter of the same painting stimulated the highest number of negative associations. This finding is consistent with Gardner's (1970) research on children's sensitivity to painting styles and illustrates that children's initial reactions to paintings are driven by paintings' subject matter, color, artist technique, or presence of a certain detail. The finding highlights the importance of selecting appropriate artwork for this age group and points to the benefits of using multiple artworks to generate children's interest in various aspects of visual literacy.

Most of the participants, including four-year old children, knew basic colors and shapes, and were able to identify some of these elements in the paintings they viewed. Several children were already aware of more advanced visual literacy elements, such as primary colors or horizon line. Overall, older children exhibited more extensive pre-existing knowledge of basic visual elements and were able to better verbalize their thoughts about the paintings than younger participants. This finding is consistent with literature findings about the cognitive and developmental differences of four- to six-year old children (Kail, 2011). In addition to the age-related variation in the quality and quantity of participants' responses, we also observed gender differences. For example, when given an opportunity, girls were more willing to experiment with different colors than boys. Boys, on the other hand, generated more elaborate stories associated with the subject matter of the paintings, even when they were not asked to do so. Further work is needed to understand whether this finding is attributed to the developmental

differences between four- and six-year old boys and girls (Overman *et al.*, 1996; Stephens and Crowe, 2008), differences in self-regulation (Matthews *et al.*, 2009), or random behavioral variations. Despite the causes of such variations, our findings highlight the need for the visual literacy programs to incorporate variable features and degrees of difficulty for children of different ages and gender.

Children's critical thinking and engagement with our chosen artworks was expressed through their willingness to describe images, suggest changes, and imagine themselves in the paintings. These findings indicate that visual art images can stimulate interest and excitement in young children and should be considered when developing visual literacy programs. We noted that participants were generally more talkative when sharing their thoughts and feelings about the first image they saw compared to the second image. For example, more children were interested in changing original colors and objects in the first image than they were with the second image. This observation might also signal diminished attention, tiredness, and lack of novelty associated with the second image and suggests the need for further research on the optimal duration, delivery method, and content of visual literacy programs that can provide learning opportunities while maintaining children's attention.

Color. Children liked talking about colors and showed improvement in understanding and identifying primary colors and warm and cool colors from the first painting to the second painting. The concept of light and dark colors was more difficult for children to understand, with the van Gogh painting stimulating the most discussion about dark and light colors. Based on children's responses, it might be more effective to incorporate primary color and color temperature elements rather than color values in visual literacy education programs.

Shapes. Children knew a lot of shapes prior to instruction, which could be attributed to the content of their math curriculum (IXL, 2016a, b). Children's ability to identify shapes and ways in which shapes create objects in the paintings improved after instruction. Since the discussion of shapes builds upon children's existing knowledge and can lead to noticeable improvements in their visual literacy abilities, it should be considered for inclusion in visual literacy programs. We observed that it was easier for children to identify shapes in the Cezanne and van Gogh paintings rather than the Sisley painting, suggesting that shapes might be best introduced in an artwork with small recognizable objects (e.g. images with trees, houses, tables might be better suited for stimulating discussion about shapes than images of larger objects, such as road and sky).

Lines and horizon. The most commonly mentioned lines were associated with objects (e.g. building, walls), which is consistent with previous research on younger children's tendencies to focus on subject matter (Gardner, 1970). Children showed improvements in their ability to identify various types of lines after receiving instruction. Introduction to the horizon line improved children's ability to understand its purpose and identify it in a painting, though children frequently forgot the technical term for this line (i.e. "horizon") We found that drawing additional lines and/or blocking parts of the image helped emphasize the lines that guide children's focus to the salient point and perspective. Since identifying important lines in the painting was more challenging for children than identifying colors and shapes, more work needs to be done in order to understand the appropriateness and effective ways of introducing these elements to young children.

Perspective and salience. The elements of perspective and saliency were the most difficult for children to understand. We attribute some of these difficulties to our image

selection. For example, our explanations about small objects being at the far distance and larger objects appearing closer did not make much sense to children, particularly concerning Cezanne's painting, where the biggest and brighter object, Mount Saint-Victoire, was at a distance. The difficulties could also be attributed to the novelty of the perspective concept compared to concepts more familiar to children, such as color and shape, as well as developmental limitations in understanding complex and abstract ideas at this age (Wadsworth, 1996).

The concept of salience was introduced through discussion about the most important object in the image. In the Cezanne and van Gogh paintings, salient points corresponded with the focal point (the mountain and café light, respectively), and the discussion about saliency followed the discussion about lines leading to the horizon and the focal point. In the Sisley painting, the church at the end of the road qualified as the focal point while the column in the foreground was identified as the salient point. In all, 12 children made improvements in their abilities to identify salient points in the shown images, while five children struggled with this concept. The difficulties experienced by children can be attributed to their expressed interest in colorful or exciting objects that might not always correspond to the salience or focal point (e.g. the red mill in the bottom right corner of Cezanne's piece or stars in van Gogh's piece). This difficulty was previously noted in younger children (Gardner, 1970) and tends to disappear at an older age, when children begin to focus on conceptually relevant objects. Despite children's initial struggle identifying more complex elements, we observed improvements in children's abilities to understand perspective and saliency and would encourage further studies to examine the appropriateness of these concepts in visual literacy instruction for young children.

Applying new skills to surroundings

In most cases, children had no difficulties identifying visual elements in their environment, pointing to the objects and naming their colors, sizes, and shapes. Most of the participants were also able to identify lines that lead an eye to the horizon. These findings indicate that children are able to retain some of the newly learned visual literacy concepts and apply them to their surroundings. Future work might measure long-term retention of visual literacy skills with various degrees of these skills' knowledge reinforcement. It is worth noting that since the discussion about the surroundings took place at the end of the interview, most children had diminished interest in the proceedings. Four-year olds were particularly disengaged and eager to end conversation, which is consistent with the literature that discusses positive correlations between child's age and her/his attention span (Neville and Williams, 2007). This observation suggests potential challenges in developing informative yet short, engaging and systematic programs to introduce, maintain, and improve visual literacy skills in young children.

Parents' and educators' perspectives

Prior to taking the online survey, participating parents and educators showed mixed understandings of visual literacy. However, after being introduced to our study and a definition of visual literacy, all but one participant acknowledged the importance of developing visual literacy skills in young children. Only one educator expressed opposition to visual literacy on the grounds that doing so would make children self-conscious about their art, which the educator viewed as a negative outcome.

These findings indicate that parents and educators are generally supportive of developing visual literacy programs for young children.

All respondents (both parents and educators) agreed that visual literacy should be taught in school, with several educators describing specific means by which visual literacy is currently integrated into his/her school's curriculum. A majority of parents and educators thought that on-site museum programs would be appropriate for teaching children visual literacy. However, since more parents preferred to take their children to parks, bookstores/libraries, or movie theaters than museums, more work is needed to test the feasibility of offering visual instruction in museums compared to other settings (e.g. libraries). Further examination of the causes of parents' selection of their children's activities is needed in order to understand whether museum attendance of young children is linked to parents' individual interests, their understanding of their children's needs, availability of museum programs for children, and/or other factors. The idea of parents, tutors, or mobile applications facilitating visual literacy instruction did not meet extensive support among our participants. Due to the small sample size of participating parents and educators, more work is needed to examine the potential support and methods for developing visual literacy instruction for young children.

Conclusion

Despite an increase in the amount of time children spend with image-based media (Kaiser Family Foundation, 2010), we have a limited understanding of their abilities to interpret visual messages. In an effort to better understand children's readiness for visual literacy instruction, we interviewed 17 children aged four- to six-years old about three impressionist paintings. Overall, children reacted positively to the images and were engaged in discussions about them. Children exhibited extensive knowledge of simple visual literacy elements (e.g. color, shape, line), and generally had no difficulties learning more nuanced concepts (e.g. primary and warm/cool colors, use of shapes to construct objects). Children's initial understanding of more abstract elements (perspective and salience) was limited, but most children were able to better comprehend these elements after instruction. Children's comprehension of the visual elements that were used in this study was further confirmed when they were able to identify these elements in their surroundings. These findings suggest that young children are ready to receive instruction on visual literacy elements using art images. Results from questionnaires given to children's parents and teachers indicate a strong interest in and support for visual literacy programs. Based on our study's findings, we offer the following recommendations for educators, information curators, technology developers, parents and others involved in the development of literacy programs for young children:

- (1) Images for instruction should be selected for their potential to stimulate children's interest and discussion about various visual elements (Gardner, 1970; Callow, 2008). For example, in our study, van Gogh's image of a night café generated excitement about image colors and rich discussion about shapes, but was problematic when explaining the horizon concept.
- (2) Instruction should be based on age-appropriate language and integrate participant feedback; technical terms should be avoided and substituted with simple explanations (O'Neil, 2011). For example, part of the reason participants showed improvements in understanding visual literacy concepts can be attributed to the use of simple instruction and the ability to modify it according

to children's responses. During study interviews, we tried to maintain a playful atmosphere by mixing formal instruction with questions that allowed children to express themselves. Considering the popularity of educational and gaming applications and the graphical nature of visual literacy instruction, mobile apps or computer games might provide appropriate channels for visual literacy instruction (e.g. Stone-MacDonald, 2015; Aronin and Floyd, 2013; Beschorner and Hutchison, 2013).

- (3) Not all basic visual literacy concepts might be appropriate for the four- to six-year old children. For example, in our study, the purpose of light and dark colors as well as some elements of perspective and salience were not easy for children to grasp. This suggests that some abstract concepts should be introduced at an older age or after children have developed an understanding of basic visual literacy concepts.
- (4) Keeping instruction short and engaging would be critical for successful visual literacy instruction. In our study, children were more engaged with the first image they saw than the second one. Diminishing interest can be attributed to their limited attention span, fatigue, lack of novelty, and other issues found in previous research (Stewig, 1994) and should be considered in future work.
- (5) Based on the feedback from parents and educators, visual literacy instruction can be integrated into school curriculum, can be offered through museum programs, mobile applications, as well as by parents or tutors. Such programs would require development and promotion of appropriate educational resources. We hope that our study contributed to the development of such resources but more work needs to be done in order to test effective methods of visual literacy instruction.

Our study had a number of limitations. The study relied on a sample of children from two private schools in the New York and New Jersey area. While our participants varied by age, gender, and race, they all had similar socio-economic backgrounds and access to pre-k/k education. Due to this fact, participants' verbal skills and pre-existing knowledge of basic visual literacy elements might have differed from some of their less-privileged peers. However, while other children might have displayed different pre-existing knowledge and abilities to discuss visual elements, we would expect a similar level of engagement and understanding of visual literacy instruction (Callow, 2010). Sample demographics might have also attributed to general support for visual literacy programs expressed by participants' parents and educators. It is possible that adults in other communities would have different educational priorities and express a different level of support for visual literacy programs. Future work will try to mitigate these limitations by including representatives with more diverse socio-economic backgrounds.

The study identified many areas that require additional work. One such area might focus on exploring images that stimulate interest in young children and can be used for introducing basic visual literacy components. Additional work is needed to understand a set of visual literacy elements that would be most appropriate for young children, as well as the most effective ways to deliver visual literacy instruction. We plan to use the study findings to develop a series of visual literacy workshops for young children and offer them in several libraries and museums of the New York City. The workshops will aim to test and popularize the methods for engaging children into visual literacy through art.

Visual literacy creates more possibilities for challenge, creativity, and freedom (Edwards and Willis, 2000). Considering the growing prevalence of visual communication, more efforts should be made to incorporate visual literacy into early childhood education (Barnett, 1995). Our study extended the discussion on the means of integrating visual literacy into early childhood programs, and illustrated children's readiness to engage with the artwork beyond mere viewing and learn visual literacy skills.

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Appendix 1. Interview protocol for children

Painting

- Cezanne
- Van Gogh
- Sisley

0.1 Do you like this painting?

- Yes
- No

Other:

0.2 Can you describe this painting for me?

0.3 How does the painting make you feel?

- Happy
- Sad
- Excited

Other:

0.4 Why does it make you feel that way?

1. Colors

1.1 What colors do you see?

- Blues
- Reds
- Oranges
- Yellows
- Greens
- Black

Other:

1.2 What color here is your favorite? *Point and, ideally, name

- Blue
- Red
- Orange
- Yellow
- Green
- Black

Other:

1.3 Do you know what primary colors are?

- Yes
- No

1.4 Now can you show me the primary colors?

- Yes
- No

Other:

1.5 Can you show me light and dark colors?

- Yes
- No

Other:

What do you think the light and dark colors mean?

1.6 Do you know the difference between “warm” and “cool” colors?

Yes

No

Other:

1.7 Can you show me some warm colors now?

Yes

No

Other:

1.8 Can you show me some cool colors?

Yes

No

Other:

1.9 If you were painting this picture, would you use the same or different colors?

Same

Different

Unsure

Other:

2. Shapes

2.1 What shapes do you know?

Circle

Square

Triangle

Diamond

Rectangle

Other:

Do you see any of the shapes (circle, square, triangle, diamond, rectangle) here? *Point

2.2 Do the shapes make anything e.g., house, mountain, cloud, etc.? *Point and discuss with participant

Yes

No

Unsure

Other:

3. Lines

3.1 Show me the lines you see in this picture

Less than 3

More than 3

Other:

3.2 Do you see these lines? *Point to additional lines related to horizon, distance, focal point

Yes

No

Unsure

Other:

3.3 Do the lines point to anything? *Show where the lines are meeting/pointing to; help child see the focal point

Yes

No

Unsure

Other:

3.4 Do you see ~~the~~ a line (horizon) [or shape] splits the picture into 2 parts? (i.e., sky and ground)

Yes

No

Unsure

Other:

4. Perspective

4.1 Which things look close to you?

4.2 Which things look far away?

4.3 How can you tell that this (*point) is far and this (*point) is close? *Explain small and big

4.4 Show me what you think the most important thing in this picture is? *Point; explain focal point

5. Creative Thinking

5.1 Is there anything you would add to this image?

Yes

No

Unsure

Other:

5.2 Would you like to be in the picture?

Yes

No

Unsure

Other:

5.3 What would you be doing?

5.4 What would you be feeling?

After the last painting, go to classroom and ask participant to point to lines, colors, shapes.

END.

Researcher's notes:

Appendix 2. Online questionnaire for parents and educators

Not just a
pretty picture

1225

Parents

1. In your free time, where are you most likely to take your child? (Please rank from 1 = Least likely 5 = Most likely).

- The park/playground
- A sporting event
- A museum
- A bookstore/library
- A movie theater

If you would choose another location not listed, please specify:

2. In the last 12 months, about how many times did you visit any type of museum with your child(ren)?

0 1 2 3 4 5 6 7 8 9 10+

3. How do you usually feel when you visit art museums?

- Comfortable
- Uncomfortable
- Engaged
- Welcome
- Bored
- Excluded
- Neutral
- Intimidated
- I don't typically visit art museums; I visit other types of museums.

Other (please specify):

4. To what extent do you agree or disagree that...

	Strongly Agree	Agree	Disagree	Strongly Disagree
It is important for your child(ren) to be exposed to fine art?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is important for you to engage your child(ren) in meaningful discussions about artworks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is important for children to understand art, not just create it?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Are you familiar with the term "visual literacy"?

- Yes
- No

6. If you answered yes to the previous question, please describe what visual literacy is:

7. "Visual literacy" is defined as the ability to interpret and construct meaning from visual images.

Do you think visual literacy should be incorporated into your child's education?

- Yes
- No

8. If you think visual literacy is an essential skill for children to learn, how do you think it should be taught? Please rank in order of preference. (5 = This would be the most effective way to teach children visual literacy skills. 1 = This would be the least effective way to teach children visual literacy skills).

- In school
- Mobile phone applications
- On-site museum program
- By parent(s)/caregiver
- Hiring a tutor

If you would choose another teaching method not listed, please specify:

9. If you have any additional thoughts about introducing visual literacy to children, please share them here:

Educators

1. In the last 12 months, about how many times did you visit any type of museum?

0 1 2 3 4 5 6 7 8 9 10+

2. How do you usually feel when you visit art museums?

- Comfortable
 - Bored
 - Uncomfortable
 - Welcome
 - Engaged
 - Excluded
 - Intimidated
 - Neutral
 - I don't typically visit art museums; I visit other types of museums.
- Other (please specify):

3. To what extent do you agree or disagree that...

	Strongly Agree	Agree	Disagree	Strongly Disagree
It is important for children to be exposed to fine art?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is important for children to understand art, not just create it?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Are you familiar with the term "visual literacy"?

- Yes
- No

5. If you answered yes to the previous question, please describe what visual literacy is:

6. "Visual literacy" is defined as the ability to interpret and construct meaning from visual images. Do you think it should be incorporated into your school's curriculum?

- Yes
- No

7. Is visual literacy currently integrated into your school's curriculum?

- Yes
- No
- Unsure

8. If yes, please describe how:

9. If visual literacy is not currently integrated into your curriculum, please explain why:

10. If you think visual literacy is an essential skill for children to learn, how do you think it should be taught? Please rank in order of preference. (1 = This would be the most effective way to teach children visual literacy skills. 5 = This would be the least effective way to teach children visual literacy skills).

- In school
- Mobile phone applications
- On-site museums program
- By parent(s)/caregiver
- Hiring a tutor

If you would choose another teaching method not listed, please specify:

11. If you have any additional thoughts about introducing visual literacy to children, please share them here:

About the authors

Irene Lopatovska holds a PhD from Rutgers. She is an Associate Professor at the School of Information, Pratt Institute, New York. Her research interests include human information behavior and affective computing. She teaches research and management courses. Irene Lopatovska is the corresponding author and can be contacted at: ilopatov@pratt.edu

Sarah Hatoum holds a Bachelor's Degree in history from the Hunter College (New York, NY) and is expected to earn her Master's Degree in library and information science from the Pratt Institute's School of Information (New York, NY) in 2016. She currently works as a Document Delivery Assistant at the Memorial Sloan Kettering Cancer Center Library and as a Graduate Assistant at the Pratt Institute. Her academic interests include user experience design, archives, and research.

Saebra Waterstraut is a Master's Candidate in the fields of Information Science and History of Art. She received her Bachelor's of Fine Arts at the Bowling Green State University in 3-Dimensional Studies. Her research interests include the sociological effects of nineteenth and twentieth century art works regarding gender.

Lisa Novak is a retired Military Journalist who currently manages the Genealogy Research program at Green-Wood Cemetery in Brooklyn, NY. Her contributions to this work were made as a student at the Pratt Institute in New York City, where she earned a Master's of Library Information Science and an Advanced Certificate in Archives in 2015. She also holds a Master's in Public Administration from the Bowie State University, as well as a Bachelor's of Science in broadcast communications from the Arizona State University. She currently resides in Brooklyn, New York.

Sara Sheer holds a BA in History from the SUNY Purchase. She works part-time as a page in the Research Room of the main branch of the New York Public Library. She lives in Westchester, New York.

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