## Background

The Ohio State University College of Medicine (OSUCOM), in partnership with the Columbus Museum of Art (CMA), is piloting an innovative experience for medical students utilizing observation of the visual arts medium, analysis of artwork based on a critical thinking rubric paired with a sheltered group discussion named, "Art of Analysis." During the 2010-2011 academic year, medical student learning communities, composed of 12 second year medical students and a clinical faculty mentor, spent an evening exploring the collection of the CMA while practicing critical thinking skills. To do so, participants addressed questions posed by CMA education staff using a thinking routine in order to interpret artwork. The critical thinking rubric is called "ODIP," an acronym for "Observe, Describe, Interpret, and Prove" (see Table 1). The Art of Analysis (AoA) goals are to encourage critical thinking skills, engender empathy, create a foundation for cooperative achievement, increase students' tolerance for ambiguity, and build visual observation skills in physicians in training.

Humanities education and the appreciation of artistic expression have recently become very prevlanet in physician education in the United States (Rodenhauser, 2004). Several programs exist at prominent medical schools in the United States, including Yale, Harvard, Stanford and Cornell. These programs encourage exposure to the visual arts as a method to increase students' observation and visual diagnostic skills (Dolev, , 2001). Rodenhauser et al, in a 2002 survey of all U.S. medical schools designed to assess student involvement in arts-related activities found that over half of the responding schools involve the arts in learning activitiesMost include literature, visual arts, performing arts, and/or music. Use of the arts serves four major functions: a) enhancement of student well being; b) improvement of clinical skills; c) promotion of humanism; and d) employment by students as a teaching tool (Rodenhauser, 2004).

Visual arts observation in particular has proven to improve the diagnostic skills of medical students (Naghshineh, 2008). Among professional development programs developed by art museums, those created for students and practitioners of medicine are "the most prolific" (Alvarez, 2011). And while visual arts observation is key to partnerships between schools of medicine and art museums, each program is specially tailored to best serve the needs of the student population. Some programs include a clinical session (Shapiro, 2006), while others focus on the observation of portraiture, with the hope of improving the ability of medical students to make accurate observations regarding the care of patients (Bardes, 2001). The AoA program allows students to consider a wide variety of works of art, including portraiture, landscapes, narrative-based, and non-representational works of art, while answering questions posed as a part of the experience and developing critical thinking skills through the use of an acronym analogous to the clinical practice of medicine.

## Methods

Prior to the official start of the program, students and their faculty mentor socialize around a catered meal on a weekday evening. They find that this is essential to the success of the program, as the students and faculty familiarize themselves with the

environment while meeting and satisfying their physiological needs. The introduction to the program begins with facilitators inquiring about students' expectations and previous exposure to art museums. Students are given a one-page summary of research on the connections between medicine and the arts, and facilitators briefly describe how the program developed. The ODIP thinking strategy is introduced at this time, and a formative question is posed to students for consideration as they move through the program: "How and why is this [program] going to make me a better physician?" This introduction helps to make explicit the goals of the AoA, as well as prepare students and their faculty mentor for what to expect over the next two hours.

The in-gallery experience begins with a 20 to 30-minute group discussion of one work of art. Students are asked to analyze the work of art by moving step-by-step through each phase of the ODIP strategy, with facilitators posing questions and providing information as necessary (see Table 1).

**Table 1**

**ODIP Strategy, Art of Analysis program**

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| **O** | Observe | Take a few minutes to look hard and look closely. What do you see? Try to find a detail you think no one else will notice. |
| **D** | Describe | Describe what you're looking at, using adjectives and descriptive language. What colors are present? How would you describe these colors? |
| **I** | Interpret | What's going on in this work of art? Make an interpretation based upon what you see in the work. |
| **P** | Prove | Prove your interpretation using visual evidence. What do you see that supports your interpretation? |

Students are reminded at the beginning of the discussion that there is no single correct interpretation of a work of art. Instead, they are asked to gather visual evidence and use their own prior knowledge to "prove" their conclusions. Directives such as, "Find a detail you think no one will notice," encourage students to examine the painting in great detail and look more closely than they might otherwise.

Thinking routines like ODIP are typically used by educators in order to facilitate thinking and learning regarding works of art. While CMA developed ODIP, other thinking strategies are more widely known, including those created by Harvard University's arts education initiative within its Graduate School of Education, Project Zero, as well as an approach developed by psychologist Abigail Housen and art educator Philip Yenawine called, "Visual Thinking Strategies," colloquially known as "VTS." VTS is used among medicine and arts partnerships most prominently and foundationally in Harvard Medical School's course called, "Training the Eye." It is employed for medical and nursing students at Indiana University School of Medicine in conjunction with the Indianapolis Museum of Art (Duke, 2011). VTS, similar to ODIP, was initially created for use with younger students to "teach critical thinking, visual literacy, and communication skills," but its application has been expanded to many different audiences, including medical residents (Reilly, 2005). Thinking routines commonly call upon the power of group discussion and learning, as well as allowing visitors to develop meaning about the works of art independent from extant knowledge or information. ODIP is viewed as a framework or guide for gallery conversations at CMA; facilitators are encouraged to incorporate their own knowledge about the work of art or the artist into the conversation in the hope of enhancing and deepening group learning.

Participants are then given 40 minutes of individual time in the galleries to address questions posed by the museum education staff. Examples include: "What does a good teacher look like?" and "What does empathy look like?" (see Table 2). At a set rendezvous time, groups gather in front of the selected works to orally present their analyses in accordance with the ODIP strategy as a means to generate discussion. During these discussions, facilitators encourage cooperative analysis and interpretation, providing for unique observations, probing questions and problem-solving strategies.

Finally, 20 minutes are set aside for group reflection after the exercise. Honesty and openness are essential parts of the process and ODIP strategy, so creating an encouraging atmosphere is essential to successfully implementing the AoA program and creating lively, interactive discussions that mimic the type of debate common in clinical medical practice. Uniquely, the students at OSUCOM are part of a four-year longitudinal learning community in groups of 12, with a clinical faculty member as the facilitator to provide a safe place for discussion of the challenges and experience of medical education. Therefore, students already have an acquaintance with one another that facilitates open discussion and reduces the effort needed to establish a safe environment for the exchange of ideas.

## Discussion

CMA facilitators encourage a safe environment for students to observe a wide variety of visual arts, including portraiture, landscapes, sculpture, narrative-based and non-representational works of art. A wide range of artistic subject matter is consciously chosen, so that the experience is not directly connected to the students' medical curriculum. During the initial group conversation using the ODIP strategy (see Table 1), students are asked to make observations, describe the work in greater detail, and then interpret and analyze their observations and practice defending their interpretations to the group. The individual must make a strong case for his or her interpretation using visual data and prior knowledge; the word "prove" correlates to the idea that one must be able to communicate clearly and ably why he or she is thinking or feeling a particular way. This discussion emphasizes social learning, as students ask clarifying questions and lend their own ideas. A photograph by Finnish artist, Harri Kallio, is often used for this exercise. Kallio creates digitally altered photographs of life-size models of dodo birds, creating realistic portraits of the extinct birds in their natural habitat. When students view this photograph, they are often puzzled; something feels "not quite right." As they describe and interpret this work of art, they begin to tease out what details make them feel this way, and they suggest what might be happening in the work of art. Only after students are deep into conversation does the facilitator interject, providing some details regarding the artist's technique, medium, subject matter or intention. The conversation concludes after many suggestions, questions, and interpretations, but it does not identify one primary "meaning" regarding the work of art.

The ODIP strategy has been evaluated in the past, as part of a two-year study conducted by the Institute for Learning Innovation (ILI) to evaluate the impact of a CMA program, ARTful Reading, on fifthgrade students' critical thinking skills. ARTful Reading is a multi-faceted program that includes a docent pre-visit to the classroom to introduce students to the ODIP strategy; a docent-led tour at the Columbus Museum of Art where ODIP is used to examine works of art; and a studio experience at a nearby high school. All Columbus City Schools' fifth graders (approximately 5,000 students) take part in the program, which is designed to exercise their critical thinking skills. The centerpiece of the ARTful Reading program is ODIP; it is utilized in all three parts of the program. The impact of the program and its focus on the ODIP strategy was assessed in both years of the study. Year One of the study showed that the program allowed for critical thinking to happen; Year Two, in a pre- and post- study, demonstrated that students significantly increased their number of observations about a work of art after going through the program (Luke, Yocco, 2010). While these findings do not necessarily apply to the Art of Analysis program, it is likely that the strategy does improve observational skills in the OSUCOM students.

By following the ODIP steps with expert guidance from museum education staff the learning community members engage in a group process of sharing observations, likes, dislikes and rationales for various opinions. There are no right or wrong answers, only personal observations and interpretations providing opportunities for growth and improvement in the skills of observing and reporting observations. The ODIP strategy

encourages the cooperative method of critical thinking inherent to medical practice. Fellow team members are included in the interpretation and proof portions of the discussion, allowing the team to make new observations and interpretations, inspiring more creative thinking and successful solutions to questions posed during the exercise.

During the two-hour exercise, students are given free access to a large portion of CMA's permanent collection and are asked to address one of several questions (see Table 2) using the ODIP strategy and are given time to observe the displayed artwork, select a single work that helps answer their question, make observations, and plan a brief oral presentation.

**Table 2**
**Sample questions posed to students, Art of Analysis program**

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| **1. What does compassion / empathy look like? Find the best illustration of compassion you can find in the galleries and argue why this artwork depicts it.** |
| **2. What does cruelty look like? Find the best illustration of cruelty you can find in the galleries and argue why this artwork depicts it.** |
| **3. What does (the act of) being humane look like? Find the best example of humane behavior in a work of art and argue why this artwork depicts it.** |
| **4. What does selfishness look like? Find the best illustration of selfishness you can in the galleries and argue why this artwork depicts this.** |
| **5. What does being a good teacher look like? Find the best illustration of this in the galleries and argue why this artwork depicts it.** |
| **6. Find a work of art that does / does not immediately appeal to you. Document why this is so. Using the "ODIP" strategy, make an interpretation of the work of art using visual evidence.** |
| **7. Choose any two works of art that you are surprised to see installed next to each other, and make an argument for why they are side by side.** |

Participants are not limited to representational pieces or portraiture, but are encouraged to use their observational skills to address the questions posed as a part of the critical thinking exercise. Works selected by students represent all areas of the CMA permanent collection, from photography, to contemporary sculpture, to 20th century American Scene paintings, to 17th century European stilllife.CMA galleries are organized thematically into categories like "Traditions" or "The Changing Landscape," in favor of works being organized by subject area, nationality, or style. As a result, participants encounter many different works of art, as they are given time to look through nearly half of the CMA's currently installed permanent collection. The question, "What does a good teacher look like?" has been answered using a representational portrait by American painter George Bellows of his mother: the participant made the case that Bellows painted her with empathy, and she looks kind and wise. The same question was addressed by another participant in the same group using a non-representational fabric "painting" by Lucas Samaras that features strips of colorful polyester and other fabrics running at different angles all over the surface of the canvas. Students all learn in different ways and have different interests like the strips of fabric, and a good teacher needs to honor and encourage these paths, but also keep the group together and moving toward a common goal, like the canvas gathers them together.

Students present their findings, and their fellow students interject, lending their own analysis and opinions regarding the presenter's analysis. This format teaches students to support their theories and form proofs for their ideas. The directive to, "Find a work of art that does not immediately appeal to you," almost always triggers an instinctual response and judgment, but through group discussion, the students who receive this initial directive often become more aware of their own biases and learn to view the work from different perspectives. In addition, the discussion format is naturally

more open and engaging, because the students all belong to the same medical school learning community and are thus already familiar with each other. Learning communities are groups formed in pre-clinical medical student education, which include a faculty facilitator and medical students with the goal of providing an opportunity for reflection of the process of becoming a physician and the rigors of medical education. Students can express insecurities, complaints, struggles and concerns in a safe environment without fear of alienation or reprisal. These groups meet starting in the first months of their medical education, so that by the time second-year medical students engage the AoA program, the bonds of shared experience and openness have already been established. As a result, students quickly engage one another in lively discussions related to their questions, forming unique solutions and increasing their problem-solving as well as team-building skills. Often, a follow-up question is posed to the presenter, asking if his or her own opinion has changed based on the theories presented by program participants.

The ODIP process applied to the visual arts mirrors medical education. Medical students are asked to observe their patients during the medical interview by paying close attention to the visual cues and nonverbal communication during the patient encounter. For instance, a stoic patient suffering from appendicitis may report little pain, but wince during a physical exam of the abdomen, or an abused spouse may cower from a domineering, abusive partner who dominates the conversation and insists on speaking for the injured person. Medical students are asked to accurately describe the patient's answers to relevant questions and do a thorough physical examination, further describing their findings to attending physicians and the healthcare team. Students then interpret these findings along with results of tests and studies formulating a differential diagnosis, a list of likely and less likely causes of the patient's ailment. Finally these students prove their theories, justifying their differential by relating facts in the case as a participant in medical rounds, a time when the multi-disciplinary healthcare team meets to discuss a patient's progress and formulate a plan for the patient's continued care. Similar to the process of "grand rounds," group discussion aims at challenging participants' presuppositions and observations regarding the pieces of art.

Medical rounds involve teams of physicians presenting, discussing and planning for the care of patients in their collective care. Medical students and residents "pre-round," talking with, and examining, patients, reviewing lab and study results and then presenting these findings to the team later in the day. The junior members of the team suggest ideas and thoughts regarding these patients and the next phases of their care. Senior team members and attending physicians act as mentors and facilitators to direct discussions and formulate care plans. These processes are analogous to the ODIP process. The discussion of observations and interjection of dissenting opinions help to consider multiple etiologies of symptoms, similar to the formulation of a differential diagnosis, a list of all possible causes of a patient's symptoms. Theories are then formulated based on physical exam findings, as well as lab and test results. A diagnosis is identified and tested, and therapy is recommended based on this process. Antibiotics, surgery, or chemotherapy is prescribed to address the diagnosed conditions. For example, consider the youth with a cut to the knuckles of his hand. Although the patient may claim he cut his hand jumping over a fence, the seasoned physician will know to ask if the youth has been involved in a fight, because, for example, if sustained in an assault by a bite, the

wound may become seriously infected. Intravenous antibiotics are prescribed and surgery is often needed, but this diagnosis may be missed by junior practitioners had it not been challenged. The straightforward presentation by a young healthy male with a cut to his hand can hide a much more insidious symptom. Also, many physicians remember the experience of being called to the emergency department to care for a patient with pancreatitis, the inflammation of an organ of the abdomen. Assumption that the diagnosis of another practitioner is correct without the evidence of findings and results to support such a diagnosis can lead to missing the evolution of appendicitis or a cancer.

The environment the AoA program seeks to reinforce the critical thinking skills crucial to the process of medical diagnosis in the hospital setting. The shared ODIP strategy helps students sharpen their observational skills and their skills in communicating their findings and opinions based on those findings. Students participating in this dynamic discussion and problem solving approach learn to tolerate ambiguity and respect the opinions and skills of other team members, much in the same way they will learn to respect their co-workers in the healthcare setting. Students also learn that the collection and sharing of ideas often expands and inspires one's own viewpoint, and this clearly correlates to the medical process of medical rounds and formulating a differential diagnosis. The program is designed to produce future physicians who will be receptive and respectful of their future patients' insights, while developing a unique and innovative approach to medical problem solving.

## Conclusion

Senior CMA education staff led the Art of Analysis program with assistance from trained docents. Recently CMA has undergone a major renovation and opened an 18,000-square-foot Center for Creativity, part of an effort to transform the museum to function as a force in the community to encourage and foster creativity. This innovative concept aids in the process of creating and sustaining the Art of Analysis program. Students begin the program in the Center for Creativity, and the philosophical underpinnings of the program are grounded in the belief that creativity does not belong exclusively to the arts, but is present in all disciplines, especially medicine. The arts foster many of the same skills required of physicians, including risk-taking, problem-solving, careful and attentive looking, interpretation and analysis, developing empathy for others, and seeing an issue from multiple perspectives. Clinical observations are key to the practice of medicine and by observing artwork and practicing critical thinking skills in the setting of CMA, we aim to improve the quality of physicians produced at The Ohio State University College of Medicine.

By employing the ODIP process, the Art of Analysis program uniquely develops team cohesion, empathy, cognitive abilities and tolerance for ambiguity. Students address questions, present their observations and analysis in a supportive group setting and then defend the nature of their interpretations. Trained art educators and docents at the Columbus Museum of Art lead the groups in this process by teaching the ODIP strategy to the medical student participants with their facilitators. Students are encouraged to make correlations between the critical thinking processes they participate in as a part of this program and their experience in medical education.

Future plans are to collect and report outcomes data. A research proposal is being submitted to the Ohio State University Institutional Review Board to conduct follow-up studies. Current plans are to continue providing this experience to second-year medical students in their learning communities and consider adding exposure to the AoA program to students in the throes of their clinical training, reinforcing the critical thinking skills and encouraging empathy in a longitudinal manner throughout the medical students' education.

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