

## WEB PAPER

# Utilizing visual art to enhance the clinical observation skills of medical students

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## Abstract

**Background:** Clinical observation is fundamental in practicing medicine, but these skills are rarely taught. Currently no evidence-based exercises/courses exist for medical student training in observation skills.

**Aim:** The goal was to develop and teach a visual arts-based exercise for medical students, and to evaluate its usefulness in enhancing observation skills in clinical diagnosis.

**Methods:** A pre- and posttest and evaluation survey were developed for a three-hour exercise presented to medical students just before starting clerkships. Students were provided with questions to guide discussion of both representational and non-representational works of art.

**Results:** Quantitative analysis revealed that the mean number of observations between pre- and posttests was not significantly different ( $n=70$ : 8.63 vs. 9.13,  $p=0.22$ ). Qualitative analysis of written responses identified four themes: (1) use of subjective terminology, (2) scope of interpretations, (3) speculative thinking, and (4) use of visual analogies. Evaluative comments indicated that students felt the exercise enhanced both mindfulness and skills.

**Conclusion:** Using visual art images with guided questions can train medical students in observation skills. This exercise can be replicated without specially trained personnel or art museum partnerships.

## Introduction

Skills associated with inspection and clinical observation are fundamental in practicing good medicine as they are inextricably linked to arriving at accurate diagnoses (Naghshineh et al. 2008). Although observation plays an important role in the practice of medicine, the deliberate teaching of this essential skill has only recently been formally addressed in medical education (Bardes et al. 2001; Dolev et al. 2001; Bleakley et al. 2003; Naghshineh et al. 2008). Bardes et al. (2001) wrote: “Courses in physical diagnosis teach the students to recognize normal and abnormal findings...but do not emphasize the actual skill of careful looking in itself. Looking is often assumed.” Recognition of this lack of deliberate focus by medical educators has prompted some medical schools to include courses designed to provide observation skill training to their students (Dolev et al. 2001; Rodenhauer et al. 2004; Elder et al. 2006; Naghshineh et al. 2008). The premise of these courses is that this important skill can be taught (Bardes et al. 2001; Reilly et al. 2005; Boudreau et al. 2008; Naghshineh et al. 2008). There is great variability among these courses, and currently there are no evidence-based activities for training medical students in clinical observation.

Visual Thinking Strategies (VTS) (Housen 2002), a method to focus visual observations to enhance critical thinking and language skills, utilizes three questions to focus observations: “What do you see?”, “What makes you say that?”, and “What else do you see?” VTS questions have been used to provide

## Practice points

- Facilitated group discussion of visual art, with guided questions related to *Observation, Interpretation, and Reflection*, along with *Communication*, is effective in enhancing clinical observation skills of medical students.
- Visual arts training led to a decrease in subjective descriptions, and an increase in scope of interpretations, use of beneficial speculative thinking, and visual analogies in describing clinical observations.
- A visual arts-based observation training program for medical students can be developed and implemented without formal museum partnerships or specially trained personnel.

observation training to medical residents (Reilly et al. 2005). Boudreau et al. (2008) described observation as supportive of but distinct from inference, goal oriented, made concrete through description, and occurring on different levels. The purpose of this project was to build on previous work, to develop an exercise to provide more structure for learning-enhancing observation skills, and to evaluate the use of the method in teaching medical students.

## Methods

Third year medical students (110) participated in a three-hour long exercise during a required week long course.

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**Table 1.** Four-step method for training clinical observation skills.

| Observation step   | Goals                                      | Facilitator questions  | Student tasks                        |
|--------------------|--|--|--------------------------------------|
| Observation (O)    | Identify objective visual findings         | <i>What do you see?</i><br><i>What makes you say that?</i><br><i>What else do you see?</i> | Record observations without judgment |
| Interpretation (I) | Draw conclusions about the work's meaning  | What do you think this means?<br>What is your visual differential?                         | Generate multiple interpretations    |
| Reflection (R)     | Evaluate conclusions and question validity | Does this make sense to you?<br>How can your beliefs bias your observations?               | Consider personal beliefs and bias   |
| Communication (C)  | Share ideas                                | Can someone create a mental image of your description?                                     | Contribute to group discussion       |

Note: Questions in bold italics designate the three question prompts used in Visual Thinking Strategies (VTS).

Introduction to the Clerkship Experience (ICE), just prior to the start of clerkships. The three-hour exercise included a large group discussion about eight fine art images that was facilitated by the student researcher. Students were guided through a process using the VTS questions along with additional questions added to delineate four steps, Observation (Identify objective visual findings): “What do you see?”, “What makes you say that?”, and “What else do you see?”; Interpretation (Draw conclusions about the work’s meaning): “What do you think this means?” and “What is your visual differential?”; and Reflection (Evaluate conclusions and question validity): “Does this make sense to you?” and “How can your beliefs bias your observations?” Communication (Sharing ideas) was encouraged throughout the process; students were asked to share thoughts at every point in the exercise (Table 1).

It has been suggested that programs using visual arts to improve observation skills of medical students must consider both the manner of instruction and the types of images used for such instruction (Dolev et al. 2001; Reilly et al. 2005; Shapiro et al. 2006; Naghshineh et al. 2008). For this exercise, both representational and non-representational art were selected to stimulate discussion and engage students. Representational art allowed students to focus on identifying recognizable forms and contextual information (Dolev et al. 2001; Shapiro et al. 2006; Boudreau et al. 2008), while non-representational art allowed for pattern identification (Shapiro et al. 2006) and highlighted the possibility of uncertainty in observation. Evaluation consisted of a pre- and posttest. For the pre- and posttests, students examined two patient photographs with visible medical conditions and were asked to list unique observations regarding the first photograph, and to write a free text description about the second photograph. Students also completed a survey to evaluate the value of the exercise, and to indicate their previous experience with training in the visual arts. A paired *t*-test calculated using SPSS was used to determine statistically significant differences between the pre- and posttest means. Free text descriptions and evaluation survey responses were analyzed qualitatively to identify recurrent themes (Babbie 2001). All data were de-identified and collated according to randomly assigned unique identification numbers. This study was approved as exempt by the University of Medicine and Dentistry of New Jersey institutional review board.

## Results

Approximately 25% of the students reported some previous visual arts training: 61% of these students reported taking an art course in college, while 30% took a course in high school. The mean number of observations between pre- and posttests was not significantly different ( $n=70$ : 8.63 vs. 9.13,  $p=0.22$ ). Qualitative analysis of free text descriptions revealed four main themes: (1) use of subjective terminology, (2) scope of interpretations, (3) speculative thinking, and (4) use of visual analogies.

### Use of subjective terminology

On the pretest, students utilized subjective terminology such as “normal,” and “healthy” in their descriptions of patient photographs. Use of such terminology assumes that others will comprehend the description without an established definition. On the posttest following the visual arts-based exercise, students provided more concrete descriptions of what they observed; the use of subjective terminology decreased in frequency by 65%.

#### Example 1

**Pretest:** His right arm and leg are positioned normally...

**Posttest:** Her right arm and leg are straight and lay flat. Her left arm is flexed at the shoulder and elbow with the hand clenched in a fist with the thumbs extended away from the fingers. The left leg is flexed at the hip and knee.

#### Example 2

**Pretest:** His face appears normal...

**Posttest:** She appears to be wearing a white nightgown that has been pulled up to allow her to pose in a rather dance-like position. She has raised both her left arm and left leg in the air. Yet both are bent in a rather purposeful position... She does not appear happy or at peace, but instead rather focused and possibly uninterested or tense.

### Scope of interpretations

On the pretest, many students placed greater emphasis on what they saw as the medical condition. This emphasis on the

apparent medical condition resulted in a more limited range of interpretations. Posttest responses revealed a broader scope of interpretations involving the patient's surroundings, the patient's perspective, or emotional state, resulting in a more comprehensive description of the image. There was a 40% increase in scope of interpretations on photograph descriptions after students participated in the visual arts-based exercise.

#### Example 1

**Pretest:** Left sided weakness...muscle atrophy in left extremities

**Posttest:** Young female lying down, left extremities are uplifted, person is glancing at something in her hand, right extremities appear to be weak... person in hospital gown, opening in bed that facilitated movement, bland/plain background-possible in hospital or a care facility

#### Example 2

**Pretest:** Middle aged male appears in fairly good shape with well-defined muscles standing on his right leg... He has a bent left leg with his toes on the floor and his heel off the floor. His left knee is turned in towards his midline and located just in front of his right thigh. His left hip appears mal-rotated and displaced posteriorly. . .

**Posttest:** There is a white female patient lying in a bed. Her right side of her body appears to be relaxed but her left extremities seem fixed in a bent position and are hovering above the bed. Her left leg is bent at the hip-knee and the ankle seems fixed. Her right arm is bent at the shoulder and suspending her extremities in the air. Despite her right arm and leg she appears relaxed... She is wearing a gown and may be in a hospital. The bed is strangely shaped and it appears to have sides that are elevated near the head and foot with a dip in the middle, maybe for getting in and out. There is some type of curtain in the background.

#### Speculative thinking

As in previous studies (Naghshineh et al. 2008), speculative thinking was identified in student descriptions by the use of words such as "suggests," "might," and "seems." These words were used to communicate the possibility of multiple interpretations for observations, and thus the likelihood of constructing a more in-depth visual differential. There was a 62% increase in the use of speculative thinking on photograph descriptions following participation in the visual arts-based exercise.

#### Example 1

**Pretest:** A naked, Caucasian male, standing with some neurological disorder, with the left upper and

lower extremity in slightly flexed poses... a little atrophy of the musculature on that side.

**Posttest:** There is a young woman lying supine in a bed. Her left arm and leg are flexed at the most proximal joints and the 2nd most proximal joint. This might convey a neurological condition such as infarction or other injury to the spinal cord or higher, resulting in upper motor neuron manifestations. From our vantage, her face seems almost expressionless, like she is frozen. Also the room does not look like a clean white hospital room of modern times, but perhaps a ward for chronic cases of some sort. Of course, the patient might be mobile and simply demonstrating some motion, unsolicited or as directed by a physician.

#### Example 2

**Pretest:** Thin man with beard and mustache... his leg is angled inward

**Posttest:** Female in a sparse room, bed doesn't look like a modern hospital but the room suggests an institution as there are no personal affects...

#### Use of visual analogy

Visual analogy in this study refers to relating an observation to a recognizable image. Some examples are "left arm is bent as if in a cast"; "left arm is held taut against his abdomen as though it were in a sling"; "left arm is lifted above the head in a ballet-type posing position"; "appears to be... in a rather dance-like position." There was an 80% increase in the use of visual analogies by students following participation in the visual arts-based exercise.

Qualitative analysis of the evaluation survey responses regarding the value of the exercise indicated that students felt they increased their mindfulness and skills regarding clinical observations.

**Mindfulness.** Mindfulness in learning refers to a state of mind that is open to new information, actively engaged in the present, aware of multiple perspectives, and recognizes the impact of the context on perception (Langer & Moldoveanu 2000). A substantial proportion of students in this study referred to the idea of mindfulness. For example: "[This exercise] will help my awareness when observing patients on various levels"; "It will make me more aware of what I'm observing and why I interpret what I see in certain ways"; "I think I'll be more cognizant of the patient as a whole and sum of parts." Many students linked mindfulness to noticing visual details. For example one student stated, "It will help me look more for smaller details about patients that I would not have otherwise noticed." Students also specified that their behavior will be altered: "It helped to remind me to slow down and take time to make observations."

**Skills enhancement.** Students indicated that the intervention would help enhance their clinical performance with respect to making and describing observations. One student commented,

“It might help me clarify some of the wording I use to describe the observations I make in clinic,” and another student stated, “I may be more observant and better able to describe my patients.” Some students indicated that the intervention would help enhance their skills by becoming more patient-centered in providing healthcare. For example, “It will help me to appreciate the . . . body language of patients to better inform my observations and to better understand my patient’s concerns, feelings, and emotions,” while another indicated that the intervention will help “to see things that are both medical and personal about the patient.”

A smaller number of students indicated uncertainty as to how the intervention would impact their clinical observation skills or believed the exercise may have some future impact. For example: “I am not quite sure what I learned. . . . Perhaps it will be useful once we get to the floors.”

## Discussion

The need for training medical students in observation skills is well documented and the results of this study encourage the belief that these skills can be trained with a brief intervention using visual art. VTS questions formed a basis for unbiased observation, and the additional questions to guide *Observation*, *Interpretation*, and *Reflection*, along with hearing responses in the group setting (*Communication*), likely enabled students to organize their thoughts and reflect at a deeper level. The questions – *What do you think this means? What is your visual differential? Does this make sense to you? How can your beliefs bias your observations?* – led to enriched observations that should be of benefit to medical students in real clinical encounters. Observation is not just intuitive; posing questions makes the process of observation more tangible. Identifying and practicing each distinctive component of the observation process (*Observation*, *Interpretation*, *Reflection*, and *Communication*) seemed to heighten participant’s focus and reflection leading to changes in the depth and breadth of the visual analysis. A decrease in usage of subjective terminology and emergence of visual analogies in posttest responses suggests that our observational method initiated an awareness of communicating visual information more effectively to others. Interestingly, these behaviors were not explicitly mentioned to participants during the visual art discussion sessions. Reflection and change, defined as “mindfulness,” is likely a necessary component in the design of successful observation skills training exercises, and will be associated with better learning outcomes (Langer & Moldoveanu 2000). Awareness of observation as a process leads to more focus on becoming a better observer. Examining mindfulness and the modification of behaviors in clinical observations may be useful in assessing the quality and the growth of observation skills in medical students. The process of clinical observation appears to be highly complex and composed of multiple levels (Berger 1980; Boudreau et al. 2008); focusing on all these levels seems to be associated with better clinical care (Berger 1980). Our study results demonstrated an increase in speculative thinking and a broadening of the scope of interpretations, suggesting that these changes could lead to future improvements in clinical performance. It is

recommended that future training addresses differences between *clinical observation* and the *interpretation/inference* of visual findings for medical student trainees.

This exercise can be implemented fairly easily. Unlike other programs, it does not require the use of trained staff or a museum partnership (Bardes et al. 2001; Dolev et al. 2001; Reilly et al. 2005; Elder et al. 2006; Kirklin et al. 2007; Naghshineh et al. 2008; Pretorius et al. 2009). This exercise was designed and led by a fourth year medical student with interest in the visual arts, conducted with a large group for two 90-minute sessions.

A number of factors may have limited this study. Because some students expressed negative feelings about participating in this student-led exercise during their third year orientation course, level of engagement in the exercise may have been affected. And because the exercise was presented to the entire third year class, there was no opportunity to measure findings against a matched control group. The number and quality of observations may have been related to the selection and sequencing of images for the pre- and posttests. In addition, changes in observation skills were assessed immediately after the intervention, so the long-term impact of the exercise is not known. It will be important to assess the usefulness of visual arts to train clinical observation skills in medical students longitudinally, beginning with first and second year students, and continuing at least through clerkship training.

## Conclusion

Using visual art images with guided questions appears useful to train medical students in clinical observation skills. Questions from the VTS methodology, along with additional prompts to focus on Observation, Interpretation, Reflection, and group discussion (Communication), provides a specific framework for designing an exercise, which can be replicated without specially trained personnel or art museum partnerships. This exercise can be easily replicated for training medical students in observation, an essential clinical skill.

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