Art Rounds: Teaching Interprofessional Students Visual Thinking Strategies at One School

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Abstract

Purpose
The Art Rounds program uses visual thinking strategies (VTS) to teach visual observation skills to medical and nursing students at the University of Texas Health Science Center San Antonio. This study's goal was to evaluate whether students' exposure to VTS would improve their physical observation skills, increase tolerance for ambiguity, and increase interest in learning communication skills.

Method
In January 2010, 32 students attended three, 90-minute sessions at which they observed and commented on three pieces of art in small groups led by museum educators. Pre and posttest evaluations included Geller and colleagues' version of Budner's Tolerance of Ambiguity Scale, the Communication Skills Attitudes Scale, and free responses to art and patient images. Statistical analyses compared pre and post time looking at images, number of words used to describe images, and number of observations made according to gender and discipline.

Results
Students significantly increased the amount of time they spent looking at art and patient images ($P = .007$), the number of words they used to describe art ($P = .002$) and patient images ($P = .019$), and the number of observations made of art ($P = .000$) and patient images ($P = .001$). Females increased the time spent observing significantly more than did males ($P = .011$). Students significantly increased their tolerance for ambiguity ($P = .033$) and positive views toward health care professional communication skills ($P = .001$).

Conclusions
The authors speculate that these improved skills may help in patient care and interprofessional team interactions.

The 2010 Carnegie Foundation report, "Educating Physicians: A Call for Reform of Medical School and Residency,"[1] discusses the importance of humanities and social science education in the formation of the physician. Among the report's recommendations are innovative programs that use art museums as teaching laboratories. The 2009 Harvard Libraries conference, "Art Museums and Medical Education," included poster presentations by 10 medical schools, one nursing school, and their collaborating art institutions. Results from these innovative educational programs demonstrate that they improve participants' capacity to make accurate observations of both art and physical findings. Several of these programs have used techniques to improve "visual literacy." For instance, a program at Yale University School of Medicine focused on students' observations, not their interpretations.[2] Students were assigned to one of three groups: control group, large-group anatomical images lecture attendees, and small groups who looked at a piece of art for 10 minutes and then described it to four other students. Each group had a single meeting. This study used pre- and posttests using pictures of patients with illness that were scored based on noticing a dermatologic diagnostic feature. Whereas the first two groups showed no change in pre and post observations, the art group showed significant change. We hypothesize that art is a good teaching tool because students do not have a bias as to what details are more important, which they may have in looking at patients. However, the study did not test this hypothesis.

In a preclinical course for Harvard Medical students called Training the Eye: Improving the Art of Physical Diagnosis, art educators facilitated observational exercises using visual thinking strategies (VTS) combined with lectures that linked visual art concepts with physical diagnosis.[3] After the eight-week, 20-hour course, students demonstrated increased accuracy at making observations. A one-hour pre- and posttest gave students eight minutes to observe and interpret three images of patients and two of art. One of the limitations of the study is that the combined effect of training in VTS and didactics was studied. Therefore, the researchers were unable to differentiate the contributions of each.

VTS is a method developed by Abigail Housen, a cognitive psychologist, and Philip Yenawine, an art educator. Originally, this method was created as a tool to foster aesthetic development and to assist empathic understanding of others' experience of the visual world through visual art. According to

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Housen,[4] VTS uses art to assist students in developing critical thinking, communication and observation skills, and participation in group thought processes. The VTS method has successfully been used in K–12 education programs across the United States at various museums and schools.[5] The process has even been used to train police detectives in improving their visual skills so that they can increase their observations at crime scenes.[6] In the medical school setting, Reilly et al[7] have documented using VTS in an end-of-life session for medical students and housestaff. They found that VTS helped build several skills including forming a cohesive team idea about art (or a patient), team building, listening, and analytical thinking. However, that analysis is based on their observations of student comments and not on a rigorous examination of the gained skill set.

Other projects have suggested that training in VTS can lead to an increased tolerance for ambiguity or uncertainty,[8] a cognitive variable increasingly important for physicians. Medicine is filled with practice variations from defining whether a set of symptoms is a particular disease, to which test should be ordered, to selecting a treatment, to differing physiological and psychological reactions in patients. As physician–philosopher David Eddy states, "Uncertainty creeps into medical practice through every pore."[9]

Although there is anecdotal evidence that VTS piques interest in communication skills,[7] no strong evidence has been reported to date for health care professions students or for interprofessional groups. At one Swedish nursing school, art gallery training was affiliated with improved interpersonal relations between nursing students.[10] Fagin[11] explains that collaborative relationships between the health professions are essential and that methods are needed to remove barriers.

Therefore, we developed this study to examine a 4.5-hour, voluntary, interprofessional experience offered to first-, second-, and third-year medical students and both graduate and undergraduate nursing students. Our hypothesis was that this experience would improve participants' physical observation skills, increase their tolerance for ambiguity, and increase their interest in learning communication skills.

Method

In late 2009, we recruited students for this educational program via an e-mail flyer sent to all 765 nursing and 901 medical students at the University of Texas Health Science Center. In their prior study, Naghshineh and colleagues[3] established a difference in their intervention group versus control group, but we did not want to deny participation to any students who wished to be involved by relegating them to a control group. Thus, we chose not to use a control group. Students in our study received a one-year membership to the McNay Art Museum for participating in the program. Because this was an enhancement program, students did not receive academic credit.

We held three, 90-minute sessions at the McNay Art Museum in San Antonio, Texas, in January 2010. The students were randomly assigned by discipline to one of three groups (two groups of 11 and one group of 10) to ensure proportional disciplinary representation. Each group was led by one of three museum educators who were trained in VTS and applied this technique during their rounds. VTS was chosen because of its documented success in many learning environments, including the Harvard study's experience.[3] Also, one museum educator had been trained by the cofounders of the method and had used VTS very successfully with other groups. The VTS method asks three questions of students for each piece of art: What do you see? What do you see that makes you think that? What more do you see?[5,7] VTS also uses a process of reflective listening. A student will make a comment, and the educator repeats back the observation. For example, the educator will say, "So what John sees is …" and then rephrase his statement while showing those elements in the art. The group is then invited to make further observations, to disagree, or to build on what was just said. In this way, communication skills are emphasized along with observation skills. The process encourages the group to think together and to build on each other's ideas.

Each group visited the same three works of art per week in rotation. Each rotation was 25 minutes, except in week 3 when it was 20 minutes. The objective for the first week was for students to look at and describe what they saw without interpreting meaning. All works of art were presented anonymously, with tags referring to artist, title, date, or other information hidden. During this time, students spoke out loud to their entire assigned group. The works viewed were Emile Bourdelle's *Beethoven: A Tragic Mask* (1901), Jacob Epstein's *Helen* (1919), and Ignacio de Zuloaga's *Basque Peasants and a Dwarf* (1910). In week 2, students carefully described and interpreted what they saw. For one of the three rotations, students wrote a short description of what they viewed and then shared it with the group. The works for this rotation were Marc Chagall's *Dream Village* (1929), Jan Gossaert's *Portrait of Anna de Bergh, Marquise de Veere* (1530), and Auguste Rodin's *Burghers of Calais* (1890s). In the third week, participants looked at less representational works to describe what they saw, focusing on interpreting the emotional quality in works; in one rotation, they were given a single fact about the piece or artist. Works viewed in this week were Ernest Ludwig Kirchner's *Portrait of Hans Frisch* (1907), Seymour Lipton's *Swing Low* (1942), and Max Weber's *Conversation* (1919). After each session, we gave students docent educational handouts about each work they viewed.

To evaluate the effect of the Art Rounds program, students completed a pre- and postintervention test on their own time via SurveyMonkey. For both the pre- and posttest, students took two standardized tests, Geller and colleagues' variation of Budner's Tolerance of Ambiguity Scale[12,13] and the Communication Skills Attitudes Scale (CSAS).[14] Budner's scale* measures a person's perception of an ambiguous scenario as threatening.[15] The CSAS† distinguishes between positive and negative attitudes, student feelings about the method of teaching, the importance one places on healthcare

*Rees et al[14] have reported internal consistency of alpha = 0.873 and an interclass correlation of 0.646 ($P < .001$) on subscale 1 as well as consistency of alpha = 0.805 and an intraclass correlation of 0.771 ($P < .001$) on subscale 2.

†Sobal and DeForge[15] found that the Pearson correlation between two administrations of the CSAS scale is 0.64. At first test, internal reliability was 0.64 and at second test 0.63.

providers having communication skills, and whether such skills will assist a student in her or his future communications with peers and patients.[16–19]

In addition, for both pre- and posttest, students gave free-response answers to the question "What do you see?" for three images of works of art and three images of patients. Patient images were headshots taken in a dermatology clinic of patients who had visible signs of their disease, including examples of lupus, rosacea, alopecia, and thyroid goiter. Students were randomly assigned to receive one of two versions as the pretest and the other version as the posttest. The pretest was given two weeks before the initial meeting, and the posttest was completed one week after the end of the program. Scores were calculated for the standardized tests. For the free-response answers, word count in MS Word 2007 tallied the raw number of words. Number of observations was counted by one individual and verified by a second (C.K.). An observation was defined as a single factual declaration about an image. We did not conduct a content analysis of responses because the program curriculum did not focus on the content or quality of observations but, rather, on making them, that is, seeing more.

Using PASW 14.0 statistical software, we analyzed the pre- and posttests with paired *t* tests and 95% confidence intervals. Significance was defined as $P = .05$, and results were rounded to three decimal places. We compared the results of the standardized tests to discipline and sex using Fisher exact test of means through a contingency table.

Results

Thirty-two students participated in the class (yield rate of 1.92%): 23 females and 9 males. Eighteen students were from the medical school (8 first-year students, 8 second-year, and 2 third-year) and 14 from the nursing school (5 undergraduates, 9 graduates). Seventeen students had never been to an art museum before; 3 held undergraduate degrees in art.

In both ambiguity and CSAS testing, students demonstrated no differences in pre- and posttesting based on either sex or discipline. And in number of words and number of observations, we found no significant differences between medicine and nursing. However, female students made significantly greater gains in time spent observing ($P = .011$), number of words used in describing art ($P = .007$), and number of words used in describing patient images ($P = .000$) on the posttest than did the men (see Table 1). The male time average went from 51.2 minutes to 52.9, whereas the female average went from 25.4 minutes to 59.0. Overall, male student number of words average (art and patient combined) went from 139.6 to 192.9, whereas female number of words average went from 105.8 to 212.3.

Table 1

Fisher Exact Test by Discipline and Sex of 32 Students, From a Study of the Influence of Observing Art on Visual Thinking Strategies, University of Texas Health Science Center San Antonio, Texas, 2010*

	P value	
Measure	**Sex**	**Discipline**
Time	0.011	0.5350
Number of art observations	0.821	0.820
Number of patient observations	0.181	0.652
Number of words: art	0.007	0.938
Number of words: patient	0.000	0.381
Ambiguity	>0.999	>0.999
Communications Skills Attitudes Scale	>0.999	>0.999

* Fisher exact test was computed using means of pre- and posttest scores with two-tailed method of summing small *P* values. The tests compared are Geller and colleagues' variation of Budner's Tolerance of Ambiguity Scale, the Communications Skills Attitudes Scale, and free-response scores (time spent on the tests and number of observations). Comparisons were made regarding discipline (medical and nursing) and sex (male and female).

As shown in Table 2, students had a significant increase in tolerance of ambiguity and an increased interest in communication. In the pretest, students spent a mean of 32.69 minutes on the free-response portion, whereas on the posttest they spent a mean of 57.25 minutes. This difference is statistically significant, with a *P* value of .007 (−41.959 to −7.166). For most of this additional time, students were engaged in responding to the six images. Students increased the raw number of words and the number of observations of the six images in the posttest (see Table 3).

When students gave free responses to the program evaluation asking "What did you learn," four themes emerged. Students listed *listening skills* (10 out of 32 students), *learning more about collaboration and group process* (10 students), *learning to appreciate multiple perspectives on the same image* (15 students), and *not to jump to conclusions* (10 students).

Discussion

Our findings show that a short course of three sessions can significantly increase students' visual observation skills. The increased acuity was more pronounced in looking at art than patient images, but the effect was seen in both. Students spent significantly more time looking at a patient image after Art Rounds than before, which enabled them to make more observations. Abraham Verghese[20] speaks about a turn away from the physical patient to the point where physicians often talk to patients while filling out forms on the computer. He says that health care providers treat results and not patients. Visual training may help medical students to focus more on looking at the patient. Although this study, as well as prior ones,[2,3] only used images of patients, we speculate that these skills will lead to improved physical observation.

The amount of time spent and number of words used are representative measures of observation. The instructions for both pre- and posttest were exactly the same on both the pre- and posttests; thus, the score difference cannot be attributed to changed directions. The question is, why did the students spend more time looking? The answer may be that during Art Rounds, students spent 25 minutes looking at a single image, whereas the average museum visitor only spends 27.2 seconds looking at each piece.[21] During the art sessions, they learned that the longer you look at an image, the more you see. In an average patient visit, doctors only spend 10.7 minutes in face-to-face interactions.[22] Thus, we hope that teaching students to spend more time observing should lead to longer and more productive patient interactions. Further studies to prove this are necessary.

Table 2

Change in Tolerance of Ambiguity Shown by 32 Students, From a Study of the Influence of Observing Art on Visual Thinking Strategies, University of Texas Health Science Center, San Antonio, Texas, 2010*

Test	Mean	95% CI	*P* value
Tolerance of Ambiguity†			
Pretest	49.91	0.167 to 3.708	.033
Posttest	47.91		
Communication Skill Attitudes Scale‡			
Pretest	104.75	−5.883 to −1.679	.001
Posttest	108.53		

* Paired *t* test was used to calculate the difference between pre and post scores in Budner's Tolerance of Ambiguity Scale and the Communications Skills Attitudes Scale after a three-week session of the Art Rounds program.
† Lower numbers mean greater tolerance. Scores can range from a high of 112 to a low of 16.
‡ Higher numbers mean a more positive attitude and increased interest in learning about communication. Scores can range from a low of 26 to a high of 130.

Female students had a statistically significant higher increase in time observing images. They also had a significant increase in number of words used in their description. If one assumes that increased time means increased words, then that result is logical. However, there was little difference of increase in number of observations made between men and women. This result suggests that the extra words and time did not lead to a significant increase in number of observations. Future studies should examine the content of such responses to determine what function the additional words serve.

It is important to note that number of words and time are not substitutes for the relevance of an observation to understanding, diagnosis, or art criticism. In this study, saying a patient in an image had a "red face" was given the same weight as saying "red shirt," even though the first has greater clinical significance. In the Harvard study, Naghshineh and colleagues[3] determined that students who underwent the art program increased their use of art criticism terms in describing images. To our knowledge, no study has yet examined whether these programs actually translate into better clinical skills.

Recall that the CSAS shows several aspects of communication including pedagogy, importance, and projection. The statistically significant increase in participants' CSAS scores suggests that students had more positive feelings about the active feedback and group processing of VTS. In addition, the scores indicate that afterward students placed more importance on health care providers having communication skills and that the students believed such skills would assist them in their future professional communications. For many, the Art Rounds experience was their first time working with someone from another health professions discipline. In written evaluations of the program, many students stated that observing art with others allowed them to see the images from other people's perspectives, an attribute which they suggested increases team communication.

Table 3

Change in Numbers of Free-Response Words and Observations by 32 Students, From a Study of the Influence of Observing Art on Visual Thinking Strategies, University of Texas Health Science Center, San Antonio, Texas, 2010*

Measurement	Pre- or posttest	Mean	95% CI	*P* value
Number of words				
Art	Pretest	122.27	−198.781 to −49.907	.002
	Posttest	247.31		
Images of patients	Pretest	107.69	−107.430 to −10.133	.019
	Posttest	166.47		
Number of observations				
Art	Pretest	13.66	−28.630 to −12.620	.000
	Posttest	34.28		
Images of patients	Pretest	14.91	−16.835 to −4.790	.001
	Posttest	25.72		

* Using a paired *t* test, the number of words used and number of observations made by students in pre- and posttest evaluations were calculated. The examined text came from students' written free responses to six images (three art images and three dermatologic patient images) when prompted by the question, "What do you see?" An observation was defined as a factual declaration about an image.

Grumbach and Bodenheimer[23] suggest that communication is one of the essential elements of a successful health care team. In 1995, Carpenter[24] studied interprofessional health education and learned that attitudes toward and understanding of the other profession improved. Communication may improve with any shared interprofessional group activity, Art Rounds being but one possibility. Our findings do not suggest whether it is the practice of looking at art, conversing with people from a different discipline, solving a problem together, and/or just spending time together that leads to this increase in attitude. Each of these avenues would be worth pursuing in separate trials.

In most cases, neither medical nor nursing students can claim expertise in art. Even the three art and art history students in this program performed no better than others in terms of numbers of observations made or time spent observing. Thus, art seems to provide an even playing field outside of usual health care hierarchies. Art is also ambiguous, rarely presenting right or wrong. Students were never told the rightness of their responses; they were simply encouraged to say more. Through art, students developed significantly increased comfort with ambiguity. This is important because medicine is about more than numbers and test results. Technology provides more predictive power but also more ambiguity because one does not always know what the test results mean. Geller and colleagues[13] have suggested that tolerance of ambiguity is associated with physicians being less

paternalistic and more open to patients' perspectives.

VTS has been used in family medicine residencies, medical schools, and nursing schools, though not interprofessionally. Interventions at Yale and White Memorial Medical Center used single sessions, and those researchers claim changes in participants' observation skills.[2,7] The White Memorial publication is anecdotal and is based on theory and a program evaluation. Yale did not use the VTS system. The Harvard program claimed a "dose response" after 20 hours of attendance and used a pre- and posttest that asked students to observe and interpret.[3] In contrast, for our study, a significant response was seen after 4.5 hours, and students were only asked to observe, not to interpret. As suggested by the experiences of the other two medical school programs and the fact that we noticed changes in speaking at the second session, effects of the "dose" may become evident with even shorter exposures. No program has looked at the long-term follow-up to these interventions. Also, all of the medical student programs used volunteers. No study has examined the effect on medical students required to attend a VTS or other art program.

Finally, the skills that students cited in their program evaluations (listening skills, learning about collaboration and group process, appreciation of multiple perspectives, and not to jump to conclusions), are essential in providing attentive, patient-centered care and working in a team.

As in any evaluation of an innovative teaching intervention, this study has several limitations. First, out of the 901 medical and 765 nursing students invited, only 32 participated. Such a yield is low, but one must consider that this program did not offer credit, was outside of normal class times, required travel to a distant site, took place on three separate occasions, was limited in size (a goal of 30 students), and cut into students' study time. Second, the changes we witnessed during the program could have occurred independently of the program as students matured and developed professionally. However, given that the changes were seen in two distinct groups of students (nursing and medicine) who do not interact in their studies at all outside of Art Rounds and that the program lasted only three weeks, the chances for significant changes outside of this program are unlikely. Third, given the self-selected nature of the participants, the results may not be generalizable to students who would not volunteer for such a program. In the future, a randomized trial would be called for to answer this question. Fourth, this evaluation focused on quantity of observations and not whether students increased their use of artistic terms, clinical findings, or ability to focus on details of clinical relevance. Fifth, the study took place at a single institution, although it does build on findings from similar programs at other institutions.

Future research should include multiple sites, employ a control group, and examine what types of observations increase rather than just quantity. A study that follows students from this course across their clinical placements to see if there is a continued effect that translates to the clinic would also be valuable.

Programs like Art Rounds seem to be highly effective in improving students' visual observation skills in the short term. Whether such a program would be effective in the long term, when treating actual patients, or when students are not volunteers, remains to be examined. The program is very cost-effective and creates stronger ties between the medical school and the community, which may help students feel an increased connection to the area and improve chances at retention for residency and practice. Although our research has focused on the value of the arts in teaching a clinical skill, it has also demonstrated effects on such values as communication, teamwork, and comfort with ambiguity. The humanities themselves are valuable for providing medical students with improved critical and analytical thinking skills, an ability to relate better to patients, and learning to take a moment for self-reflection and engagement.[25,26]

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