Fostering Wonder Through the Arts and Humanities: Using Visual Thinking Strategies in Medical Education

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Abstract

Philosophers and scientists alike argue that wonder—that emotion or state of consciousness in which one's attention is fixed on phenomena beyond one's comprehension—is the central virtue and driving force of all education. As in general education, wonder is central to all aspects of academic medicine's tripartite mission; a sense of wonder fuels the delivery of humanized patient care, sparks scientific discoveries, and supports engagement in lifelong learning. Despite its importance throughout medicine, developing a capacity for wonder among physicians has not been a stated goal of medical education, and innovative methods to foster a capacity for wonder have not been explored. There is a growing interest in the arts and humanities in medical education, and evidence suggests that these can support the development of a diverse array of clinically relevant skills and attitudes (including close observation, critical thinking, empathy, and tolerance for ambiguity) in medical learners across the learning continuum. However, even the potential of these methods to support a capacity for wonder has not yet been fully explored. In this article, the authors explore how one of the most widely used and studied arts-based learning activities in medical education, Visual Thinking Strategies, can help develop a capacity for wonder among physicians. They illustrate how Visual Thinking Strategies support the central elements of wonder-based pedagogy (i.e., exploration, improvisation, imagination, personal interest, and the ethos of educators) previously developed in education theory.

Philosophers and scientists alike argue that wonder—that emotion or state of consciousness in which one's attention is fixed on phenomena beyond one's comprehension—is the central virtue and driving force of all education.[1] Wonder has been associated with curiosity and awe.[2,3] However, wonder differs from curiosity in its ability to inspire radical appreciation (a sense of deep and transformative gratitude), reflection, and an intellectual and emotional reorientation of one's awareness of the world.[2,4] Wonder is also distinct from awe, as awe is almost exclusively associated with an external perception of vastness, while wonder can also involve strong internal reactions toward ordinary and mundane experiences.[2,3] As previously explored in general education, wonder is central to each aspect of academic medicine's tripartite mission. Not only does wonder support engagement in lifelong learning, but also a sense of wonder fuels the delivery of humanized patient care and sparks scientific discoveries.[5] Although foundational to medical education, clinical practice, and research, developing a capacity for wonder among physicians has not been a stated goal of medical education, and innovative methods to foster a capacity for wonder have not been explored. Given the potential for wonder to drive scientific exploration and humanistic care, it may be critical to prioritize wonder and its development among academic physicians as a learning domain in medical education.

The Association of American Medical Colleges; the National Academies of Sciences, Engineering, and Medicine; and the World Health Organization all recognize the fundamental role of the arts and humanities in medical education.[6–8] Evidence suggests that the arts and humanities can support the development of a diverse array of clinically relevant skills and attitudes in medical learners across the learning continuum (from premedical through continuing medical education).[9] One preliminary study suggests that the arts and humanities may also have the potential to foster a capacity for wonder in medical learners[10]; however, this has not yet been fully examined. It is also not known which arts and humanities learning activities might best support the development of a capacity for wonder and how this outcome might be achieved. As arts and humanities programs are increasingly developed and integrated into medical education, the time is ripe to consider the use of the arts and humanities to foster a capacity for wonder in medical learners.

In this article, we explore how the arts and humanities might develop physicians' capacity for wonder by examining one of the most widely used and studied arts-based learning activities in medical education: Visual Thinking Strategies (VTS). Using VTS as our example activity, we review the ways that VTS can help develop a capacity for wonder among physicians.

VTS at a Glance

In a VTS session, participants begin by silently viewing a preselected work of art. To intrigue specific groups, the chosen artwork should have elements that are recognizable to encourage quick

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engagement, but that are also ambiguous enough to support extended exploration. After a period of initial silent looking, a facilitator leads a structured discussion guided by 3 questions:

1. What is going on in this picture?
2. What do you see that makes you say that?
3. What more can we find?

Each of these questions serves to hold the group in a state of inquiry, while encouraging participants to search for visual evidence to support their interpretations. The facilitator ensures that each comment is heard, acknowledged, and folded into an ever-enlarging process of inquiry and meaning making.

Originally designed to help primary and secondary school students engage in meaningful experiences with art, researchers noticed that the skills learned in VTS transferred to other subjects.[11] Over 3 decades of field testing (from the 2000s to the 2020s), VTS was seen to yield the same benefits with adult learners and has since been used for professional development across diverse fields, including education, public safety, business, and medicine.[12–17]

Research exploring the use of VTS with medical learners suggests it may improve a wide variety of clinically relevant skills and attitudes, including close observation, critical thinking, empathy, and tolerance for ambiguity.[13,14,18–20] The connection between VTS and wonder was initially established in the first chapter of a foundational text on VTS titled "Permission to Wonder"[21]; research now suggests this learning activity may also have the potential to impact medical learners' capacity for wonder,[10] as measured by the Capacity for Wonder scale.[2] This scale characterizes wonder as having 2 components: perspective shifting (similar to curiosity) and emotional reawakening (similar to awe),[2] both of which are core experiences of VTS. Philosophers and researchers also suggest that wonder is connected to an epistemological comfort with not knowing,[2,22] which aligns with VTS' potential ability to support tolerance for ambiguity.[18]

In VTS, each participant spends time viewing a work of art and reflecting silently—often drawing from highly personal, social, or cultural associations—before sharing their thoughts with the group and actively listening to others' ideas. Skillful VTS facilitation encourages individuals to risk "out of the box" ideas, whereby each participant finds their own perspectives shifting as their original ideas are revised, added to, or built on in a scaffolding process. In time, symbolic and metaphorical readings often arise as personal connections to a work of art are developed. As the VTS discussion evolves, the process of collective meaning making enlarges an individual's interpretative possibilities as they consider the other group members' similar and/or conflicting interpretations.

VTS experiences provide an established learning framework for a process of discovery that is accompanied by a deep sense of attunement and appreciation. Elements of the VTS learning framework are conducive to creating educational experiences that extend beyond fostering mere curiosity; VTS experiences are not simply a process of detached intellectual inquiry but are also opportunities to engage emotionally and thus to experience a sense of wonder.[1,22,23] Here, we illustrate how VTS supports the central elements of wonder-based pedagogy (i.e., exploration, improvisation, imagination, personal interest, and the ethos of educators) previously developed in education theory.[4]

Five Ways VTS Supports Wonder

Exploration

Any arts and humanities learning activity focused on the domain of wonder must include the "natural and necessary" process of engaging learners with new things or allowing them to "experience familiar things as if for the first time."[2,4] In VTS, the facilitator invites participants to explore an unfamiliar artwork with fresh eyes and an open mind. The facilitator provides little or no background information on the artwork or artist and reminds participants that no knowledge of art or art history is required (although, as part of the accumulation of ideas, the facilitator can fold into the discussion any information of this type that a participant has offered).

In both the initial silent moments of close looking and the subsequent discussion, participants are suspended in a process of perception, investigative meaning making, and critical thinking. To move individuals beyond mere surprise to wonder, the facilitator helps participants to transform perceptive experiences into opportunities for contemplation and inquiry. The open-ended first question—What is going on in this picture?—is asked only once and intentionally designed with ambiguity, inviting participants to respond in any way they choose, including personal feelings and associations. The second question—What do you see that makes you say that?—asks participants to search for and provide visual evidence to bolster or revise their response. This question trains participants to think critically by either finding visual evidence or recognizing the lack of visual evidence to support their ideas. By asking participants to shift from an immediate stimulus-level response to a deeper, investigative response that explains the origin of the ideas uncovered during the initial exploratory phase, this second question moves participants beyond an experience of mere curiosity or awe and evokes in them a deep, contemplative sense of wonder. The third question—What more can we find?—urges participants to continue to search for more detail and probe all discoveries more deeply.

Improvisation

VTS discussions engage all participants regardless of their knowledge of or experience in art, simultaneously respecting the innate ability of each participant to perceive, form hypotheses, and assemble justifications, while capitalizing on the ambiguous nature of art. The process of discovery is central to the experience of wonder—that is, rather than providing learners with readily available, agreed on answers, in VTS, learners must be provided the time and opportunity to improvise and uncover answers for themselves.[4] Trained VTS facilitators use the open-ended nature of VTS questions to support this kind of discovery process. Moreover, they maintain a neutral stance as they facilitate, never inserting their own knowledge, observations, or interpretations; thus, they avoid being perceived as the ultimate source of information or opinion, which could make participants reluctant to share their own divergent ideas. Facilitators avoid emphasizing a "finding the right answer" approach, but rather welcome individuals' own perceptions and meaning

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making, thereby providing an opportunity for personal engagement, reflection, and transformation. They further nurture this open and accepting exploration through validating every response by pointing to the visual features mentioned and thoughtfully paraphrasing each comment using language of conditionality (e.g., statements such as "You think that this could be …" instead of statements such as "This is …"). The safe and autonomous nature of VTS exploration allows room for improvisation that acknowledges each participant's subjective experience and interpretations and allows for personalized experiences of wonder. Finally, VTS discussions conclude without providing answers, closure, or summarizing remarks so as to leave intact the spirit of ongoing inquiry and to allow individuals to stay in a state of wonder.

Imagination

While researchers often recognize that an inquisitive sense, a philosophizing tendency, and curiosity are related to a sense of wonder, wonder is also related to a sense of imagination and creativity, which are involved in exploring what is possible beyond existing bodies of knowledge.[4] The capacity for imagination inspired by wonder allows learners to uncover new answers or approaches, explore alternative possibilities, or deepen their understanding of existing theories.

In VTS discussions, though participants may initially gravitate toward dominant subjects and activities based on what they recognize from their existing experiences, at some point, participants may feel they have exhausted their ability to find new subjects in the artwork. The third question in VTS discussions—What more can we find?—repeated throughout the VTS discussion, intends to help participants push past this point by inviting them to probe for additional observations, consider further inferences that can be drawn from the group's accumulated observations, build on the ideas that have already been shared, and, through reflection, consider revising or elaborating on their perspective or adding a new perspective. Along with the second question, which is asked when needed, this third question sustains the close looking phase and continues the search for new ideas and information that are justified by the visual evidence. Although VTS discussions vary in duration, in this phase of extended looking, participants draw from gestalt interpretations, create new narratives, and push beyond literal meanings to explore symbolic readings and metaphors.[19] This phase of discussion supports the entertainment of imaginative possibilities grounded in evidence, which is an aspect of critical thinking.

Imagination is also essential to tolerance for ambiguity and empathy, as broadening one's own perspectives or imagining other experiences allows an individual to empathize with others. In VTS, as participants share their interpretations, the facilitator is tasked with linking convergent and divergent thoughts across the discussion, noting how ideas build on each other or offer alternative viable possibilities. This invites participants to listen actively to others' perspectives and respectfully consider their observations. Furthermore, in listening to others' search for supporting visual evidence, participants become aware of their own preconceived notions through understanding differing perspectives.[24]

Personal interest

A key part of creating a personal experience of wonder is allowing learners opportunities to pursue their own interests.[4] The highly personalized nature of exploration and discussion inherent in VTS invites participants to form their own interpretations for which they are asked to seek supporting evidence. Such evidence may reveal highly personal associations and draw on systems of meaning from their specific personal and cultural backgrounds. Because VTS discussions happen among peers, participants not only draw on personal inspiration to form deeply personal, often emotional, connections with the artwork, but they also consider them in the context of the diverse meaning and value systems of others, both of which represent rare opportunities in medical education.

Avoiding highly structured learning environments and a reliance on reductionistic, quantitative outcomes metrics is critical to preserving personal and authentic experiences of wonder, as well as other learner-centered attitudes and virtues.[25] Despite their structured design, VTS group discussions remain open-ended and student driven, as trained facilitators support continued inquiry and critical thinking in a nondirective, nonjudgmental manner. Furthermore, to foster genuine experiences of wonder, we advise avoiding educational metrics evaluating learning outcomes to minimize social desirability tendencies. Rather, as suggested with the "objective" measurement of other virtues and highly personal experiences, we recommend process-oriented metrics that emphasize *how* learners can engage in wonder.[25,26] The Capacity for Wonder scale, for example, measures the *capacity* of learning environments to foster intellectual and emotional engagement, which underlie experiences of wonder, by evaluating how open learners are to this process, rather than individually assessing participants on the magnitude or quality of their wonder.[2] While the degree of individual engagement may vary, it is also important to acknowledge the validity of and encourage legitimate peripheral participation, an approach whereby students who initially conform to desired behavior later internalize the behavior as authentic attitudes and virtues.[27]

The ethos of educators

Although the medical curriculum and learning environment can be intentionally designed to support experiences of wonder, these moments usually arise outside the classroom setting in unexpected environments.[4] In the setting of arts and humanities learning activities, interdisciplinary subject matter and spaces, such as art museums, can intrinsically distinguish these experiences from the core medical school curriculum.[28]

While VTS and wonder-based pedagogy may align on theoretical foundations, practical implementations of these can vary widely depending on the ethos of the educators. Training and coaching in facilitation by a certified VTS coach can help to ensure that educators take a standardized approach to facilitating each VTS discussion in a way that honors the method's potential to foster wonder. As medical educators traditionally encounter students who have a desire for closure, the facilitator directly addresses these expectations at the beginning of the VTS session (e.g., "We encourage you to expect and accept nonclosure. You are likely to leave with more questions than answers.") and encourages students to reflect on the benefits of nonclosure at the end of the session (e.g., "How is staying in inquiry relevant to medicine?"). To facilitate a

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capacity for wonder, in a departure from traditional classroom environments, which often emphasize discussion of high-yield information and compliance with "correct" answers, VTS facilitators instead adopt an attitude of mystery and humility toward the nature of knowledge.[4] Throughout a VTS discussion, the facilitator validates every response from each participant. By offering a safe and nonjudgmental space to share ideas, the facilitator provides the opportunity for participants to risk being vulnerable and in doubt of "the answer." By asking neutral questions without providing answers, the facilitator further affirms the ambiguous nature of interpreting art and invites participants to take risks in creating knowledge. At the conclusion of a VTS discussion, the facilitator offers no summative statement, no synthesis of the discussion or consensus, and importantly no answers. The facilitator simply thanks the participants for their contributions and offers general appreciation. By creating a sense of mystery and affirming the malleable nature of knowledge creation, VTS facilitators encourage participants to avoid premature closure and continue their personal discovery journeys after the session.

Conclusions

To be sure, although arts and humanities learning activities, like VTS, may have the potential to cultivate a capacity for wonder,[10] no study has yet evaluated the impact of such activities on this capacity. Some have argued that while the tripartite mission of academic medicine lies in education, clinical care, and research, an unbalanced emphasis on 1 or 2 of these aims, or the pursuit of these aims as ends in themselves, strays from medicine's central goal of improving health.[29] However, given the increasingly complex and interdisciplinary nature of medicine, a space for cultivating wonder provided by arts and humanities programs may allow learners to explore creative approaches to questions critical to the delivery of excellent patient care. Studies have shown that the integration of the arts and humanities into medical education can support the development of clinically relevant skills and attitudes, like empathy and tolerance for ambiguity,[18] which potentially relate to the capacity for wonder.[10] Moreover, virtual VTS sessions have the potential to overcome barriers to accessible education by offering a wider range of multimedia activities and access to numerous works of art from online collections, while providing personal and professional benefits that are comparable to those experienced in sessions held in person at local art museums.[28,30,31]

We believe exploring the effectiveness of arts and humanities learning activities, such as VTS, in fostering a capacity for wonder is critical to the future of medicine. Nurturing the capacity for wonder among medical learners has the potential to enhance lifelong learning, improve patient care, and spark scientific discoveries. In this article, we have demonstrated how one arts and humanities learning activity, VTS, aligns strongly with the central elements of wonder-based pedagogy and may nurture a capacity for wonder in physicians. Further research is needed to explore how different forms of arts and humanities–based medical education learning activities uniquely support the cultivation of a capacity for wonder, which in turn allows one to engage with the full range of humanistic and scientific subject matters that arise in medicine. Through participation in such arts and humanities learning activities, medical learners may become more perceptive of nuances, celebrate deep contemplation and radical appreciation, and search for meaning as they develop personal insights and gain an appreciation of diverse perspectives along their professional journeys. Evaluation of the impact of the integration of arts and humanities learning activities into medical education on learners' capacity for wonder via both quantitative (e.g., the Capacity for Wonder scale) and qualitative measures will be instrumental to creating a learning environment that is conducive to intellectual, emotional engagement in medical education.

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