Perspective: **A Perfect Storm: The Convergence of Bullet Points, Competencies, and Screen Reading in Medical Education**

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Abstract

Three distinct phenomena are currently at play in medical education: (1) the pervasive use of PowerPoint in teaching, (2) the wholesale application of competency models, and (3) the shift from paper reading to screen reading regardless of course, text, or genre. Finding themselves placed at this intersection, students encounter fewer and fewer opportunities to practice some of the very cognitive and affective habits medical educators say they value in physicians, particularly critical reflection and deliberation, an eye for nuance, context, and ambiguity, and an appreciation that becoming a doctor involves more than learning content or performing skills. This article confronts these phenomena singly and then at their intersection, which may discourage, even dismantle, many of these habits. The author proposes that the rapid shift over the past decade to a technology-driven, competency-oriented environment in medical education is the medical educators’ creation, one that sets up conditions for a perfect cognitive storm.


In a recent article in *Inside Higher Education*, Judith Shapiro has paid homage to Susan Jacoby’s book *The Age of Unreason*, one of the most recent lamentations regarding the “culture of reading being replaced by a rapid-fire, short-attention-span-provoking, overstimulating, largely visual, information-spewing environment.” Neither Shapiro nor Jacoby was addressing medical education but rather a major cultural force throughout the United States that deeply affects university life.

What I propose here is not a lament of this culture. This is not another hand-wringing exercise on the difficulties we faculty face in capturing the attention of Millennial or iGeneration medical students, nor is it a charge that today’s students are anti-intellectual, irrevocably damaged by excessive attention to the digital world. Rather, I focus on our role in creating and sustaining this “rapid-fire, short-attention-span-provoking, information-spewing environment” in medical education. I propose that this rapid shift over the past decade is our own creation, one that sets up conditions for a perfect cognitive storm. These conditions converge at the intersection of three phenomena currently at play in medical education: (1) the pervasive use of PowerPoint in teaching, (2) the wholesale application of competency models, and (3) the shift from paper reading to screen reading regardless of course, text, or genre. Finding themselves placed at this intersection, students encounter fewer and fewer opportunities to practice some of the very cognitive and affective habits we say we value in physicians, particularly critical reflection and deliberation, an eye for nuance, context, and ambiguity, and an appreciation that becoming a doctor involves more than learning content or performing skills. In this article, I examine each of these conditions as single entities and then reflect at their intersection.

**The Pervasive Use of PowerPoint in Teaching**

Very few educators would disagree that PowerPoint has revolutionized teaching across all levels and domains of knowledge. It can improve lectures by distilling complex information and providing imagery to support major points that are visually compelling, sometimes even entertaining. Its organizational structure can help students study for what their faculty denote as key points; indeed, it can help faculty organize content and keep a presentation on track. PowerPoint is undoubtedly one of the most useful technological developments for educators in the last quarter century.

Yet in 2003, Yale professor Edward Tufte, one of the world’s most respected scholars in information design, startled conventional thinking about PowerPoint’s wholesale desirability—and the emphasis here is on “wholesale”—with the publication of his 27-page monograph, *The Cognitive Style of PowerPoint*. Here and in subsequent articles Tufte argues that PowerPoint can encourage fragmented thinking through the relentless use of bullet points and linear slides of complex matter—a visual construction that may inhibit logical connections and disrupt reason. Others similarly note that PowerPoint’s slide-by-slide format sometimes makes it difficult to see relationships between different sets of data, “encouraging oversimplification by asking presenters to summarize key concepts in as few words as possible—for instance, bullet points—which can lead to gross generalizations, imprecise logic, superficial reasoning, and quite often, misleading conclusions.”

Complex content, not to mention integration of such content with other domains of knowledge, requires more than bullet points or various layered structures. In fact, this requires narratives that lecturers
may abbreviate in order to stay tightly connected to the points on the screen.

Faculty and students can thus become overly managed by a screen that boxes thinking into neat, orderly, get-to-the-point packages. Busy faculty are seduced by a technology that offers an easy default to construct their lectures and “subsequently the ideas about how they will present their material.” Coutu argues that “the PowerPoint aesthetic of bullet points does not easily encourage the give-and-take of ideas, some of them messy and unformed. . . . PowerPoint, like so many other computational technologies, is not just a tool but an evocative object that affects our habits of mind.” A persistent use of bulleted slides may also result in the illusion for faculty that they are able to pack in more information in a 50-minute period. Yet, too few faculty are taught to use PowerPoint as a point of departure to teach concepts while guiding learners beyond the bullet—to connect and build on their previous knowledge, to apply concepts to clinical cases and develop clinical reasoning skills.

Still, PowerPoint use has become so taken for granted that it is used in nearly every learning environment in medical education from basic science lectures to clinical seminars and grand rounds to ethics and humanities courses, not to mention students’ own presentations to peers and faculty. Students expect content to appear on a screen because PowerPoint has been totally integrated into the learning environment of medical education. This enables students “to focus on things other than the lecture,” as one student wryly noted: “If he’s reading me a PowerPoint and I could read it myself later, then I’ll check my e-mail.” A forgotten mantra of education technology is that the presenter, not the slides, should always be the primary audiovisual, not the “unseen voiceover of [their] own lectures.”

Other students report that the PowerPoint slide presentation has so much status as the source of all that is deemed important by faculty that little attention is paid to anything not appearing on the slides. In fact, Parker argues, PowerPoint suggests that “information is all there is” by “squeezing out the provider of process”—that is, “the person whose thoughts cannot be arranged in the shape of an AutoContent slide.” Tufte delights in reminding us that scientists and engineers (“and everyone else for that matter”) have expressed complicated, dense matter for hundreds of years “without hierarchical bullet outlines. Richard Feynman wrote about much of basic physics—mechanics, optics, thermodynamics, quantum behavior—in a 600-page book with only 2 levels: chapters and headings within chapters.”

The Wholesale Application of Competencies

As I and others have argued elsewhere, competency efforts have flooded the learning environment throughout medical education, often without critical reflection and action to counteract its philosophical and practical limitations. Although such efforts may make sense in particular domains in which a desired level of knowledge or skill can be determined, the same logic cannot be applied to all aspects of a physician’s professional identity, particularly those surrounding the holistic, complex, nuanced, and context-driven dimensions of any clinical encounter, much less one’s sincerity, authenticity, and compassion. Yet the pull of competencies, particularly from the Accreditation Council for Graduate Medical Education (ACGME) to tail that increasingly wags the undergraduate curriculum dog, informs much of our curriculum and assessment decisions that, in turn, shape our students’ beliefs about what is important and worthy of their attention.

This is not a new phenomenon. Collins argued decades ago that this approach, now a ubiquitous presence in medical education, has the capacity to reduce all the essential elements of any medical practice into a “manageable” form amenable to objective measurement, which lends a “false aura of exactness” to competency-based systems and which tells us “nothing about the processes involved in competent performance. True understanding necessitates grasping the meaning of what is being enacted.”

Others have similarly taken on these sirens of exactitude based on discrete elements of practice. Grant contends that this “sum” of essential elements is always greater than its parts because physicians are always “making judgments, managing cases in the absence of information, taking a multiplicity of factors into account, dealing with each case on its own merits, almost never replicating precisely the same approach because every case is never exactly like any other.” Fraser and Greenhalgh agree:

> Learning how things are interconnected is often more useful than learning about the pieces. Traditional curriculums, based on a discrete and simplistic taxonomy of disciplines that focus on the acquisition of facts, usually highlight content without helping learners understand the interrelationships of the parts. Without this understanding of the interactions and relations between the pieces it is difficult to apply the learning in a unique context. . . . The complex real world is made up of messy, fuzzy, unique, and context embedded problems.

In their eloquent “Taking apart the art: The risk of anatomizing clinical competence,” Huddle and Heudebert similarly argue that competence “slip[s] through our fingers when we break it down into specific objectives and view it as their sum.” They believe that a competency approach like the ACGME Outcome Project “anatomizes” competence by addressing it in general terms and then dissecting it into bite-sized pieces, much like the slide-by-slide approach to knowledge in the PowerPoint lecture. All the small pieces can be objectively assessed, and then, once added back up, the sum denotes competence. Govaerts also takes on the competency movement when it is a collection of lists of what should be learned and a set of minimal performance standards to be achieved. Instead, the knowledge, skills, and attitudes are merely “aspects of competence that will only take on meaning through engagement in and reflection on tasks, leading to profound understanding of professional practice. To put it simply, knowing is not enough for doing, nor is doing enough for learning.”

Breaking down trainees’ performance into discrete elements and then having them successfully pass them all does not necessarily translate into their responsiveness to an evolving human situation in a clinical context any more than memorizing the content of each slide in an entire PowerPoint lecture denotes an understanding of how they all
fit together. Past editor of Academic Medicine Michael Whitcomb went so far as to "urge that the medical education community should petition the ACGME and ABMS [American Board of Medical Specialties] to abandon the use of core competencies as the main measure of clinical competence, and work to develop approaches for assessing competence based on careful observations of residents' performances in providing patient care." We medical educators would be wise to pause to consider the same as we approach changes to the undergraduate medical curriculum with a truncated focus on the attributes that must be acquired by all students to move on simply as a series of bullet points. It may be that rethinking this progression from novice to highly skilled, always learning, caring professional is also a progression of capabilities, not competencies—what Fraser and Greenhalgh call "the extent to which individuals can adapt to change, generate new knowledge, and continue to improve their performance."

The Shift From Paper to Screen Reading

Anyone who has been in higher education for more than a few years has watched the slow disappearance of hard copy and the increasing appearance of memos, forms, announcements, and finally entire syllabi and accompanying readings in electronic formats. The rationales for this switch are varied: Some view it entirely as an effort to save forests; others laud the efficiency and organizational dexterity of electronic formats. The advantages of a digital curriculum, particularly a well-crafted electronic syllabus, are sizeable: It allows students the flexibility of studying almost anywhere they can carry a lightweight computer; it allows the creative faculty member to offer links to journal articles, digitized procedures, interviews, film clips, and cases, not to mention opportunities for online discussions, critiques, and other collaborative projects; it makes vast amounts of information from disparate sources available to students quickly and efficiently.

But like the wholesale endorsement and use of PowerPoint and competencies, this shift has limitations that have seemingly gone unnoticed in our uncritical rush to adopt such technologies. Still, we quickly move forward without enough data to elucidate differences in screen and print reading across variations in the cognitive tasks related to such reading, variations in styles of study, and variations of the genres being read. In a recent issue of The Chronicle Review, Emory professor Mark Bauerlein writes compellingly of the different levels of literacy between screen and print reading. Screen readers often race across the surface, dicing language and ideas into bullets and graphics, seeking what they already want and shunning the rest. They convert history, philosophy, literature, civic, and fine art into information, material to retrieve and pass along. That's the drift of screen reading. Yes, it's a kind of literacy, but it breaks down in the face of a dense argument, a Modernist poem, a long political tract, and other texts that require steady focus and linear attention—in a word, slow reading. Fast scanning doesn't foster flexible minds that can adapt to all kinds of texts, and it doesn't translate into academic reading.

Bauerlein cites the work of Jakob Nielsen, a Web researcher who has studied how people read on screen by using eye-tracking tools. Whereas numerous studies have shown that in general screen reading is slower than print reading, Nielsen's research complicates these findings. His use of eye-tracking tools to map how people read suggests that people read differently online: We first read all the way across at the top of the screen, but as we proceed downward our reading quickens and our "horizontal sight contracts, with a slowdown around the middle of the page." Near the bottom of the page, our eyes move "almost vertically, the lower-right corner of the page largely ignored. It happens quickly." Bauerlein argues that this wholesale adoption of screen reading has a flattening effect on reading across all kinds of texts. A reader may, in quick succession, scan an e-mail, search for an item in an online catalog, or check out someone on Facebook during breaks from reading a dense essay or studying PowerPoint slides, all "as subsets of one general activity." He believes that screen reading—or, more accurately, screen scanning—is only one kind of reading, and that "it conspires against certain intellectual habits" many of us value in medicine education, particularly the slow, self-reflective processes at the core of the medical humanities and similar kinds of deliberative inquiry. Hunt refers to this phenomenon of "constant connectivity" as "continuous partial attention . . . students feel [the need] to monitor everything at once . . . driven by a constant fear that they might miss something important. The result is a high level of stress, accompanied by an inability to devote full attention to what is happening in front of them."

At least some students recognize this paperless phenomenon as distracting and not at all what they prefer for all their studies. In one of the few articles on paperless phenomena in medical education, Martin and Platt found that computer-based learning in medical education is hindered by the fact that many students just print out all digitally available material. Students' responses to why they print documents rather than read them on screen are varied: "I print so I can highlight and make margin notes"; "I have to mark it up—mostly underline and margin note"; "I'm visual and physical; I remember colour of ink and where it was on the page"; "I have to draw pictures, graphs, stuff to help me remember"; or merely, "I write all over what I print." Moreover, many students spoke of their need for the "simultaneous array" of texts—old tests, lectures, other documents that can be spread out in front of them as they study. Although some students do take advantage of digital annotation options for class notes and other texts, this does not address the bulk of the objections cited above. Martin and Platt ask us if it is "possible that we are trying to force the computer to function in ways it simply cannot," and that perhaps its highest function is to serve for nearly immediate information access. In that capacity it has already functioned to transform education by enhancing the comprehensiveness of research. . . .

Ironically, however, it delivers it one screen at a time to students habituated to stacking books and arraying annotated notes about themselves for study. Is learning such a highly individual process that, once information is gathered, the individual's learning needs must guide the remainder of the process?

Implications, or the Eye of the Storm

Lest I be mistaken for a Luddite, I should state that I am a major enthusiast for the
digital technologies that have transformed medical education, and I have the highest regard for colleagues who skillfully use such technologies to create challenging, imaginative, motivating, and effective learning environments. I similarly endorse the notion of competency when it is tied to bottom-line assessment of the knowledge and skills deemed necessary but not sufficient for trainees to move into arenas of increased responsibility for patient care. At the undergraduate level, a good deal of what Huddle and Heudebert designate as “building blocks” fits well into competency models; other important dimensions of becoming a doctor do not.

What I have proposed is that the mindful, near-universal adoption of digital technologies for all educational purposes, particularly in an educational environment where progress involves competency bits to be mastered, provides all the elements of a perfect storm that risks turning medical education into vocational training and performance. The constant glow emitted from PowerPoint slides and the paperless electronic curriculum washes over the learning environment, condensing and codifying knowledge and skills, hiding nuances and complexities, simplifying relationships and flattening reflection. Carr eloquently takes us back to the thinking of Marshall McLuhan in the 1960s, still resounding today, perhaps even more so:

“Media are not just passive channels of information. They supply the stuff of thought, but they also shape the process of thought. And what [the digital world] seems to be doing is chipping away my capacity for concentration and contemplation. My mind now expects to take in information the way the Net distributes it: in a swiftly moving stream of particles. Once I was a scuba diver in the sea of words. Now I zip along the surface like a guy on a Jet Ski.”

Competencies are relegated to the same bullet-point mentality as the PowerPoint lecture in which the sense of mastery of the parts matters most. That is, a single-minded focus on competencies results in an atomized, impoverished, bulleted conception of “physicianhood,” scattering attention away from the relationship between thought and action, between reflection and practice. Like screen reading, learning in order to pass a series of competencies invites scanning for key points rather than reflecting on the “messy, fuzzy, unique, and context embedded problems” of caring for patients. Similar to the layered hierarchies embedded in PowerPoint presentations, the competencies that are currently objectively assessed in the current educational environment reflect only those “building blocks” of the higher-level competence we all seek in our physicians.

Despite the above scenarios, medical educators are not powerless to redirect at least some curriculum effort to ward off the negative effects that may result from these converging forces. Bauerlein offers one of the best approaches educators can take against what he calls the “tidal wave of technology,” and that is to reframe a number of classrooms and courses as “slow reading” and “slow writing,” away from smart rooms and computer screens and PowerPoint slides, immune from the objective assessment of competencies. He strongly urges that we keep a portion of our students’ experiences “disconnected, unplugged, and logged off,” and that even though “pencils, blackboards, and books are no longer the primary instruments of learning . . . they still play a critical role in the formation of intelligence, as countermeasures to information-age mores.”

What Bauerlein is describing is similar to Parker’s ruminations about “deep reading,” an ability, a propensity that is increasingly being lost in many students’ “hyperactive, data-stoked minds.” Parker believes that the act of deep reading, away from screens and involving a sequence of printed pages, is worthwhile “not just for the knowledge we acquire from the author’s words but for the intellectual vibrations those words set off within our own minds. In the quiet spaces opened up by the sustained, undistracted reading of [the printed text] . . . we make our own associations, draw our own inferences and analogies, foster our own ideas.” We risk encouraging our students to become what playwright Richard Foreman describes as “‘pancake people’—spread wide and thin as [they] connect with that vast network of information accessed by the mere touch of a button.” Deep reading and other reflective experiences like them promote the ability to slow down. As Mann thoughtfully argues, “Such activities require the allocation of energy and cognitive resources . . . that can be effectively utilized when sufficient experience and expertise allow cognitive space to be freed . . . . It is reflection in and on practice that promotes the ability to ‘slow down when you should.’”

The loss of deep reading with all its attendant skills and affinities also may result in the sharp turn away from the vitality and promise of narrative medicine in clinical settings. Charon describes what these skills and affinities have brought to her practice of medicine, enabling her to listen to what my patients tell me with a greater ability to follow the narrative thread of their story, to recognize the governing images and metaphors, to adopt the patients’ or family members’ points of view, to identify the subtexts present in all stories, to interpret one story in the light of others told by the same teller. Moreover, the better I was as “reader” of what my patients told me, the more deeply moved I myself was by their predicament, making more of myself available to patients as I tried to help.

We have choices as medical educators, even in the face of seemingly irrepressible forces within and outside the profession to digitize our students—literally and metaphorically—and to authenticate them through objective assessment that is incapable of revealing high-level competence. There is no curriculum on the planet that cannot offer respite from these forces, and if we build specifically designed spaces to accommodate slow and deep reading, for reflection and bewilderment—places where the computer is turned off, no “performance” expected, and no script to be learned—students will come.

Acknowledgments
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References
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Education Issues


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**Did You Know?**

In 1969, a team from Harborview Medical Center in Seattle, Washington, developed Medic One, an emergency response system for treating cardiac arrest patients quickly with advanced life support.

For other important milestones in medical knowledge and practice credited to academic medical centers, visit the “Discoveries and Innovations in Patient Care and Research Database” at (www.aamc.org/innovations).