Expertise and Authority in an Age of Crowdsourcing

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It scarcely needs to be asserted that students in higher education struggle with evaluating the multitude of resources they have available to them for research. The rise of *Wikipedia* and the ubiquity of Google have challenged traditional notions of academic expertise. Why do we need experts when we have a crowdsourced encyclopedia like *Wikipedia* that, according to a 2005 *Nature* article, is almost as accurate as Britannica?[1] This is the era of the wisdom of crowds and of a diminished appreciation of expertise. What is more is that Google and *Wikipedia* are the preferred initial research resources for many students in higher education, leading to a much wider concept of "useable information" than existed in the more restrictive academic environments of the past.[2]

This contributes to a rather limited notion of what is required to be an "expert." If you as a professor claim to your class, "I know more than you do," does that make you an expert? If so, then students can counter by arguing that our current access to information makes mere knowing an unnecessary attribute. Knowledge is a cheap commodity today. What we don't know, we can look up. Who needs a knowledge expert?

Even if we were to find that expertise and its resulting declaration of authority are still necessary in our world, the current information environment makes it exceedingly difficult to determine what resources are worthy of respect. Imagine a keen student who comes across the following article in a Google Scholar search: "Cultural-Institutional Persistence under Autarchy, International Trade, and Factor Mobility" (http://www.santafe.edu/media/workingpapers/13-01-003.pdf). The paper looks like a scholarly work (citations and bibliography), and the authors have high credentials, but there is no journal title in the PDF. Is this a pre-peer-review posting of something that will later go through the regular publishing process, ending up in an established journal? Or has it simply been published to the web without any vetting? The answer is "neither." It has been posted by the Santa Fe Institute as a "working paper." That is, while having been written by competent people and perhaps reviewed to some extent by the institute, it has been posted as a work in progress, with actual peer review possibly in its future.

Changing understandings of expertise and authority, tied with the long-standing challenge that evaluation is difficult for any student who lacks subject knowledge and is unfamiliar with the conventions of the discipline, make evaluation of resources a difficult prospect. In order to understand the nature of the problem and its potential solutions, we must first trace recent developments in our growing uncertainty about the nature of expertise and authority.

The Era of Crowdsourcing
Where We Were

Harry M. Collins and Robert Evans have described the evolution of thinking about expertise in the sciences as comprising three waves.[3] Wave One of the 1950s and 1960s saw scholars being accepted as authoritative simply by virtue of their education and expertise. Collins and Evans argue, "Because the sciences were thought of as esoteric as well as authoritative, it was inconceivable that decision-making in matters that involved science and technology could travel in any other direction than from the top down."[4]

Wave Two arose out of a growing recognition that Wave One was circular: Information is authoritative because it is produced by authorities, who in turn are authorities because their qualifications make their pronouncements authoritative. For Wave Two, there must be some alternative way of measuring

authority beyond saying, "I am an authority because I am an authority."[5] Thus there was greater interest in public participation and evaluation, along with the recognition that the work of experts has a political aspect to it that may influence authoritative statements. In fact, the boundary between expert and nonexpert was perforated to such an extent that it became difficult to determine what statement was actually authoritative and what was not. This led to Wave Three, a corrective to Wave Two, in which expertise is questioned and challenged but still recognized if it passes the test.

Wave Two, as described in Collins and Evans's study is of particular significance in that it fits with developments in the 1960s and beyond that tended to level all knowledge, challenging the very concepts of expertise and authority.

The New Consciousness

There has been a steady movement in the past few decades away from the traditional concepts of expertise and authority, both in academia and in popular culture, driven by parallel movements in the theory and democratization of knowledge.

In knowledge theory, the pervasive label for the spirit of our age is likely "postmodernism," which emphasizes the subjectivity of authors and readers, along with an increasing uncertainty about the authority or even validity of authoritative pronouncements.

Closely linked to postmodern thinking is the increasing recognition that knowledge dissemination is intensely political rather than objective and disinterested. Consider, for example, the works of Paolo Freire and Brian Martin.[6] Freire wrote of a pervasive "banking concept of education," in which the expert instructor bestows knowledge upon the "ignorant" student. Seeing this as a method for oppression, Freire proposed a process of "problem-posing education" in which professor and students learn together. Tellingly, he argued: "In this process, arguments based on 'authority' are no longer valid; in order to function, authority must be *on the side of* freedom, not *against* it. Here, no one teaches another, nor is anyone self-taught. Men teach each other, mediated by the world, by the cognizable objects which in banking education are 'owned' by the teacher."[7]

Freire's strong critique of knowledge oppression has been highly influential in helping to move instruction from "sage on the stage" to "guide on the side." But it has also rendered suspect the idea that anyone should claim to be a knowledge authority. Authority, to Freire, results in oppression.

Martin took a slightly different tack, arguing that academia, in essence, forms a guild intended to accentuate the difference between the expert and everyone else. Even the use of terminology can become a means to elevate authority illegitimately: "The specialised language and concepts of the discipline are convenient for those in the know. They also are convenient for ensuring that outsiders can't quickly see through to the essence of the issues."[8] The academic guild for Martin is intensely political. Once experts have all-encompassing control over knowledge, it is in their best interests to make sure that nonexperts are excluded. The result is that mediocre research, which has the approval of the academy, passes peer review, while potentially better material that is new or radical does not see the light of day. Martin's critique casts doubt on the notion that information is authoritative just because it is academic or peer reviewed. To enlist the perspective of Collins and Evans, academia, for Martin, perpetuates First-Wave thinking: Something is authoritative because the academic guild says it is authoritative.

Philip Schlesinger more recently has argued that academics are driven by interests that go far beyond disinterested use of expertise as they try to make authoritative statements uninfluenced by outside forces. Rather than being guided by their own academic culture, they are compelled by market forces:

> As opposed to the first model of an internalized culture that supplies the public sphere with spontaneously generated intellectual work, this is a *necessity-driven, demand-led model*. Ideal-typically, you produce research and engage in knowledge exchange in line with what is requested in order to justify your existence. Public intellectuality, therefore, is wanted but only on certain, quite instrumental, terms.[9]

The politicization of expertise and authority to meet utilitarian goals is, for Martin, Schlesinger, and many other scholars, a path to perverting the purposes of genuine scholarship, thus casting the whole notion of academic authority into disarray.[10]

Yet much of the current challenge in the field of authority comes less from the theorists than from the practical realities of the World Wide Web, which has led to the democratization of knowledge. Though it has been scarcely more 20 years since the web was created, it has transformed our understanding of what

constitutes valid and significant information. From a restrictive but far more certain environment of peer review and other gatekeeping processes that limit publication, we now have anyone able to publish their ideas to the world. With the ubiquitous Google having become the tool of choice for student research, we are left with a challenge of epic proportions: How can we determine what has authority, or even what can be believed?

There is now an alternative to the authoritative scholar: Information produced by the crowd. The classic example is *Wikipedia*, which, rather than developing through contributions of recognized scholars, has been written by the people, the "great unwashed," or so the mythology goes. The theory behind crowdsourcing has actually been with us for quite some time. In 1907, Francis Galton published an article in *Nature* in which he demonstrated that 800 people, averaged out, could actually judge the weight of an ox to within one percent of its actual weight.[11] This concept has been described as "the wisdom of the crowd" and posits that, given enough people working on a single problem, a result can be produced that is comparable in value to the finding of an expert. In recent years, it has been popularized by the enthusiastic writings of journalist James Surowiecki.[12]

While it is commonly asserted that *Wikipedia* developed in just such a fashion, this is not entirely true. Sabine Niederer and José van Dijck point out that much of the mechanism that keeps *Wikipedia* from degenerating into chaos is controlled by editors and software: "The technicity of *Wikipedia* content … lies in the totality of tools and software robots used for creating, editing and linking entries, combating vandalism, banning users, scraping and feeding content, and cleaning articles. It is the complex collaboration not of crowds, but of human and nonhuman agents combined that defines the quality standards of *Wikipedia* content."[13]

The late Aaron Schwartz found, through discussion with the originator of *Wikipedia* and his own research, that while *Wikipedia* "outsiders" provide most of the initial content, a cadre of insiders do most of the edits.[14] Aniket Kittur and Robert E. Kraut have demonstrated that explicit coordination of editors in the development of *Wikipedia* articles is crucial to their success.[15] In essence, the power of *Wikipedia* is not in the supposed wisdom of the crowd but in a carefully designed and extensive system of quality control.

Google, similarly, constitutes a wisdom of the crowd in that Google's algorithms are based strongly on the links other sites make to a target site. Websites that have more external links made to them tend to rise to the top of

search results, on the premise that heavy use by others indicates that such a site is inherently better than one that is ignored. External links form a crowd opinion about a website, thus giving it higher standing.[16]

James Goldman's dissertation on "collective intelligence" found that, while crowdsourced knowledge creation holds promise, it has yet to overcome the challenge that experienced users of the World Wide Web do not attribute the same credibility to creations of the collective that they do to sources that they view as having "cognitive authority."[17] Thus, while alternative approaches to the expertise-authority issue exist in our time, there is less trust in their validity than there is with more traditionally produced information. This leads to confusion. If we are not sure we can trust our "authorities," but we dare not rely too much on the crowd, how do we determine what information we can reliably use?

Now that authority structures are under challenge and the new options available to access information have varying levels of authority (in the traditional academic sense of the word), a new consciousness has risen. The result is, as Adam Frank has so ably described it, that we have entered an "age of denial" in which the pronouncements of authorities, particularly scientific authorities, are simply dismissed as one person's view that can easily be rejected by those who choose not to believe it.[18]

The Loss of Guideposts

With the role of authority figures in academia under challenge and the increasing growth in digital information that has not been peer reviewed or otherwise controlled by any traditional models of gatekeeping, today's student lives in a decidedly ambiguous and confusing academic environment.

MaryBeth Meszaros, in fact, has labeled this problem a "crisis:" "The word crisis may at first seem hyperbolic, but when one considers what is at stake—the ability of a citizenry to render reflective judgments, to weigh knowledge claims, to generate evaluations based on something more substantive than mere taste and feeling—the designation is apt.[19]

This growing uncertainty about the authority of academic assertions has been a phenomenon for several decades. Peter J. Pels and Lorraine Nencel, writing in 1991, referred to their fellow anthropologists as all being "uncertain about our projects" and all doubting "the representation of local knowledge in local texts."[20]

Not everyone shares this sort of pessimism. Mark E. Warren argues that authority is challenged only when it appears to be "unjustifiable." Thus we do

not have a crisis, but an increasing pluralism in authority structures.[21] Warren's approach, unfortunately, is of little comfort to students who lack the subject knowledge and evaluation criteria to discern even what is justifiable and what is not.

The growth of digital culture through the Internet has exacerbated the problem. The University of California's commission on the future of the Berkeley Library stated the challenge cogently:

> Paradoxically, the massive and largely unregulated expansion of scholarly materials and information on the Internet has made it more difficult for scholars to locate authenticated materials and related services and to discover new resources. Expensive investments are underutilized as are cheaper and equally useable alternatives. For students, the challenge of finding appropriate materials in both print and e-forms and of distinguishing between reliable and non-reliable sources has become evermore difficult.[22]

What is it about the mere existence of a digital culture that makes it problematic for assessing authority of resources? Ray Land refers to the changeable nature of electronic texts that can be edited or altered at will, along with the constant increase in commentary on existing texts. Digital texts are thus "characterised by their volatility, multivocality, and radical contestability [which] become implicated in the 21st-century university's difficulty in maintaining and asserting its traditional authority."[23]

A recent paper from the International Federation of Library Associations describes a challenge to the very notion of the authorship and ownership of information: "New digital content is being created at an unprecedented pace, and is crowdsourced, computer-generated, and remixed as well as created by individuals. It can be easily shared and distributed, with impacts on markers of authorship, exercising of control and notions of 'ownership.'"[24] If we cannot determine authorship, our evaluation of authority very much depends only on our assessment of the final product. For students not familiar with the subject matter of the discipline under study, such evaluation is bound to be fraught with uncertainty and will likely not be done well.

While students show appreciation for the freedom of expression and interpretation afforded by the current emphasis on subjectivity and the

openness of the Internet, there is also frustration with the lack of certainty that such freedom brings. If there are no absolute authorities or absolute answers, how can there be closure in any debate? Consider this comment from a student: "I just get so frustrated. Of course there are no definitive answers, so it seems to me we aren't supposed to argue anything—just merely accept that there are many different sides and nothing can be resolved. I get tired of saying, 'This seems most likely to mean this, because of these examples… but, of course, it could also mean that, because anything is possible.'"[25] In such an environment, a fruitful analysis of the validity, reliability, and importance of any resource used in research seems virtually unattainable.

Student Perceptions of Expertise and Authority
The Authority of the Professor

There has been a shift in student recognition of the authority of professors over the past number of decades, comparable with the growing confusion about expertise and authority in general. While students still tend to rely on the expertise of their professors, the authority they recognize may well be more "administrative" than "cognitive," to borrow the terminology of Patrick Wilson.[26] That is, they respect the authority of the professor because of the professor's position rather than, necessarily, because of any supposed superiority of knowledge or expertise.

Even though the expertise and authority of professors is more likely to be challenged today than it would have been in 1950, there is one sense in which professorial authority as administrative can enable students to choose resources that embody higher levels of expertise and authority.[27] Simply put, the professor determines both the requirements and grade for assigned research projects. Finding out "what the professor wants" is a clear priority for most students who want good grades, but it is noteworthy that, despite this "administrative" power of the professor to prescribe elements of research quality, students remain confused about the resources they are to use.[28] One would think that clear instructions from the professor as to what resources are acceptable (and where those resources could be found) would raise the level of authority in student bibliographies. But the inclusion of nonacademic or popular sources still

abounds in student "academic" writing.[29] Somehow, professorial requirements are either not being stated clearly or are being misunderstood or ignored.

The Authority of Academic Literature

The high level of student confusion about the definitions of terms like "academic" and "scholarly" as well as a lack of understanding of why author credentials are important are phenomena encountered by academic librarians on a daily basis.[30] Even when students are able to cobble together bibliographies that meet their instructors' expectations, they are often not able to grasp why it matters that their resources should have a certain level of scholarship.[31] It is as if they believe they have been sent out to play an academic game whose rules are set by the professor for reasons unknown.

This is hardly surprising, given the disparity between professorial understanding of valid resources for research and the actual information world of the average student. A large number of research studies which show that students use Google and nonacademic Internet resources predominantly.[32] Many students satisfice with websites that provide "good enough" information. Even *Wikipedia* articles, after all, have endnotes and bibliographies. Discerning what more is needed to make information "scholarly" is baffling, even to students who are further along in their studies.

The Contradictory Authority of Student Experience

The Citation Project found that 77 percent of all student citations relate only to the first three pages of a source, regardless of its length.[33] This means that students are not engaging with their resources to any great extent. Neil Hogan and Connie Varnhagen discovered that, even when students do demonstrate understanding of criteria for critical evaluation of sources, they are not using those criteria to evaluate their sources in actual practice.[34]

Overall, many students fail to see the importance of evaluating resources.[35] There is a widespread preference for convenience of access over a more challenging search for more authoritative works.[36] In general, evaluation, when it is anything like a priority, is reserved for situations in which the research assignment demands such evaluation.[37] For the most part, students seem very

trusting of most information they receive and view the demand of professors to evaluate sources as an unnecessary requirement.

The Nature of Expertise and Its Resulting Authority
The Nature of Expertise and Authority

It is a truism that the authority embodied in any piece of information relies to a large extent upon the expertise of its author. Expertise comes through knowledge development and experience. In essence, expertise involves the ability to demonstrate a mastery of subject matter and to operationalize that subject matter in order to demonstrate a superior grasp of problems and solutions in a particular field. As such, it must both be developed over time and recognized by colleagues as well as by those who receive the pronouncements of "experts."[38] The resulting acknowledgment by the recipients of the expertise that it is valid and has power to lead to sound decisions constitutes the authority in the expertise.

Academic Challenges to Authority: Postmodernism and a New Information Environment

Let's take a moment to assess the background to the current challenges preventing ready evaluation of expertise and authority.

Expertise, by its very nature, separates the expert from the nonexpert. Such separation has led to many criticisms of the role of experts and, indeed, the means by which we may determine what is authoritative. Martin has put the problem this way:

> Once a group of experts has established itself as having exclusive control over a body of knowledge, it is to their advantage to exclude nonexperts. This occurs in many ways. A long and expensive training is commonly demanded before a newcomer can be accepted as an expert…. Most experts are full-time professionals. Those

> who might like to make an occasional contribution are
> not made welcome. Finally, many experts are arrogant,
> displaying contempt or hostility to amateur interlopers.[39]

Postmodernism, as embodied in the writings of Jean Francois Lyotard and Jacques Derrida, challenges all claims to authority, arguing that knowledge is mediated by the subjectivity of the receiver and thus can bear no claim to truth.[40] Postmodernism, indeed, has become pervasive in modern society despite clear signs that it is waning in some philosophical circles.[41] Peter Broks summarizes the influence of postmodernism as follows: "Indeed, there are no authorities. No final court of appeal to which we refer (or defer)."[42] The world of nature under postmodernism does not, for the scientist, reveal what we once thought it did: "What it tells us is no longer a single, unmediated, transcendent truth, but a historically contingent collection of stories in an anthology of little narratives. Its epistemological authority is shattered into a thousand pieces, a thousand local knowledges."[43] This, essentially, dissolves the boundaries between expert and layperson, making everyone an expert.

We see the results in the growing challenges to scientific and other authorities as well as in the common belief of our students that all information is essentially of the same nature, with none having more authority or believability than any other.[44] While we may applaud a new order that is breaking down the wall between the expert and the novice, thus allowing greater public involvement in the knowledge economy, it represents a significant challenge to students who must sift through a mass of information and discern which resources are more reliable than the rest. If there is no such thing as the authority of information, then we lack the means to discern what information is most worthy of our consideration. In contrast, academia asserts the principle, at its very foundation, that academic knowledge has an inherent authority.

Finding Equilibrium in Expertise and Authority

Collins and Evans have summarized the problem as follows: "Our question is: 'If it is no longer clear that scientists and technologists have special access to the truth, why should their advice be specially valued?' This, we think, is the pressing intellectual problem of the age."[45] In response, several scholars have found useful ways to navigate the postmodern landscape while at the same time not abandoning expertise and its resulting authority.

John Hardwig argues that, in our current context of specialization, knowledge is built through teamwork based on the trust of scholars toward one another. He writes, "For the alternative to trust is, often, ignorance. An untrusting, suspicious attitude would impede the growth of knowledge… Trust in one's epistemic colleagues is not, then, a necessary evil."[46] Therefore, as long as there is good reason to trust the statements of those who provide rational reasons for what they say, nonexperts should be able to rely upon those statements.

More recently Hardwig has argued that even experts must rely upon other experts from other fields in order to have the evidence to support what they are saying, so that, in the face of subject areas in which any of us lack expertise, we must trust others to speak to us reliably. To this end, he suggests an ethics of expertise for those appealing to experts. Specifically, his instruction is to seek the best-qualified expert but not to demand that this expert share your values or goals; recognize that what you are seeking may not be known or may be a matter of considerable disagreement among experts; understand that expert opinion is not infallible; and know that experts may be tempted to say what you want to hear, so that you need to correct for that tendency.[47]

Steve Fuller, responding to Hardwig's earlier work, has argued that simple trust in experts is fraught with the common problem that the goals of the expert and those of the novice are often different or even contradictory. To follow Hardwig's approach is to give in to an "authoritarian theory of knowledge" in which there is no logical reason to challenge the authority of an expert. For Fuller expertise only goes so far, and the receiver of expertise must then decide what to do with it, something the expert is not qualified to determine for anyone.[48]

In an attempt to reconcile these two views, Robert Pierson has argued that it is not rational to assume that a layperson can evaluate the claims of an expert: "The layperson lacks the training and competence of the expert. And, in lacking these qualities, she will likely be unable to understand the expert's reasons, or, even if she does understand them, she may not be able to appreciate why they are good reasons."[49] Thus, the layperson is not the peer of the expert. As Pierson puts it, "Hardwig grants sole epistemic authority to experts, while Fuller, to the contrary, grants it to laypeople."[50] The best course for Pierson, however, lies between these extremes. While we may have to defer to the expertise of those who are authorities in their fields, it is only rational for a layperson to challenge an expert's findings when those findings impinge upon the layperson's future course of action. Thus the expert may be seen as right, but the layperson is not thus required to follow the plan that expertise lays out. Warren, in agreement,

argues that authority in a democratic system must always be tempered by ongoing opportunity for critical challenge of that authority, even though not every authoritative utterance will necessarily be challenged.[51]

It is precisely in the potential abuse of expertise or authority that most scholars of this issue register their cautions. Daryl Koehn warns that the very concept of expertise may become the enemy to true authority. Expertise actively seeks a goal, and that goal may well be self-serving. True authority rests in the profession of the scholar, a profession that is guided by objective principles.[52] Thus, to the degree that any assertion comes from an expert whose motives may be in a conflict of interest with the objective goals of the profession or discipline, that assertion is open to challenge.

We might, in fact, wonder whether the academy as an authority vehicle is not just another version of the wisdom of the crowd, but on steroids. There are significant differences, however. The crowd is not governed by rules of evidence or even by a particular loyalty to the discipline under discussion. The academy carries with it a rich history, clear methodology, and deep expertise (the product of many hours working within the discipline, along with many debates among its members before judgments are finalized). We may challenge the whole academy as wrongheaded, out of date, and so on, but the very purpose of the academy, as elitist as it may seem, is to ensure that it has the mechanisms for quality control well in place.

A further warning comes from the work of Jojanneke Van der Toorn, Tom R. Tyler, and John T. Jost whose study revealed that those who feel most dependent upon an authority will be the most likely to defer to that authority and even to the prescriptive counsel of the authority.[53] Thus students, when they are dependent on the use of peer-reviewed literature for their ultimate grade, may be more inclined to accept that literature as true and valid simply because of their level of dependence on it.

We are left with a challenging mix of views about expertise and authority. Postmodernism, the World Wide Web, and the mythology of the wisdom of the crowd have ensured that uncritical acceptance of authority (if that ever existed) can no longer be sustained. Indeed, for many of our students, knowledge is flat, with none of it having more inherent authority than any other. This, of course, is an illusion, because none of us know enough not to need the guidance of those who know more than us. For academia, the exercise of cognitive authority is foundational. Our students need to acknowledge that reality but must also understand both how to discern it and when to challenge it. This is a difficult

prospect for the average student who lacks deep subject knowledge and thus possesses neither the criteria nor the skills to evaluate it effectively.[54]

Restoring Appreciation of Expertise and Authority in Our Students: The Options
The Professorial "Big Stick"

One fairly certain way to raise the level of authority of resources used by students is to encourage faculty to specify more clearly what "scholarly literature" actually means. Many students see the world of academic writing as a mystery: What makes a work scholarly? How do I find the scholarly? How will I know it when I find it? Professors should be taking a strong role in opening up the worlds of scholarship within their disciplines so that students can begin to grasp what makes a certain work important and another peripheral.

Librarians, as well, can facilitate this professorial agenda by guiding students to the types of resources that are more likely to win a professor's approval. Here, showing students how to determine level of scholarship in books is one approach. With regard to journals, those libraries who still provide access to individual academic databases (as opposed to discovery tools) can guide students in selecting academic or peer-reviewed articles from their result lists, often with the single click of a link to a scholarly subset of the citations in their result list. While not perfect, a database link to scholarly resources is better than no link.[55]

We might assume that simply setting the parameters narrowly would compel students to raise the authority level of their resources, but such an assumption is naïve. Raising the level of authority is no substitute for giving students the ability to evaluate resources well. A scholarly article may be deeply flawed in its arguments, yet a blanket professorial statement that peer reviewed is good and non-reviewed is bad can give the impression that students must believe what they find in scholarly literature. Clearly that is not always the case.[56] In addition, there are solid resources available that are not part of the peer-review system but may have been produced with all the rigor of peer-reviewed scholarship.

Let Them Figure It Out
Alternatively, we could leave the decisions about the authority of resources to

our students in the hope that, over time, they will begin to discern what information is most reliable. Miriam J. Metzger argues that students do better at the task of evaluation of resources when their motivation is high.[57] If professors base grades on a requirement to use high-quality resources, the motivation of students is increased, and they should make more effort on their own to find better information.

In essence, this approach is the status quo in academia, with professors often providing minimal standards and minimal criteria in the hope that students will find high-quality resources on their own.[58] The main problem here is that students, lacking deep content knowledge, are unlikely to choose well even if they know the best criteria to use and are well motivated. Sadly, for the majority of students, neither knowledge of criteria nor motivation to spend time evaluating is a prominent factor in their research.

The Checklist Approach

There are numerous checklists available that provide point-by-point guidance for evaluating information.[59] Particularly among novice students, checklists allow a step-by-step approach to thinking through the main evaluation criteria. Yet checklists are not without their critics, particularly Marc Meola, who argues in favor of "chucking the checklist."[60] Among his many criticisms, the following is salient:

> Another problem with the application of the checklist model in practice is that it can serve to promote a mechanical and algorithmic way of evaluation that is at odds with the higher-level judgment and intuition that we presumably seek to cultivate as part of critical thinking. The checklist format can give the impression that the checklist is a kind of machine that spits out correct website evaluations when given the right input.[61]

In Meola's view, the checklist results in students surrendering evaluation to a mechanical process and thus deprives them of the opportunity to further their own critical faculties.

It is possible to argue that checklists are not totally useless. They can be employed as general guides to the sorts of criteria students should look for in evaluating any piece of information. However, it is unlikely that many students,

except the most motivated, pay much attention to checklists. As Meszaros writes, "The *A* word that matters most to the undergraduate researcher is accessibility, not authoritativeness. Thus, a mechanical method applied to information evaluation—the checklist approach—often does little to address and challenge undergraduate epistemological beliefs because it is based on premises that undergraduates frequently discredit."[62]

The Alternatives

Several non-checklist approaches have been suggested. Meola puts forward a three-step process: promoting peer-reviewed resources, comparing sources, and finding corroboration for statements that are made.[63] Metzger suggests using a variety of approaches, from checklists to more basic intuitive evaluations, depending on how important it is that the information be evaluated.[64]

Steve Borelli and Corey Johnson make a strong case for professors introducing students directly to the literature of their field, explaining the nature of scholarly work as opposed to popular and teaching students what to look for within scholarly articles in order to derive the most benefit from them. Faculty should, as well, address the motivations of students in order to align these with a choice of resources that better fit the requirements of the discipline.[65] Wilson, in this regard, comments:

> Evaluation of a piece of the literature is clearly better when the particular work is seen in relation to the other works in the field; attempts at evaluation of a work in isolation are generally pointless. Seeing a work as part of a structured field is seeing it in an appropriate context for informed evaluation. Seeing a structured body of literature as a whole is also a prerequisite for informed evaluation of the whole literature.[66]

Sara Robertson Seely, Sara Winstead Fry, and Margie Ruppel found through empirical research that formative assessment by librarians of the evaluation work done by preservice teachers resulted in enhanced evaluation skills. Simply providing feedback on previous evaluation work may well be a strong path to improving students' appreciation of the criteria and judgments needed in evaluating information.[67]

A Way Forward

It might appear that insisting on peer-reviewed resources, along with teaching how to use a checklist, should be sufficient to ensure that students are discovering expertise and using resources that are authoritative. But we live in an age in which everyone is an expert (or no one is), an age dominated by search engines that lack the ability to grade information as to its level of authority. Thus, for good or ill, our students are often left without the skills to make good evaluations and, indeed, without an understanding of why they should need to do so.

The previous age is not going to return. Thus we must work with our current reality. The following are several suggested steps to improving student ability to discern expertise and authority:

1. Faculty need to be made aware that lack of information ability and a disinclination to find material of higher authority is a significant challenge to student education. The solution is not merely to insist on peer-reviewed resources but to teach students how the academic information in the discipline actually functions. Students need to read closely and interact with actual literature in the field to begin getting a feel for what constitutes a valid resource and what does not. To put it colloquially, they need to begin knowing it when they see it.

2. Librarians must stress to students the special nature of academic information. As an experiment, a colleague and I team-taught library orientation sessions to three sections of 150 students each. We established the following scenario: A student is required to find five peer-reviewed journal articles, from the previous five years, on climate change in the Arctic. My colleague did a search on Google and eventually found one article from *Nature* that fit the bill. Despite a great deal of effort, that was all he was able locate. I then used Academic Search Premier, enlisting its many search features. Within a few minutes, I had narrowed the topic dramatically with faceting (down to the plight of polar bears due to the climate change-related loss of Arctic ice) and located more than five highly relevant peer-reviewed articles from the past five years. The students were impressed. The lesson to take away was that authoritative academic literature is different from the run-of-the mill Google fare. Finding it takes special tools, and appreciating it requires recognition that it operates at a different level from the average website.

3. Students, almost counterintuitively, need to understand that we live in an age in which slavishly accepting information that is deemed authoritative because it is academic is as wrong as assuming that all information is flat and of the same kind, thus needing no special evaluation. Whether they use checklists or other methods such as those suggested above, they must become critical users of information in their own right. As their content knowledge grows and their understanding of the ethos of information in their disciplines becomes more finely tuned, their skills will develop.

4. We must recognize that no intelligent evaluation of the authority of sources happens without deliberate input from professors and librarians. We live in an increasingly complex and convoluted information environment. Including that environment in our instruction, that is, developing students who understand and can work well with the kinds of information available to them, is just as important as teaching content. Education about information as a system must come into its own as something integral to higher education as a whole.

The complexities of the concepts of expertise and authority in our information age demand more intentional solutions. Educators must teach those complexities and provide students with the ability to navigate the information environment with discernment. Anything less is a failure to educate.

Notes

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3. Harry M. Collins and Robert Evans, "The Third Wave of Science Studies: Studies of Expertise and Experience," *Social Studies of Science* 32, no. 2 (2002): 239; compare Harry M. Collins and Robert Evans, *Rethinking Expertise* (Chicago: University of Chicago Press, 2008).

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6. Paulo Freire, *Pedagogy of the Oppressed,* trans. Myra Bergman Ramos (New York: Seabury Press, 1970); Brian Martin, "The Politics of Research," in *Information Liberation: Challenging the Corruptions of Information Power* (London: Freedom Press, 1998), 123–42, http://

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8.   Martin, "The Politics of Research," 130.

9.   Philip Schlesinger, "Expertise, the Academy and the Governance of Cultural Policy," *Media, Culture and Society* 35, no. 1 (2013): 34.

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26.   Rosemary Chang, Gregor Kennedy, and Tom Petrovic, "Web 2.0 and User-Created

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27.   Weisser, "'Believing in Yourself' as Classroom Culture."

28.   Alison J. Head and Michael B. Eisenberg, *Finding Context: What Today's College Students Say About Conducting Research in the Information Age*, accessed August 15, 2014, http://project-infolit.org/images/pdfs/pil_progressreport_2_2009.pdf.

29.   A study of 174 research papers from 16 universities found that fewer than half the citations were from books, journals or government documents; the remainder were websites and news sources: Sandra Jamieson and Rebecca M. Howard, "The Citation Project: Preventing Plagiarism, Teaching Writing; Initial Data from the Citation Project Study of Student Use of Sources in Researched Papers from Sixteen US Colleges and Universities," last modified August 2011, accessed November 1, 2013, http://site.citationproject.net/wp-content/uploads/2011/08/Sources-Cited-in-the-Paper.pdf.

30.   Meszaros, "Who's in Charge Here?," 6–7.

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32.   The plagiarism resistance company Turnitin has done research on its extensive database of student papers that provides a clear statistical picture of the sources students use. Nonacademic resources predominate. The Citation Project found the same: Turnitin, "White Paper: What's Wrong with *Wikipedia*? Evaluating the Sources Used by Students" (Oakland, CA: Turnitin, 2013); Turnitin, "White Paper: The Sources in Student Writing" (Oakland, CA: Turnitin, 2013); Jamieson and Howard, "The Citation Project."

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38.   For an incisive analysis of expertise, see E. Summerson Carr, "Enactments of Expertise," *Annual Review of Anthropology* 39 (2010): 17–32.

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40.   Jean Francois Lyotard, *The Postmodern Condition: A Report on Knowledge* (Minneapolis, MN: University of Minnesota Press, 1984); Jacques Derrida, *Of Grammatology* (Boston: JHU Press, 1998).

41.   Robert L. McLaughlin, "After the Revolution: US Postmodernism in the Twenty-First Century," *Narrative 21, no. 3 (October 2013): 284–95.*

42.   Peter Broks, "The Authority of Science and the Postmodern Reformation," *Interdisciplinary Science Reviews* 28, no. 2 (2003): 81.

43.   Ibid.

44.   Frank, "Welcome to the Age of Denial;" Meszaros, "Who's in Charge Here?."

45.   Collins and Evans, "The Third Wave of Science Studies," 236.

46.   John Hardwig, "The Role of Trust in Knowledge," *The Journal of Philosophy* 88, no. 12 (1991): 707. Compare Tyler Burge's assertion, "A person is apriori entitled to accept a proposition that is presented as true and that is intelligible to him, unless there are stronger reasons for not doing so," in Tyler Burge, "Content Preservation," *The Philosophical Review* 102, no. 4 (1993): 469.

47.   John Hardwig, "Toward an Ethics of Expertise," in *Professional Ethics and Social Responsibility*, ed. Daniel E. Wueste (Lanham, MD: Rowman and Littlefield, 1994), 83–101.

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49.   Robert Pierson, "The Epistemic Authority of Expertise," *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 1 (1994): 401.

50.   Ibid., 403.

51.   Warren, "Deliberative Democracy and Authority."

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57.   Miriam J. Metzger, "Making Sense of Credibility on the Web: Models for Evaluating Online Information and Recommendations for Future Research," *Journal of the American Society for Information Science and Technology* 58, no. 13 (2007): 2078–91.

58.   See the evidence from the Turnitin and Citation Project studies, note 30.

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62.   Meszaros, "Who's in Charge Here?," 8.

63.   Meola, "Chucking the Checklist." For more on the role of corroboration see Alvin I. Goldman, "Experts: Which Ones Should You Trust?," *Philosophy and Phenomenological Research* 63, no. 1 (2001): 97.

64.   Metzger, "Making Sense of Credibility on the Web."

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67.   Sara Robertson Seely, Sara Winstead Fry, and Margie Ruppel, "Information Literacy Follow-Through: Enhancing Preservice Teachers' Information Evaluation Skills through Formative Assessment," *Behavioral and Social Sciences Librarian* 30, no. 2 (2011): 72–84; compare William B. Badke, *Teaching Research Processes: The Faculty Role in the Development of Skilled Student Researchers* (Witney, UK: Chandos Publishing, 2012).

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