Chapter Three

The Wisdom of a Crowd of Experts

Finding Reliable Scholarly Research

No truths—not even mathematical truths—can be considered secure for all time. But over time and with the openness afforded by the Internet, we have a greater likelihood of establishing truths than during any previous era of human history.
> —Howard Gardner, *Truth, Beauty, and Goodness Reframed* (2012)

Ray Tomlinson, a sixty-two-year-old from Warren, Michigan, just wanted to get home quickly: driving from Arizona to Michigan was a long trip. When his girlfriend sitting in the passenger seat turned out to be not sleeping but dead from a drug overdose, he knew what to do. Whipping out his smart phone he searched for the laws in Arizona on how soon you were required to contact the police if someone dies. Warren police Sergeant Stephen Mills, who later arrested Ray, related:

> "He then does an Internet search via his phone . . . He says he finds on the Internet that he has 48 hours to take her to a medical examiner."[1]

The police Sergeant then explains that the information on the Internet was incorrect.

What did Ray do wrong? Where do I begin . . .

By starting and ending with a Google search and not thinking through his search strategy, Ray probably violated all six of the following strategies for finding reliable information online.
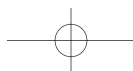
1. Start at the Source

Ray likely popped into one of the first items that came up in his Google or Siri search rather than "starting at the source." He should have at least gone to an official law website and started his search there. He could have started with a Google search if he was thinking about searching for a *source* rather than a piece of information:

> Google: *Arizona Statutes "report a death"*[2]

He also could have relied on librarians who have created guides, called "LibGuides," for every topic imaginable. These guides link to free and proprietary resources online. If you have access to a library these guides link directly to library-owned sources, but they also point the way to the best free resources, such as Findlaw, a great source for finding legal information.

> Google: *Libguides Free Legal Resources Web*

Legal searches are tricky. They are a unique kind of scholarly research. Often the best way to find official laws or regulations is to take a back-door approach. The search above will lead you to some unofficial legal sites that provide easy access and will identify the law by name and number. That gives you the information you need to then locate the official law. Once you have the statute number, in this case Title 36:344, you can go straight to the Arizona statutes.

> Google: *Arizona Statutes*

Then simply look up the Title number to make sure that this law is still accurate, up to date, and in force—that it is still "good law."

2. Pay Attention to the "Psychology of Search"

Ray was suffering from a strong case of *motivated cognition*. He really wanted to drive quickly from Arizona to Michigan and not be bogged down with reporting the death of his girlfriend. He searched and found what he wanted to find. That did not make it true. In addition, *confirmation bias*—giving greater credence to information that agrees with Ray's personal perceptions—and *false certainty*—not even recognizing the possibility of uncertainty—were also at play here. This is human nature, many of us automatically start searching online for what we *want* to be true.

3. Expert, Amateur, Crowd?

In the case of law the searcher needs to consult official documents or an expert. It is not a good idea to rely on WikiHow or About.com for legal advice.

4. Context, Motivation, and Bias

If you are on an official legal website—such as the Arizona Revised Statutes that are on a .gov site—then you are all set. Ray was not on an official site.

5. Comparison and Corroboration

Ray only looked at one site, an unofficial site. For a legal question, if you are verifying that something is not a potential felony, you may want to consult a few sources or even call a lawyer. In Ray's case he was committing a misdemeanor and the police went pretty easy on him, though he did get into the national news. Perhaps that was punishment enough for poor judgment *and* poor search skills.

6. Go Deep, or Not

Relying on the first page of search results in a Google Search is the opposite of going deep. For a legal question like Ray's, expect to spend more than two minutes wading through the law. A surprising number of people believe that coming up in the first five search results in Google is a sign that a piece of information is trustworthy.[3]

Often when we search for something online we think we are shooting for a "yes" or "no" or one-sentence answer:

Who won the World Cup in 2014?

But many questions do not have simple answers, even when it seems like they should:

Does bologna contain lard?

Research questions are frequently more nuanced and complex. In the social sciences, such as psychology or anthropology, there is typically no right answer, but some answers are better than others and represent current knowledge in the field. In his book *Thinking, Fast and Slow*, Daniel Kahneman writes about our tendency toward fast thinking and experiencing false certainty.[4] We default to fast thinking and draw instant conclusions based on whatever information comes up first in a search. Instead, we should dig a

little deeper, check out the source of the information, and understand that the answer might be more nuanced. Some bologna may contain lard and some may not.

GOING DEEP

When a new client approached me about helping her with a research question she had already gone way past our Arizona driver Ray in doing her homework, but she had turned up conflicting results and was confused about how to proceed. Maya is the CEO of a tech start-up that is about to design a new office space. They just received an infusion of venture capital and are planning the usual type of start-up space: an open-plan shared workspace with primary colors, connected couches, shared desks, ping pong tables, and Razor scooters. Many start-ups mimic the open-plan office layout found at successful workplaces such as Google. Maya read in the business section of the *New York Times* an article by an experienced journalist*:*

> *They've [Google] looked at the data to see how people are collaborating. Physical space is the biggest lever to encourage collaboration. And the data are clear that the biggest driver of performance in complex industries like software is serendipitous interaction.*[5]

But Maya has also just read the following opinion piece in the *New York Times* written by a respected author:

> *Studies show that open-plan offices make workers hostile, insecure and distracted. They're also more likely to suffer from high blood pressure, stress, the flu and exhaustion. And people whose work is interrupted make 50 percent more mistakes and take twice as long to finish it.*[6]

Journalists are famous for using phrases like "studies show," but unfortunately, many newspapers do not provide citations to these "studies" that "show." Maya asks me to do a comprehensive literature review. She wants a summary of all the research to date on this topic so that she can make an informed decision. In essence, she wants me to go deep, but also go fast.

Go Deep is my middle name.

GO DEEP, BUT FIRST POKE AROUND

Spenser, the fictional detective in Robert Parker's novels, typically starts his search for the bad guys by doing a little poking around. Like doing research, Spenser wants to get a sense of where things currently sit:

Hell, I don't know [what I'm doing]*, Mr. Esteva. I don't know what's going on so I wander around and ask questions and annoy people and finally somebody says something or does something then I wander around and ask questions about that and annoy people and so on. Better than sitting up in a tree with a spyglass.* [7]

A comprehensive literature review involves methodically finding any relevant research that has been done on a topic, but there are also elements of serendipity. It helps to start by poking around to see what is out there, to come up with a list of keywords to search for, to carefully define and refine the topic, and to see who the expert players are that are working in a particular area and find out the current buzz.

You cannot do a comprehensive literature review on any topic. If a client came to me and asked me to do a comprehensive review of the research on ADHD I would say: "Give me a ten-year contract or forget it!" Really, what I would say is:

"What about ADHD? ADHD and medication? ADHD and young children?"

Interestingly, you can discover the most common searches that people do for ADHD by typing ADHD into Google. Google has an "autocomplete" feature called "Google Suggestions" that lists a handful of the most common searches that have been done recently related to ADHD. If you search:

Google: *ADHD*
The suggestions are:
ADHD test
ADHD in adults
ADHD medications

Bing and Yahoo have a similar mechanism for calling up frequently searched terms. The practice can be surprisingly powerful and controversial. A skydiving company was upset when searchers entered their company name in Google and the first suggested autocomplete word was accident. There had been a recent accident at the company, but they did not want to have that be immediately associated with their name in a Google search. Some companies hire *mechanical Turks* to do thousands of searches on a company name combined with positive words in order to push down negative words that come up next to their company name in autocomplete. [8]

What is great about Google autocomplete is that it will reflect recent searching trends, it is not just a sum total of searches. If President Obama were to suddenly confess he has ADHD, that item would likely come up in autocomplete when searching ADHD. In short, autocomplete can suggest the

most recent popular ways people have tried to break down a topic, and this can be helpful in pointing to the recent thinking about a topic.

I riff on a number of different keywords for the concept of open offices and find that "open-plan office" seems to be the most common term. Then I search simply:

Google: *open-plan office*

If I type a space after office, I get suggestions like "vs. cubicle" or "office etiquette." If I add a space before my search I get "advantages of" and "working in."

Though not always useful, autocomplete can sometimes provide a quick pointer to what key issues relate to a topic. For example:

Google: Dalmatians SPACE
Retrieves:
101 Dalmatians
102 Dalmatians
Are Dalmatians mean?
Are Dalmatians deaf?

Interestingly, Dalmatians are more likely to be deaf than any other dog breed, and they can also be overly aggressive, and sometimes this is related to hearing issues.

Starting a literature search on anything is a process of finding out how big that something is. What is included? What is left out? I search:

Google: *open-plan office* (490,000 results)
Google: *"open-plan office" design* (206,000 results)

Using quotes to get the exact phrase and adding another keyword limits and focuses my results. Many of the articles that come up first are free articles that are plugging a particular furniture company. Several of the top items retrieved are articles in *Forbes* and *Businessweek* that are interviews with office design companies pushing their products while discussing "the re-search." But no one actually cites a scientific research article. While I used to think of *Forbes* as a reliable business magazine, I was surprised at the quality and amount of content I was seeing. By generating oodles of fresh content *Forbes* was guaranteeing a top landing place in search results, and by having content that was connected directly to advertising—native advertising— Forbes was ensuring a high revenue stream. In 2013 Joe McCambley, an advertising expert, interviewed by David Carr, the former media critic for the *New York Times,* said:

> *What I love about* Forbes *is that they have the guts to take risks, to experiment, but I think some of it is dangerous. When you go to Forbes, you expect sound business advice and news, information that has been fact-checked and vetted. But what you get instead is a mix of staff content, contributor content and sponsored content. It's hard to know where you are.*[9]

I decide to better define my question to avoid the sponsored content and get at something deeper. What my client is really interested in is office design in relation to productivity. I add this filter to my search:

Google: *"open-plan office" productivity* (38,000 results).

It may seem silly to gauge hit counts because for now I am only going to view the first few pages of results, but adding in specific words such as productivity to narrow my results can limit the type of information I retrieve. I can also use words like "research" or "study" and so on. I again breeze past the puff pieces and notice a *Scientific American* article listed in my results. Though it is not research per se, *Scientific American* is better at citing sources and presenting unbiased journalism than some of the lighter business oriented publications that are more focused on selling advertising.

The *Scientific American* article gives me a nice introduction to the history of open-plan offices. I also pick up a few articles from the *New York Times* and the *New Yorker*. Both publications are famous for fact checking their stories, especially the *New Yorker*. They are the gold standard of fact checking, spending weeks and in some cases months corroborating every fact mentioned in a story.[10]

I pull together enough background information to get the big picture: designers and architects invented open-plan offices to improve office life. These designers felt that by bringing down walls and bringing people together office life would become more democratic and less hierarchical. Modern architects such as Frank Lloyd Wright designed spacious and flexible open plans that would "liberate" office workers, but employers often saw open offices as an opportunity to save space and money. They plunked office workers into rows of desks squished together. These are sometimes called "bullpens" and they predate cubicles and open-plan offices. In the 1950s a German design group suggested breaking up the uniform rows of desks in a bullpen into smaller groupings based on work assignments.

In 1964, following in the footsteps of the German designers, Bob Probst, an artist and sculptor, joined forces with the furniture company Herman Miller to create the "action office."[11] Their goal was to provide more flexibility for the worker: desks at standing and sitting height, larger surfaces, and modular components that could be re-configured when needed. Unfortunately, many employers again saw cost savings and control advantages and selected the parts of the modular plan that would allow them to squeeze as

many workers as possible into the same space. Probst was horrified by what had been done with his idea of modular flexible space. The bullpen later morphed into the cubicle by inserting dividers when people had trouble working due to distractions, noise, and lack of privacy.

Today 68 percent of all offices have an open floor plan, with or without partitions, and the number is increasing.[12] At the same time, people seem to fall into two camps on whether the open-plan office increases or decreases productivity:

> *This open style of work, insists Mr. Rouady, an employee of Netscape Communications, is best done in an open setting—where workers are separated only by low partitions instead of being walled off behind closed doors in individual offices. "The programming code we write has to work together seamlessly so we should work together seamlessly as well," he said.*[13]

The computer company Intel, like Netscape referenced above, has been pro-cubicle and open-plan since just after its founding in 1968. On the other side of the fence, Microsoft's corporate offices follow the vision of Bill Gates and Paul Allen, who are crystal clear that software programmers work best alone with individual offices and few distractions:

> *"Every time we revisit the issue of having open-plan offices, it is roundly rejected," said Nick MacPhee, the general manager of real estate and facilities. "The reaction borders between horror and hysteria."*[14]

Recently Microsoft has gravitated toward a combination of private office space and open plan. One extremist in the debate has been Michael Bloomberg. When he served as mayor of New York from 2002 to 2013 he went retro and put almost everyone in city hall into one large bullpen with Bloomberg's desk front and center. Bloomberg adopted the plan from his days working on the Wall Street trading floor and also designed his corporate offices this way. Incoming Mayor Bill de Blasio decided not to dismantle the bullpen due to expense, but he quietly took a private office on the floor below.

While some office design firms tout all kinds of new "research" advocating for open-plan offices, most of the web pages that come up in top Google searches rail against them:

- "The Open Office Trap." *(New Yorker)*[15]
- "Ending the Tyranny of the Open-Plan Office." *(Business Week)*[16]
- "Study: Open Offices are Making us all Sick." *(Wall Street Journal)*[17]
- "Open-Plan Offices Were Devised by Satan in the Deepest Caverns Of Hell." (*Guardian*)[18]

While the negative articles were in the majority, there were also a few on the other side of the fence:

"Open-Plan Offices: The New Trend in Workplace Design." *(Slate)* [19]

Many people would stop after reading five or six articles from recent and reputable newspapers and magazines touting the latest studies, and sometimes this can be enough. But for me this was just scratching the surface. I decided to wade deeply into the story behind the story, and the current quickly pulled me out, deep.

SATISFICING: EAT FISH!

Satisficing is an idea developed in 1956 to explain why people often pull together a limited amount of resources in order to find "good enough" information.[20] The theory predates the widespread use of the Internet by decades, and the behavior has probably gone on for centuries. It is not about being lazy. It is a practical coping technique because we are all bound by time limitations. Professor Metzger and others have shown that for important decisions we choose to spend more time searching for information, but for decisions we make daily and weekly at work or as consumers we tend to "satisfice" with a few quick searches.[21]

Often satisficing is combined with other strategies called "heuristics" to save us time. Confirmation bias, for example, is our tendency to view information as credible if it confirms our preexisting beliefs, and not credible if it counters our beliefs.[22] Combine this with the tendency people have to only look at the first five search results in Google and we get many people relying on a lot of unreliable information. Many of us also have a strong need for closure, and this also impacts our credibility assessments. Researchers have found that when people are experiencing a high degree of "need for closure" they are more likely to seize on the first piece of information they find because their primary goal is to get an answer quickly.[23]

In looking for information on office plans I could feel the urge to "satisfice," and also my confirmation bias was trying to gain control. I had worked as a research librarian for twenty years and in my last year there we transitioned overnight from having private offices to an open plan. I hated it. My initial foray onto Google was confirming all my deep-seated biases. Open plans were noisy, stressful, disruptive, and so on. I found myself wanting to minimize the handful of articles that were positive. While satisficing and the confirmation bias have been problems for many decades, this type of behavior is quickly magnified when searching online. Sometimes we even set ourselves up to confirm what we already believe by searching using terms that bias our findings from the start.

Newspaper and blog writers feed our need for satisficing. They grab one study and declare: *Eating Fish Is Good for Your Heart!* They do it because it works. Readers want a simple story with clear conclusions. They do not want to get bogged down with all the details: should the fish be farmed or wild? Tuna or salmon? Were the studies done with a randomized and large enough sample of subjects? We often just read the headlines anyway: Eat Fish!

PROOF BY REPEATED ASSERTION

It is always tempting to take a shortcut on the path to finding reliable information. I am committed to getting to the bottom of the research on open-plan offices, but if there is an easy way to get the full story quickly, that would be great. As I pop around looking at blogs and news articles a definite pattern was emerging. I keep seeing references to the same study and the same man. Apparently a researcher from Queensland University of Technology (QUT) in Brisbane, Australia, I'll call him "Dr. O.,"[24] had done an extensive review of the literature on open-plan offices. Dr. O. was quoted as saying:

> *In 90 percent of the research, the outcome of working in an open-plan office was seen as negative, with open-plan offices causing high levels of stress, conflict, high blood pressure, and a high staff turnover.*[25]

What is weird about the Dr. O. quote is that it is *everywhere.* In fact, almost every article I read as I pop around my search results has the Dr. O. quote of "90 percent." Dr. O. also offers heady sound bites about open-plan offices negatively impacting productivity and rails forcefully against this type of design by saying it caused so many problems there might be employee lawsuits down the road due to the stress the open-plan office might cause.[26]

Digging a little further, not surprisingly, I find that Dr. O.'s research is one of a handful of citations listed on Wikipedia under the subject of "open-plan offices." It is hard to know which came first: did Dr. O. do the study, get interviewed by a journalist, and then get cited in the Wikipedia article? Probably, and then all the other writers picked up the sound bite from either the first writer or from Wikipedia. Unfortunately, the link on Wikipedia does not go to the actual review study as promised, but instead links to yet another brief news article, this time from an Australian health site summarizing his research review.[27] In this summary, Dr. O. is quoted as saying:

> *The evidence we found was absolutely shocking!*

As I dig around more I find over 1,000 brief articles on the Web quoting Dr. O. saying how shocking his findings were, and just short of 1,000 of them cite the "90 percent" figure. I am stunned by the popularity of Dr. O.

Perhaps his review of the research is so extensive and his expertise so vast that this had made him *the* authority on open-plan offices.

Here is Dr. O. in Japanese railing against open-plan offices and referencing his study[28] (thank you Google translation!):

研究报告作者乌曼（**V** ▮▮▮▮ **O** ▮▮▮▮▮▮）指出，员工觉得压力大，血压升高，以及冲突多和流动率快，都与开放式的办公环境有关。 乌曼在这项发表于"亚太健康管理 ...

Here he is in Vietnamese, next to advertisements for cubicle partitions:[29]

Jul 4, 2014 - **V**▮▮▮▮ **O**▮▮▮▮▮▮ một chuyên gia sức khoẻ cộng đồng của ĐH Công nghệ ứng dụng Queensland (Brisbane, Australia), cho...

And in Sweden, here is Dr. O., popping up like a "Where's Waldo?" in yet another article about open-plan offices making employees stressed and ill:[30]

Den **australiske forskaren V**▮▮▮▮ **O**▮▮▮▮▮ har **funnit** att 90 procent av studierna om arbetsmiljön i öppna kontorslandskap talar emot en sådan ...

He is even featured in a brochure for an acoustic sound-masking company to help with the stress-inducing noise levels in open-plan offices, and he appears in a Google image search, a friendly smile on his face as he stands in front of a group of low-partitioned office desks.[31]

There is a phenomenon called "proof by repeated assertion" that occurs when a piece of information is repeated over and over again. This repetition reinforces the idea that because so many sources have reported it as true it therefore must be true. Combine this with the re-blogging and re-tweeting of the same story ad nauseam and you have a problem. When journalists and bloggers do not do their homework and then parrot each other, one piece of information becomes magnified a hundredfold. I wondered if the journalists who reported on the study had even *read* it. Many of them quoted Dr. O. in a way that implied they had each directly interviewed him, but it was the same quote in each story, suggesting that he was probably only interviewed once and then the story was parroted around what might be called "the shallow web."

With over 1,000 sources pointing to Dr. O. I think it possible that his study can answer all of my client Maya's questions, but my gut is telling me otherwise. There is something about his quotes in the articles online that seem off. It is rare for a researcher to say how "shocked" he is by the research or to make wild assertions about potential lawsuits. My guess is that

the open-plan office issue is not as black and white as Dr. O. proclaims. It is time to track down the real research review and see if it holds water, and to do a little more digging into Dr. O.'s credentials.

Having just read Daniel Kahneman's book *Thinking, Fast and Slow*, I congratulate myself for not getting sucked into false certainty and not jumping to instant conclusions. Instead I recognize the possibility of uncertainty and know I need to investigate the quality of the information. Kahneman encourages us to think slow: "to doubt, hesitate, qualify."[32] He encourages skepticism. I am skeptical of Dr. O.'s study, but can 1,000 blogs and articles be engaged in fast thinking and false certainty? Even reputable publications like *Scientific American*? This seems hard to swallow.

WALKS LIKE A DUCK?

In the social sciences, like the sciences, there is primary research and then there are reviews summarizing and analyzing piles of primary research. Primary research consists of real experiments. To oversimplify: researchers take x number of subjects and expose them to some experimental condition and see what happens. The best research uses a randomized design for putting participants into control and test groups, they are double-blind, meaning participants and scientists do not know if a subject is in the experimental group or not, they use a large number of subjects, and the study results are repeatable by others. They are written up in scholarly journals and they follow a common format:

- Abstract
- Introduction
- Method
- Results
- Discussion
- Literature Cited

Most of these articles begin by touching on related research to demonstrate how this research builds on the work of previous studies. Those bumper stickers that read, "everything is connected" are not referring to the scholarly research process, but they could be. No one does useful research in a vacuum.

Below is a picture that demonstrates the interconnectedness of scholarly research. The image in the center is an article reporting on primary research. To the left are articles that the center article cites, the research that the center article is building on and thus obligated to cite. To the right are articles on research that took place after the center article had been published and cite it
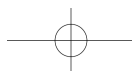
in their new research. This new research is furthering the conversation about a topic. It is easy to see that an article has followed proper etiquette if it contains a lot of citations on the left by citing previous research; it is also easy to see how influential an article and its research is by seeing how many researchers have cited the article after it was published, the pile on the right.
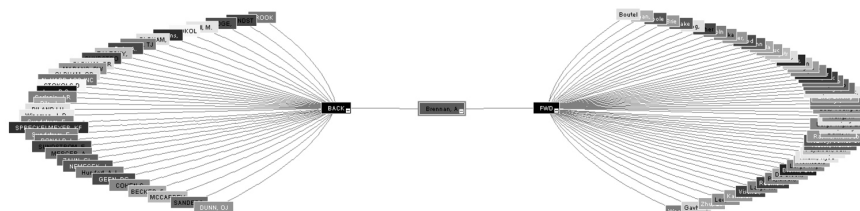
The Scholarly Research Process: Everything Is Connected. [33]

Reviews of the literature, on the other hand, take dozens and frequently hundreds of research articles and condense, summarize, and analyze the results. Sometimes they draw new conclusions based on their survey; sometimes they just provide a summary and analysis of the current state of the field.

Reviews of the literature vary in quality, sometimes cherry-picking studies to serve a particular researcher's agenda, but when they are done well they are comprehensive, systematically conducted, and cover a carefully defined area. [34] The authors will typically explain the procedures by which they conducted their review and they summarize and draw conclusions about the current state of an area of study. I know that if Dr. O's review holds up it will save me days of research and reading.

I track down Dr. O.'s review using Google Scholar, a fantastic and comprehensive search engine of published scholarship. Fortunately Dr. O.'s first and last names are unusual. If it had been a common name I would have thrown in subject keywords as well. Also, unlike many articles in Google Scholar, Dr. O.'s article was open access so the citation linked directly to a PDF. Had it been unavailable I would have been stuck paying for it or getting it via a library.

With the tremendous growth of information on the Web, evaluating information has been foisted onto the searcher. Publishers, libraries, and bookstores used to provide robust filters that excluded much of the commercial drivel that now populates the Web. The downside was that they also suppressed or curtailed innovative ideas that were not quite ready for prime time. There are many benefits to having access to greater amounts of information, but finding quality information has become more challenging as a result. While Google Scholar selects only scholarly information, it casts a large net and uses a broad definition of scholarship, but it provides access to much

more reliable and scholarly information than a search on just Google, and it leaves out most of the marketing and advertisement pieces.

Just because an article appears on Google Scholar does not mean it is completely reliable research, though it is much more likely to be, and it is more likely to have been subject to some type of vetting and review process. My next step is to carefully evaluate Dr. O's article. Howard Rheingold and University of California Berkeley Libraries have both developed useful checklists and criteria for evaluating information (e.g., Currency, Reliability, Authority, Purpose).[35] At the same time, some experts, such as Marc Meola, warn searchers against leaning too heavily on checklists for evaluating information because checklists can encourage a mechanistic way of evaluating that is at odds with critical thinking.[36] Going down a checklist can become rote. Meola advocates using a contextual approach by shooting for peer- and editorially reviewed resources when possible, and using comparison and corroboration to verify information. Researchers from Hofstra University agree and state that the gold standard for evaluating research should be peer review, the credentials of the author, the reputation of the publisher, and the degree and quality of documentation provided.[37] I decide to use a combination of checklists and deeper contextual approaches.

Ultimately any evaluation strategy also needs to include a critical reading of the work using a healthy amount of skepticism while digging into the context of the research itself, where it came from, and what other research has been done in the field.[38] While I usually start with author credentials, I decide to dig into other evaluation criteria first:

1. Relevance?

This seems kind of obvious, right? It's about open-plan offices, so it must be relevant. Over 1,000 journalists and bloggers referenced it as pertaining to open-plan offices, but when I look at the title the focus is not what I expected:

> *Should Health Service Managers Embrace Open-plan Work Environments: A Review.*

Health service managers seem like a different type of worker than the software and marketing people that would be working in my client Maya's start-up. Health service managers face issues such as confidentiality that might impact whether they should be in an open-plan office. None of the online articles from the media had referenced the specific health service management focus. Perhaps Dr. O. reviewed the general research on open-plan offices to apply it to the needs of health service managers?

2. Context?

The discussion of context involves where the information is situated: is it on the web page of a corporation? Is it issued by an organization that has an agenda? Is it published by a scholarly body striving for objectivity?

Dr. O.'s information was wrapped in what appeared to be a scholarly journal titled *Asia Pacific Journal of Health Management.* Though the focus was on health management, not what I was looking for, the journal looked reputable. Scholarly journals contain articles written by researchers, professors, and graduate students. They are peer reviewed or refereed, which gives them a high level of credibility, because experts working in the same field review them.

To ensure that an article is in a scholarly journal, the quickest check is to search Ulrichsweb Global Serials Directory available online via most libraries. Pop the title of the journal in and a cute symbol of a referee shirt appears if the journal is peer reviewed. Dr. O.'s journal had the referee shirt—a good sign.

I decide to go one step further and figure out the Journal Impact Factor (JIF). This is an excessive move, but I am going deep. The JIF measures the frequency with which the average article in a journal has been cited year by year. It is a flawed measure, and is sometimes accused of being like a popularity contest, but I was not going for a high JIF, I just wanted to make sure the journal *had* a JIF score.

The JIF score can be found in the *Journal Citation Reports* within the proprietary database Web of Science (WOS)[39] that is found in many libraries. Strangely, Dr. O.'s journal is not included in WOS, a comprehensive database of scholarship. While WOS uses a more restrictive definition of scholarship than Google Scholar, almost all published English-language scholarly journals are found there. No go. Makes me think the *Asia Pacific Journal of Health Management* walks like a duck, talks like a duck, and is refereed like a duck, but maybe it is not a duck, or at least not according to WOS.

Searching Google to get to the publication website turns up a dead link. Information in the dead link provides me with a lead that the journal is a publication issued by the Australasian College of Health Service Management. While it is technically refereed, it is more like a newsletter that covers reviews of research and book reviews, which must be why WOS has snubbed it—no original primary research. I'm glad Google Scholar has a broader view of scholarship, because it provides a nice counterpart to WOS, and I never would have found the publication otherwise. Ultimately I conclude that though it is not a rigorous scholarly journal, the college that issues it has no specific agenda other than to share useful information with health service managers.

3. Length?

Often length does not seem important, but for a comprehensive literature review it should be long: A typical scholarly literature review is thirty or forty pages. Dr. O.'s review is only six pages.

4. Methodology?

For a literature review this is crucial. Dr. O. and company explained their search criteria: They had chosen appropriate journal databases to search, though they had included a preponderance of medical databases, including PubMed, Medline, and CINHAL (nursing). They listed the keywords used in searches and included negative words such as "office crowding," "office noise," and "office privacy," which could slant the search results. Not a deal breaker, but it would have been nice if they had searched for words like "collaboration" as well.

5. Timeliness?

Timeliness can mean different things. For some disciplines, like science, timeliness means the last year or two. A review of the literature from ten years ago for the treatment of colon cancer is useless. For my purposes I would accept something within the last few years. Dr. O.'s study was six years old, meaning the research reviewed would have been older than seven years, but more concerning was that Dr. O. indicated he had put no time limit on the research he reviewed. Many of the studies cited were old, from the 1970s and 1980s. While the expectation is that a deep review should cover older material, the older studies he referenced constituted half of the sixty studies cited.

   In Dr. O.'s favor, they had used a snowballing strategy. This involves taking each article found and tracking down the articles cited at the back of that article. Unfortunately, they do not mention tracing forward to find out what articles were citing the articles they retrieved, so that they could get the most current research. This can be done with the click of a link on WOS or Google Scholar.

6. Balance?

In reading the review itself I find a balanced analysis of open-plan offices. The last page contains a chart listing seven advantages and ten disadvantages of the open office. This seems disconnected from the media reports that quote Dr. O. denouncing open-plan offices. I found no mention of the 90 percent figure so widely quoted online. The review itself makes no mention of that figure. Near the end of the review the authors write:

Just because a workplace has an open-plan design, does not mean low employee productivity.[40]

What had happened between publishing the literature review and Dr. O.'s brush with the media? Had he gotten caught up in his "fifteen minutes of fame" and let loose his feelings of hatred toward open-plan offices? Or had the media misrepresented their interview with Dr. O.?

FINDING DR. O.

I decide that this "literature review" is not deep enough for my purposes. But I am intrigued. Why had so many writers quoted Dr. O. and his study? Was it just like a bad virus that spread around the Web? Was it a product of lazy journalists? *Just who is this Dr. O.?*

According to the article, Dr. O. is listed as "Senior Project Officer," and his coauthors are listed as "Executive Officer" and "Research Assistant," respectively. Dr. O. is listed as a "Dr." in the article, but there is no Ph.D. following his name, instead he is listed as:

BDS, MHlthSC, CertMRC, DipMedDent, AFCHSE, CHE

I am not kidding: six degrees. I look up some of them and figure out that DipMedDent may be some type of graduate degree in dentistry though it is rare to see it listed as DipMedDent, even in Austalia. Not exactly the expertise needed for what falls under industrial and organizational psychology, business management, or possibly architecture and design. The coauthors are listed as "Mr." and "Ms." One has a physical education diploma and the other has a nursing degree. Many of the media reports call Dr. O. "a researcher from Queensland." I had assumed he was on the faculty or was a researcher with a Ph.D.

I cannot locate his resume online and when I check Google Scholar for a list of his other publications I found only a few on various medical subjects, all published within a two-year period of the open-plan article. I decide to email him and ask about the 90 percent figure: where did it come from given that it did not show up in the research review? I look on the Queensland website in the staff directory and do a search combining his name with Queensland.

There is no Dr. O. listed there!

Any sane researcher would just move on at this point. It was time to see if there was a better review article out there or create my own literature review. But I am captivated. How had Dr. O. become *the* spokesperson against open-

plan offices? Was there some commercial payoff or personal agenda in-
volved? I clear my schedule for the week to track down Dr. O., his study, and
everything I can find that relates to it.

I begin to feel like the central character in a detective movie with every
new piece of evidence dragging me in more deeply. My husband and chil-
dren throw up their hands in defeat, slipping dinner under my study door . . .
again. My eyes are burning from too many hours on the computer, but what I
begin to uncover is too hard to resist—like pulling at a loose sweater thread
and watching the entire garment unravel.

THE ART AND SCIENCE OF FINDING PEOPLE

Finding information about people online is both an art and a science. If you
are trying to determine if a researcher is legitimate, a quick Google search
with their name and institution or logging on to the staff directory at their
university it typically enough. In most cases there will be a vita or resume,
publications list, courses taught, and information about research interests.
These people want to be found. If that fails, as it did with Dr. O., it begins to
raise a red flag.

Most of us, whether we admit it or not, have searched—maybe even a bit
obsessively—for someone on the Web. If their name is unique or unusual it
can be easy, but if they have a common name or are not active in social
media a more strategic approach is needed.

Once you have exhausted initial Google Searches—either because noth-
ing is coming up or too much is coming up—searching for people can be
broken down into four types:

1. Social Media

Most people have a social media profile unless they are in a witness protec-
tion program. Facebook is the most widespread, but if it is a common name
and there is no known geographic location it can be challenging.

Graph search, on Facebook, lets you search for people by geographic
location, institutional affiliation, hobbies, college attended, and even whether
they "like" a certain restaurant. More people are turning on their privacy
settings, but they cannot prevent searchers from viewing their name and
profile image, if they have one. Sometimes you can glean just enough from a
Facebook page to then do an improved Google search.

As you pick up bits and pieces of information, combine them and plug
them into sites such as Twitter, LinkedIn, Google+, and Tumblr. You will
need accounts on these sites to do this. Try searching for their name in a
Google image search: If you find an image, then link back to its origin.[41] If
you find a photo they have posted on Instagram you can run it through a site

called The Beat. Developed by Rutgers students, it combines Instagram photos with a Google Street View of the photograph's location. Usually it will give you both the location of the photo and the time the photo was taken, helping you pinpoint the location of the person.

LinkedIn is becoming more useful for locating people and seeing where they work. If you are secretly tracking down an old flame or future romantic partner, *log out of your own account first,* before scanning their site. People who have enhanced subscriptions to LinkedIn can tell who has viewed their profile.

Twitter is also a place to find people if they want to be found, but unless the person identifies themselves in their "biography" it is not much use. Other social media sites are hit or miss. Remember that Google can search inside some social media sites but not others. There are niche vertical search engines that spring up and die out regularly, so to search Twitter, for example:

Google: *Search Engines Twitter*

Unfortunately, Dr. O. does not seem to be the social sort.

2. Contact Someone Directly

I know this sounds crazy, but sometimes the easiest approach is to email or call someone, or connect with someone who might know them. There are tricks to getting Google to pony up an email address or phone number. Try searching their name combined with @, or try their area code or workplace name if you have it. Several free (and many fee) white pages are available online. AnyWho.com and 411.com are useful. If you know the email of someone they work with, it can be easy to guess at the structure of your person's email: for example, Pedro_Martinez@Smithsonian.gov.

Cell phone numbers are difficult to find unless they are listed in some document out on the Web that can be accessed by Google. The "free" cell phone registries are rarely worth searching. They lead you on, but then try to charge for what is usually a landline number.

Unfortunately, I am not able to track down my Dr. O. The only information is that he has worked in some capacity at QUT, but was no longer there. I email the human resources department at QUT, but they cite privacy restrictions and are unable to respond.

I email Dr. O.'s coauthors listed in the QUT staff directory, but receive no response. I then email the coauthors that had worked with Dr. O. on his other published articles. Miraculously, one of them emails me back. She asks not to be quoted by name, but confirms that Dr. O. has "some sort of dental degree from India." This helps corroborate and confirm the *DipMedDent*

degree listed next to his name in the article. She also reports that she thinks he might be "working for a small business in Queensland." This seems useful, but in poking around further with this information I find nothing.

3. People Search Sites

Finding information about people online is big business and big money: $31 billion a year and growing.[42] If you do a Google search for someone's name, you will quickly fall into the clutches of fee-based data brokers such as Spokeo, PeekYou, Zaba, Intellius, and Pipl. These sites scrape the Web and off-line sources for information and sell it for a subscription or fee. Much of this information is available online for free, but you have to do the leg work by popping into sex offender registries, court databases, social media sites, mortgage registries, and so on.

The compilers are savvy marketers. They will give you a teaser or will lead you on by promising that they have some hefty dirt on the person you are investigating:

Click here to find a criminal record for Leslie Stebbins!

Eventually this leads to a page asking for your credit card information. If you are short on time it can sometimes be worth paying, but many of these companies have gotten into trouble because their information is frequently inaccurate. They often make assumptions about data they have and link people to incorrect record information. This can have devastating consequences when someone's name gets linked to a felon who has the same name and lives in the same city.

The Federal Trade Commission (FTC) recently fined Spokeo $800,000 for selling personal information to employers and job recruiters. The collecting of personal information is not illegal, but the use of this information can violate the Fair Credit Reporting Act.[43] Spokeo was called on the carpet because they failed to verify how the information they were selling would be used and failed to ensure its accuracy. They were also fined for posting fake endorsements of their service on news sites.

A 2014 FTC report reveals how data brokers obtain and share information without consumer knowledge, and calls for new laws and greater transparency.[44] Data brokers collect information from on and off-line sources that include social media activity, purchases, warranty registrations, sweepstakes entries, voter registration lists, marriage and business licenses, birth records, magazine subscriptions, bankruptcies, criminal records, apartment leases, and mortgages. Using these services you can find out someone's race, religion, socioeconomic status, political affiliations, and more.

I am not willing to pony up the $39 fee for a data broker, and the initial information some of them gave me was what I had already gleaned on my own: that Dr. O. was quoted in many articles saying that 90 percent of the research on open-plan offices showed a negative impact on workers. Wow. Really.

4. The Exhaustive Search Engine Slog

To do an exhaustive Web search can sound a little insane, especially if you are dealing with a Jose Martinez or David Smith. But if you can add one more piece of information to your search, such as *Albuquerque* or *psychologist*, then it may be worth doing. Experiment with quotation marks to limit your search as well:

> Google: *"Jose Martinez" psychologist*
> But if Jose uses a middle name or initial you are out of luck. Do a second search with:
> Google: *Jose around(2) Martinez psychologist*

This will retrieve the word "Jose" with no more than two words in between it and "Martinez." If that still retrieves too many you could do *around(10)* next to the word psychologist as well to narrow the search.

For many of us it is a radical notion to move past the first page or two of Google search results. The reality is that there can be valuable information buried in search results. Some people even hire reputation companies who, if they cannot get negative information removed, will at least attempt to bury it by optimizing other newer pieces of information about the person.

For Dr. O. it means going through hundreds of pages of news articles and blogs about him and his comments about open-plan offices. But, buried way down at the end of the Google search results, hundreds of pages down, I find two vital pieces of information:

1. A link between Dr. O's name and a company name. The company is described as "Australia's first and leading online bullion store selling Swiss gold bars and silver bullion" founded in 2013. Dr. O. is listed as CEO in several-gold selling business directories.
2. A directory of gold sellers lists an address for Dr. O.'s company in New York!

I search the address online and cross check it with a reverse directory look-up and even "Google Earth" it to make sure the building exists. The address and suite number where Dr. O.'s company is allegedly located is connected to a lawyers' office that has the same suite number. I do research on the law office and find that they have received an "F" from the Better

Business Bureau and are not officially recognized as a legitimate business. Fraud reports and complaints were also listed against them. As I dig further in I discover that Dr. O.'s office mates are in the "business" of creating shelf corporations. Shelf corporations, similar to shell corporations, are companies that are created on paper, but do not really exist except to have an "address" in the form of a mailbox in an office building.

Things are looking dire. My plan to reach out to Dr. O. needs to be nixed. I had found my answer many days and many research hours earlier: Dr. O. had little expertise in fields related to office space and productivity and his review article was too narrow to be useful to me. There was nothing wrong with what Dr. O. had done. His article had been written for a university publication to inform health service managers. He probably gave a few interviews to local news outlets and that became magnified across the Web. My best guess is that he was a former staff member at QUT, a former dentist in India, and now appeared to be selling gold bullion. I have just blown off an entire week. Dr. O. may have struck gold. I have not.

GOING DEEP

I stand by the concept of starting research using the fine art of poking around to get the size and shape of a topic, but getting sucked into a black hole for a week is not recommended. Devise an exit strategy.

I still need a high-quality scholarly literature review—either to find one or to compile one myself—or some combination of the two. I need a literature review that is not too narrowly focused, was systematically conducted, and does not pull in an unrepresentative sample of studies to serve a particular agenda.[45]

Part of the problem has been that I was looking for a quick solution to a challenging research question. It is likely that there is no "yes or no" answer to the question about productivity and open-plan offices. It was a nuanced subject. When I got on Google I had been swept up into the "open-plan offices are Satan" type of thinking. Daniel Kahneham argues that we often revert to "substituting an easier question," as a way of avoiding doing the work to answer a more challenging question. Substituting an easier question is a type of fast thinking and needs to be countered by slow thinking: asking specific questions and evaluating arguments based on evidence rather than getting quickly swept up in the easy fix.[46] I decide to slow down and go deeper. I crack my knuckles, grit my teeth, and jump into the Deep Web.

The Deep Web is the best place to look for serious research, and I remain hopeful that I can find a good literature review, because I had not yet searched specifically for this when Dr. O.'s work fell into my lap. The Deep Web is not as mysterious as it sounds, but it is hard to pin down because it

contains many types of resources that need to be found using different tools. The Deep Web is all the information on the Web that cannot be found by using a regular search engine such as Google or Bing. The vast bulk of the Deep Web includes scholarly articles and books that are behind paywalls or hidden within databases that traditional search engines cannot access. Pages buried several layers down in the site hierarchy are also part of the Deep Web, because search engines tend to skim mostly the top and second-layer pages, they do not go more than a few layers down unless a page has multiple links to it from other websites. [47]

The Deep Web also includes *some* government information (billions of pages), white papers, special archives, some blogs and wikis, many social media sites, corporate intranets that are behind firewalls, and, of course, pornography sites. Search engines also personalize search results and customize what they retrieve for each of us based on our past search interests, so parts of the Web might be more buried for some of us than for others. Some experts argue that because most people do not look through more than a few pages of search results, results that are buried on page 900 are also part of the Deep Web. [48] Often smaller sites that do not have a lot of links to them get buried, regardless of the quality of the information.

Content within the Deep Web is accessed through specialty, and sometimes proprietary, databases or vertical niche search tools. We use these all the time without thinking about it. If we are looking for a vacation house we might go to VRBO or Airbnb, if we want to buy a book we search Amazon, and if we want to buy new shoes we might go directly to Zappos or Nike. There is no single search engine for the Deep Web because it is not a single entity. In fact, many of us should be glad that some things on the Deep Web do not show up in our search results. Pornography sites, drug trade interactions, sexual predator solicitations, as well as the IRS Tax Code, thankfully, do not commonly surface in our search results.

COMMITTING TO THE WHOLE ENCHILADA

For my purposes, I wanted to access just the scholarly journal literature on the Deep Web from business and psychology journals. If you have connections to a library, you can choose a database that covers the discipline you think is most relevant to your subject. In my case I could search PsychInfo or Business Source Premier. The other option is to use Google Scholar, which indexes most scholarly journal articles and can be great for topics when you are using specific search terms such as "open-plan offices." Google Scholar is less good for a topic such as "diabetes" if what you want to focus on is just medical journals or just history journals.

Doing an extensive review of the research on a topic is a little like getting to know a potential partner really *really* well. It's a process that unwraps layer after layer of information. First you learn that, wow, they *too* like ping-pong and birding! Later you learn that they had a difficult childhood, are phobic about spiders, make a mean daiquiri, and have an abnormal fear of babies. In reviewing the scholarship on open-plan offices I couldn't just pick out the articles I liked. I had to take it all. You can't just accept the parts of your new partner that you like—you have to commit to the whole enchilada.

Every researcher who is doing their job conducts a mini literature review before starting their research. They need to know the current knowledge base of the little corner of the world that they are investigating. They need to tie their investigation to previous research so that they do not repeat the same mistakes. They need to build on the work of others in the field. Every few years a group of researchers will tackle a comprehensive review of the literature on a topic. This provides a service to researchers by analyzing all the scholarship on a topic so others can push on further, by "standing on the shoulders of giants."[49]

Most researchers work within an *invisible college*: a small group of researchers around the world that are investigating the same specific area. Typically they know each other or at least know *of* each other, see each other at conferences, and sit on boards and committees together. The invisible college also contains the scholars from previous generations. In a sense, scholarship is tapping into the wisdom of a crowd: The wisdom of a crowd of experts.

At the same time, it is important to acknowledge that researchers are not without an agenda. Everyone has an agenda. When researchers run a study, the way they interpret their findings can be influenced by their own ideas about a subject they are passionate about. That is why it is important to read the study carefully to identify the authors' conclusions and determine if the evidence they present directly supports their conclusions. The good news is that there is a correction mechanism in research. If someone publishes outlandish findings and runs too far afield, their work either will be ignored (i.e., never cited) by others in the field, or they will be dealt with directly when others try to repeat their studies and get different results.

Jacob Cohen, a psychologist at New York University, has pointed out that:
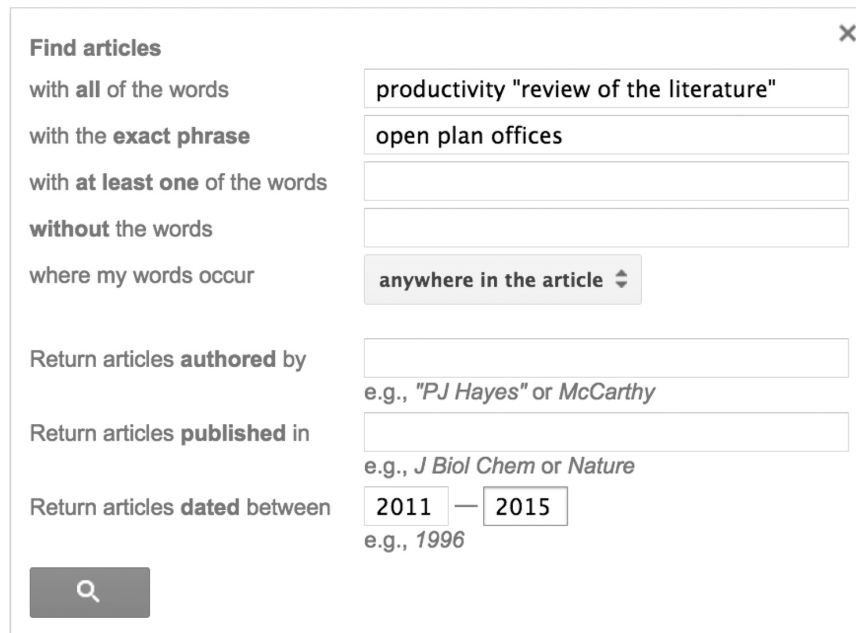
> *A successful piece of research doesn't conclusively settle an issue, it just makes some theoretical proposition to some degree more likely.*[50]

Office design and productivity research had started around 1910. It was a concrete body of knowledge and researchers working today in the field were all connected to previous research in this area. They could all point to impor-

tant "Aha" moments that had occurred over the course of many decades of research. For example:

- A series of studies from 1924 to 1932 called the Hawthorne Experiments essentially shut down the subfield of office design and productivity research for more than two decades. There were numerous impacts from these experiments, including the idea of the famous "Hawthorne Effect" (workers behaving differently simply by virtue of knowing someone is studying their behavior). For office design researchers the important takeaway of these experiments had been that they could find no direct proof of a connection between the design of the work environment and worker productivity. So they stopped looking for many years.
- In the 1980s an influential study now referred to as the "Coding War Games" compared the work of more than 600 computer programmers at ninety-two companies. The study found an enormous gap in productivity between programmers working at some companies versus other companies. The programmers working at the highly productive companies performed better not because of higher pay or greater experience, but because they had more privacy, personal workspace, and freedom from interruption.[51] The takeaway here was not that everyone should always have their own private office, but that it was crucial to focus on people rather than processes and products, and for this large group of programmers, having fewer interruptions seemed to have a positive impact on their output.

Being the information extremist that I am, I return to Google Scholar and its fancier library-owned counterpart, WOS. I access Google Scholar, use my keywords and also try a few synonyms. I also click a small arrow to the right of my search terms and a drop down menu provides a few options. I limit by date and add the phrase "review of the literature." This is not foolproof. It will bring up false hits and also might eliminate good review articles that do not use that exact phrase. Generally it will get me most of the articles I want and I will pick up other important articles by snowballing through tracing citations of the articles I find.

Find articles		×
with **all** of the words	productivity "review of the literature"	
with the **exact phrase**	open plan offices	
with **at least one** of the words		
without the words		
where my words occur	anywhere in the article ↕	
Return articles **authored** by		
	e.g., *"PJ Hayes"* or *McCarthy*	
Return articles **published** in		
	e.g., *J Biol Chem* or *Nature*	
Return articles **dated** between	2011 — 2015	
	e.g., *1996*	
🔍		

Google Scholar advanced search for a literature review on open-plan offices and productivity.

Doing an initial search on "open-plan offices" and "productivity" I retrieve over 2,000 articles, limiting by recent date and adding "review of the literature" narrows it down to seventy. I eliminate many of the seventy because they are narrowly focused or have given me a false hit—turning up articles on green design or office bullies. A few dozen look worth pursuing and I select one that seems perfect by Dr. Matthew Davis and two other researchers.[52]

I also go into WOS and run through similar searches. WOS has a number of advantages over Google Scholar because it defines scholarship more narrowly by using humans rather than spiders—bots that crawl websites and index them for search engines—to determine what sources are included. WOS also provides bells and whistles that allow me to analyze my search results. I can ask questions such as "What authors have published the most on this subject?" and "What journal articles have covered this topic the most frequently?" I can also limit my search specifically to literature reviews. On the other hand, Google Scholar is great for tracking down an obscure piece of scholarship, a needle in a haystack, or for extremely comprehensive searches. It is also free.

Combining Google Scholar and WOS I come up with a few dozen possibilities, with Dr. Davis again rising to the top of the pile. In a nutshell, here is why I like Dr. Davis so much:

1. Authority: Dr. Davis is on the faculty of Leeds University Business School and his resume on the Leeds site pops up quickly. He has a Ph.D. in Organizational Psychology, an MS in Occupational Psychology, and his specialty is, get this, workplace design! He has won dozens of honors, published dozens of related papers, and spoken at dozens of relevant conferences. His two coauthors have similar credentials.

2. Relevance: The article is spot on. In addition to giving background on research to date on open-plan offices, the review also serves to aid managers in making decisions about workplace design and reviews how open-plan offices are evolving to suit modern organizations. The end of the article focuses on managing the process of change that office design and optimization requires. A number of solid studies have pointed to the fact that it is the *process* of changing from one design to another that has a tremendous impact on morale and productivity, even more impact than the actual design of the office itself. Involving the employees in the process of designing an office is a crucial step in the process.

3. Context: His article is published in the *International Review of Industrial and Organizational Psychology*. Unlike Dr. O.'s journal, Dr. Davis's journal is included in WOS because it is considered "scholarly," it is also refereed, but it does not have a Journal Impact Factor because it is considered a serial book publication rather than a journal.

4. Length: The review article is forty pages and includes a review of 176 research studies.

5. Methodology: The authors have done a comprehensive job. They state that they are seeking "a fresh approach" to the study of workplaces and that the purpose of their review is to not only "collate and synthesize" all the research in this area, but also to review the ways open-plan offices are evolving, the implications of that, and how best to manage the process of design and identify how their field can contribute to decision making and current theory.

6. Timeliness: The article provides historical background, but then goes on to analyze recent research. The article itself was published three years ago.

7. Balance: Dr. Davis and his coauthors trace the history of research on office design and draw attention to the early research that showed improved team communications in open-plan designs. But as employers shifted to the open plan, many of them did so to reduce fixed overhead costs, and employees found themselves increasingly working elbow to elbow in closer and closer quarters. Later studies examined the density and proximity of workers, and how the openness of the design influenced worker effectiveness. Dr. Davis goes on to cover

the research on benefits of open-plan offices, the risks, individual and contextual factors that impact open-plan offices, research on balancing the tradeoffs between closed and open-plan offices, and the recent evolution of the open plan into more mixed-use spaces.

Dr. Davis's conclusions, though challenging to summarize in a few sentences, place the discussion within the context of research on organizational change management and office design. He finds that "pull-based user-owned change" in office design fares much better in terms of worker productivity than when "experts" come in and design a system and "push" it onto the workers. He then discusses ways to effectively involve workers in the design of the workspace. He also points to new trends in office design, including sustainable buildings, and the need for research in many of the new office configurations that are springing up that combine private and public space. He suggests that the focus has been on how the physical environment changes the way people work, but what researchers need to look at is the reverse: how can people craft their jobs to shape and change their environments to improve outcomes. Dr. Davis calls on organizations to be careful about assuming that they will save money by placing workers much closer together: in the short run possibly, but for knowledge workers this has been shown to result in significantly lower productivity, and Dr. Davis cites dozens of research articles that prove this.

PATIENCE AND PERSISTENCE

Because Dr. Davis's article was three years old, the last item on my list is to track the article forward in time. I embark on my own mini literature review of any articles that came out in the last three years by searching Google Scholar and WOS without the "review of the literature" limit in place, but limiting the date range. I also use a link in Google Scholar and WOS to check out who has cited Dr. Davis's article after it was published.

I find more than fifty new articles, but only a few stand out. One builds on Dr. Davis's ideas about building work environments that are more responsive to worker needs, another explains the current difficulty in actually measuring productivity in a meaningful way when examining the output of knowledge workers, and a third discusses younger workers liking the social aspects of open-plan offices better, but being less productive in them.

With Dr. Davis' article and the other three downloaded, I head to Maya's office to report back. While I am tempted to mention my adventures with Dr. O., I decide that it would only make me appear unprofessional. I had gone deep, and though the real depth had only taken two days of strategic research,

I could chalk my previous week's time sink up to experience gained and curiosity abated.

The differences between what I found searching the Deep Web and the shallow Google search results were dramatic. Why hadn't the bloggers and news sites that popped up in my initial Google searches—even *Scientific American*, FastCompany, and the *Times Higher Education Supplement*—picked up on Dr. Davis or another higher caliber article? Why had they instead pounced on Dr. O.? Low-hanging fruit? Anthropologist Alex Bentley has argued that the Web makes "academic research a popularity contest," because search engines prioritize information not based on scientific merit but instead on what will appeal to large audiences.[53] To increase readership, blogs and newspapers often overdramatize their stories: Open-plan office research is not nuanced and complex, it is "satanic." Accuracy often takes a back seat to entertainment. Just like high school, Dr. O. had won the popularity contest that Dr. Davis had not even entered. Dr. Davis was an academic interested in furthering research within his discipline, not getting "likes."

The famous educator Howard Gardner wrote:

> *Truth is about statements, propositions. The proliferation of information on the Internet makes it more difficult, initially, to determine truth. But with patience and persistence, we have a better chance than ever before to determine whether a proposition is true, false, or indeterminate.*[54]

With patience and persistence I had found Dr. Davis with the following strategies:

1. Start at the Source

After my initial poking around I centered in on Google Scholar and WOS as my two sources. Doing a dozen searches on each I was able to find a good literature review from three years ago and also trace it forward to bring my research up to date.

2. Pay Attention to the "Psychology of Search"

I had resisted the pitfalls of the psychology of search by not "satisficing," and by avoiding fast thinking. I had avoided false certainty by not settling for the first piece of information I found. I followed Kahneman's advice by thinking slow, "doubting, hesitating, and qualifying."[55]

3. Expert, Amateur, Crowd?

I had chosen the expertise of researchers, but I had chosen a "crowd" of researchers by selecting a comprehensive literature review providing me with all the nuances of the subject I was investigating.

4. Context, Motivation, and Bias

I had looked carefully at the context and motivation of the sources and authors I had dug up. By being skeptical of Dr. O. I had uncovered the shortcomings of his research in connection to my needs. Instead I had chosen a scholar who had conducted an extremely comprehensive review that was relevant to my needs.

5. Comparison and Corroboration

I had compared many studies, as had Dr. Davis, to come up with verification that the kinds of information I was passing on to my client reported on the current state of the field.

6. Go Deep, or Not

I had gone deep, and then some.

NOTES

1. "Man Drives Hundreds of Miles with Corpse Passenger," *Boston Globe,* June 5, 2014, http://www.bostonglobe.com/news/nation/2014/06/04/man-drives-miles-with-corpse-passenger/FiQvt8DrPyjDyQXkR5GokK/story.html.

2. Quotes can be placed around terms to indicate in Google to search for that specific phrase.

3. Ezster Hargittai, Lindsay Fullerton, Ericka Menchen-Trevino, and Kristin Yates Thomas. "Trust Online: Young Adults' Evaluation of Web Content," *International Journal of Communication* 4 (April 2010), http://ijoc.org/index.php/ijoc/article/view/636.

4. Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus & Giroux, 2011).

5. James B. Stewart, "Looking for a Lesson in Google Perks," *New York Times,* March 15, 2013, http://www.nytimes.com/2013/03/16/business/at-google-a-place-to-work-and-play.html?_r=0.

6. Susan Cain, "The Rise of the New Group Think," *New York Times Sunday Review,* January 13, 2012, http://www.nytimes.com/2012/01/15/opinion/sunday/the-rise-of-the-new-groupthink.html?pagewanted=all.

7. Parker, Robert B. *Pale Kings and Princes.* New York: Random House (2009). Used with permission.

8. Danny Sullivan, " How Google Instant Autocomplete Suggestions Work," Search Engine Land Blog, April 6, 2011, http://searchengineland.com/how-google-instant-autocomplete-suggestions-work-62592.

9. Joe McCambley, quoted in David Carr, "Storytelling Ads May Be Journalism's New Peril," *New York Times,* September 15, 2013, http://www.nytimes.com/2013/09/16/business/media/storytelling-ads-may-be-journalisms-new-peril.html?pagewanted=all&_r=0.

10. Dan Duray, "Can't Handle The Truth? How a *New Yorker* Reporter and a Team of Fact-Checkers Took on the Church of Scientology," *New York Observer*, January 29, 2013, http://observer.com/2013/01/cant-handle-the-truth-how-a-new-yorker-reporter-and-a-team-of-fact-checkers-took-on-the-church-of-scientology/; John McPhee, "Checkpoints: Fact-Checkers Do It a Tick at a Time," *New Yorker,* February 9, 2009, http://www.newyorker.com/magazine/2009/02/09/checkpoints.

11. Don Goeman and Deanne Beckwith, "Design's Strategic Role at Herman Miller," *Design Management Review* 15, no. 2 (2004), doi: 10.1111/j.1948-7169.2004.tb00160.x.

12. Shari F. Epstein, "Space and Project Management Benchmarks," Report by the International Facility Management Association, 2010, http://wkpointe.com/pdf/Space%20and%20Project%20Management%20Report%2034.pdf.

13. Steve Lohr, "Rethinking Privacy vs. Teamwork in Today's Workplace," *New York Times,* August 11, 1997, http://www.nytimes.com/1997/08/11/business/rethinking-privacy-vs-teamwork-in-today-s-workplace.html.

14. Ibid.

15. Maria Konnikova, "The Open-Office Trap," *New Yorker,* January 7, 2014, http://www.newyorker.com/business/currency/the-open-office-trap.

16. Vanessa Wong, "Ending the Tyranny of the Open-Plan Office," *Bloomberg Business,* July 1, 2013, http://www.bloomberg.com/bw/articles/2013-07-01/ending-the-tyranny-of-the-open-plan-office.

17. Rachel Feintzeig, "Study: Open Offices Are Making Us All Sick," *Wall Street Journal,* February 25, 2014, http://blogs.wsj.com/atwork/2014/02/25/study-open-offices-are-making-us-all-sick.

18. Oliver Burkeman, "Open-Plan Offices Were Devised by Satan in the Deepest Caverns of Hell," *Guardian,* November 18, 2013, http://www.theguardian.com/news/2013/nov/18/open-plan-offices-bad-harvard-business-review.

19. Seth Stevenson, "Open-Plan Offices: The New Trend in Workplace Design," *Slate,* May 4, 2014, http://www.slate.com/articles/business/psychology_of_management/2014/05/open_plan_offices_the_new_trend_in_workplace_design.html.

20. H.A. Simon, "Rational Choice and the Structure of the Environment," *Psychological Review* 63, no. 2 (1955), doi:10.1037/h0042769.

21. Miriam J. Metzger, Andrew J. Flanagin, and Ryan B. Medders, "Social and Heuristic Approaches to Credibility Evaluation Online," *Journal of Communication* 60 (2010), doi: 10.1111/j.1460-2466.2010.01488.x; Judit Bar-Ilan, "Presentation Bias Is Significant in Determining User Preference for Search Results—A User Study," *Journal of the American Society for Information Science and Technology* 60 (2009): 135–49, doi: 10.1002/asi.20941; Lynn Silipigni Connaway, Timothy J. Dickey, and Marie L. Radford, "'If It Is too Inconvenient, I'm Not Going After It': Convenience as a Critical Factor in Information-Seeking Behaviors," *Library and Information Science Research* 33 (2011), doi:10.1016/j.lisr.2010.12.002.

22. Metzger et al., "Social and Heuristic Approaches."

23. A.J. Head and M.B. Eisenberg, "How College Students Seek Information in the Digital Age," Project Information Literacy Progress Report, Information School, University of Washington, 2009.

24. I am using the pseudonym "Dr. O." in this chapter to protect his privacy. He is a real person who, as far as I know, has not done anything illegal or unethical.

25. See, for example, Kevin Kruse, "Facebook Unveils New Campus: Will Workers Be Sick, Stressed, and Dissatisfied?" *Forbes,* August 25, 2012, http://www.forbes.com/sites/kevinkruse/2012/08/25/facebook-unveils-new-campus-will-workers-be-sick-stressed-and-dissatisfied/.

26. Terry Smyth, "Office Warfare," *Sydney Morning Herald,* April 30, 2009, http://www.smh.com.au/national/office-warfare-20090429-anfm.html.

27. Dr V—O—, "Why Your Office Could Be Making You Sick," *QUT News.* (Note: this is now a dead link, but the article existed and was viewed on July 15, 2014.)

28. See http://keywalker.afpbb.com/headline/search?q=%22Vinesh%20Oommen%22.

29. See http://dantri.com.vn/suc-khoe/ban-lam-viec-khong-vach-ngan-loi-bat-cap-hai-303215.htm.

30. Mattias Davidson, "Han Gör Tummen ner för Öppna Kontorslandskap," *Arbetar Skydd*, January 14, 2009, http://www.arbetarskydd.se/nyheter/halsa_ledarskap/halsa/article99507.ece.

31. See http://www.soundmask.com.au/pdf/intro_A4.pdf. See also Terry Smith, "Open-Plan Offices Sickening, Unproductive," *Brisbane Times*, April 30, 2009, http://www.brisbanetimes.com.au/national/openplan-offices-sickening-unproductive-20090430-anl0.html.

32. Kahneman, *Thinking, Fast and Slow.*

33. Reproduced under a license from Thomson Reuters. You may not copy or redistribute this material in whole or in part without the prior written consent of Thomson Reuters.

34. Pierre-Marc Daigneault. "The Blind Men and the Elephant: A Metaphor to Illuminate the Role of Researchers and Reviewers in Social Science," *Methodological Innovations Online* 8, no. 2, (2013), http://www.methodologicalinnovations.org.uk/wp-content/uploads/2013/12/Daigneault.pdf.

35. Howard Rheingold, "Crap Detection Mini-Course," video, February 20, 2013, http://rheingold.com/2013/crap-detection-mini-course/. See also "Evaluating Resources," http://guides.lib.berkeley.edu/evaluating-resources.

36. Marc Meola, "Chucking the Checklist: A Contextual Approach to Teaching Undergraduates Web-Site Evaluation," *Portal: Libraries and the Academy* 4, no. 3 (July 2004), doi: 10.1353/pla.2004.0055.

37. Alan Bailin and Ann Grafstein, "Evaluating Research: Beyond the Gold Standards," paper presented at the 13th Annual International Conference on Education, May 23–26, 2011, Athens, Greece. (Note: Bailin & Grafstein go beyond the gold standard, noting that we should also look at the financial interests of the researchers and sponsors, the dominant theoretical paradigms, and the potential political ideologies of the researchers and funders.)

38. For more on this, see Birger Hjorland, "Methods for Evaluating Information Sources: An Annotated Catalog," *Journal of Information Science*, April 18, 2012, doi: 10.1177/0165551512439178.

39. Scopus is a database that is similar to Web of Science. Large academic libraries typically purchase one or the other. In my examples I have used Web of Science.

40. Dr. V—O—, "Should Health Service Managers Embrace Open Plan Work Environment: A Review," *Journal of Health Management* 3, no. 2 (2008).

41. Google image search involves searching Google and then clicking on the word "image" that appears at the top of the screen right before the search results

42. Interactive Advertising Bureau, "Internet Ad Revenues Hit $31 Billion in 2011, Historic High up 22% over 2010 Record-Breaking Numbers," press release, April 18, 2012, http://www.iab.net/about_the_iab/recent_press_releases/press_release_archive/press_release/pr-041812.

43. Federal Trade Commission, "Spokeo to Pay $800,000 to Settle FTC Charges Company Allegedly Marketed Information to Employers and Recruiters in Violation of FCRA," press release, June 12, 2012, http://www.ftc.gov/news-events/press-releases/2012/06/spokeo-pay-800000-settle-ftc-charges-company-allegedly-marketed.

44. Federal Trade Commission, "Data Brokers: A Call for Transparency and Accountability," May 2014, http://www.ftc.gov/system/files/documents/reports/data-brokers-call-transparency-accountability-report-federal-trade-commission-may-2014/140527databrokerreport.pdf.

45. Mark Pettigrew and Helen Roberts, *Systematic Reviews in the Social Sciences: A Practical Guide* (Malden, MA: Blackwell, 2006).

46. Kahneman, *Thinking, Fast and Slow.*

47. Jane Devine and Francine Egger-Sider, *Going Beyond Google Again: Strategies for Using and Teaching the Invisible Web* (New York: Neal-Schuman, 2013).

48. Ibid.

49. This quote has been attributed to various scholars, including Isaac Newton.

50. Jacob Cohen, "Things I Have Learned (So Far)," *American Psychologist* 45 (December 1990).

51. Tim Lister and Tom DeMarco, "Programmer Performance and the Effects of the Workplace," in Proceedings of the 8th International Conference on Software Engineering, August 1985.

52. Matthew C. Davis, Desmond J. Leach, and Chris W. Clegg, "The Physical Environment of the Office: Contemporary and Emerging Issues," *International Review of Industrial and Organizational Psychology* 26 (2011).

53. Alex Bentley quoted in Rebeca Tuhus-Dubrow, "Group Think: The Turn to Online Research Is Narrowing the Range of Modern Scholarship, a New Study Suggests," *Boston Globe,* November 23, 2008.

54. Howard Gardner, "Reframing Truth, Beauty, and Goodness," *Education Week,* September 20, 2011, http://www.edweek.org/ew/articles/2011/09/21/04gardner_ep.h31.html?tkn= XMMFaK5jTQox%2FOEdDYf4lIWgs8fvbrX6l78B&print=1.

55. Kahneman, *Thinking, Fast and Slow*.