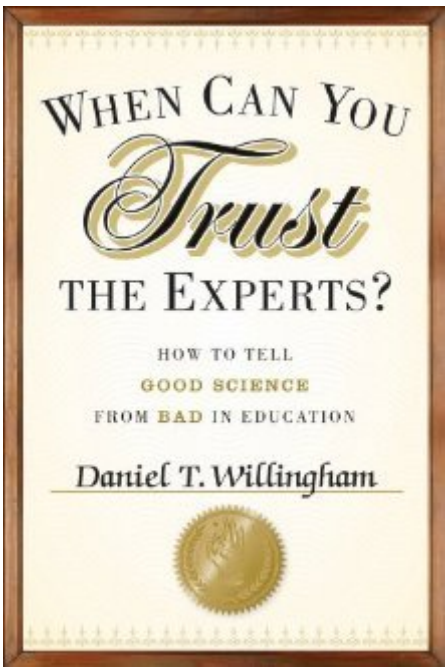

When Can You Trust the Experts?: How to Tell Good Science from Bad in Education

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Clear, easy principles to spot what's nonsense and what's reliable Each year, teachers, administrators, and parents face a barrage of new education software, games, workbooks, and professional development programs purporting to be "based on the latest research." While some of these products are rooted in solid science, the research behind many others is grossly exaggerated. This new book, written by a top thought leader, helps everyday teachers, administrators, and family members--who don't have years of statistics courses under their belts--separate the wheat from the chaff and determine which new educational approaches are scientifically supported and worth adopting.

Author's first book, *Why Don't Students Like School?,* catapulted him to superstar status in the field of education Willingham's work has been hailed as "brilliant analysis" by *The Wall Street Journal* and "a triumph" by *The Washington Post*
Author blogs for *The Washington Post* and Brittanica.com, and writes a column for *American Educator*
In this insightful book, thought leader and bestselling author Dan Willingham offers an easy, reliable way to discern which programs are scientifically supported and which are the equivalent of "educational snake oil."

When Can You Trust the Experts?: How to Tell Good Science from Bad in Education Details

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From Reader Review When Can You Trust the Experts?: How to Tell Good Science from Bad in Education for online ebook

Christy says

Not as practical as I would have liked. The final three chapters are where Dr. Willingham tells how to evaluate programs and research. His steps are to strip it and flip it, trace it and analyze it before deciding if it's a good fit for you/your school.

Strip it of any emotional appeals, analogies, "experts", claims, etc. to determine what is being claimed.
Flip it to see the adverse outcomes (if reading scores improve in 30% of students, what about the other 70%?), your/your school's behavior.
Trace it - Basically, education doesn't have a good authority to vet research, the closest is the What Works Clearinghouse and not everyone agrees that WWC is very good. Therefore, we are left tracing research on our own and often find conflicting studies.
Analyze it and beware of your own bias when doing so. Make sure you pay attention to the outcomes you desire...it's great if the program helps kids be more organized, but if your desired outcome is improved math scores, organization isn't the focus.

Erika Daniels says

I love Daniel Willingham's work. He is a cognitive scientist who focuses on education issues. I use his text "Why Don't Students Like School" in one of my undergrad classes b/c it is an engaging way of presenting research on how we learn. His most recent book has the same great writing style but is a little slower. It is still very good though and offers practical suggestions for reviewing research and deciding what claims to believe. I wish that policy makers, parents, and educators would apply Willingham's principles before jumping on the bandwagon of the next big reform. I definitely recommend this book.

Ilib4kids says

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If a man will begin with certainties, he shall end in doubts;but if he will be content to begin with doubts he shall end in certainties.
---Francis Bacon

Confirmation bias p46
"The first principle is you must not fool yourself, and you are the easiest person to fool". --- Richard Feynman p102

"Them most difficult subjects can be explained to the most slow-witted man if he has not formed any idea of them already; but the simplest thing cannot be made clear to the most intelligent man if he is firmly persuaded that he knows already, without a shadow of doubt, what is laid before him" -Tolstoy p50

Chap2: Science and belief
meta-belief: Enlightenment vs. Romantic era
1st meta-belief: The best way to understand the world is through reason (Enlightenment, Newton's principia, nature was governed by laws, like enormously complicated clockworks p67, Francis Bacon)

2nd meta-belief: the best way to understand the world is through personal experience
One impulse from a vernal wood
May teach more of man,
of moral evil and good,
Than all the sages can
---Wordsworth "Tables Turned"

Sweet is the lore which Nature brings
Our meddling intellect
Mis-shapes the beauteous forms of things
We murder to dissect
---William Wordsworth

A Treatise of Human Nature: Being an attempt to introduce the experimental method of reasoning into moral subjects By David Human

Non-traditional schooling
Leonard and Gertrude by Johann Heinrich Pestalozzi
Summerhill: A Radical Approach to Childrearing by Alexander Sutherland Neill

Chap3: What Scientist call good science
Science cycle: Observation, theory, test
Good science
1.The provisional nature of scientific theory
2. Cyclical nature of scientific method is self-correcting.

Good Observation: first principle pick a problem that one can observe; second principle: Observation means measurement p89

Correlation vs. Causation P98
The fact that you observe that two factors are related doesn't mean you can draw a causal link. For example, ice cream consumption and crime are correlated, but not because ice cream makes peoples criminals. Hot weather makes peoples want ice cream, and it also make people more short tempered, which increases violent crime. Surprisingly often, people conclude cause-and-effect relationships from correlations - for example, the relationship of race and academic performance.

Chap4: How to use science
Relationship between Applied and Basic Research
Levels of analysis: when you've analysed something and understand it, your understanding applies only to what you've studied, not necessarily to a group of things you've studies. p121
3 ways basic scientific information from lower levels of analysis can benefit education. p125

Chap5: Step one: Strip it and Flip it
(1)Precisely what change is being suggested

(2)Precisely what outcome is promised as a consequence of change
(3)the probability that promised outcome will actually happen if you undertake the change p136

"If I do X, then there is a Y percent chance that Z will happen.. p136

Frame effect: the way a problem or question is described influences the solution or answer we provide.

What Works Clearinghouse whatworks.ed.gov
The What Works Clearinghouse (WWC) was established in 2002 as an initiative of the Institute for Education Sciences (IES) at the U.S. Department of Education.The goal of the WWC is to be a resource for informed education decision making. p181

Where to find research p197
ERIC (Education Resources Information Center) http://eric.ed.gov
maintained by U.S department of Education. A fairly comprehensive search of articles to education.
have check box for "peer reviewed"
Using quotation like "Singapore math" limited to exact phrase "Singapore math" or contain Singapore and math
First look for abstract: a summary of article.

PubMed www.ncbi.nlm.nih.gov/pubmed?
maintained by U.S National Library of Medicine and the National Institutes of Health
almost all articles are peer reviewed

National Council of Teachers of Mathematics www.nctm.org

Statistical Vs. Practical Significance p203
Statistical Significance: you're justified in concluding that difference is real, not a quirk due to chance.
Practical Significance is a judgement call.

A suggested "Scorecard" to keep track of research findings p200
What was measured? Comparison? How many kids? How much did it help?

Chap 8: Step four: Should I do it?

p211 Some indicate the Change won't work, some indicate suspicion that changes wont' work, and some don't tell you whether or not the Change will work, but indicate that scientific evidence on the question is lacking. The fourth category points to instances where the Change may have scientific support, yet you may not want to adopt it

p212 I kept encouraging you to frame the promised Chang as "If I do X, there is a Y percent chance that Z will happen." Predicting the likelihood of Z is what science good for. Science is not, however, good for telling you how badly you want Z to happen.

p174 **Howard Garden's Theory of multiple intelligences**
Musical–rhythmic & harmonic
Visual–spatial
Verbal–linguistic

Logical–mathematical
Bodily–kinesthetic
Interpersonal
Intrapersonal
Naturalistic
Existential

p221 I think architecture serves as a better comparison than medicine does. Architects, like teachers, usually have multiple goals that they try to satisfy simultaneously.... In addition, architects make use scientific knowledge, notably principles of physics, and materials science. But this knowledge is certainly not prescriptive. It doesn't tell architect what a building must look like. Rather, it sets boundary conditions for construction to ensure that building will not fall down..

In the same way, basic scientific knowledge about how kids learn, about how they interact, about how they respond to discipline - this knowledge ought to be seen as a boundary condition for teachers and parents, meaning that this knowledge sets boundaries that, if crossed, increase the probability of bad outcomes. Within these broad boundaries, parents and teachers pursue their goals.

other books
A Companion to the Philosophy of Science by William H. Newton-Smith (Editor)

Exavidreader says

I wanted to stop reading when he puts his argument about the "Reading Wars". However, I wanted to give the book the benefit of the doubt so I skipped to part 2. Some of the tips given made sense, some were ones that I already do without even thinking. So maybe this book would be more useful for people who are easily taken in by ads. But cynics and sceptics are already good at filtering the good from the bad.

Sandy says

I would give this book 3.5 stars. I really enjoyed Willingham's writing style, and felt like I gained a better understanding of how the human mind operates. It was easy to read, and I could grasp his arguments without any difficulty. The number of real-life examples that were woven into the text are what made the reading pleasant and what made the facts he was conveying concrete. One example is when he writes in Part One about how Coke introduced a new recipe in 1985, which they called New Coke, in order to compete with the popular Pepsi brand. The marketing ploy was an utter disaster. People were outraged. Not only did they like the taste of the original Coke better, but they had developed an emotional attachment to the brand. I mean, honestly, how adorable are the Coca-Cola polar bears, right? Willingham brilliantly writes: "It's as though you went to a teenager's house and said, 'You know how your mom is always nagging you and won't get you the cool cell phone you want and embarrasses you in public? I found someone who won't do those things. Here's New Mom!' New Mom might have the objective features that Old Mom didn't, but the emotional attachment to Old Mom is not so easily replaced." There is so much about how we think that is based on beliefs, emotions, and familiarity. Did you know we are more likely to believe a person who is physically

attractive? We also tend to trust the word of an "expert" as truth without digging further to see if that person really does have the facts and expertise. For instance, people tend to believe what Dr. Oz has to say about a wide variety of topics, including mental health related ones, when in actuality he was a cardiothoracic surgeon and doesn't have a mental health background. I have to admit that I found the first half of the book to be interesting, but completely frustrating. Willingham's point in that part of the book is that most of what we think to be true is not rooted in actual fact. We are either easily persuaded or rely on our values and beliefs to guide what we "know." In the world of education, there is very little that can be claimed with scientific certainty because it is such a complex social system. While in other disciplines, such as medicine, there are laws to prevent false scientific claims, there are no such laws in the world of education. Any company can claim that their product is research-based, even if it actually isn't. Willingham talked in detail about whether you should make a Change to a program without knowing how well it is going to work. I found this all upsetting, because in a school environment, you are not given the opportunity to ask tough questions about a program. You are just told that you have to use it. Yet, I felt my attitude restored in Part Two of the book, because at this point I realized that Willingham basically just wants educators to be cognizant of the fact that companies are trying to sell you a product, and to take everything they say with a grain of salt. As a classroom teacher, you need to conduct your own research to see if the program or product actually works in helping students to learn. If it does not, then it shouldn't be used. I feel better about the fact that I have always had the attitude to use what a district gives, but adjust and eliminate the components that do not promote learning progression.

Nguyên ng? ng? says

so v?i các cu?n nh? b?n ko thông minh l?m ?âu, ngh? thu?t t? duy rành m?ch...thì cu?n này mình ??c ko ép phê b?ng, vì hai lý do
1. thiên v? khía c?nh giáo d?c
2. thiên v? c?i cách t?m v? mô

Còn các cu?n tr??c mình ??c là ?ng d?ng luôn cho cá nhân, nên ??c th?y th?c t? h?n cu?n này.

Lupe says

Interesting, but I didn't feel particularly impressed by this book. I would be interested in reading Willingham's other books as I feel they'd be more informative for me, personally. It wasn't a bad read, but at the same time, I don't think it really was something I *needed* to read. That being said, it did raise some interesting points about the way education research plays a role in our education system ranging from k-12 through post-secondary education. I did come away feeling even MORE skeptical and more able to question those in the position to enact changes, so I am grateful for that.

Miriam says

Willinghams eerdere boek 'Why Don't Students Like School? A Cognitive Scientist Answers Questions About How The Mind Works And What It Means For The Classroom' vond ik erg interessant en nuttig, dus dit boek van hem wilde ik zeker lezen. Willingham stelde niet teleur, ook dit boek is weer goed geschreven, interessant en nuttig, zowel voor docenten, ouders als thuisonderwijzers.

Darin says

As someone who was very used to reading scientific claims before entering the educational field, in a way I was depressed that this book needed to be written in the first place. But WIllingham's statement is accurate in that many teachers swallow advertising whole-hog and begin to implement widespread changes to curricula and class procedures that have been disproven or are logically nonsensical. In that sense, Willingham's text is a well-needed guide to theoretical claims.

The book consists of two major parts. First, a demonstration as to why educational claims are so easily accepted without proof, and secondly a way to fix this blind spot. The author's main thesis is that educational research is difficult to verify because (a) children are not lab rats and thus do not have behavior as predictable as we'd like, (b) the number of stakeholders involved in education (from the President of the United States all the way down to the four year-old in the classroom) have different goals that often contradict one another, and (b) education is not a hard science, and therefore the credentials and data cannot be treated as a hard science. His four-step process for analyzing data is a simple way to take emotion out of research (we love kids and we therefore get emotional about helping them and are willing to accept nonsense in order to do so). Other than the basic nature of the information, the only weakness is that I think the kind of teacher who will need this book will not understand statistics well enough to put them in action. That said, this is not the fault of the author--you can only do so much in one text.

Overall, I found this to be a worthwhile system that I plan to pass on to colleagues that need it. I'm not one of them, but if research and numbers in education make your head spin, you'll get a lot out of this.

Ken says

When we think "science" and "education," we think of those teachers who taught us how to set the Periodic Table, break beakers, and light fires. What we don't think of are white-coat types holding a magnifying glass to education research. Still, in this day of "research-based" this and "best-practices" that, shouldn't we at least question what that means? Daniel T. Willingham certainly thinks so, and he wrote WHEN CAN YOU TRUST THE EXPERTS? HOW TO TELL GOOD SCIENCE FROM BAD IN EDUCATION in an attempt to rectify that.

As I teach English and not science, I am probably a good test subject for this book. I'm happy to say that not all of it was new. In fact, if you, like me, know a thing or two about persuasion and logical fallacies, you will find some of Willingham's information warmed-up leftovers. He starts the book with a little history -- admittedly my favorite part -- about the Enlightenment, where science was king, and the Romantic Era, where emotions and nature held sway. Turns out, educational sorts are still tapping these roots to impress and persuade us that their particular form of educational-change-for-the-better is superior. Thus, we might see a picture of a scientist in a white coat (usually an avuncular sort with white hair and a clipboard) attached to the pitch. Also, statistics might be used, and the holy words "science" and "research" themselves might be invoked. People trust scientists and research, even more so in the U.S. than in many other countries.

Romantic roots? Think of the word "natural" (also used prolifically in the food business, where it means absolutely nothing). The Romantic movement also sends us our love of "the whole child" and of each

learning style being unique and thus worthy of our attention and lesson planning. Yeah. We like that individualistic spirit, too -- and educational salesmen know that. Thus, they use the right buzzwords to sell us.

After explaining how we are easily fooled and how science might save us, Willingham moves on from background information to actions we might take. He advises that we "flip it, trace it, and analyze it." In brief, an example of "flipping it" might be the hamburger that calls itself 85% lean on its packaging. Flip it and you get the much less tantalizing 15% fat which is the same thing but would hurt sales if it appeared on the package in large red letters with exclamation points. "Trace it" teaches you how to sniff a trail, hound dog-like. Who is making this claim and where is his data coming from? Finally, "analyze it" shows you how a scientist would put said data to the test. There's data and there's data, after all.

If you don't know where to begin, you might start with this book, even if it can get a bit dry at times, especially for my right-brained (whoops, bad science!) mind. Still, I know it's good for me, so I carried on. Plus, Willingham was constantly providing tables to summarize key points. This is good science, apparently, especially when English teachers are reading.

Despite the fact that it doesn't really name a lot of names, products, and strategies, I recommend the book for those who are questioning certain educational systems and claims, those who are vetting them, or those who must champion them. Know of what you speak before you endorse or challenge things! As E.D. Hirsch said, in a quote repeated in this book: "The enormous problem faced in basing policy on research is that it is almost impossible to make educational policy that is not based on research. Almost every educational practice that has ever been pursued has been supported with data by somebody. I don't know a single failed policy, ranging from the naturalistic teaching of reading, to the open classroom, to the teaching of abstract set-theory in third-grade math that hasn't been research-based. Experts have advocated almost every conceivable practice short of inflicting permanent bodily harm."

So much for "research." Almost as dependable as that "all natural" you see on so much unhealthy food.

J.S. Green says

This book is specifically aimed at educators (teachers and administrators, but parents, too) who might be considering "educational software, games, workbooks or other programs" which claim to be "based on the latest research." While some of these products may be based on actual research, many are not. But how can you tell? Willingham discusses the history of science and the role it plays in persuading us and appeals to our biases (especially the "confirmation bias" where we look for "evidence" that supports what we already believe and discard what doesn't support it). Ultimately he outlines and explains four steps:

- Strip it and Flip it. Strip the claim down to its essentials and promises: "If I do X, then there is a Y percent chance that Z will happen."
- Trace it. Should you take statements by "authorities" at face value?
- Analyze it. What evidence is offered? Is there any scientific evidence (from reliable studies) that support or refute the claims?
- Should you do it? And how will you measure results, or when do you call it quits?

It's a rather straightforward process that can weed out a lot of programs and help you find (and understand) the kind of research for making better-informed decisions. And while it's geared more toward eduation

professionals it's also written plainly enough that parents can use the same processes. I picked it up hoping it could apply to other areas where science is touted. Such issues are certainly beyond the scope of this book, but I think Willingham's method is a good place to start and can be applied in more areas than just education. It's not a long book and Willingham's writing style is easy to follow. But the main idea is to get people thinking for themselves and not be misled by emotional appeals or psuedo-science.

Peter Mcloughlin says

Their are many urban myths in our culture. We hear a half-digested nugget out there in the ether or from a friend or colleague and take it in with out really looking into whether such a factoid is true or not. This happens a lot in education. Education is far from an exact science like physics. There are so many different factors that go into it and so many confounding cause and effect relationships that it is hard to sift the wheat from the chaff. For educators it is important to have tools that scientists use to protect themselves from being fooled or fooling themselves. Scientists are prone to the same psychological pitfalls as the rest of us. They can take arguments from authority as gospel, they display confirmation bias (i.e. only notice evidence that corroborates their worldview and ignoring evidence against it), being persuaded by an appealing delivery of a message instead of evidence and many other pitfalls we all are liable to fall into. Scientists have a systematic method for establishing claims and testing them that offers some protection from fooling themselves. This book shares some of those methods to educators in hopes to improve their ability to evaluate evidence and determine the truth of claims in the area of education. This book is down to earth and gives tips on how to decide what is true and what is not. It also along the way shoots down some cherished myths currently circulating in education like whole word methods of teaching children how to read, and Gardner's multiple intelligences model, Dore methods of therapy for children with autism. If you are an educator or have a child in school this is a good book to get your hands on.

Jeff Bush says

Not bad. A decent introduction to scientific and statistical reasoning as applied to educational issues. Some great insights, though mostly the book is written for laymen never introduced to scientific and statistical reasoning. Highly recommended for those educators not familiar with these types of reasoning, only moderately recommended for those that are. It should be required reading for everyone involved in educational policy and administration. But overall the book is far short of Willingham's earlier book "Why Don't Students Like School," which is one of the most important books I've ever read on education.

Chase Parsley says

Educators are constantly bombarded with shiny new bells, whistles, and golden bullets that promise to "fix" what teachers do in their classrooms, raise test scores, and bring our youth up to 21st century technological speed. The problem is that many of these changes are misguided and can even backfire. Daniel Willingham questions these changes and more importantly gives the reader advanced tools to question them too. Every educator and concerned parent ought to digest the contents of this book.

Some key takeaways include (spoiler alert):
- Familiar people and ideas, beauty, and social proof are all powerful persuading techniques that we must be

able to recognize.
- Western culture is obsessed with anything "scientific" and/or "natural". This cultural trend has deep roots in the Enlightenment and Romantic Ages.
- Goals and mission statements across the country (in school districts, school buildings, etc.) are often fluffy and next to worthless when you ask basic questions about its exact nature.
- With new ideas, "strip it and flip it." Ask: IF I DO X, THEN THERE IS A Y PERCENT CHANCE THAT Z WILL HAPPEN." A brilliant strategy!
- Also with new ideas, ask whether doing nothing would be better. Question the source. Flip the promises and see how that sounds (85% fat free meat vs. 15% fat meat sound different, etc.)
- Education is extremely complex to measure. Case studies go deeper yet only focus on a narrow berth. Larger studies cover more ground yet are shallower. Lots of external factors influence education.

I give this book a 4/5 star rating because the last few chapters were a bit dry and applied more to people in education who implement change decisions - something I am not. Otherwise this was a very good read! Thank you for your work Professor Willingham and thank you to my wife Reby for shoving this book in my face to read. :)

JJ Meredith says

Again, a homerun by Willingham. Big takeaway: To analyze 'scientific' claims, reduce them to "If X happens, there is a Y% chance of Z happening." Unpack the claim and examine the evidence.
