



# **A Handy Compendium of 2015 Posts**

**from**

## **Eileen Dombrowski's Theory of Knowledge Blog**

**from**

**Activating TOK, her own website:**

**<http://activatingtok.net>**

**and**

**Oxford University Press Education Blog**

**<http://educationblog.oup.com>**



## Note

Searching within a blogsite is easy -- using a menu, a tag cloud, a search window. But for browsing a whole group of posts, isn't it *easier* to have them consolidated into a single document for scrolling? Myself, I think so! And so....today I've pulled together everything that Theo and I have written on Theory of Knowledge in 2015 and added a Table of Contents.

However you skim what we offer, I really hope that you'll find something that will stimulate your own thinking. I really love the course myself for its exploration of ideas and engagement with all the ways in which we human beings construct our knowledge of our world, and I'd be really happy if I could add anything to your own enjoyment of the course.

Moreover, as 2015 ends, I feel all the more strongly that a course on thinking critically is essential to our students if they are to navigate a world of conflicting knowledge claims and perspectives, and to recognize the relevance of their own growing knowledge. May our TOK course help them find the excitement in the academic sphere, appreciate the diversity of human perspectives, and identify for themselves a purpose and means to contribute!

How does this blog connect with the Oxford University Press Theory of Knowledge course book? For my thoughts on this, scroll ahead to....ah...that'll be page 54.

Happy New Year!  
Eileen Dombrowski,  
January 11, 2016

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# Newest technology + oldest subject matter = new knowledge (and it's amazing)

FEBRUARY 3, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) *How* do scientists know so much (and so little) about galaxies far, far away? As we fly at high levels of general overview, surveying and comparing the methodologies of the areas of knowledge, we need *stories* to bring our discussions to life — *stories* of people on the ground actively engaged in the process of building knowledge and *news releases* of research breakthroughs or shifts of interpretation. For a news release that illustrates general points about technology and methodology but may also bring a moment of amazement and wonder, I recommend the latest image of the faraway Andromeda galaxy.

In the [American Astronomical Society's press release January 5, 2015](#), the “photographic cartography” is described as “a new benchmark for precision studies of large spiral galaxies”: “Never before have astronomers been able to see individual stars over a major portion of an external spiral galaxy. Most of the stars in the universe live inside such majestic star cities, and this is the first data that reveal populations of stars in context to their home galaxy.”

This composite from the Hubble space telescope is just one more contribution to an ongoing exploration, but it's one that could work effectively in class: it's short ([and the one on the Hubble site is shorter](#)), it's visual, it's (arguably) beautiful, and it's possibly thought-provoking for perspective and scale. It also illustrates not just the *shared knowledge* of astronomers, but the unprecedented access we have in our internet age to knowledge shared also, as far as we can grasp it, with people like us. Myself, I'd certainly add a video of the Andromeda galaxy to a menu of class moments that demonstrate and celebrate knowledge in the process of creation and sharing.

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# Germany's Pegida: “groping in the dark of logic”

FEBRUARY 8, 2015 THEO DOMBROWSKI

(Re-posted from [Activating TOK](#)) “As a default, we humans are notoriously irrational,” writes [Adam Fletcher](#). “Many of us suffer from something called dysrationalia which is being unable to think and behave rationally despite having adequate intelligence. Dysrationalia explains why otherwise smart people might believe in horoscopes, Yeti, the Easter Bunny, the Tooth Fairy, or Xenu, the ruler of the Galactic Confederacy.”

The failure to separate genuine knowledge from spurious claims can, of course, be dangerous. The contemporary world, in spite of increased education and awareness, is bristling with politically painful examples of widespread social problems arising from “dysrationalia”. In fact, the opening quotation is from [a satiric article](#) focusing on the particular issue of knowledge-claims-gone-horribly-wrong — yet flourishing — in a protest group in Germany called *Pegida*.



Essentially *Pegida* is against immigration of all sorts, and especially of Muslims. Founded in October, 2014, in Dresden, it takes its name from an acronym (in German) for Patriotic Europeans Against the Islamization of the West. Attempting to avoid close (or, at least, exclusive) links with neo-Nazi groups and/or violence, the organization specializes in largely orderly public demonstrations claiming to represent “the people”. In fact, **its recent 19 point “manifesto”** includes some reasonable, even moderate, points — along with many that are, well, the opposite.

There is, of course, nothing new about xenophobia—nor is it restricted to contemporary Germany. *Pegida*, however, makes a good example to discuss in a TOK class because it has given rise to some analytical and thoughtful analyses of issues relevant to several aspects of TOK.

### 1. History as an AOK: knowledge of the past

In an article in *The Guardian* focused on *Pegida* and headed “**Amnesia, not Immigration, is Europe’s Problem**”, Natalie Nougayrède argues that the failure to remember its own history, and to base historical assertion on fact, underlies *Pegida* and similar groups. She turns for many of her points to historian Tony Judt who shows how, contrary to what many xenophobic groups think, Europe has had a long history as a multicultural crossroads.

It seems, indeed, that the rhetoric of groups like *Pegida*, brandishing the claim that European nations were formerly “pure”, or, at the very least, homogenous, is simply ignorant:

*Since 1989 many of Europe’s centres have become “cosmopolitan global cities, whether they like it or not”, writes Judt. The historian’s message is that Europe’s future [like its past] is multicultural. Its core values are about being open to the Other. The only time Europeans experienced relative demographic homogeneity – that era of supposed tranquillity – was in the wake of Hitler’s and Stalin’s devastations.*

She adds:

*Tony Judt is great to read on this. In his book **Postwar**, he recalls how “the European continent was once a complex tapestry of languages, religions, communities, and nations that overlapped. Many of its cities – including some of the smallest, at the intersection of old and new imperial borders, such as Trieste, Sarajevo, Salonica, Czernowitz, Odessa, Vilnius – were truly multicultural, with Catholics, Orthodox, Muslims, Jews and others mingling.”*

But why, then, do many contemporary Europeans believe that, until recently, their countries were culturally homogenous? It seems that the world wars that swept across Europe are to blame:

*Judt goes on: “Between 1914 and 1945, however, this Europe was reduced to ashes.” As a result of war, occupation, border changes, expulsions and genocide, most people ended up living among people like them, in different states. During the cold war, the two halves of Europe lived in “hermetic national enclaves” – a world of homogeneity, notes Judt.*

It is thus a basic misunderstanding of history that lies at the root of many of the claims of *Pegida*. Much of history’s value as an area of knowledge may arise—as is often pointed

about—by providing us with knowledge of a past so that we are not “doomed to repeat it”. The value of history in this example, however, is otherwise: *knowledge of the past can prevent false assumptions about the way the future should be managed to replicate a past—that didn’t exist.*

## 2. History and perspectives

Though treating it as a comparatively minor thread through **her article**, Natalie Nougayrède does identify a second fundamental aim of TOK—the crucial importance of recognizing the role played by “perspectives”.

In this case, historian Tony Judt demonstrates the role history can play for Europeans in emphasizing— and as a “core value”—being “open to the Other.” Just as TOK underlines the importance of understanding the role played by differing perspectives (of culture, gender, religion, and so on), so the (negative) example of Pegida demonstrates, through its ignorance of history, the role played by *failing to understand* alternate perspectives.

Although journalistic analyses of the knowledge-failures of Pegida are multiple, one particularly **lively satirical (ironic? even sarcastic?) article** provides a useful analysis of four more relevant problems with knowledge claims gone badly adrift.

Addressing the reader as a (hypothetically) disgruntled citizen ripe to join Pegida, author Adam Fletcher outrageously asserts: “Pegida™ technology offers you an instant and magical new world view, vastly superior to your previous world view.” By “magical”, needless to say, he means enticing, yes, but hopelessly wrong-headed.

Wherein does this “magical new world” reside? Exactly, it seems, where all magic lies. Need we say more?

So, from Fletcher’s list...

## 3. Slogans and reflex thinking

*With the help of Pegida™, you become immune to the effects of inconvenient facts. If anyone from the “lying press” tries to contradict your world view, your brain will automatically short-circuit like a robot vacuum cleaner covered in milk.*

*Thanks to Pegida™, when someone confronts you with the so called “truth”, you’ll repeat a series of standard phrases until they go away.*

If Adam Fletcher is correct, then members of this group practise a kind of double-pronged method of blocking out genuine knowledge. First, without making a conscious effort, not only do group members simply ignore any knowledge that doesn’t correspond to their own beliefs, but also they build up their defences further by unthinkingly repeating (often shouting in public rallies) several standard phrases— most infamously “Lügenpresse”, literally “lying press”. (**“Pegida’s favourite ‘lying press’ is ‘un-word 2014’**). (See “repeated affirmation” in the *TOK Course Book’s* “Fallacies of argument” p.148.)



#### 4. Cause attributed falsely

Many will recognize “false cause” from informal logic (TOK Course Book p. 128). The term refers to the familiar human problem of seizing on an apparent cause that, in fact, is merely that–apparent. In discussing reason as a way of knowing, we look at issues that arise in sifting through cause and effect analysis.

Adam Fletcher doesn’t use the term “false cause” (or the more traditional *Post Hoc*), but he does point out the easy confusions of cause and effect perpetrated by Pegida. In what he calls “Advanced Scapegoating”, Fletcher points the finger of blame at Pegida for creating a mere illusion of knowledge. As he playfully he puts it:

*Scapegoating was an ancient tradition that involved taking a goat, projecting all of your problems, sins and disappointments upon it and then casting it out to the desert. It was a very fun and effective way to deal with your problems, because you weren’t the goat.*

Still, if his analysis is correct, Pegida is, indeed, guilty of this very form of misaligning cause and effect. If a problem has arisen *after* immigration in time sequence, the all-purpose *cause* of the problem is, for Pegida members, immigration.

#### 4. Group Thinking and Identification

The thought-confusion created by “crowd mentality” has long been established (c.f. p. 290 of the TOK Course Book and its photograph of the Nuremberg rallies).

In what he calls “Instant Community”, Adam Fletcher asks his hypothetical citizen, “Do you get lonely sometimes? Do you wish there were other people around who shared your opinions?”. Pegida, he ironically asserts, attracts people like that, who “know” based on their emotions (TOK emotion):

*But with it, oh boy, you get to be part of a group of disappointed individuals who think no-one is listening to them! Much better! Many don’t know exactly what it is they’re not being listened to about, but that doesn’t mean they can’t be angry about it. Rabble! Rabble! With Pegida™ you get to be one of the Volk.*

(See *TOK Course Book*, “Fallacies of argument”, appeal to belonging, p. 172.)

#### 5. Irrationality/dysrationalia

Like Natalie Nougayrède, Fletcher identifies “selective amnesia”, and then goes on to give his lively definition of “dysrationalia” quoted at the beginning of this post. Arguably, all the knowledge problems with Pegida listed here are largely kinds of dysrationalia.

Still, in the last part of his analysis, called “Heightened Irrationality”, Adam Fletcher singles out Pegida’s particular ability to fall victim to two species of irrationality—first, “to believe in even more

far-fetched things” (than the Easter Bunny), and second, to accept rational contradictions. Aping a Pegida follower, he says, for example: “‘The press lie about Pegida™, yet we won’t be interviewed to tell them the truth.’” Fletcher summarizes, “With Pegida™ you can have hours of fun groping in the dark of logic.”

*Groping in the dark of logic? Suffering from dysrationalia?* In this satirical article’s treatment of Pegida, its followers are presented as wandering in the murky depths of false knowledge claims. Yet it’s clear that their ignorance of history and their susceptibility to logical fallacies over cause are not exclusive to them; these are common human failures. Their response to slogans and desire to belong are likewise recognizable and understandable emotions.

Can’t we see these characteristics in ourselves? Learning to think more critically is a skill that is useful not only for evaluating *others* and their thinking. It’s a skill that helps us recognize the tendencies in *our own minds* – toward error and toward group thinking that blocks alternative perspectives. The case of Pegida, though, reinforces the vital need for those skills and points toward the implications for how we live with others in the world.

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Images

Pegida demonstration by Kallispera Dell, CC BY-SA via [Wikipedia](#)

People’s Climate March 2014 NYC, CC BY-SA 2.0 via [Flicker](#)

# Indigenous enoughness: Perspectives are more complex than they seem.

FEBRUARY 12, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) Why do I have such ambivalent reactions to this video “Enoughness”, when it is so obviously a splendid film to take to a TOK class? Not only does it give a short, pithy summary of perspectives on the natural world and their implications for how we treat it, with graphic illustration, but it also supports a new area of knowledge in the TOK course, indigenous knowledge. Moreover, the value it places on sustainability puts it utterly in harmony with IB education. But...but...but for me, perhaps it’s my objections to it rather than my general endorsement that make me consider it particularly valuable for TOK.

## 1. At first glance...description and analysis

At a first glance, the video could hardly provide more effective support for course ideas. The idea that how we think affects how we act in the world is fundamental to TOK’s emphasis on learning to think critically. The companion idea that understanding different cultural perspectives is enriching is fundamental to both TOK and IB goals.

On a first viewing, I would encourage students to analyze the perspectives as they are presented in the video for their components (TOK Course Book, page 29): their assumptions,

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their values, the effect of assumptions and values on how they affect what is seen as important, their processes of validation (with confirmation bias possibly involved), and their implications for how we act in the world.

## **2. At second glance...counter-argument**

It's at a second glance, though, that the film gets even more interesting for TOK. Although I accept that a short film must simplify ideas, I find myself protesting. Is the indigenous perspective truthfully so homogenous? Are there — or have there been — no indigenous groups who acted destructively in the environment or who did not embrace equality and cooperation in their societies? And is the western perspective as uniform as it is presented as being? Are there — or have there been — no non-indigenous groups within the west who did not treat the natural world destructively and did share cooperatively? Has there been no opposition from within the west to the cultural view attributed to it? Of course there has been!

I can accept broad generalization even on a concept as complex as “culture” — but not without acknowledgement of the difficulties even of defining it (and cultural anthropology insists that there are many) and not without at least a recognition that the perspectives are not uniformly held by all subgroups and their members.

If you choose to use the film in class, I recommend encouraging your students not to emulate it in two regards in their own class presentations involving perspectives: first, they should hesitate to present perspectives as homogenous and uniformly belonging to a whole group; second and related, they should acknowledge counter-argument.

## **3. At a third glance...recognition of framing argument**

It's evident, though, that the video is not simply contrasting two worldviews and their implications for the sake of comparison but is pointedly drawing lessons from the indigenous worldview and way of life as pertinent to our survival in the present and future. The generalizations on culture are being used for a purpose — presenting the perspective, in turn, of the filmmakers. The comparison is being made to argue for living more sustainably. To what extent does it matter if the cultural antithesis is oversimplified for the purpose of argument? This is a serious question.

It's easy, too, to see the film as carrying some pride in heritage, a native heritage that has been historically disparaged by colonial powers but whose wisdom in sustainable living has become increasingly recognized. The filmmakers are from an indigenous organization, First Peoples, whose website provides some good materials for a TOK treatment of indigenous knowledge. The “indigenous perspective” they present in the video may have been a matter of informal cultural heritage, but the one they deal with and develop themselves is much more than purely heritage. They are using the tools of contemporary communication, with conscious social purpose, and building the shared perspective.

To the extent that there genuinely is an “indigenous perspective” uniting widely different groups for their common characteristics, it hasn’t “just happened”. It has been — and continues to be — the product of relevant groups working together (as in other areas of knowledge). As we treat indigenous knowledge in Theory of Knowledge, we shouldn’t make the mistake of assuming that it is exclusively something of the past. The people are still here, and they are forging a larger common identity across groups of great diversity. And, significant to what we hope to gain from different cultures, they are offering a perspective on the world that is strikingly pertinent to the contemporary world.

## News anchor in disgrace: media, memory, and questions of knowledge

FEBRUARY 22, 2015 THEO DOMBROWSKI



(Originally posted on Activating TOK) If there’s one quality we all want in news announcers it is their *truthfulness*. A liar is *not* what we want. It’s not surprising, then, that one of the most widely covered news stories of recent weeks is the one directed at exposing famous NBC News “anchorman” Brian Williams—as a liar. So high profile is this story that if you take it to a TOK class you can expect most students to have heard it (at least in North America.)

As for the lie itself, well, according to Williams he was traveling in a helicopter in Iraq in 2003, when it was hit by enemy fire. The truth? It wasn’t. (In fact, another helicopter traveling ahead of him by more than half an hour was hit—though Williams’ helicopter did land to avoid a dangerous situation.)

Ask the same TOK class what knowledge questions related to shared knowledge emerge from this story and, no doubt, many will point out those associated with trusting news media. The fact that Williams did not present his story as a *news* story will hardly take away from the point. This emphasis, however, obscures an even more interesting question for TOK, one raised by psychologists commenting on the story. Is it possible that it illustrates not a failure of *honesty* but the normal workings of fallible *memory*?



## 1. Knowledge questions regarding news media:

**To what extent and in what ways can we trust the media as a reliable source of shared knowledge? Of what characteristics of media should we be aware as we try to gain knowledge from them?**

Some students will no doubt point out that the story reminds us that news is often distorted, slanted in its selection and language (TOK language), or completely wrong— though some news sources have earned reputations as being comparatively reliable and even “objective.”

Some, too, will no doubt point out that one of the most dominant news stories involves the failures of *competitor* news media. The irony is obvious.

Others might point out that the story brings to light the problems with a widespread inclination to put truly peculiar trust (Might we call this “faith” as a way of knowing, according to one definition?) in a particular news “anchor”—without stopping to ask whether this news anchor is much more than a ventriloquist’s puppet, merely reading out the lines written by others. They might be particularly interested in commenting on the fact that in the United States, as one of “**the most trusted people in the country**” Williams has dropped from 23rd to 835th—and speculating on how and why he was given that trust in the first place.

Along this line, others are likely to add that the public isn’t entirely to blame, given the tactics used by news media to build an aura of charisma, trust and authority around their much-hyped “anchors.”

Yet others will probably respond by pointing out that these media themselves aren’t entirely to blame: they are, some might argue, merely playing into a common human weakness to place faith in the “wiseman” or “wise woman” as extraordinary (and nearly infallible) sources of knowledge. It wouldn’t take long to take a romp through fantasy fiction and myth on the one hand, or the history of cults, political movements and some religions on the other to make the point. Many, many of us want a Gandalf or a guru.

## 2. Knowledge questions regarding memory:

**To what extent is memory reliable as a way of knowing? In trying to gain knowledge, of what limitations should we be aware concerning memory as a justification?**

What makes this particular example interesting to discuss in a TOK class, however, is the way media have pursued the story as repercussions, accusations, and analyses have followed. The fact that Williams has given differing explanations and apologies, not entirely consistent with each other, has been followed up with **stories of his being suspended** from NBC for six months and his resigning from the board of directors of the Congressional Medal of Honor Foundation.

This is all as we might expect.

What we might *not* expect quite so obviously, however, is that the response to this story has been quite different from psychologists, neurologists, and other professionals working in related fields. For them—and, for a TOK class—the story is perhaps most striking not for what it shows about news media as for what it shows about that elusive way of knowing—*memory*.

Key to the interest taken by this group is **one of Williams' statements**:

“You are absolutely right and I was wrong,” he wrote [on Facebook], adding that he had in fact been on the helicopter behind the one that had been hit. Constant viewing of the video showing him inspecting the impact area, he said, “and the fog of memory over 12 years — made me conflate the two, and I apologize.”

The *TOK Course Book* provides many insights into the nature of memory that can alert students to the peculiar role that memory may well be playing in this situation.

“Memory, clearly, does not operate on its own as a way of knowing. It interacts with sense perception and emotion, intuition and language—not just in the *content* of memories retained of the past but also in the *processes* we recall the past, reshape it, or forget it. As [a] New Jersey judge summed it up, ‘Memory is a constructive, dynamic, and selective process.’”  
(*TOK Course Book*, p. 107)

Neurologist Steven Novella points out how Williams' behaviour is entirely consistent with the way memory can misfire. Writing in his blog *NeuroLogica* and adding additional thoughts in his podcast, *The Skeptics Guide to the Universe* (Episode 501, February 14) he makes three main points:

1. Each time we recall an event we commonly see it as more dramatic or sensational than we did initially.
2. We typically recall such events with vivid clarity, thus making us all the more convinced that our memory is accurate. As Novella writes of Williams, “He may have been falsely reassured by the clarity of his memory, which is not a good predictor of veracity.”
3. In each recollection of an event in which we have played a tangential role we commonly pull ourselves closer and closer to the centre of the event until, in some cases, we are playing a central role.

Writing in *Discovery News*, **Benjamin Radford develops this latter point**:

“A **review of the evolution of Williams's account** suggests a clue about how the incident could have migrated from one helicopter to another. In a 2013 retelling of the story to David Letterman in which Williams stated that his helicopter had been hit, he repeatedly uses the word “we” to describe the group he was in that came under fire. There seemed to be a blurring of the distinction in his mind between “we” (the crew and passengers on the specific helicopter he was on) and “we” (the whole group on that mission, of whom he states “two of our four helicopters were hit... we were only at 100 feet doing 100 forward knots” — which accurately described all of the helicopters, including both the one that was hit and the one he was in).

“...[his] use of the words “we” and “us” to describe who came under fire suggests that he began to see himself as the target and possibly misremember whose helicopter was actually hit.”

Writing in the Associated Press, [Meghan Barr reports another psychologist and adds another crinkle](#):

“We all change our memories to fit with constantly evolving societal norms: sharpening the details that we’re comfortable with and forgetting the ones that are inconvenient or uncomfortable, said Harold Takooshian, a psychology professor at Fordham University. ‘So the bottom line is that Brian Williams is 100 percent normal: It seems to me he was just exaggerating and he started believing what he said,’ Takooshian said.

[Psychologist Almut Hupbach points out](#) the additional role played by trauma (an aspect examined in the *TOK Course Book*, p. 105, in the chapter on *TOK emotion*):

“How is it possible to remember something initially and then change your account of the experience later on? You can imagine that being in a helicopter under Iraqi attack would be extremely stressful. This stress could have been further exacerbated by the fact that for some time while in the air, Williams probably didn’t know exactly what was going on or why his helicopter had to land. There was lots of uncertainty.

“In times of stress, our attention narrows—we can only take in the crucial aspects of an experience, ignoring details that are not central to our survival. So Williams most likely already started out with a fuzzy memory. Given its traumatic character, we can assume that Williams recounted this memory many times in the weeks and months following the incident, frequently reactivating the memory, and potentially imagining different outcomes.

“We know from research that memory reactivation makes memories temporarily fragile. Imagining something that didn’t happen but is related to what actually did happen can rather easily infiltrate our memories.

“And these distortions are more likely to occur with time. This can explain why eyewitness reports are so unreliable. In the aftermath of an event, especially a significant one, people ask questions, and make suggestions—and the way the questions are asked and what they suggest alters memories.”

Can we *know* whether Brian Williams was *lying* or whether he was *misremembering*? From the point of view of TOK that matters less than the fact that this high profile news story is a powerful vehicle for illuminating much about the way we gain shared knowledge—or think we do.

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Photo: Dust qualification training by The U.S. Army, CC BY 2.0 via [Flicker](#)

## Seeing and interpreting: Do terrorists live here?

FEBRUARY 25, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) **The police descended, responding to the warning:** residents of Karlskrona, Sweden were allegedly displaying their allegiance to the terrorist Islamic State with an enormous IS in their window. The officers left laughing, however. The inflatable balloons, viewed from the inside of the house, took the shape of 21, the number of the birthday celebration. “I’m so surprised at all the attention,” said Sarah Ericsson. “I will never forget my 21st birthday.”

This is a short and funny story, but its relevance to TOK’s treatment of sense perception is obvious. What we see depends, yes, on the angle from which we are observing. But it also depends on what we carry already in our minds, so that the interpretation is difficult to disentangle from the sight. And then — how do we act, based on our interpretation? Do we pause to question what we’ve “seen” — or do we call the police?

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Balloon photo via [The Local](#)

## What colour is that dress? Millions disagree!

FEBRUARY 28, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) Yes, of course, we do know that people perceive colours differently. But *so very differently*? The dress at the centre of this week's media storm makes an entertaining example in TOK of variability in sense perception, interpretation of optical illusion, and the extreme edge of "shared knowledge" – knowledge claims not shared through communal and corrective methodology but instead spread swiftly through social media. Millions of people are firm in their conflicting knowledge claims: "It's obviously blue and black!" "Are you kidding? It's white and gold!"

In sheer crowd appeal, the colour of the dress surely trumps other colour tests or optical illusions that TOK teachers often take to class to prompt discussion on human variability in sense perception and interpretation. As the [BBC reports](#), BuzzFeed's online story about the dress has been shared more than 20 million times. Its post about the story also set a record for the website when 670,000 people went on to the site at the same time."

"Shared" it is! But does this story exemplify "shared *knowledge*"? What *justifies* all the fervent –

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and conflicting — knowledge claims? A TOK class could have some fun with these questions. So will a TOK teacher who can nudge discussion beyond merely individual differences in sense perception and assertions that “seeing is believing” and into the role of awareness of ways of knowing in creating good critical filters for the eager knowledge claims of the world. With a stronger nudge, the dress example could lightly touch on the role of testing phenomena and checking sources, and the difference between knowledge claims shared in the popular media and those that are shared and filtered through the methodologies of areas of knowledge.

**Reliable word has it** that the off-line dress is, in fact (What a lovely and questionable expression “in fact” is!) blue and black. However, an article in *Wired*, **The Science of Why No One Agrees on the Colour of This Dress**, brings the conflicting interpretations directly into the TOK realm of sense perception as a way of knowing: “This fight is about more than just social media—it’s about primal biology and the way human eyes and brains have evolved to see color in a sunlit world.” To understand the differences in interpretation, we have to consider the biology of the eye, features of the object being observed, the parts of it to which we direct attention, and its background context of detail and lighting. Go, TOK, go.

But, personally, in spite of what I now “know”, I still *see* the dress as white and gold.

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Dress photo via [Tumblr](#)

## **Black and blue**

MARCH 7, 2015 EILEEN DOMBROWSKI

(Originally posted on **Activating TOK**) A week now since I posted “**What colour is that dress? Millions disagree**”, the story of the dress (black and blue, or white and gold?) continues to echo in the media. As different groups frame the story of the optical illusion with their own interests and ask their own questions, they create different stories of their own attached to what is currently a common reference point. Does placing the dress in different contexts affect, do you think, how you “see” it? I’ll pick out just two striking uses of the dress, both of them seizing on it to make points irrelevant to its optical qualities – but in the process moving into extended TOK territory!

The first asks, “Who made the dress? Under what labour conditions?” **The writer reports that** Roman Originals, the dress manufacturer, was exposed in 2007 for using child labour in sweat shops in India. However, saying it hadn’t been aware, the company says it immediately cancelled its contract with that supplier and reinforced the ethical terms of contracts they signed. Interestingly, it is planning now *not* to market a gold and white dress (the original *actually* having been blue and black) but to make a single white and gold dress — and auction it for charity. Do you find that this added information changes in any way how you “see” the dress or respond to the image?



A second striking use of the dress is shocking – and meant to be so. The Christian humanitarian organization The Salvation Army **demand**s in a caption to a picture of a model wearing a white and gold dress, “Why is it so hard to see black and blue?” The model is covered with bruises – “black and blue” — and the caption adds, “One in six women are [sic] victims of abuse.” For background on the campaign, see this **Global News video**.

Clearly, the article is not concerned with optical illusions. The creative agency that created the ad for the campaign against violence to women freely admits, ““We wanted to take advantage of the hype of the meme to spread awareness for something important.” In punning on “black and blue” (and thereby using amphiboly as a communicative tactic), it shifts the conversation to its own concerns. Nevertheless, the ad campaign still does not leave TOK territory: it treats not what people actually see but what people *acknowledge seeing*, and, by implication, responsibility for taking action.

Both of these uses of the dress raise related knowledge questions:

1. How does our prior knowledge affect our sense perception – what we see or otherwise gain through our senses, what we notice out of all the sense information that we gather, and how we understand it?
2. How do our concepts of the world and human relationships affect our sense perception? How do our *perspectives* influence both what we notice and what we acknowledge noticing?
3. Does recognition of injustice bring any ethical responsibility for attempting to oppose it?

Why or why not?

Personally, I find the optical illusion dress an entertaining example to take into a TOK class for discussion of sense perception, **as I commented last week**. However, I find it even more interesting this week with an extension of knowledge questions into implications for human rights and justice. The single example of the dress – white and gold, or black and blue – becomes fruitful for wider ranging TOK discussion.

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Photo: Salvation Army via [Twitter](#)

## “Knowledge-Based Trust” (KBT): Google aims to give us the facts.

MARCH 17, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) Who needs critical thinking when we have Google? A team of computer scientists working for Google has proposed an improvement on what comes up when we enter our terms in its search window. They suggest a method of calculating a “trustworthiness score” for webpages based on their factual content: “We call the trustworthiness score we computed Knowledge-Based Trust (KBT).” An avid Googler myself, I am awash with both admiration and amusement. What would our students, many of them also consummate Googlers in face of essay

assignments, make of the knowledge questions that instantly arise about the nature of facts, truth, and reliable sources?

### **Reliability: consistency of knowledge claims within the Knowledge Vault**

The proposed system, explained briefly in *New Scientist* (“Google wants to rank websites based on facts not links”) pushes web sources up the Google rankings *no longer* by counting the number of links to it within the interconnected Web, *but instead* by internally checking its facts and bumping down the “trustworthiness score” of those pages whose information contradicts what is otherwise established within the web.

But how can Google rate the factual accuracy of the information and knowledge claims of websites? Google doesn’t do independent research, nor does it have a method of establishing a Reliable Source independent of the knowledge claims repeated throughout the internet.

It can only check *inside* the web, within what it calls its **Knowledge Vault**, an immense compilation of information extracted from the internet by bots and algorithms. And it is this data store that the proposed software will use to establish consistency between sources of information. It will establish *trustworthiness* through *coherence* – that is, internal consistency and freedom from contradiction. (See the coherence check for truth, **IB TOK Course Book**, chapter 3.)

### **To what extent will you grant Google your own KBT (Knowledge-Based Trust)?**



We can imagine the vast compilation of electronic information using many different metaphors: the web, the Vault, or a self-contained bubble, for instance. Perhaps the metaphor (TOK language) we choose might affect what knowledge questions we pose about the Google measure of trustworthiness – and using the metaphor of “an echo chamber” ought to provoke a few!

I suggest sharing the short article from *New Scientist* with your students to find out what questions they might want to ask before they grant Google their own Trust. I’ll share a few knowledge questions of my own – ones I consider extremely important as, like so many students, I hunt down

information on the web. (“Google” is one of my most active verbs!)

### A few knowledge questions — on coherence, reliable sources, and circular reasoning

First, I’m inclined to step back from *coherence* as a way of establishing truth:

- If all sources agree on information, is it true?
- If the information provided by a minority of sources contradicts the information provided by the majority, is it false?
- Is the probability of accuracy of a source *reliably* measured by the degree of accord with other sources?
- What is a “fact”?

As students could well point out, we often use coherence as a way of checking the truth of knowledge claims, not just in everyday knowledge but also in the methodologies of our areas of knowledge. Mathematical proofs aim for freedom from internal contradiction and perfect logical consistency (TOK reason) within bodies of statements. History, working with very different subject matter, still uses consistency as a test for truth: it aims, as one measure of accuracy, to find accord between documents to establish what really happened in the past. (Historians, of course, expect to find human inconsistencies and all the variability of our limitations and perspectives.)

Given that internal consistency is a widely used, and often appropriate, check for truth, then, we might be pushed to tackle a few more knowledge questions as we withhold from Google, for the moment, our KBT. These questions close in more tightly on *reliable sources*, and are ones to which our students have assuredly already given some thought:

- Are all sources of information equally reliable? Why or why not? Do all websites contribute equally to accurate understanding of an issue?
- What is an “expert”? To what extent do our expectations of an expert source vary according to the area of expertise?
- If a source is expert on one topic, is that same source necessarily reliable on unrelated topics?

As students are likely to point out, we should choose whom we ask depending on the topic, and we should weight our trust according to the knowledge of our sources. If we want to know whether a medical procedure is safe, we should turn to doctors, not to a democratic vote of our friends. We’d be wise, similarly, to listen to the consensus of climate scientists regarding climate change rather than looking for the most frequent assertions in the media.

(Or...at least we probably acknowledge that *we should* trust appropriate experts. In practice, according to cognitive scientists, we are *appallingly* inclined to be convinced by anecdotal evidence – including the stories of our friends! And we are also sadly inclined to be subject to *confirmation bias*, filtering information to accept only what confirms what we want to believe. )

The Google research team has proposed a way of dealing with this problem of numerous unreliable sources. They’ll weight a source more heavily as reliable in their scoring system if it has a higher score for factual accuracy. Ah. Sounds like a good idea, Google. But if students don’t instantly raise



knowledge questions about *circular reasoning*, you might want to prompt them to do so:

- To what extent can we evaluate the trustworthiness of a source by the trustworthiness of its information?
- To what extent can we evaluate the trustworthiness of information by the trustworthiness of its source?
- Can we *simultaneously* evaluate the quality of the source according to the accuracy its information, and the accuracy of the information according to its quality of the source?

### 3.4.1 Source quality

Following [8], we estimate the accuracy of a source by computing the average probability of its provided values being true:

$$\hat{A}_w^{t+1} = \frac{\sum_{dv:\hat{C}_{w dv}=1} p(V_d = v|X)}{\sum_{dv:\hat{C}_{w dv}=1} 1} \quad (27)$$

We can take uncertainty of  $\hat{C}$  into account as follows:

$$\hat{A}_w^{t+1} = \frac{\sum_{dv:\hat{C}_{w dv}>0} p(C_{w dv} = 1|X)p(V_d = v|X)}{\sum_{dv:\hat{C}_{w dv}>0} p(C_{w dv} = 1|X)} \quad (28)$$

*This is the key equation behind Knowledge-based Trust estimation:* it estimates the accuracy of a web source as the weighted average of the probability of the facts that it contains (provides), where the weights are the probability that these facts are indeed contained in that source.

## Am I being unfair to Google?

I fear I may have missed something truly significant in this proposal to change the methods of a Google search. I certainly don't understand all the supporting methodology – and I encourage you to try to **read the equations and diagrams yourself**. This is not my field! I would welcome response from someone more knowledgeable to comment on my comments and what I've missed. Altogether, though, I'm left with appreciation of what the Google aims to do in making this change. If it moves away from ranking websites on a search according to how many other sites refer to them with links, it moves away from *ranking by popularity* – popularity that can be gained through reasons that have nothing whatever to do with reliability. I'm concerned, though, that what it takes on in *ranking for reliability* is much more complex and may create trust – KBT! — that has a shaky foundation.

And so, despite my appreciation of Google's goals, I'm also left with an *even greater appreciation* of what eludes data collection by bots and internal analysis by algorithms: that is, *critical thinking and human judgment*. We can be glad to have better information come up on a Google search, but we'll still want to do the critical processing ourselves as we tackle a knowledge question that is extremely important within IB Theory of Knowledge and relevant to student research within the entire IB Diploma: How can we *best* determine the likelihood of a source being trustworthy?

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Photo: Spider web by Alan Reeves, CC-BY via [Flicker](#)

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## Taking TOK on the road

MARCH 26, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) This blog will be quiet during April. Theo and I are going away to Guatemala for the month as volunteers with a development charity. He'll be teaching art and I'll be helping with English — but we're expecting that what we learn will vastly overbalance what we teach.

The Mayan village we're going to, by the way, looks nothing like the tourist image that Theo painted and I've posted here. I'll tell you all about it — or at least share any TOK-relevant reflections — when we're back later in May. Best wishes to you all.

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# Myths of scientific discovery

MAY 16, 2015 EILEEN DOMBROWSKI



Here it comes, Newton!

(Originally posted on [Activating TOK](#)) “The mythical stories we tell about our heroes are always more romantic and often more palatable than the truth. But in science, at least, they are destructive, in that they promote false conceptions of the evolution of scientific thought.” So writes Leonard Mlodinow in [an article in the New York Times](#) forwarded to me by my co-author and friend Lena Rotenberg. It’s a good article for any TOK reading list, taking aim at myths of scientific discovery and their implications for understanding any complex field:

“Even if we are not scientists, every day we are challenged to make judgments and decisions about technical matters like vaccinations, financial investments, diet supplements and, of course, global warming. If our discourse on such topics is to be intelligent and productive, we need to dip below the surface and grapple with the complex underlying issues. The myths can seduce one into believing there is an easier path, one that doesn’t require such hard work.”

The article chooses examples of Darwin, Newton, Hawking, Aristotle to emphasize the gulf between the myths of inspired insight and the reality of the hard work behind reaching insight and grounding it in sound justification. “The Darwin, Newton and Hawking of the myths received..instant gratification. The real scientists did not, and real people seldom do.”

My only lament about this article is that it is rather scolding and humourless. Having recently enjoyed the movies *The Theory of Everything* (Hawking) and *The Imitation Game* (Turing) and the

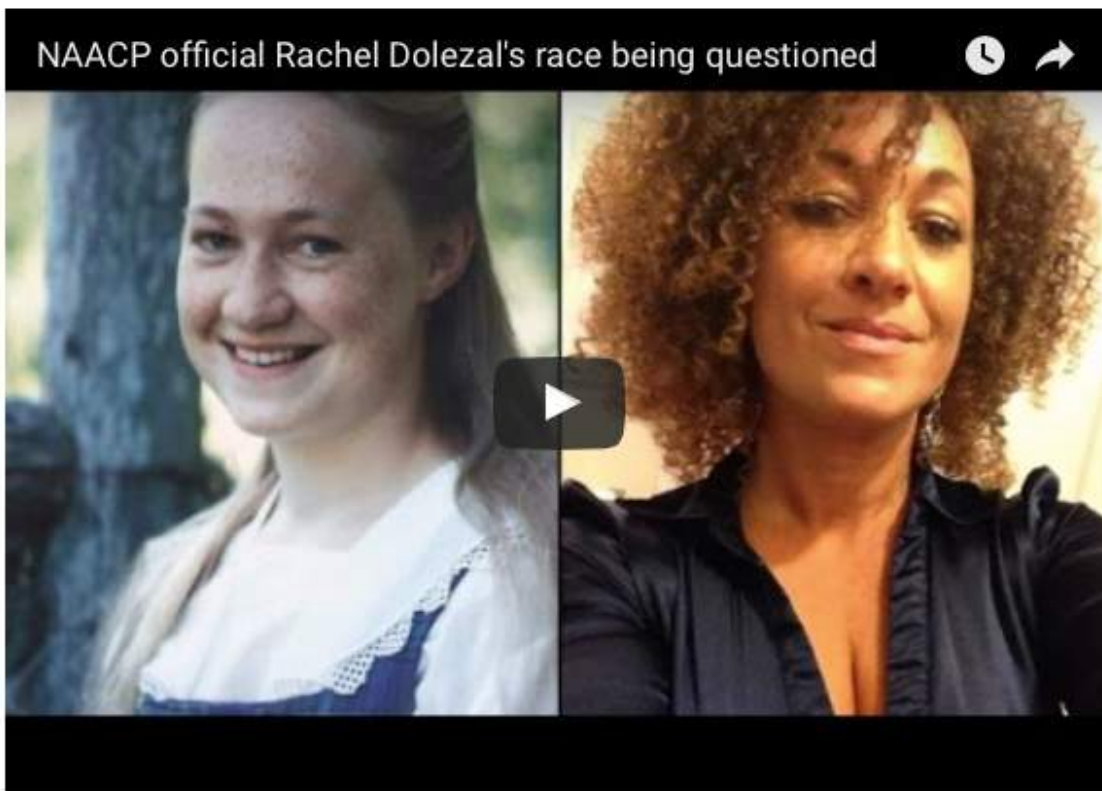
enigma code), I'm inclined to cheer when the hero of a gripping film is a major thinker. Yes, we do have to distinguish between reality and story. Yes, we do have to recognize the crucial role of hard work in gaining understanding in any complex field. And then — let's enjoy the stories and the elevation of brilliant mathematicians or scientists to the ranks of cultural heroes. May they be appreciated for their hard work — but may they also shine brightly for their genius in our stories!

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Photo: Apples by Jennifer C, CC BY 2.0 via [Flicker](#)

## “Passing” as black: classification and social implications

JUNE 14, 2015 EILEEN DOMBROWSKI



[https://www.youtube.com/watch?v=ih777exy\\_fA&feature=youtu.be](https://www.youtube.com/watch?v=ih777exy_fA&feature=youtu.be)

(Originally posted on [Activating TOK](#)) A story currently running in the media jolts me out of summertime diversions, straight back to TOK. I find knowledge questions about classification magnetic, especially when the categories constructed have social and emotional resonance as they are applied to human beings – as has the categorization of “race”.



This week's incident gives an interesting twist to American stories of people of one race "passing" as another. Rachel Dolezal, president of a Washington state chapter of the National Association for the Advancement of Colored People (NAACP), has been exposed by her birth parents as lying about being black. She is white – and they have the birth certificate to prove it. Many people have condemned her deception, **including her black adopted brother** who describes her "blackface" as "a slap in the face to African-Americans".

Yet she is clearly a leader in Washington state's black community, an expert on Black American culture, and an advocate for the community on issues of civil rights. Asked by a reporter whether she was *black* or *white*, Dolezal responded only, "That question is not as easy as it seems. There's a lot of complexities ... and I don't know that everyone would understand that."

## Knowledge Questions

If you'd be interested in taking this story into a Theory of Knowledge class, it seems to me that there are a few central knowledge questions, to which this story brings an intriguing example and a range of perspectives:

1. On what basis do we classify our *observations* of the world? How are the ways of knowing of sense perception, emotion, language, and memory particularly involved? For instance, if people are categorized according to race, what ways of knowing are interactively in play?
2. How do we categorize our *concepts*? How do naming and defining (WOK language) both reflect and create categories, and how might generalizing (WOK intuition, reason) both entrench and question concept boundaries? In the example of race, where scientists tell us that biological differences are minute, skin-deep, and variable across a spectrum, how do *concepts* of race influence observation?
3. What are the *implications* of accepting and applying general categories when it comes to people? When we are seeking knowledge, why might it matter for us to understand the basis and justifications for the conceptual categories we use?

There's no shortage of coverage on the internet to demonstrate that racial categorization in this case is intensely important to people, but this particular article acts as a good introduction: "**Race v ethnicity: the strange case of Rachel Dolezal, explained (sort of)**".

It also contains links to a range of further coverage with major perspectives identified. Some commentators focus on biological information, others on race as a social construct, and others on the likeness (or not) between claiming racial identity and sexual identity. **Stephen Thrasher, a mixed race columnist, comments:**

"I have zero personal insight into why Dolezal chose to perform race as she did. But the reason that her story is so fascinating to me and to the rest of the world is that it exposes in a disquieting way that our race is performance – that, despite the stark differences in how our races are perceived and privileged (or not) by others, they are all predicated on a myth that the differences are intrinsic and intrinsically perceptible."



Theory of Knowledge certainly has a role in helping students to enter discussions of race and racism in terms of conceptual categories and their impact on what we claim we know about the world. A TOK class can give students vocabulary and a somewhat detached space in which these hot social issues can be considered more calmly and thoughtfully than they are on the internet. In every area of knowledge and in every society, I would venture to say, people are likely to think more clearly and advance their knowledge more effectively if they are aware of the concepts they assume or accept.

As for Rachel Dolezal, she has said that she'll make a statement shortly. Are her personal knowledge claims the deciding factor, in your mind, for determining her racial identity? Why or why not?

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## **Classification and implications: Who is black, or indigenous, or Jewish?**

JUNE 17, 2015 EILEEN DOMBROWSKI

(Originally posted on **Activating TOK**) I ended my last post with questions about Rachel Dolezal's claims to be black: "Are her personal knowledge claims the deciding factor, in your mind, for determining her racial identity? Why or why not?" What has captured media attention, it seems, is the way in which her story pits her own personal knowledge claims about her own racial identity against social knowledge claims of racial classification – and this in a society where racial categorization is charged with assumptions, associations from history and politics, values, and implications for treatment.

What captures my own TOK attention, however, is more generalized. It's the differing bases and justifications for general classifications, of course. But even more intriguing is the way particular examples fit – or, being human, sometimes dramatically refuse to fit – into the categories assigned to them. As soon as we take two steps back from Rachel Dolezal's story, others flood into the space. Who is black? Who's an Indian? Who's Jewish?

Who is “black”? Rachel Dolezal’s identity wasn’t in question, and she was apparently contributing productively to her black community until her white birth parents “outed” her. Her response in [an interview with NBC news yesterday](#) was to question her parentage, question how language is used to categorize people, and emphasize her personal knowledge (“my truth”) and the ambiguities of racial categories:

“Nothing about being white describes who I am. So, you know, what’s the word for it? The closest thing that I can come to is if you’re black or white, I’m black. I’m more black than white. On a level of values, lived experience currently. In this moment, that’s the answer. That’s the accurate answer from my truth. But I hope the dialogue continues to push against, ‘what is race? what is ethnicity?’”

**Who’s an “Indian”?** I’ve blogged on this before. [“Who’s an Indian?: classification and implications”](#) (December 2014) dealt with cases in Canada and Tanzania, and pointed out that the way we categorize “indigenous people” has ramifications not just for specific rights and land claims but also for our intriguingly ambiguous TOK category of “indigenous knowledge”. In an earlier blog post, [“Indigenous Knowledge: definition, implications, and controversy”](#) (September 2014) I touched on interconnected questions of group identity and shared knowledge. (The TOK category of “shared knowledge” – and questions over *who* controls *what* is shared and *how* – is a side-discussion with methodological issues but also political context!)

**Who is “Jewish”?** The classification of people as Jewish raises knowledge questions that overlap with being black or being aboriginal in that concepts of biological inheritance intersect with concepts of ethnicity, and personal self-identification can be at odds with external identification. The categorization, in some places and times, has had implications of life or death. For this particular classification, though, I want only to pick out a personal story much stranger, to my mind, than Rachel Dolezal’s — and to pass the questions to you.

Csanad Szegedi, a leader in a neo-Nazi Hungarian political party that described Jews as “lice-infested, dirty murderers”, confronted – and *transformed* – as he learned more about his own family lineage. The story broke in 2012, [as reported in NPR](#): “One of the leaders of Hungary’s Jobbik Party, which the Anti-Defamation League says is one of the few political parties in Europe to overtly campaign with anti-Semitic materials, has discovered that he is himself a Jew.” By 2013, he had talked with his grandmother and was “shocked” to learn that the “Holocaust really happened” and that she had survived Auschwitz. ( [“Neo-Nazi Leader Csanad Szegedi Converts to Judaism”](#) ) He learned more of his background, experienced an emotional change (TOK emotion), and converted to orthodox Judaism. A recent report in the BBC, with a really interesting podcast in [From Our Own Correspondent](#), summarizes Szegedi’s personal story in brief. ( [“What happened when an anti-Semite found he was Jewish?”](#) ) One conclusion he voices concerns the very basis of prejudice, with its emotional roots in fear: “Anti-Semitism doesn’t need Jews, because it’s based on false premises. It is the projection of one’s own fears, and lack of self esteem.”

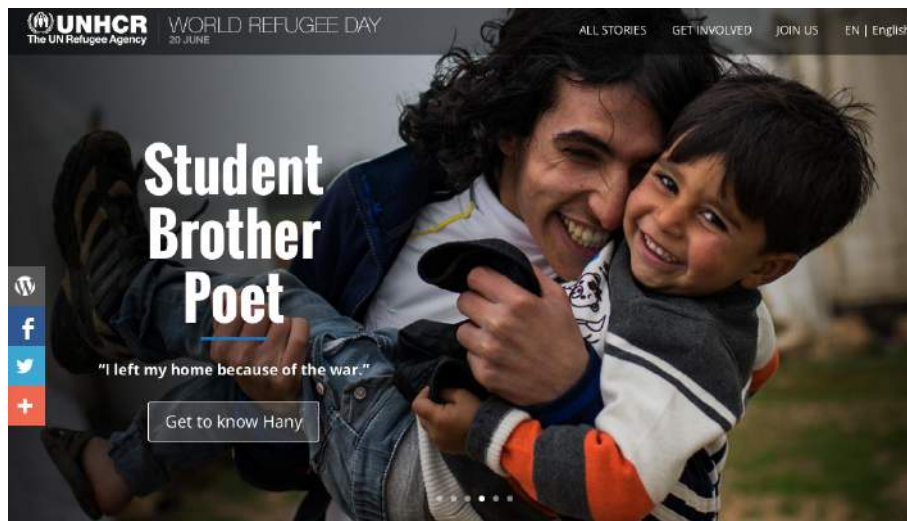
In my last posting, I identified a number of knowledge questions to raise with the story of Rachel Dolezal. What knowledge questions would you raise with the story of Csanad Szegedi? Why might they matter?

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## World Refugee Day: What do our categories leave out?

JUNE 20, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) Today, a PS to this past week’s posts on classifying human beings. What do our categories highlight, and what do they exclude? My past two posts have used current examples from the media to raise knowledge questions about “race” and the contentious balance between biological heritage and culture or ethnicity (a balance that carries varies labeling in

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various contexts). Today I'd like to comment, just briefly, on another classification of human beings, one that carries enormous significance for how we live in the world – in the creation of the category to begin with, in the definition of the category in law and politics (implications!), and in the way the category tests our common humanity. I'm referring to the category “refugees”. I feel that TOK has a role to play in invoking not only the ways of knowing that most effectively slot particular phenomena into their generalized boxes, but also the ways of knowing that invite us to think beyond those boxes and awaken compassion.

There is no “refugee gene” and no biological inheritance that places someone in the group “refugees”. The causes are social – and we have to look to the human sciences for explanation, perhaps all of psychology, sociology, history, and political science. We also look to politics and the media. As we consider *classification* in TOK – a topic that crosses all of our areas of knowledge – we want to keep raising for question the differing bases on which we categorize (all WOK involved), the role of definitions in our shared knowledge (notably WOK language), the personal and shared associations that categories gather (notably WOK emotion, memory, imagination), and the implications of classifying for what knowledge we gain and how we gain it. As highlighted in the TOK knowledge framework, our opening *concepts* create the rails on which our thinking runs — the extent to which is does being explored in the topics of TOK language as a way of knowing.

Regarding “refugees”, I have only two points to make – and invite you to comment if you have others.

**First, the category raises huge challenges of definition**, with the definition being highly problematic yet carrying major implications for how individuals may be treated in a place of asylum. I recommend an article from IRIN: “**Refugee versus migrant: time for a new label?**” This “label” provides thoughtful material to raise knowledge questions in TOK and illustrate the importance of asking them, , with special reference to language as a way of knowing and the category of “concepts/language” in the TOK knowledge framework.

Second, the category “refugee” does what categories do, for both good and ill as we build knowledge: **it highlights certain features that people have in common and leaves out of the picture other features that are not relevant to the label**. Here, I recommend two articles that, with their personal stories and photos, invite us to question what is often assumed about the category “refugee” and to think beyond that box.

One is the UN Refugee Agency’s own feature for **World Refugee Day**. It steps beyond the label “refugee” to add other categories. For instance, Ibrahim is a “English student, Brother, Footballer”. Yadira is a “Roller skater, Daughter, Team player”. Katia is a “Gardener, Mother, Nature Lover”. And so on. We are given the kind of photos we’d take within our own families, and their personal stories. **High Commissioner for Refugees António Guterres declared** as the campaign began to “tell the human story of the refugee plight”:

“All around the world we are seeing families fleeing violence. The numbers are massive – but we must not forget that these are mothers and fathers, daughters and sons. People who led ordinary lives before war forced them to flee. On this World Refugee Day, everyone should remember the things that connect all of us – our common humanity.”

Sometimes, I'd say, our categories are *too big* and *too general* to let us see the individuals within them, but *too small* and *too limited* to encourage us to see the humanity we share.

The second (and last) article I recommend is one that looks not primarily at the terrible situation of many refugees but at individual stories of what people have done to help. "**World Refugee Day: stories of everyday heroes helping Syrian refugees**". Again, it uses a category to gather examples of people to present in the article, but within that category gives us pictures and stories to personalize the situation. It roots the general in the particular in a way familiar to photography and literature and, in the process, stirs to a greater degree our (WOK) emotion and imagination.

I can't go so far as to suggest that these two articles – one on refugees and one on people who help them — also stir in their readers the question "What can I do to help?". I haven't done a survey, so that would be purely data-free speculation on my part. Yet I do wonder if imaginative engagement, even if not sufficient to provoke action, might be a necessary ingredient toward compassion and the desire to help.

TOK does not have the role in the IB of explicitly educating on global issues or taking action as CAS does. Yet I think it has an important role to play in helping students think clearly about how they put labels on their world, and helping them recognize the implications of categories for what they know and how they act — in areas of knowledge and in the communities that surround them.

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Image via **UNHCR**

## Mathematics and Scientific Methodology: example Malaria

JUNE 26, 2015 THEO DOMBROWSKI

(Originally posted on Activating TOK) The statistics are horrifying.

*Every minute, a child dies from malaria.*

*In 2013, 90% of the world's malaria deaths occurred in Africa and over 430,000 African children died before their fifth birthdays.*

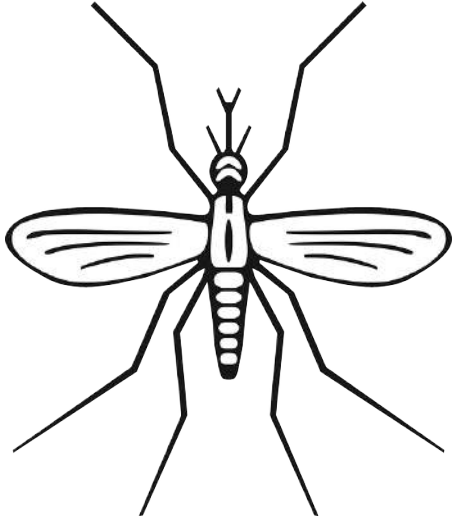
And there are plenty more statistics **where these came from:**

*In 2013, there were about 198 million malaria cases (with an uncertainty range of 124 million to 283 million) and an estimated 584 000 malaria deaths (with an uncertainty range*



of 367 000 to 755 000).

According to yet further statistics, this horrifying number is not as bad as it was just a few years earlier. Why the improvement? Mostly, it seems, from two causes: increased availability and use of both insecticides and mosquito nets over sleeping areas. Medical research still has not led to a vaccination.



### Malaria research as an example for TOK class

The research and experiences of IB graduate Dr.

Two aspects of current malaria research are most helpful to bring to a TOK class. The first concerns those elements absolutely basic to gaining *scientific knowledge*—making observations, collecting data, making assumptions, and formulating hypotheses. The second, Dr. Davenport’s specialty, is less obviously fundamental—applying *mathematics*.

#### First, what questions and what methods?

First, then, the basics. A good way of engaging students in this first aspect, may well be to ask them several questions, the very questions that many malaria researchers have asked. There is a bit of a trick here. The questions may appear a little *leading*, since this part of the process is most illuminating if students give the same answers—the same *reasonable* answers, importantly—as malaria researchers generally give. What you, as teacher, know in advance, however, is that, according to Dr. Davenport, most of these answers could well be wrong, or, at least, oversimplified.

Part of the point of asking these questions, therefore, is not just to point out the roles played by observation, data collection, and hypotheses, but to show how easily *reasonable* scientists can well be led astray.

**Question 1.** Many of us may know that the very first vaccines (against small pox) were developed because of the well-known phenomenon that milkmaids seemed largely immune to small pox. (It turned out that this was because they had developed a natural immunity from exposure to cow pox, a closely related but less dangerous pox than small pox.) **Question:** If you were looking to develop a

vaccine against malaria what population group might you first examine?

The obvious answer, of course, is you would look in a group with natural resistance. What, though, is the *premise* (arguably there is more than one) that lies behind such an answer?

**Question 2.** For this question, students need to know that even in areas of high incidence of malaria, many recover from infections. **Question:** If, therefore, you went into a rural village in a high malaria area, and were able to spend considerable time there, how would you identify a group who seemed to have natural immunity?

The slightly less obvious answer—but one that could easily be teased out—is that you are likely to identify two apparently resistant types: 1. those who don't seem to catch the disease even after considerable time 2. those, who having the disease, don't seem to develop severe symptoms. The roles played by *observation*, *data collection*, and, again, *hypothesis* are clear here.

**Question 3.** Would one of these groups seem to you more likely than the other to have natural immunity? Given the fact that you have limited resources (and again, this is actually the case with research groups) where would you invest your research money—on those who seem resistant to catching the disease in the first place or those who don't develop severe symptoms?

Here there is no clear “correct” answer. Reasonable hypotheses could be made about both groups. Though students might argue for one group more than the other, the fact is that researchers have been looking in both groups—as you can point out to the students.

**Question 4.** Since children generally suffer more severely than adults when they are infected, would you target children in your research or merely include them in your study? Either answer, arguably, is *reasonable*. Though you might find the question becomes too complex to introduce, you may note that those who would argue for examining children first are actually introducing something akin to a *utilitarian ethic*.

## **Second, how does mathematics help to examine the methods?**

At this point, we shift to the second main aspect of this problem—enter mathematics!

One of those working to penetrate the complex biology that could lead to a vaccine is IB graduate Dr. Miles Davenport. A Professor at the University of New South Wales in Australia and head of the “Complex Systems in Biology Group”, Dr. Davenport is using as a primary weapon not what most would expect: he is using *mathematics*.

Many will already be familiar with some of this former IB student's arguments quoted in the Oxford University Press *TOK Course Book*. Mathematics, he argues, unlike most other research tools used in immunology work, is crucial in finding *patterns* in the *detail* produced by most research: “What we urgently need are some ‘lumpers’ [as opposed to ‘splitters’], who search for the overarching rules which help us understand how the different phenomena arose and how they fit together.” “The discipline that mathematical analysis imposes on the field is the need to state *how different factors will interact* and what outcomes we predict.” ( p. 363)

As lead author in a newly published paper, Dr. Davenport and his research team serve as an excellent example for a TOK class of current research employing mathematical analysis to advance research in the battle against the devastations of malaria.

Keeping in mind his own experiences as an IB student, Dr. Davenport has suggested a *class activity* in which current students can sample some of the ways in which critical thinking and the principles of mathematics can be applied to malaria research (and, in fact, other epidemics like HIV/AIDS and possibly ebola).

### **Class activity: understanding random processes**

The student activity to echo some of his own team's research methods starts with a chess board and a hand full of rice (or similar bits and pieces).

Step One: The process is deceptively simple. Drop the rice grains loosely onto a chess board and see where they land, says Dr. Davenport. Then apply a simple mathematical method. Draw a graph, he says, recording distribution. Count squares with 0, 1, 2, 3 etc. grains of rice on them. On the horizontal axis enter the number grains of rice in each square. On the vertical axis enter the number of squares. The graph, of course, will show what happens when the patterns of random distribution are at work.

Step Two: Look at a standard graph of random distribution—in other words, a “bell curve”. An example can be see [at this website](#).

Step Three: Compare the 2 graphs. What should most leap off the page is that the graphs bear a striking similarity.

Now, what you need to tell students is that if they were to look at a graph of the *rates of infection* (remember the discussion of a group likely to have natural resistance?), they would see that it, too, *looks almost exactly like a graph of randomness*.

Is this enough to strike a chill into the heart of any malaria researcher? Possibly. Does this suggest that attempts to decode the biology at play in individuals with “natural resistance” are based on entirely false premises? Is there *no pattern after all*? Possibly.

This is what Dr. Davenport and his team conclude in the [recently published paper](#):

“We find that under most circumstances, the distribution of time-to-infection [i.e. rate of infection] is consistent with this simply being a random process. We find that age, method for detection of infection, and underlying force of infection are all factors in determining whether time-to-infection is a useful correlate of immunity.”

### **Going beyond randomness**

Have researchers thus reached a dead end? Is there no such thing as natural immunity ? Is

all *apparent* immunity merely the result of *chance*? In spite of the parallel between random patterns and patterns of infection, quite possibly not.

In fact, it seems, there is considerable hope that such a phenomenon as natural immunity to malaria actually does exist. And, at this point, we need to consider another problematic issue with most current research. As Dr. Davenport argues, most current researchers who use *time to infection* as the sole method for selecting the immune group are almost certainly misguided. Thus this new paper is a warning to those researchers pouring resources into malaria prevention by focusing on those who seem resistant to becoming infected that they may well be fundamentally wrong in their approach. Other approaches are needed.

At this point, then, having been jolted to a position of reconsidering premises by means of mathematics, we return to first of the two main aspects being looked at here, the fundamental elements of the *scientific method*.

In TOK terms, we might rephrase to say that the *methodology* is flawed, giving insufficient *justification* for the conclusions reached. We cannot accept conclusions in the sciences unless we can trust the methodology that produced them. The conclusions *could be wrong*. BUT...*they might still be right*. We just don't have enough evidence to decide whether they are wrong or right when major flaws emerge in the methods of gaining evidence.

The full paper goes into details in making recommendations on the most likely methods of finding resistant individuals—and improving methodologies. Amongst other things, the paper analyses the need to work on more refined instruments than are often employed to measure the point at which patients are *actually infected* rather than, as is currently the case, the point at which they produce easily observable symptoms. Malaria is, after all, as the paper shows, a complex disease—and different levels of resistance or immunity can occur at various stages in the process of the parasite's development. Again, he is arguing that many researchers are using shaky premises, making shaky observations—and thus collecting equally shaky data.

In the end, the scrupulously close study of data leads Dr. Davenport and his team to conclude that it is only by using a particular method of detection of infection (described in the paper) and only by applying it to a group within a 1. narrow age group and 2. within the same geographical area that researches can legitimately expect to find individuals with natural immunity.

And remember question 4? While conceding that it is children who are most vulnerable to the disease and suffer most, he points out that it is only in *adults* that real natural immunity might effectively be detected.

### **Critical thinking and critique of methodology**

Dr. Davenport suggests that confronting some of the problems that researchers face in important contemporary research encourages students to recognize that critical thinking is not always obvious or easy. The example of malaria research to which he introduces us demonstrates some of the challenges to overcome in finding patterns that can lead to understanding cause.

He and his group have used mathematics to *analyze* the *methods of analysis* commonly used in malaria research, in order to get researchers to recognize problems broadly overlooked. An important contribution to advance in science is critique of the methodology itself. If researchers recognize problems and work to eliminate them, they can direct their own resources more effectively. We can all hope that they close in sooner on what they — and we! — all want: a prevention or cure for malaria.

### Broadening out: knowledge questions

Beyond demonstrating the ways in which two AOKs, mathematics and the natural sciences (and biology in particular) are interdependent, this example of current research in malaria raises at least the following *knowledge questions*:

- How much does this example demonstrate the common assertion that, of all the natural sciences, biology is most difficult to quantify and most difficult in which to find general laws? Why might this be the case? (The term “systems” might be useful.)
- What does this example demonstrate about issues involved in employing *statistics* as an application of *reason* as a way of knowing? (You might find my earlier blog post on “data journalism” useful, where knowledge questions are applied to “**White Men and Climate Change**” )
- This example shows some of the problems with finding pattern in detail. Evolutionary biologists suggest that even in day to day living—quite apart from scientific research—we humans tend to find significant patterns because our survival has depended on our doing so. For this kind of pattern-finding, ways of knowing of *sense perception*, *intuition* and *reason* can aid us, but can also mislead us. What are some common forms of such misled pattern finding? (You might refer to some of pareidolia, numerology, and cognitive biases such as confirmation bias and the others treated in chapter 12 on Intuition in the *TOK Course Book*.)
- What does this example suggest about the importance of finding *causality* in the natural sciences, and the role of reason in identifying causality?

### PS on mathematics

Those who are intrigued by the role of mathematics in this kind of analysis –and that *should* be all of us!–might be equally intrigued by glimpsing a tiny sample of the papers’ methods of analysis: This is not a joke! We may not even begin to understand this particular mathematical formula, but we can all appreciate how mathematics is being used in a rigorous and powerful manner!

The model that describes the infection curve with the delay to detection is defined by formula (0)

$$S(t) = F(1) + 1 / F(rmax) \int_1^{rmax} e^{-\lambda \max(t - \Theta(r) - \tau, 0)} f(r) dr$$

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Images

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## Backward Brain Bicycle: memory and knowing how

JULY 11, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) “Knowledge”. “Understanding”. “Truth”. Your students might want to argue with the way Destin Sandlin uses the terms — and so will you — as he struggles to learn how to ride what he calls the Backwards Brain Bicycle. This video is likely to provoke ripples of laughter and to animate discussion on “*knowing how*” and on *memory* as a way of knowing. Not a bad lead-up to knowledge questions!

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## Some Knowledge Questions

- Other than riding a bicycle, what skills do you have yourself that you use without seeming to think about them? Do you seem to recall them in a different way from how you remember factual information? *Knowledge questions:* Does *memory as a way of knowing* operate differently for different kinds of things we learn and know?
- *Knowledge questions:* What is the difference between *knowing* information and *knowing how* to do things? How do the two differ, and how do they work together in different areas of knowledge? In what ways does it help us to draw such distinctions in terminology and give definitions?
- Devlin Sandlin makes a point that knowledge is not the same thing as understanding, and applies that distinction to knowing how to ride a bicycle. Would you use the term “understanding” as he does, to embrace a grasp that goes beyond conscious awareness? How else, and perhaps differently, might you use the term? *Knowledge questions:* What is the difference between knowledge and understanding? Does the distinction show up in different ways in reference to mastery of *ideas*, mastery of *intellectual skills*, and mastery of *physical skills*?
- What does Devlin Sandlin mean when he concludes that “truth is truth” and that we are all looking at the world with a bias whether we think we are or not? There is a huge gap between the demonstration of riding a “backward bicycle” and this sweeping conclusion, to which he brings additional background not introduced in this video. What are “neural pathways” and “cognitive biases” to which he briefly refers, and how is *understanding these concepts, named and defined*, important to understanding Sandlin’s conclusions? *Knowledge question:* To what extent are we all inclined by our brains and upbringing to respond to the world in particular ways? (Actually, this question is so huge that you would probably want to touch it only lightly in connection with this non-academic bicycle video — but it’s worth touching lightly repeatedly all the way through the course.)

I wouldn’t spend a lot of time in class on this video, but would use it to bring a class together and to sound again (as we do, again and again!) some of the ongoing knowledge questions of the course.

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# “Evidence Based Medicine”: WOK Language and AOK Natural Sciences

JULY 20, 2015 THEO DOMBROWSKI



(Originally posted on Activating TOK) When we depend on language to mediate scientific knowledge, the field is ripe for misunderstanding and abuse. And when life and death are involved, as they often are in medical science, getting it right is important. Hence the attempts of prominent figures who straddle both fields — medical science and communication (e.g. David Gorski, Stephen Novella, John Byrne) — to change terminology when current terminology has created problems. In fact, these medical writers/doctors have created a whole society and web site on the issue: *Science Based Medicine: exploring issues and controversies in science and medicine*.

The need for one particular new term, though, may seem surprising. “Evidence Based Medicine” is a term that should hardly need changing. Right? After all, evidence is exactly that—evidence. And evidence has always (in “modern medicine”) been and should always be the basis of medical science. Right?

Well, apparently, not. Surprising as it may seem, the *term* “evidence based medicine” (though not the *concept*) emerged fully only in 1990. (Consider WOK language and the TOK knowledge framework’s “concepts/language”!) It, and its acronym EBM, “emerged as something that needed a manifesto and an acronym because, in practice—and this is a bit awkward—an awful lot of medicine *was* still based on things like faith, tradition, and vehemence.” (Paul Ingraham.) So what went wrong between 1990 and more recent times when, it seems, the term has faltered?

## Evidence Base – or Pseudo-Evidence Base?

For part of the answer, flick through a magazine or the web. (The following might not be a bad 5 minute exercise for a class, especially if students have laptops or tablets). A search for sales of remedies for just about any ailment will quickly reveal how often and how glibly the terms “clinical trials”, “research” or “clinical evidence” pop up. Paul Ingraham, a science writer, points out, “EBM appears to worship clinical trial evidence above all else...” **John Byrne asks,**

*“Shouldn’t we first ask ourselves, based on established scientific knowledge, does the claim make any sense? Does the phenomenon in question exist? Is it even plausible? These are critical questions that one should ask before worrying about randomized controlled trials.”*

As if that weren’t enough, **says Paul Ingraham,** “This blind spot has directly contributed to the infiltration of quackery into academic medicine and so-called EBM...” “This EBM idea, even applied too narrowly, would have worked out pretty well if no one had even been dishonest about the evidence.”

As I noted in a blog post last year (“**Skepticism: a million dollar challenge**”), the veneer of scientific methodology and language has been misappropriated by climate science “skeptics”. It should be no surprise that much the same can be true of those who are enticed by illegitimate profiteering—or lunatic fringe ideology.

Thus, “pseudo-evidence based medicine”, as the term goes, is really “quackery that strives to create the appearance of being evidence-based.” It is difficult to find much consolation in the fact that the bad guys at least reinforce in the public’s mind the compelling importance of proper validation of hypotheses through testing—rather than “faith, tradition, or vehemence.”

The most striking abuse of the language of clinical trials, it seems, is in two main forms:

- 1. **False claims** that clinical trials have shown.....etc.
- 2. Disingenuous assertions that “**more study**” is needed.

## Tooth Fairy Science

Yet, in both cases, the *actual substance* of the preposterous claims flies in the face of thoroughly researched and substantiated scientific facts. Harriet Hall, MD illustrates this principle with her idea of “**Tooth Fairy Science**“. Tooth Fairy science seeks explanations for things before establishing that those things actually exist. For example:

*“You could measure how much money the Tooth Fairy leaves under the pillow, whether she leaves more cash for the first or last tooth, whether the payoff is greater if you leave the tooth in a plastic baggie versus wrapped in Kleenex. You can get all kinds of good data that is reproducible and statistically significant. Yes, you have learned something. But you haven’t learned what you think you’ve learned, because you haven’t bothered to establish whether the Tooth Fairy really exists.”*

Some thoughtful students could well object at this point. What, they might ask, of new scientific principles? Does not the emphasis on pre-established principles prevent new discoveries? No, says Byrne:

*This is not to say that we need a plausible, basic science explanation for all claims. We can (and do) rely on evidence only from clinical trials to support the use of many treatments for which we do not have a basic science explanation. Although science tends to fill in the missing mechanisms as we discover new aspects of basic science, we have used many treatments with only clinical evidence. The value of hand washing was discovered as a result of the clinical studies done by Ignaz Semmelweis. There was no basic science of microbiology at the time. The basic neurophysiology of many psychotropic medications was unknown (and still is in some cases). They have been used because clinical trials confirmed that they work.*

*So, a known basic science mechanism of action is not really needed to study a claim. However, \*\* a claim should not contradict established basic science knowledge\*\*. The above examples did not contradict any scientifically established facts, laws or theories of physics, chemistry or biology. In fact, the clinical knowledge that came from these examples sparked the search for new basic science knowledge.*

TOK teachers and students might well recognize in Harriet Hall's comments on the tooth fairy some of the drawbacks of the *coherence check for truth*, when a body of knowledge claims, internally harmonious just as is a mathematical system based on reason, becomes a self-referencing and self-reinforcing bubble. They might equally recognize in Byrne's comments above a distinction between two checks for truth – the *pragmatic test for truth* based on practical results and the *correspondence check for truth* based on evidence. (See truth checks in chapter 3 in the *TOK Course Book*.)

### **“Evidence Based Medicine” vs “Science Based Medicine”**

The remedy? The introduction of the term “Science Based Medicine” clearly comes with the intention not to subvert the essential importance of “evidence” from clinical trials, but rather to elevate the equally essential importance of proven science. (Classes familiar with the principle of the Baye's Factor, Likelihood Ratio, or Bayesian Probability might find it helpful to have those terms applied to this principle.)

If, indeed, Science Based Medicine does replace EBM as the “gold standard”, then several goals will be met:

- Claims that blatantly violate proven science will absorb fewer resources in more and yet more costly clinical trials. Do we really need to prove yet again pure water is not a cure for cancer—or anything else very much (except thirst?)
- Fake medicine-men would be less able to parasitize the credulous public while claiming the need for “further trails.”

It seems only too appropriate that Paul Ingraham should invoke that essential litmus paper test first



stated by science writer Carl Sagan: “Extraordinary claims require extraordinary evidence”.  
**EBM, SBM, and TOK**

The arguments for pushing the term **Science Based Medicine** provide an excellent example of the constant need to scrutinize our terminology for what it means and how it is used, in practice, to clarify ideas or sometimes (even deliberately) to confuse them. In IB Theory of Knowledge we confront ambiguous and slippery language not only in our specific treatment of *language as a way of knowing* but also in our examination of *concepts and language* in areas of knowledge. In TOK we also give appreciation to scientists trying to improve their area of knowledge in terms of the ways of knowing that underlie it within its overall methodology. Clearly, we will want give our applause to **John Byrne as he calls for careful treatment of evidence**:

*“The call for SBM is not a call to end EBM. It is a call to advance the evidence-driven paradigm; to fill in the crack that lets in the wedge of pseudoscience. They should be one and the same.*

*“If we recognize this, we just might get it right.”*

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Paul Ingraham “Why ‘Science’-Based Instead of ‘Evidence’-Based? The rationale for making medicine more science-based” updated Aug 26th, 2014 <https://www.painscience.com/articles/ebm-vs-sbm.php>

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Image: Doctor by geralt, Creative Commons via [Pixabay](#)

# “Evidence-based medicine”: a class discussion, with a caffeine lift!

JULY 26, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) *Did you know that green coffee bean extract can help you lose weight? No? Me neither!* Today, I’d like to propose a class discussion on thinking critically about media knowledge claims for products that yield fabulous (literally) medical benefits. The discussion is given a caffeine lift by a bite-sized example from a year ago – a story of fabulous claims and the corrective process of science.

I’m including this now because of Theo’s post last week (July 20, 2015): [“Evidence Based Medicine: WOK Language and AOK Natural Sciences.”](#) He outlined arguments given by scientists for replacing the term “evidence-based medicine” with the term “science-based medicine”:

- 1 to bring attention to common abuses of evidence (TOK justification),
- 2 to increase clarity of ideas (TOK concepts/language) and
- 3 to frame interpretation of data with larger scientific understanding (TOK methodology of the natural sciences).

As teachers, we can usually enter a topic easily enough through following arguments and linking them with our own understanding of TOK and our own experience. But when we take a topic to class, we don’t always *teach* in the same way we *learn*. We often want to provide real life examples to get students started in their own thinking, and then guide them from the specific case toward general concepts and distinctions.

## Green coffee beans: 3-part discussion

**Purpose:** This discussion is on knowledge claims based on (that is, “justified by”) apparent clinical trials, and on the way science works not by proving statements true but by knocking out knowledge claims that are demonstrably false (that is, “falsifying”). It reinforces the skills and awareness constant in TOK teaching: *skills of applied critical thinking* and *awareness of broad knowledge questions*.

**Procedure:** Nothing unusual. The activity involves students reading two short articles sequentially, with teacher-guided discussion.

### 1. Article 1: The knowledge claims.

Give students the article containing the knowledge claims for benefits of the extract from green coffee beans: “**Dr. Oz: Lose Weight Effectively with Green Coffee Bean Extract**” (June, 2014). Ask them to read the article closely and consider the following TOK questions:

- What might make them accept the knowledge claims about green coffee beans as convincing? What apparent evidence is given?
- What features of the claims of the website context might make them hesitate to accept the claims about the health benefits?
- What questions would they like to have answered before they accept or reject the claims? How would they formulate these questions?

### 2. Article 2: The Retraction.

Give students the companion article from four months later on the retraction of the knowledge claims about the benefits of green coffee beans: “**Authors retract green coffee bean diet paper touted by Dr. Oz**”,(October 20, 2014). Ask them to read the article closely and consider the following TOK questions:

- Is it a failure in science that false knowledge claims are ever made, or a success in science that they are weeded out, or both? What part does retraction play in the methods of science?
- In face of people trying to sell fake remedies, what can individuals do to protect themselves?

### 3. Conclusion: larger knowledge issues.

Last, ensure that general TOK topics are raised and reinforced in discussion. This example of green coffee beans is trivial in itself, but can be used to draw out class discussion on questions in two categories – first on applied critical thinking and second on broad knowledge questions.

**Applied critical thinking:** With the example established, it takes only a few minutes more of discussion to stress the role of reading critically and the question above: “What can individuals do to protect themselves?” Ask students to generate their own general list of “red flags” that might alert a reader to possible bogus claims about medicines. (Ongoing TOK discussions are likely to be regularly building and applying such lists!)

**Knowledge questions** in the natural sciences (including medical research): It's important to stand back from the particular example of green coffee beans to place it in context of knowledge questions for which it provides some illustration. These knowledge questions may have arisen already in discussion, but are useful to pull together before leaving the example:

- In the methodology of the natural sciences, what is the role of peer review in scientific publication? Is it a perfect process? If not, what undermines it, and what strengthens it?
- Does data ever “speak for itself”? What is the difference between clinical data and knowledge?
- It has often been said: “Science does not prove statements true beyond question, but does prove statements false”. Do you think this is a good description of scientific methodology?
- A group of scientists critiquing problems in medical knowledge claims has insisted that the term “evidence-based medicine” should be replaced by the term “science-based medicine”? Why does it matter to have “evidence” interpreted by scientists?

The final question above harks back to Theo's blog post last week: “**Evidence Based Medicine**”. I recommend raising the distinction in class to illustrate the way that a shared understanding of terminology is important in the sciences (concepts/language). A critique of sloppy or dishonest use of terminology is, at the same time, an insistence on rigorous methodology.

Myself, I'd be tempted to end this class by offering students chocolate-covered coffee beans – with no claims about benefits to their health!

## References and Further Reading

“Dr. Oz: Lose Weight Effectively with Green Coffee Bean Extract”. *Pure Green Coffee*. April 11, 2014. <http://puregreencoffee.com/articles/dr-oz-green-coffee-bean-extract/>

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“Dr.Oz-endorsed diet pill study was bogus, researchers admit”, *CBS News*, October 20, 2014. <http://www.cbsnews.com/news/dr-oz-endorsed-green-coffee-bean-diet-study-retracted/>

Theo Dombrowski, “Evidence Based Medicine”: WOK Language and AOK Natural Sciences. *Activating TOK*, July 20, 2015. <http://activatingtok.net/2015/07/20/evidence-based-medicine-wok-language-and-aok-natural-sciences/>

Image: Green Coffee Beans by carllilo3070, Creative Commons via [Pixabay](#)

Further TOK Support

Eileen Dombrowski, Lena Rotenberg, and Mimi Bick. *Theory of Knowledge Course Book* (in cooperation with the IB). Oxford University Press,

2013. <https://global.oup.com/education/product/9780199129737/?region=international> (For skills of critical thinking relevant in this activity, see the series of interchapters and the 2-page summary “A Guide to Evaluating Knowledge Claims”.)

# “— Based Medicine”: alternatives to “evidence”

AUGUST 3, 2015 EILEEN DOMBROWSKI



(Originally posted on [Activating TOK](#)) Is it *obvious* that medical conclusions ought to be based on evidence and science? What are the alternatives? For a smile along with the serious point, I recommend this satirical list by two doctors: “[Seven alternatives to evidence based medicine](#)”. Vehemence-based medicine? Eminence-based medicine?

The list predates the recent book on celebrity-based medicine with the splendid title *Is Gwyneth Paltrow Wrong About Everything?* Looking at what people believe in medicine and *why* can be very funny — and very scary.

In his book debunking the specific health advice offered to her fans by influential actress Gwyneth Paltrow, Professor Timothy Caulfield is also dealing with a more general concern, and the implications of what people accept. As [he explains in an interview](#),

“Much of her advice simply does not have the science to back it up. Some of it sounds scientific – such as detoxing – but there really isn’t any evidence to support the practice.

“I also feel that her advice is often harmful and distracts us from the simple, evidence-based and effective things we can do to live a healthy lifestyle. The pseudoscience noise distracts and confuses.”

The full title of his book reads: *Is Gwyneth Paltrow Wrong About Everything? How the Famous Sell Us Elixirs of Health, Beauty & Happiness*.

The famous can *sell* their notions and their elixirs – but need we *buy*? Ultimately, what writer Timothy Caulfield wants exactly what we want in Theory of Knowledge: to encourage a more aware and critical public. Sometimes we do it by encouraging HOW TO read, analyze, reach sound conclusions — as I’ve considered regarding medicine and evidence in my past two posts. But sometimes we do it – and possibly more humorously and effectively – by showing HOW NOT TO.

## References

*David Isaacs and Dominic Fitzgerald*. “Seven alternatives to evidence based medicine” Cite this as: *BMJ* 1999;319:1618. <http://www.bmj.com/content/319/7225/1618>

Celia Walden, “Is Gwyneth Paltrow wrong about everything?” *The Telegraph*, May 9, 2015. <http://www.telegraph.co.uk/news/celebritynews/11591936/Is-Gwyneth-Paltrow-wrong-about-everything.html>



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image: Potion, OpenClipartVectors, Creative Commons via Pixabay

## “It shakes your guts.”: TOK knowing in an adventurous ice climb

AUGUST 24, 2015 EILEEN DOMBROWSKI



<https://www.youtube.com/watch?v=-SOQwTGOMnY>

Ice climbing to precipitous heights is not everyone’s idea of a good time. Certainly – *most* certainly – not mine! But while I find adventurer Will Gadd’s ascent of frozen Niagara Falls essentially horrifying, I’m intrigued at the potential for a stimulating TOK class that emerges from the videos of his climb in January and a video/audio interview he did in June of this year. In this blog, I often suggest fresh material for TOK classes. This time, I’ll go into some detail on how I imagine using it – and please feel free to pick out anything useful to you.

## TOK Discussion Activity: Climbing the Frozen Falls

### Material

“Will Gadd, the man who climbed Niagara” highlights an interview by Shad on the program *q*, on Canadian Broadcasting Company (CBC), June 3, 2015. Will Gadd is National Geographic’s Adventurer of the Year 2014/2015 and climbed Horseshoe Falls of Niagara Falls in January 2015. The [CBC webpage](#) features two small video clips of the climb, a video version of the interview, a short article with links to earlier stories, and a link to full version of the interview on radio. Several clips of his climb and the interview with Shad are also on YouTube (see references at the end).

### Purpose in using this material

An ideal use of this video interview is to stimulate Theory of Knowledge discussion on different forms of knowledge – either to generate some distinctions or to apply to an example some distinctions already established in class. Early in the interview, Shad prompts climber Will Gadd to speak of *knowing through first hand experience* and aspects of *knowing how* to climb. The interview also brings up numerous ways of knowing, such as *sense perception* in direct experience and *emotion and intuition* regarding about fear and its positive contribution to his evaluation of a dangerous situation. In the final 7 minutes of this 16-minute interview, Gadd reflects on communicating his *personal knowledge* to others and *sharing knowledge*.

### The appeal of this particular material

*Appeal for students:* adventure and reflection. A young and trendy interviewer questions the National Geographic Adventurer of the Year about his death-defying adventure – the challenge of climbing the ice bordering a thundering waterfall, the fear of plummeting into “the cauldron of doom”, feelings over sharing stories, the changing world as icefields melt, and finally “trying to live life”.

*Appeal for teachers:* The video resources prompt discussion but don’t themselves consume much class time. Besides, the ice climb is sufficiently memorable that it will be easy in months after a discussion to recall for a class the ideas established through it.

### Sequence for discussion

**1. Preamble. Play the short (2:24) video clip “Will Gadd Climbs Ice on Frozen Niagara Falls”** (the clip with which this post opens) for background on the climbing project about which Gadd will be speaking in the interview. Before pushing on, touch the following questions lightly with the class for some immediate response — to draw their thoughts into Theory of Knowledge.

- What does Will Gadd know that you and I almost certainly do not? Do you think his experience of feeling the “visceral pounding of the water” is a kind of knowledge? Is his reflection on the sensations of his direct experience essential to our calling it “knowledge”? Would you call his skill in climbing a kind of knowledge?

- When he yells at the top of the climb, what emotion does the video narrator declare that he is feeling? Do you agree? How do you know?

## 2. Interview by Shad of Will Gadd, adventurer

Now play the **interview** (15:47) below, ready to pause it at points for class discussion. (It's SO satisfying when an interviewer asks the questions we'd want to ask in his place!) I follow the interview below with a timing outline to make it quickly accessible and questions that you may want to use to stimulate discussion in your TOK class.



<http://www.cbc.ca/radio/q/schedule-for-wednesday-june-3-2015-1.3097370/will-gadd-the-man-who-climbed-niagara-falls-1.3098198>

### Interview Section 1

Q: 0:00 opens with background of the project secrecy and excitement. Q: 0:55 “Tell us what the preparation is like.” Q: 1: 35 “How do you get up a 150 foot sheet of ice?” 3:00 “What did it feel like?”

For TOK, start at the beginning and pause the video at 3:28 for questions and comments. Section 1 contains a lot of comments on KNOWING HOW to do the climb – in planning, technique, attitudes.... and KNOWING through direct experience (“It shakes your guts”. “It’s so powerful.”)

*Questions to class:*

- What kinds of knowledge is Gadd talking about in this section we’ve just heard?
- What are the consequences if he puts his knowledge to the test – and is wrong?

## **Interview Section 2**

Q: 3:30 “Hearing this story made me think that in this day and age we have so much access to information. We can learn so much. But it’s a different kind of knowing when you know with your body. You experienced Niagara Falls physically in a way that the rest of us would not.... What’s that like?”

For TOK, restart from 3:28 and pause the video at 4:47 for questions and comment. In Section 2, Shad pushes Gadd for details on learning and knowing, and Gadd responds about experience leaving an “imprint”.

*Questions to class:*

- What TOK ways of knowing does Gadd mention as contributing to this “imprint”?
- Do you think you know what Gadd’s talking about? Have you played sports or had other experiences that have left you with such an “imprint”? We’ll never have his *personal knowledge*. But to what extent do you think it’s possible for unusual personal knowledge like his to contribute to *shared knowledge*?

## **Interview Section 3**

Q 4:48 “The story also made me think about the different kinds of fear you must feel. You must know different kinds of fear...”

For TOK, restart at 4:47 and pause the video at 6:50 for questions and comments. In section 3, Gadd speaks of different ways of knowing, especially emotion but also (although he doesn’t name it) intuition.

*Questions to class:*

- What TOK ways of knowing does Gadd talk about in the section we’ve just heard? What does he think he learns through fear? What does he think he knows through intuition? What other ways of knowing are involved in his experience?
- Shad asked Gadd about whether he felt different kinds of fear. Does this question and the answer make sense to you?

## **Interview Section 4**

Q 6:55 “You go around and share these stories.”

For TOK, pose the question below as one to think about *before* restarting the video at 6:54, and then play it right through to the end at 15:47. If they don’t have the question in mind, there are bits that students might miss connecting (whether experience can be communicated to others, what Gadd learned from his father; a larger view of the world more generally with its ice fields melting).

### Questions to class:

- What do you think the relationship is between personal knowledge and shared knowledge? As you listen to the last part of the interview, think about what Gadd has taken in from others' knowledge, and what he is contributing himself to a common knowledge pool.

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### Summary in class

If students have responded to your questions, then a lot of basic TOK distinctions and vocabulary will have come up through the discussion. Still, I'm always inclined to debrief lightly at the end of a class, just to clinch the TOK points, link them in with past discussions, and plant them for future discussions.

- different but interconnected kinds of knowledge: *experiential knowledge* as personal experience (with reflection), *skills* of knowing how, and *knowledge claims* that can be shared (knowing that...)
- different but interconnected kinds of knowledge: *personal knowledge*, *shared knowledge*, and their interaction
- ways of knowing: how they work together in learning, knowing, communicating

This particular material is likely to prompt some personal connections and anecdotes, so you might want to balance the other way at the end with questions on how athletic skills become shared knowledge – and the *process of sharing* through different forms of communication and training. After all, considering that process of sharing pulls together several ways of knowing and contributes ideas toward a larger discussion of the methodologies of the areas of shared knowledge.

And for me, scared of heights and not so very athletic, there is a final knowledge question that I can't escape: Is there some knowledge that we DON'T want? There could be a lot of different ways of answering that one!

### References

“Will Gadd, the man who climbed Niagara”, q with Shad, CBC, June 3, 2015.

<http://www.cbc.ca/radio/q/schedule-for-wednesday-june-3-2015-1.3097370/will-gadd-the-man-who-climbed-niagara-falls-1.3098198>

“Ice Climbing Frozen Niagara Falls – Will Gadd’s First Ascent”, *YouTube*. Jan 29,

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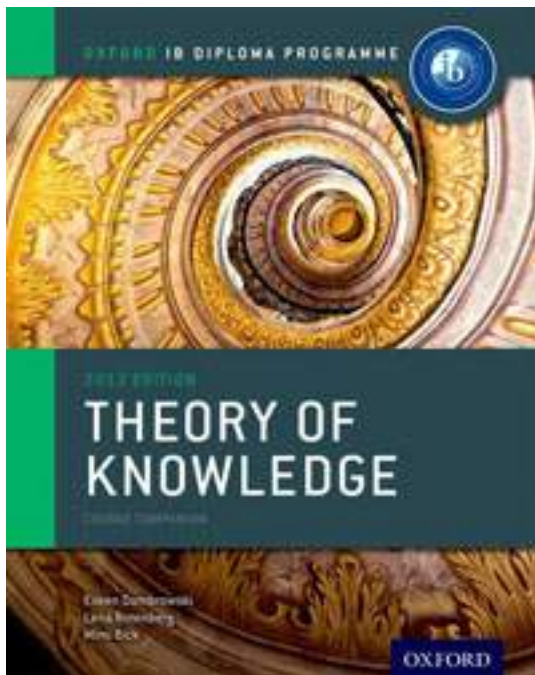
# Theory of Knowledge: the book and the blog

AUGUST 31, 2015 EILEEN DOMBROWSKI

*Sharing* – that’s what Theory of Knowledge teachers do. Long before the term “shared knowledge” took its central spot in our course, we teachers were passing around ideas and suggestions for lessons within our own IB community. Myself, I’ve been blogging on TOK for five years now, and you can see some of that history on my own website, Activating TOK (<http://activatingtok.net>) This month, though, I’m pleased to shift my primary blogging to the website of Oxford University Press. Here, I think, I’ll be able to share my ideas more effectively – in order to contribute to your own. I’ll post ideas regularly, and hope that you’ll contribute your comments and suggestions back.

## What’s the connection between the TOK Course Book and this TOK blog?

Books and blogs serve different purposes – books to integrate ideas into a large, coherent picture, and blogs to focus on specific points, often touching the passing events and thoughts of the day. You’ll find them **useful in different ways** in your own TOK course.



The TOK Course Book, which I wrote with my colleagues and friends Lena Rotenberg and Mimi Bick, provides **a comprehensive and stable resource for the whole of the TOK course**. In it, I give background on all the topics of the most recent version of the TOK course and abundant activities to launch class discussion. The book encourages inquiry, supports the entire course, and helps prepare students for assessment.

**A published book, however, cannot respond to a school context and current events as a TOK course should do.** To some large extent, the *TOK Course Book* does set up activities that take students beyond the classroom to find their own examples, and *does* generate some frameworks for analysis to be applied to present real life examples. Nevertheless, to make the book most useful to you, I had to provide in it mainly activities that take their opening sparks from situations, reflections, or knowledge puzzles that don’t go out of date. I was

*expecting* that, as a TOK teacher, you would draw on the background of the book, but frequently substitute or supplement the examples and activities in the book with ones of your own. You would *want* to follow your own interests, and to include a variety of materials of the moment. This engagement, after all, is part of the life and fun of the course.

The blog, I hope, will contribute ideas to this fresh edge of your class preparation. Although it’s more transient than the book and more scattered in its focus, it’s freer to catch events in the world as

they pass. **It can pick out current research and news stories and suggest how to use them in class. It can pause to reflect and to chat about the course.** It's a passing resource – but it's one deliberately designed for TOK, and it complements the book.

Joining me in blogging is my husband Theo, so occasionally the voice will change from alto to tenor, and the preoccupations will shift. Theo enjoys critical thinking applied to news stories (as students are expected to do in their Class Presentations), while I'm more inclined to link topics in the world with TOK classroom discussion and to comment on the course itself.

Be warned, though! We're not the voice of the IB. Although we'll always keep our comments in harmony with the TOK subject guide, we'll express lots of opinions and indulge our own senses of humour. So read what we say with your own critical filters! But – as you know — *sharing* is like that!

## How does a single photo of a single drowned child affect our shared knowledge?

SEPTEMBER 9, 2015 EILEEN DOMBROWSKI

“It was not an easy decision to share a brutal image of a drowned child,” **acknowledges the Director of Emergencies of Human Rights Watch**. As media around the world take this decision to share the photo, it has affected political debate on the crisis of refugees trying to enter Europe. But why? What role does such an image play in our shared knowledge?

In extensive media coverage, commentators express wide agreement that the image of this child, washed up on a beach in Turkey, stands out from the thousands of others of fleeing refugees and overcrowded boats. For many, it is the innocence of the three-year-old victim that distinguishes it, and the quiet isolation of the figure. For others, it is the body position of the child, arms by his sides as though asleep, or the homey details of his shorts and small sandals. For most, it seems to appeal to our own experience of loving and protecting small children, such that the image seems to be not only Aylan Kurdi, a young Syrian boy, but anyone's child.

### Using this image in a TOK classroom

I give you the choice of seeing this image or not, so I will not include it here. You can find it easily on a google search, or find it shared through some of the articles in the References at the end of this post.

Choosing whether or not to take this image to a TOK class places a TOK teacher in the same position as news editors, deciding whether to protect their readers from an image that, despite being peaceful, is very disturbing. Worldwide, not all editors have made the same choice. However, many have decided to share it, even prominently, because of what it communicates of the humanity of the current European refugee crisis.

In a classroom, we have to judge the advisability within our own contexts. Will students be

negatively affected by viewing it, after an initial response? Will others in the school context be upset if they know we have shared the image with our students? Will students, on the other hand, have seen it already in any case, and images much worse in many ways? As long as an image is not explicitly sexual or violent, should we be protecting students from feeling distress?

Below, I treat the image as acceptable to introduce into class, and you will make your own choices about whether even to read my suggestions! If you have other ideas or suggestions of your own – on whether to use the image at all, or on how to use it if you do — I encourage you to use the *comment* or *reply* feature that comes with this blog. The questions over using this particular image could provoke thoughts on how we use images in general.

If you do use it, I think it would be effective to plant at the beginning of a class the ethical questions to which I suggest returning at the end of the class for a more nuanced discussion:

- If you were the editor of a newspaper, would you choose to print this photograph? Why or why not? What is the right decision, ethically, for an editor to make?

### **Knowledge questions: ways of knowing**

After preparing students, showing the image, explaining its context, and getting their initial reactions, I'd ask these kinds of questions:

- What ways of knowing are most involved in your personal reaction to this photograph? What ways of knowing seem to be most involved in the reactions of media commentators in responses you've encountered?
- In much western philosophical discussion, emotion and imagination are viewed as distractions from more reliable ways of knowing, particularly reason. In what ways, however, could emotion and imagination be argued to lead to knowledge that reason does not? To what extent might they work in combination with reason to lead us to fuller understanding of the world?

### **Knowledge questions: symbolic representation and shared knowledge**

In the media, we extensively encounter language, statistics, photographs, and music in representations of our world. If we're going to develop our students' skills of critical thinking, I don't think that we can ignore photographs and other forms of symbolic representation in a TOK class. I'd ask questions along the line of these:

- As we discuss "shared knowledge" in TOK, what is the difference between the knowledge shared in language and the knowledge shared in images? Do images make knowledge claims? In what ways, even without asserting anything, can an image affect our knowledge? In media use of this image, notice the headlines and captions used in a few of the contexts.
- To what extent does the photo stand alone in eliciting a response and understanding, and to what extent does understanding depend on how it is framed with language? In what context is it most desirable to attempt to state only facts, and in what context does interpretation most

obviously play a desirable role?

If you're interested in further ideas on treating photographs in TOK, see the "Thinking Critically" section following the chapter on language as a way of knowing in the **TOK Course Book** and the Discussion Activity page 143.

### **Knowledge Questions: Ethics and Action**

Ethical dilemmas have great potential to bring a class to life and leave students feeling as if they have had "a good discussion" — but, in fact, to lead nowhere in terms of any TOK understanding. Personally, I've found that students need to be pushed to articulate *why* they think as they do, and the group as a whole needs help in debriefing lines of argument in terms of different ethical perspectives (chapter 16, TOK Course Book).

#### **1. Ethical questions: using the image**

Earlier, I suggested planting the following questions, to return to them at the end of a class discussion to gather more nuanced responses. The questions are likely to elicit many arguments based on conjectured *consequences*, even though the conclusions might differ. (What consequences, after all, do we take into account? And how do we know they will happen? And what weight do we give to one consequence rather than another?) When similar justifications are used to reach opposing conclusions, debriefing discussion can bring out characteristics of utilitarian ethics:

- If you were the editor of a newspaper, would you choose to print this photograph? Why or why not? What is the right decision, ethically, for an editor to make?

#### **2. Ethical questions: refugees**

The second set of questions is too huge for a TOK class to do more than glance at, in order to recognize different lines of argument based on different ethical perspectives (notably deontology and human rights, or utilitarianism and best consequences). I'd say, though, it's very important to link ethical discussions with actions (as in the partnership between TOK and CAS), even though TOK cannot give its time to the "how to" of taking those actions.

- What is the right thing for countries to do, ethically, when desperate people want to cross their borders or settle within them? What ethical responsibility do people grouped into nation states have toward other human beings outside their own borders?

*Ideally*, a school has another context, such as a program on global issues, which could pick up the issues. *Ideally*, TOK can work together with an information-based program to keep alive the knowledge questions that are transferable from one situation to another.

#### **Other TOK treatment of refugees**

You might find interesting a post I made on World Refugee Day back on June 20, as part of a series on the concept of classification and its implications for knowledge: "**World Refugee Day: What do**

our categories leave out?” Most relevant today is this comment I made at the time: “Sometimes, I’d say, our categories are *too big* and *too general* to let us see the individuals within them, but *too small* and *too limited* to encourage us to see the humanity we share.”

### Conclusion: some useful excerpts

I’m concluding with a few snippets from different news stories because they could prove useful to introduce into a class discussion, to enlarge the context or articulate certain arguments. If you want more, there is certainly no shortage of commentary on this image of the drowned Syrian three-year-old.

You will probably find quite easily, too, comments that are not at all compassionate toward refugees. In my own country, I also know where to go for analysis and commentary on government policies toward settlement of refugees, and expect that you’ll also find such sources in your own context if you want them. (I spare you my raging about Canadian politics!) If you do use this photo, I’d love to hear how the class goes, if you’d take a moment to add a comment to this blog post.

“The journalist who shot the photo expressed the outrage, despair and helplessness that it would go on to inspire in many people who saw it. ‘There was nothing to do except taking his photograph,’ said Nilufer Demir, who works for Turkey’s Dogan News Agency. ‘There was nothing to do. And that is exactly what I did. I thought this is the only way I can express the scream of his silent body.’” from CNN

“Journalists had to stop for a moment and decide how they would handle these images that stir such visceral responses. This week’s newsroom discussions evoked memories of earlier searing photos that influenced public thinking, such as the 1972 image of a little girl fleeing a napalm attack in Vietnam.” from NPR

“It really did put a human face on this awful humanitarian crisis. It has the power to change the nature of the debate on what is happening and what our reaction should be and how we should deal with it. Against this argument were voices that asked, is it right to upset readers?” Jane Martinsen, head of media desk, Guardian. quoted in NPR

“Some say the picture is too offensive to share online or print in our newspapers. But what I find offensive is that drowned children are washing up on our shorelines, when more could have been done to prevent their deaths.” Peter Bouckaert, Director, Emergencies, Human Rights Watch

“Justin Forsyth, CEO of Save the Children, said: ‘This tragic image of a little boy who’s lost his life fleeing Syria is shocking and is a reminder of the dangers children and families are taking in search of a better life. This child’s plight should concentrate minds and force the EU to come together and agree to a plan to tackle the refugee crisis.’” from The Guardian

If you actually want to help Syrian refugee children like the little boy in the viral photo, it’s not enough to care about this single dead child; you have to care about living refugee kids too, and in fact you also have to care about living refugee adults. If the image of the Syrian refugee boy made



you feel something, that's great, but it only matters for making an actual difference in the world if you can apply those feelings to living refugees as well — and, crucially, to yourself. From Vox “Images of war matter. Some highly emotional photographs from Vietnam — the brutal execution of a Vietcong guerrilla, a naked Vietnamese girl burned by napalm — brought home the horror in a way that words never could. The same has been true more recently; think of the charred corpses of American contractors hanging from a bridge in Falluja, Iraq.

“Now Syria. These two images are capable of changing the narrative, possibly affecting the course of history. That's all the more reason to handle them, and others, as thoughtfully and with as much awareness as possible. And to remember that, powerful as they are, they are only pieces of the emerging truth.” Margaret Sullivan, in 2013 (so not speaking of this particular image), New York Times.

“...Syria is just one story. There is also Iraq where three million people have fled for safety, fearing the scourge of ISIS. Over 300,000 persons —just from Africa and Middle East—have crossed into Europe since January this year. Thousands from Somalia, South Sudan, Sudan, Nigeria, Libya and Afghanistan are fleeing violence and repression. They are jumping fences in Morocco, hiding in trucks to travel to Turkey, riding trains, travelling by dinghies and walking across Hungary or Austria—in their quest for a future. It is estimated that the number of displaced people across the world is 60 million —up from 40 million just five years ago.” from The New Indian Express

“Behind all the statements and statistics about refugees, asylum seekers, the internally displaced and the stateless are real people with harrowing tales of suffering and loss, as well as hope and ambition... The best way to understand the suffering of others is to hear their stories of hardship, courage, struggle and perseverance.” UNHCR, The UN Refugee Agency.

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## Eileen’s advice for new TOK teachers

SEPTEMBER 14, 2015 EILEEN DOMBROWSKI

(Originally posted on [Activating TOK](#))



– “I’ve never even *taken* a course like IB Theory of Knowledge, and I’m not sure at all how to *teach* it.”

– “I’m just planning the course for the first time, and have some ideas...”

Voices and faces linger with me as I return from a gathering of teachers (a flocking of my own kind!). Among them were many teachers new to TOK — still taking it in, connecting it with their own backgrounds, and beginning to plan. It’s to these new teachers – with their ideas, energy, and uncertainties — that I’d like to speak in today’s blog post. May I offer you some suggestions for

enjoying to the full your teaching of IB Theory of Knowledge?

My last question, note, was purely rhetorical — and disingenuous. I really *want* to offer some suggestions and simply hope that what I prize from my own experience will find some place in your own shaping of a course that I consider central to education. I'm not at all detached, and not at all neutral: in my opinion, the whole way of thinking of TOK is crucial to the knowledge that our students *should* take with them as they graduate.

From the five pieces of basic advice I offer here, please take whatever is useful to you — and accept my good wishes that you may love the course as much as I do.

### 1. Make the knowledge questions drive the entire course.

In Theory of Knowledge, we're not in the business of delivering pat answers. As teachers, we're not experts on the content of the whole range of knowledge, and never can be. Although we certainly want to become better and better *informed* – perhaps especially on those areas of knowledge we left behind us as we specialized – it is not *information* that drives the course. The *questions* do. If we can treat knowledge as alive with questions and intensely human in all the possible ways of constructing answers, then, I feel, we can enter the course and the classroom with humility and excitement.

In TOK, the questions are meta-cognitive ones that get at the very essence of knowledge. For example:

- *How do we know? (This is the over-arching TOK question.)*
- *What ways do we have of knowing, how do we use them, and how might we use them better?*
- *What are the best methods of reaching reliable conclusions in different areas of knowledge and public life?*
- *How do different areas of knowledge enrich our overall understanding?*
- *What responsibilities does knowledge bring?*

It is by *leading with the questions* that we open up the **active process of knowing**. “How do we **KNOW**?” With a stress on the final word, this core TOK question leads to discussion of what we mean by “knowing” and what different forms it might take in our lives. “**HOW** do we know?” With a shift of emphasis to the “how”, the same core question leads straight into the interplay of ways of knowing, skills of critical thinking, and the methodologies of the different areas of knowledge. If we treat knowing as a response to questions for which we want answers, we put the stress on **active engagement** with problems and solutions, and value both the subjective and the objective in the methods of construction of the best answers we can presently achieve. We recognize the body of knowledge already created in the past as a human achievement and we welcome the living edge of creating, researching, or reflecting that modifies our understanding from year to year.

By leading with questions, we also open up for thoughtful examination the active perspectives that synthesize knowledge claims into internally coherent theories, explanations, or worldviews that differ from group to group:

- *How do they know? What are their assumptions, their values, their selected “facts” – and*

*how do we know these?*

- *What are their processes for validating their knowledge?*
- *What are the implications of accepting this perspective and its knowledge claims?*

In our real world, perspectives shared by different groups affect where we go next in developing our knowledge, and how we apply the knowledge we already possess.

As TOK teachers, we don't have to be experts in all knowledge. But we *do* have to seize knowledge questions and bring them to life for our students. If we're successful, our students are more likely in the future to question the knowledge claims they hear all around them and to appreciate sound methods of reaching conclusions in academic areas and the social sphere. Crucially, they are more likely to think clearly and critically in a world where it matters profoundly what we accept as knowledge and how we act on its basis.

## **2. Recognize the support all around you.**

Once you start posing knowledge questions, you begin to see vast resources all around you. Libraries take on fresh significance, and so does the entire world wide web with its news sources, articles of commentary, blogs, podcasts, music, and videos. So do books (ordered on the web far, far too easily!) and many of the films playing in the local theatre – and so do the meetings of every group of which you're a member. So too, for me, did family members and friends — I think I wore out them out by my incessant questions about the areas in which they worked. No other IB subject is so utterly omnivorous in its scope (knowledge) and as open to almost any application of its course questions (Why are they making *that* knowledge claim? How do they know?). As a new TOK teacher, it's easy to become completely overwhelmed by the possibilities and to feast indiscriminately.

To direct your energies and use your limited time well, it's useful when first planning a TOK course to be able to zero in on the few most useful resources. The IB now provides immensely more than when I first started, and a substantial subject guide and the Online Curriculum Centre are enough in themselves to get you launched. One of the most valuable items of all is the annual TOK subject report, which not only gives an overview of the previous exam session but in the process gives salient advice on dealing with course ideas.

For understanding the thrust of the whole TOK course and the ideas treated most centrally within it, you couldn't do better than to order some of the books currently available specifically in support of the IB TOK course, and use all of them as resources. Hardly surprisingly, I like best my *own* book, the Oxford University Press *TOK Course Book*. Yet I step back with appreciation also of the books contributed by my TOK colleagues, with their somewhat different emphases and connections of ideas. The authors of the main books know each other and have shared ideas and worked together across the years on numerous TOK projects. Collectively, we are committed to Theory of Knowledge and provide new teachers with a community of support.

And then, once you have a firm grasp of the ideas of the course, *do* go romping through the fields! Even if you use a support book for class background on topics, *do* keep renewing the activities and class materials that prompt discussion – both to demonstrate with current news and research the

relevance of TOK to knowledge in the world, and to keep your own interest fresh.

### **3. Connect with – and appreciate – your colleagues.**

Few people can resist genuine interest in their own areas of specialization. Even though your teaching colleagues are busy people, they are likely to give you their time to talk about their areas of knowledge. And they are among your best resources! If you can work together to reinforce each other's courses, you both teach better – and your students are the winners. The IB now expects all teachers to integrate TOK questions and ideas into their courses, so the bridge is already built for you.

### **4. Think of yourself as a *guide* for your students.**

In some education, the teacher aims to *deliver* knowledge, pre-digested and pre-packaged. And there *is* a place for simply transferring knowledge claims from teacher to student. That place, however, is *not* TOK.

In some group communication, a *facilitator* aims solely to enable participants to voice their thoughts and feelings, without any prior agenda or guiding intention. But TOK is a course with aims, objectives, and a syllabus. It does not encourage open wandering into ideas irrelevant to its aims! In TOK, you are neither a *delivery teacher* nor a *neutral facilitator*. You are a *guide*. You know various paths through the territory and, depending on your group and the circumstances, you provide the directions ahead. At need, you nudge the questions and discussion back onto the broad route forward. You can encourage your group ahead more quickly, or entice them to linger. You can pull them along with directions or questions from the front, or encourage them along from behind. But in all cases, you're exploring along with them, and taking them along with you.

### **5. Let the TOK course enrich your own life.**

Learning is stimulating. Knowing more gives you more to think about and more to wonder about. How could you NOT love teaching a course that inspires you to ask questions about everything around you, and to take an interest even in areas of knowledge that, at one point in your life, you were pleased to leave behind?

Although my advice to you, as a teacher new to TOK, is primarily about understanding the course in order to teach it, I will end with the best personal wishes that I can possibly give. May you find a sense of purpose and satisfaction in guiding your students to think more clearly! May you love the knowledge questions and find they heighten your own curiosity and critical edge! May you enjoy entering into different perspectives on the world to get the view from multiple angles! May you keep your sense of humour about how odd – and how oddly human — people can be in their thinking, even when you find them infuriating! And may you always have *far too much* that you really want to read and think about than you will ever have time for in this life!



# Small Picture, Big Picture: a photography resource for TOK

SEPTEMBER 22, 2015 EILEEN DOMBROWSKI



Images and stories – singular tales have power to grip our imaginations and, in vividly capturing individual moments, to evoke a far more general experience. We’ve certainly witnessed the impact on political discussion of the single photo of a drowned child that I blogged on – and so did everyone else! – just recently. (“**How does a single photo of a single drowned child affect our shared knowledge?**”, Sept 9) Yet what is the role of images in the knowledge we share?

This question is huge: it takes us into photos and films, maps and models, all of them compared with language for symbolic representation of the world; it takes us into forms of evidence and issues of reliability; it takes us into the particularizing methods of photography and literature compared with the generalizing methods of the sciences. For today, though, I’d like to narrow down to the relationship between images, representation, and knowledge claims — and share with you an exciting resource.

I give you the link to this website with a warning: you can get lost in it, opening and viewing photographs of people and their stories for pleasurable hours. But maybe you’ve had this experience already. Are you one of the over 15,000,000 (yes, fifteen million) people who “like” (Facebook) **Humans of New York**? Photographer Brandon shares on his website not only photos of people in New York but also ones of people in Iran and Pakistan, where he has travelled with his camera. It is this sheer range of people’s portraits and stories that has me hooked.

But how is this website of photos, though clearly a resource for cross-cultural empathy, also a resource for TOK? I'll make some suggestions here, and welcome any comments you'd like to add at the end of this post.

### **1. Set up the class: explore (and enjoy) the images and stories**

If you have access to the web in class so that you can browse websites as a group, look at some photos together from New York, Iran (December 2012, accessible via the menu bar at the top), and Pakistan (also accessible via the top menu). You'll want to select some favourite photos and stories in advance so that browsing doesn't turn into wandering and use up all your class time. (I find these images a bit like nacho chips – it's tempting to reach for another and another!)

If you don't have the web facilities to browse together, or if you're truly tight for time, give the class an assignment to look through the site on their own time, and to pick their own favourite images.

### **2. Look at single images to ask knowledge questions.**

If you've dealt with photographs before in class, this discussion could be brief – functioning just as a refresher. (Note that my **TOK Course Book** has activities on photographs and perspectives in the Thinking Critically interchapter following Language as a Way of Knowing)

Pick one or two of your favourite photographs from **Humans of New York**, or your students' favourites, to act as reference points for discussion. Use them for now without sharing the accompanying story. Personally, I might choose the one of a **Pakistani man sitting with a young child**. Or...maybe I might choose the one of **two attractive women standing together on the street**. Or....

#### **Knowledge questions**

- A photograph is a “copy” of the world made by technology. Is it therefore a neutral representation, perfectly truthful (passing the correspondence check for truth)?
- What choices do photographers make as they create their images? (You might consider: selection of subject matter and moment, centring and composition, angle, focus, use of colour, digital enhancement.) To what extent is a good photograph a technical achievement, and to what extent an artistic one?
- What makes certain photographs powerful in communication – such as the one from the Vietnam War often called “napalm girl” and the recent one of the drowned three-year-old washed up on the Turkish beach? To what ways of knowing do they most strongly appeal? To what extent does even the most powerful photograph depend upon our background knowledge and what we bring to its interpretation?

### **3. Look next at single images accompanied with text, for further knowledge questions on images and language.**

I would be inclined to use the same photos as in the last set of questions, but now add the text, which fills in the relationships between the people: the man and the child are identified as father and daughter, and the two women as mother and daughter. And they have stories. I'd add, too,

Brandon's **photo series of activist Syeda Ghulam Fatima**, who has devoted her life to ending bonded labour, because the relationship between image and text introduces a somewhat different balance.

### Knowledge questions

- Photographs and language function differently as symbolic representations of the world. Photographs do not make explicit knowledge claims. To what extent can photos, however, *suggest* ideas and attitudes, to the point of being *interpreted* as carrying knowledge claims? (And why are they used extensively in advertising?)
- Photographs are often presented along with accompanying text. What is the effect – or what are the *many possible effects* — of combining these two forms of symbolic representation as we share knowledge?

#### 4. Last, look at the photographic site as a whole as a *collection of images and stories*.

I suggest reading together, as a class, photographer Brandon's general statement about the photographs he took in Pakistan. Before moving on to further knowledge questions, consider **what he says about selected images** – not just his own selection of people and stories, but the selection which he thinks most people in the west are exposed to most commonly:

“A Final Word On Pakistan:

Imagine that every time you have a lapse in judgment, it gets printed in newspapers around the world: every time you lose patience with your children, every time you scream at someone in traffic, every time you drink too much and do something you regret. Each time you slip up, everyone hears about it. The world is never notified about the 99.99% of the time that you are a completely normal, productive, law-abiding citizen. The world only learns about you when things go wrong. Now imagine what the world would think of you.

It's not that terrorism, patriarchy, and violence aren't real problems in Pakistan. They exist and the country is battling these issues every single day. Pakistanis are very much aware of the extremism in their midst. The problem is that so many people seem to only be aware of that extremism. Because just as in the hypothetical example above—the other 99.99% of life just doesn't make the news. When there's only room in the newspaper for a single column about Pakistan, it's going to be filled with the most compelling story. And unfortunately, that tends to be the most violent story.

And those are important stories. Those are the types of stories that expose corruption, stop genocide, and alert the world to emerging threats. It's right for those stories to be told. But when those stories are all that we hear, it's so easy to imagine a world that's far scarier than it really is. You lose sight of the 99.99% of the world that's not scary at all. And living in fear can be a dangerous thing. Because if we're afraid of each other, we'll never be able to work together to solve our common problems.”

*from A Final Word on Pakistan*

The final knowledge questions that I suggest open out broadly to many other recurring ideas of the

Theory of Knowledge course.

### Knowledge questions

- To what extent does a selection & collection of images reflect above all the *perspective* of the selector/collector – whether that person is a photographer or the editor of a newspaper? To what extent is a selected (and possibly distorted) overall picture of the everyday world built right into “news” reporting (and perhaps even into your own personal picture file)? What is the importance for knowledge of seeking out alternative perspectives?
- Do images make knowledge claims? Do images make arguments? What is the difference between images that counter a previous impression and an argument that counters a previous argument?
- Do individual stories, or individual cases, provide sufficient justification for general knowledge claims?

Exploring these questions can set up many further discussion to which your class is bound to return — knowledge questions about particulars and generalizations, about anecdotes and case studies as opposed to surveys and statistics, about the particularizing methods of photography and literature as opposed to the generalizing methods of chemistry and physics. For today, I’ll end with a quotation to which I will be returning at some later point in this blog. Do you accept this claim yourself?:

“The plural of anecdote is data.”  
Raymond Wolfinger, *quoted from a lecture*

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image by ionasnicolae. creative commons via pixabay <https://pixabay.com/en/nikon-camera-photography-hand-515883/>

## Visualizing the TOK course: a graphic overview

SEPTEMBER 28, 2015 EILEEN DOMBROWSKI

Ideas can be treated at different scales. Anyone writing a paper or preparing to teach a course knows *that* – and Theory of Knowledge teachers most certainly do! Knowledge questions zoom skyward to such broad levels of overview that they can temporarily scale everything but the strongest contours of knowledge right out of sight. Today, I’m going to risk extreme vertigo to share with you one overview of the Theory of Knowledge course itself, scaled to a single page.



# THE DRIVING TOK KNOWLEDGE QUESTION: HOW DO WE KNOW?

## OVERVIEW CONCEPTUAL UNDERSTANDING

How do diverse **PERSPECTIVES** (cultural, ideological, academic/theoretical etc.) affect what we know as individuals (personal knowledge) and groups (shared knowledge)?

How do the **TOK WAYS OF KNOWING** interact to create knowledge...



and **JUSTIFY KNOWLEDGE CLAIMS...**

in **AREAS OF KNOWLEDGE** and the **WIDER WORLD?**



**UNIFYING THREAD:** How do we ask and answer **KNOWLEDGE QUESTIONS** in different areas of knowledge and the wider world?

## APPLIED CRITICAL ANALYSIS

Analyse **PERSPECTIVES** for their assumptions, values, selection of information, and accepted processes of validation – and the implications for thought and action of accepting their resulting knowledge claims.

Assess the contributions to knowledge and the limitations of each of the **WAYS OF KNOWING**. Consider how they interact to create, share, and evaluate knowledge, and the extent to which we can learn to use them consciously and critically.

Consider interconnected kinds of **KNOWLEDGE**: personal experience, skills, and knowledge claims.

Distinguish different kinds of **KNOWLEDGE CLAIMS**: observations, value judgments, metaphysical statements, definitions, predictions, etc.

Evaluate the **JUSTIFICATIONS** offered for different kinds of knowledge claims and counter-claims. Recognize common errors (such as fallacies and cognitive biases) and tactics of persuasion.

Compare **AREAS OF KNOWLEDGE** for what they study, how they study it, and what contributions they make.

Consider how skills of critical analysis develop into conscious **METHODOLOGIES**.

Apply TOK **overview conceptual understanding** and **critical analysis** to **REAL LIFE SITUATIONS** in the wider world.

TOK develops thinking skills toward responsible action in the world.



Eileen Dombrowski



The particular version I've done here emphasizes, in parallel columns, the connections between treating the TOK's overview conceptual understanding and developing TOK skills of applied critical analysis. I drew it for a conference I attended in Istanbul a few months ago, in hopes that it might illustrate some essential connections within the Theory of Knowledge course. I'm attaching it here as a pdf so that if you'd find it useful, please feel free to download it and use it: [DOMBROWSKI TOK OVERVIEW](#)

Do you do this, too? Do you sketch ideas and try to distil complexity into simple sentences and visual schemes? I suspect that many TOK teachers have this inclination. We're overview people. The TOK-in-a-page that I give here might not look like your own distillation of ideas – and it might not look exactly like my own, either, done on a different day with a different emphasis. Yet some of the visual representations that we come up with in this kind of sketching end up being far from casual doodles. They can help us to pull to the surface the key concepts of the course — the ones in our aims and our marking criteria — and use those to frame the details of the syllabus. They can help us knit together the bits of the TOK course — and help us teach more purposefully.

## Simplifying the knowledge framework, entry level

OCTOBER 5, 2015 EILEEN DOMBROWSKI

IB Theory of Knowledge soars over knowledge, dipping to see knowledge claims close-up and lifting into the sky for overviews of whole bodies of knowledge claims and the contours of different areas of study. Experienced teachers of TOK become comfortable with framing particular examples with general concepts at differing levels of generality, or grounding large concepts with particular examples, across all areas of knowledge. But do we risk leaving our students behind? What is a comfortable level of generality, and a comfortable level of language, for students as they enter discussions on areas of knowledge?

Although the usefulness of any approach depends on your own group of students, I suggest NOT using the *TOK Guide's* knowledge framework at an entry level for student discussions. That framework is very useful for debriefing discussions and drawing comparisons at a later stage. However, for *entering* areas of knowledge with students, I think it's a killer to open exploration: it looks too finished, definitive, and prescriptive. A sequence of headings, especially when diagrammed, appears closed rather than open – even when those headings do lead to questions.

I'd start discussion with students, instead, with *questions* – with questions that are ordinary and basic: *what? why? how?* Throughout the TOK course, this simplified version of the Guide's framework can be used to return, repeatedly, to fundamental knowledge questions we ask about each area of knowledge. It is pitched at a very high level of generality, but the simplicity of the questions might make a TOK overview seem accessible.

Here's a downloadable pdf of my simplified knowledge framework, in case you find it useful: [Dombrowski knowledge framework](#) Whether it's useful or not will depend — as ever — on your own sequence of ideas and your own group of students.

OVERVIEW CONCEPTUAL UNDERSTANDING:  
FRAMEWORK FOR AREAS OF KNOWLEDGE

## HOW DO WE KNOW?

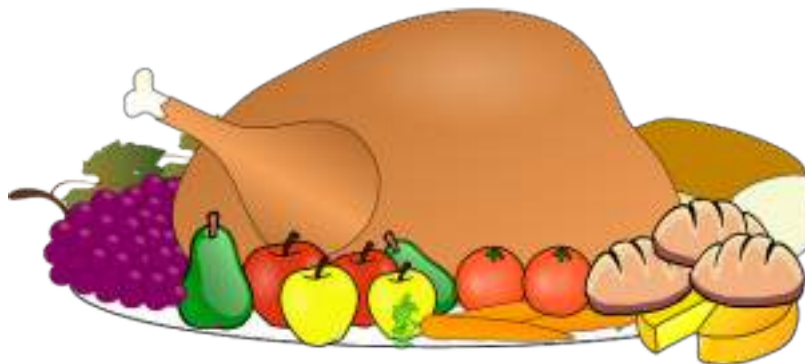
- **WHAT DOES THIS AREA OF KNOWLEDGE STUDY?**  
(What is its subject matter?)
- **WHY DOES IT STUDY IT?**  
(What are the goals of its exploration?)
- **HOW DOES IT BUILD KNOWLEDGE?**  
(How does it use ways of knowing?  
What are its methods for creating, testing,  
and communicating knowledge?)
- **WHAT DOES IT CONTRIBUTE TO OUR SHARED KNOWLEDGE OVERALL?**  
(How does it compare with other areas?  
What does it contribute to our personal  
knowledge?)



Eileen Dombrowski, [activatingtok.net](http://activatingtok.net)

# Happy Thanksgiving! It's good for you!

OCTOBER 12, 2015 EILEEN DOMBROWSKI



In my part of the world, there's an entire public holiday built around a particular emotion: gratitude. In 2015, Thanksgiving Day falls on October 12 for us Canadians and November 26 for our American neighbours. Although this year I'm not home cooking a traditional turkey (I'm off travelling in Romania!), I wanted to wish all of you the best for this day, and to send you my hopes that you have plenty in your lives to feel happy about. And (no surprise here!) I can't resist linking the **emotion of gratitude** to TOK class discussions.

In some contexts, including the historical basis of the North American Thanksgiving holiday, people express gratitude to a Supreme Being for many aspects of life. If you're dealing with religious knowledge as a TOK topic, you might find that the *concept* of "gratitude" gives an interesting entry point into comparing attitudes toward the relationship of humans and gods in different religious worldviews, and thereby broaching justifications for sets of religious knowledge claims. However, the thankfulness associated with the day has also found wide resonance in a secular society. Even atheists speak of counting their *blessings*, in the sense of consciously appreciating the positive features of their lives, whatever they may be. As a result, I will take my text for today not from a Holy Book but from the *Harvard Mental Health Letter*, and will offer not profound thoughts but a few TOK knowledge questions instead.

## Ways of Knowing: Emotion

*from the Harvard Mental Health Letter*: "In positive psychology research, gratitude is strongly and consistently associated with greater happiness. Gratitude helps people feel more positive emotions, relish good experiences, improve their health, deal with adversity, and build strong relationships."

## Some knowledge questions:

- To what extent does emotion as a way of knowing act *not alone* but *in concert with* other TOK ways of knowing? In what ways can emotion (example: gratitude) influence sense perception, for example, or memory? For religious people, how does emotion as a TOK way of knowing (example: gratitude) interact with faith as a TOK way of knowing?
- To what extent does "emotion" as a way of knowing act as a *concept*, with a name, to group

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a set of unlike or even conflicting experiences? What is the usefulness to the human science of psychology of having this general concept called “emotion”?

- Can the two clusters of questions above be applied similarly to sense perception, reason, and memory? What about the other TOK ways of knowing?

## Cause

*from the Harvard Mental Health Letter:* “Of course, studies such as this one cannot prove cause and effect. But most of the studies published on this topic support an association between gratitude and an individual’s well-being.”

### Some knowledge questions:

- What are the differences between coincidence, correlation and cause? How can we *prove* that one situation or event causes another?
- Why are scientific laws characteristic of the natural sciences but not the human sciences?

## Using “thanksgiving” in a TOK class

Taking questions like these about gratitude and emotion into a TOK class is easy enough – though probably more effective if introduced not just by my Harvard Mental Health Letter “text for the day” but also by anecdotes or personal stories.

But today I simply offer a few ideas – and leave all that preparation to you. After all, I’m on holiday. And, I would add, I’m *grateful* to be so!

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# Shared knowledge, personal knowledge: not a one-way flow

OCTOBER 19, 2015 EILEEN DOMBROWSKI

Just a quick post today – to pass on a story that is likely to appeal to students. When we discuss *personal knowledge* and *shared knowledge* in class, the flow of knowledge may seem to students to be very much in one direction. As they learn immense amounts as IB students, the floodgates are wide open and at times they can feel swamped by a one-way river from knowledge established and *shared by others* to be assimilated into their own personal learning. When the role of a single



individual is usually so small in the shared creation of knowledge, how can they see their own place in it? One way to encourage students as they look for their own place might be to use examples of people who contribute on small scales or in unexpected ways – and so much the better if the person who adds something significant to the shared flow is also a teenager.

Dutch teenager Thomas Van Linge uses social media tools available to anyone and, from his home, has created maps that show what particular fighting groups control parts of Syria, Iraq, and Libya. He aims to inform journalists of which regions are dangerous and to raise awareness of the impact on lives of bomb attacks that are ignored by international media. His maps, which he has shared on social media, have contributed to publicly shared knowledge of the conflict. He provides an excellent example of the back-and-forth flow of shared and personal knowledge – an example that might resonate with many students.

He is reported as saying, regarding his colouring of the maps, “I’m not very sophisticated with computers.”

Story: Lucy Westcott, “The High School Student Who Maps ISIS’s Lightning-Quick Advance”, Newsweek. June 13, 2015. <http://www.newsweek.com/dutch-high-school-student-maps-isis-terrifying-advance-syria-and-iraq-342604>

## “Really? You don’t know what MATTER is?”: Nobel Laureate in physics uses doughnuts to explain.

OCTOBER 26, 2015 EILEEN DOMBROWSKI





In just a minute and a half on a comedy show, Nobel Laureate Arthur McDonald explains the discovery in physics that made him a co-winner of a Nobel Prize this month. Well, actually.....no, he doesn't. But he does provoke a laugh, perhaps especially for Canadians who recognize the popular chocolate Timbits (doughnuts) he resorts to using in a simplified explanation. I recommend this video clip for TOK class for two reasons: first, a class laugh opens discussion of scientific discovery without distancing those fearful of physics; and second, it raises some tasty knowledge questions about the nature of explanation and responsibility.

In an initial reaction to the video, the first knowledge question I'd encourage a class to explore hits some of the central social issues of our day, with a practical "how to" edge to the question: *How can we non-scientists best try to understand what scientists are telling us about the nature of our world, and to understand the implications?*

The question also works the other way around:

*How can scientists best explain to non-scientists, and help us understand the implications?*

Any discussion of gaps in understanding is likely to involve a **number of central TOK topics**, for instance:

- the interaction between personal knowledge and shared knowledge, variably for the discovering scientists, their colleagues, and the public
- the role of basic concepts, named in language, for creating and understanding knowledge – as in the knowledge framework's "concepts/language". How could McDonald truly explain his discovery to people who don't know what "matter" is, and are unfamiliar with "sub-atomic particles"? On the other hand, how could scientists work together on building shared knowledge if they *didn't* have a common framework supplied by basic concepts and models, and common vocabulary?
- the nature of "a good explanation" as affected by who is explaining to whom! – and consequently the hunt for *reliable sources* of explanation, pitched at levels appropriate for the audience. (So much of TOK critical thinking comes back to this – to evaluation of sources to find those that are trustworthy!)
- responsibility for communication and understanding: Who is responsible? What different responsibilities do different groups carry?

That last question is a big one. It takes us beyond scientific discoveries into their implications and applications. It takes us into an (arguable) responsibility to gain knowledge as a basis for sound decision-making, and into sometimes-debatable territory of whether and how scientific conclusions should be used within a society. It takes us into ethics, and the different ways in which we try to establish our guides for right action. I don't think I'd use this light video clip to push discussion very far into ethics, since I'd prefer to use a discovery with more evident social implications and potential controversy as a prompt.

However, I'd certainly flag the importance of trying to learn and understand what scientists are telling us. After all, if a breakthrough discovery in science doesn't seem to make any difference to anyone but a few scientists, why should the rest of us care about the area of knowledge? And if we don't turn to science for knowledge of how our world works, how can we hope to make sound

decisions that affect how we live in the world? In TOK, I think we deal always, one way or another, with the *value* of knowledge!

And how would I conclude a discussion prompted by this video clip? I might take the discussion of science further into shared knowledge, with concepts, models, and peer reviewed communication – in which case I'd turn to more serious treatments of the Nobel Prize in physics, to use it as an example for TOK ideas.

But...if I felt I'd stirred enough of a discussion, I know how I'd close the class, especially if I were teaching in Canada, to ensure that my students remembered the lesson: I'd pass around for them a box of chocolate Timbits. We started with a laugh, and I'd want to end with one. Sometimes I think that humour is one of our most effective teaching methods.

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“22 minutes: Neutrinos are like Timbits”. Published on Oct 13, 2015. Nobel Prize winner (and Cape Bretoner) Arthur B. McDonald explains his research into neutrino oscillations...using patience and some sugary props. [https://www.youtube.com/watch?v=XBwQ\\_hz1orQ](https://www.youtube.com/watch?v=XBwQ_hz1orQ)

# Guessing, Probability and Prediction: a TOK lesson on election polls

NOVEMBER 3, 2015 MIMI BICK



*(guest post by TOK Course Book co-author, Mimi Bick)* Do you live in a democratic country? If you do you'll have noticed that leading up to major elections, the media is filled with what experts *think* will happen when the real day arrives. Sometimes they hit the nail on the head. Sometimes they don't. Is it reasonable for us to expect pollsters to get it right — and what does that mean? How similar and different are election polls to other areas of data gathering and analysis and their uses? These are questions you might usefully explore from different angles and perspectives in the context of TOK.

## **Where does the word “poll” come from?**

For those of you interested in etymology, or the history of words, “poll” comes to us from thirteenth century Middle English, “polle” referring to hair on the head (like French “poil”). By the seventeenth century, its current meaning had been established: counting heads that is individual opinions or votes.

## **What is a poll and a pollster?**

In some countries going to vote is “going to the polls” (plural). But often we also hear about a poll (singular), which is shorthand for an opinion poll.

Pollsters are the people who do the questioning. They ask about your voting intentions prior to elections, unless we’re talking about “exit polls”, when they ask us about who we voted for *after* we leave the voting station. Whether or not you answer them or answer them honestly is another matter.

A lot of data can be collected through this questioning process which is then analysed by the experts. In other words polling gives us a sample of opinions on a topic.

## **Accuracy: why are we so successful in our predictions in areas like chemistry and astronomy and much less so in others?**

Many would argue that the degree of accuracy of our predictions depend on the stability of the system in question. Halley’s Comet is a good example of accurate prediction made possible by our knowledge of the orbit of planets and Newton’s laws. Accurate prediction is certainly aided in this case by the nature of the phenomenon itself – the comet named after Halley has a stable periodicity of 76 years. Other natural phenomena are more intrinsically difficult to predict, either because of their inherent complexity (the weather is a good example) or because we haven’t as yet discovered the right methods for investigating them (earthquakes?).

*What about the human realm?* Investigating human opinions and intentions, as do pollsters, introduces other challenges.

## **Polls as samples – how representative are they?**

Aside from the absolute number of people who respond to a poll – clearly the more the better for the purposes of getting it right – how *representative* the sample of people answering a poll is in relation to the electorate is an important fact to take into consideration when assessing a result. An under-sampled demographic group can skew results and lower the reliability of a poll’s results. Will the voting public this year behave as it has done in the past? Particular groups sometimes become important over the course of months or even years. Defined by linguistic, ethnic or religious ties, age or strength of opinion regarding a single issue, an emergent group can easily be underestimated in a poll. Similarly pollsters can overestimate the salience of groups when collecting data.

## **Methodology of the poll and respondent's honesty**

An important principle of modern democracy is for the act of voting to be secret. When you go into the voting box, it is often behind a curtain of sorts. You should never feel bullied into voting for or against a party or candidate or in fear of reprisals for not doing so.

When a pollster approaches you face to face at your doorstep, will you answer your true voting intention, providing you yourself know the answer? You might not if you have a strong belief in the importance of voting privacy. But knowing how important polls are in influencing others, you might strongly want your candidate's chances to appeal by appearing high in the polls, in which case you'll want to answer honestly and immediately.

Nowadays telephones and other digital technologies have greatly aided pollsters in gathering data. But this too opens avenues of inquiry from the point of view of TOK. Are you more likely to answer questions about your voting intention to a remote questioner or to a pair of pollsters ringing your doorbell at home? More likely to answer honestly or dishonestly? These are just a few areas pollsters contend with when collecting their data.

## **Framing and formulating the questions asked**

Like other opinion surveys, elections polls can ask different questions and the exact *formulation of the wording* will influence respondents answers and so the results. You may ask people directly about their voting intentions — If the election was held today, do you know which candidate you would vote for? If yes, who? Another kind of question with a very different approach asks which candidate you expect will win the election. **According to some studies**, this second question is more likely to get it right than asking about voter intentions.

## **Analysis of the data and the result**

Two weeks before the recent events in Canada few believed that the election would produce a Liberal majority government. The polls were indicating other outcomes almost until election day itself. Why couldn't they get it right?

First of all, a poll is like a still photograph – snapping and freezing opinion which in fact is constantly shifting and changing. Secondly, pollsters use mathematical formulae – about which there is academic controversy — and extrapolate based on probabilities.

## **Publishing poll results and their effect on voting day**

If you haven't decided between candidate A and B and there's a huge media splash the day before the election that candidate A is going to sweep the country, how would you react? Who doesn't like to triumph? Since you like the feeling of being on the winner's side the poll persuades you to vote A. Not you? Alternatively, some of us like to support the underdog which in this case might be enough to persuade us to vote for B.

Some countries prohibit publishing polls several days before major election precisely because of

their potential effect particularly on swing and undecided voters. We'd like to think they do so in an effort to encourage us citizens to use information about party platforms and candidates' previous performance and character to inform ourselves when we vote.

### **Major polling organizations, methods and funding**

Next time you encounter the results of a poll, take the time to find out about the organization conducting the research, the questions asked and the methods used. And don't forget about finances. Public and private polling organizations might have their own, politically charged, agendas.

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### **ACTIVITY: Apply your awareness to real life examples.**

Compare what the pollsters said before some elections and the real results by researching elections in the past. If you more interested in the future, check out what the experts are saying for elections that will take place soon or in your own or another country of locality. Below you will find some good examples:

Date	Major election
Nov 2013	Chile
May 2014	India
May 2014	South Africa
May 2015	United Kingdom
Oct 2015	Canada
Oct 2015	Argentina
Nov 2016	USA
April 2017	France
Late 2017	Australia

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### **Further reading**

To place polls more fully in context of the methodology of the human sciences, see chapter 18 in the **TOK Course Book**.

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## “Climate Skeptic” or “Denier”: Can journalists stake neutral ground in a language war?

NOVEMBER 9, 2015 THEO DOMBROWSKI



**Words map our concepts. They affect how we think within our personal knowledge, and how we shape and exchange our shared knowledge. In any critical examination of the creation and flow of knowledge, we need to be aware of the influence of the terminology we use.**

Do you accept the knowledge claims above? If so, you are likely to be keenly interested in guidance on terminology issued to journalists by the [Associated Press Stylebook editors on September 22, 2015](#). The editors have recommended specific language for journalists writing on climate change “to help our reporters and editors present the news accurately, concisely and clearly”.

This AP announcement hands TOK teachers a current example for class on the relevance of

language to handling concepts, and the importance of definitions and connotations in public flow of knowledge.

This example could be used in 5 minutes in class, or developed as the running example for an entire discussion. Below, I suggest one approach to using the *terminology of climate change* to open up a number of TOK topics – touching on large ones such as trust in sources, the influence of perspectives on terminology, and deliberate choices within the public discussion of shared knowledge.

## **GUIDED DISCUSSION**

### **Introduction: news media as a source of shared knowledge**

Ask your class how much they trust journalists as reliable sources of knowledge. You're likely to get responses varying from inflamed cynicism to murmured indifference. Then ask them why. Most likely, answers will include the kinds of things we're all aware of and which are basic to many issues in TOK — conscious or unconscious bias that affects selection, framing, slanting and so on. Raising them at the beginning warms up a class on familiar topics and acknowledges many of the general issues that lie in the background of the questions on which you want to focus their attention. You might want to argue, en route, that journalism and the news media are possibly the most important vehicle for the public of shared knowledge of world events, including development and communication of scientific knowledge.

### **Ambiguities and connotations: climate change “skeptical” vs climate change “denier”**

The particular questions for focusing the class are these: *What is the difference between a “climate change skeptic” and a “climate change denier”? Does it matter what language we use?*

Here is a good time to play the devil's advocate. Pause and ask your class something like the following:

- Is it not true that TOK encourages questioning knowledge claims?
- Is it not true that “skepticism” suggests questioning knowledge claims?
- Is it not, therefore, accurate to describe as a “climate change skeptic someone who questions the claim that climate change is both real and caused by human activity “?

Follow this up with a question on connotations. Does it seem more flattering to be described as a “climate change denier” or climate change skeptic.” ? What does the word “denier” suggest? The chances are, of course, most will react more positively to the term “skeptic” than “denier”, particularly if they are familiar with the meaning of “skeptic” not to mean “cynic”, but, rather, someone who uses scientific principles of enquiry to *assess* — but not necessarily *deny* — claims. A “denier”, they are likely to point out, suggests someone more than a little blindly pigheaded in face of the facts. Indeed.

Both terms, until just now, were rife in the media and used more or less to mean the same thing, or, at least, to apply to the same group — that is, those who reject the findings of climate science. This is a good time to refresh the terms *denotation* and *connotation* in order to frame the following discussion. You might want to refer students to the *TOK Course Book* section “Perspectives in

language” starting page 141, and the guided analysis on page 150.

### **The Associated Press Stylebook comes to the rescue—or does it?**

Ask your students what words *they* would use if they had the power to control the language used by journalists when writing about those who reject climate change. Recognizing that perspectives influence word choice, what would they recommend themselves with a goal of neutral language? Enter the *Associated Press Stylebook* — a set of journalistic guidelines with a huge influence around the world. One of the world’s largest organizations for disseminating news makes, through its stylesheet, regular attempts to clarify words that journalists use, to counteract some of the most dangerous *mis*–and *dys*–information that swirls throughout the media.

Although *what* journalists report on remains an issue, *how* they report it has been called into question. In a **recent addition to the Associated Press Stylebook**, journalists are given specific instructions to clean up their language over the particularly gnarly issue of climate change. But pause. This may a good point to refer to a short section from the *Theory of Knowledge Course Book* (pp. 139-40):

*...what slippery territory we enter when we want to talk about the larger concepts that shape our understanding of the world!  
When we define our terms, we are trying to use the symbols of our language to make another specific symbol precise. Definitions are statements within the system of symbols, rather like moves in a large language game, with each piece depending upon the others.  
In some fields, precision is crucial. The sciences take care to define terms tightly in order to use exactly the right word....*

Well, it seems, because of the crucial importance of “precision” in writing of climate science, the AP has told journalists to *avoid both terms*, “skeptic” and “denier”! So, what next? What would your class recommend that journalists use instead? After all, they need to use *some* words to identify climate science \_\_\_\_\_ers!

### **The new, “official” terms**

This is what the Associated Press has said to the journalists who write for them:

*To describe those who don’t accept climate science or dispute the world is warming from man-made forces, use climate change doubters or those who reject mainstream climate science. Avoid use of skeptics or deniers.*

*Does this solve the problem?* Ask your class their opinion. It is likely that class reactions will be mixed—as, indeed, they have been both by those who accept climate science and those who don’t. What might climate scientists and those who accept climate science object to?

You might also point out, however, that it is not quite enough to understand the *principles* of connotation of denotation. In addition, the careful reader or writer—and TOK student— will be *sensitive* to which words have a strong connotative quality and, even more, what those connotations

are likely to be. What wording in journalists is likely to create, or solve, the most problems?

### **Reactions to eliminating both “skeptic” and “denier”**

Here, you are likely to want to go beyond class reactions into the response to the change within public discussion. Having engaged your class in the nuances of the terms, you’ll want them to see who cares in social context, and why. You’ll find a list of good articles at the end of this post, but here are a few main ones.

First, here is **one reaction in favour** of banning the term “climate change skepticism”:

*The Center for Skeptical Inquiry, which lobbied for media outlets to drop “skeptic” in a letter signed by Bill Nye and other prominent scientists because it says the term only applies to those who use “reason and evidence to reach conclusions,” applauded AP’s change...*

**Mark Boslough of The Committee for Skeptical Inquiry** goes further:

*“We should be skeptical of everything. In science, we are skeptical of everything. But being skeptical of climate change is sort of like being skeptical of Newton’s laws. [Both are] so well established. It’s like saying I’m skeptical that eclipses are caused by the shadow of the moon.”*

The bigger controversy has arisen from the banning of the term “denier”. For instance, from **Graham Readfearn in *The Guardian***:

John Cook, climate change communication fellow at the University of Queensland and founder of the SkepticalScience blog, told me:

*There is a growing body of scientific research into the phenomenon of science denial, whether it be denial of evolution, climate change, vaccination or so on. We can’t counter the corrosive influence of denial unless we heed the psychological research into what drives people to reject scientific evidence, as well as the techniques and strategies employed to misinform the public. It’s essential that we take an evidence-based approach to our response to science denial. So running away from the issue of denial is counter-productive and unscientific. Scolding people for using the accurate and informative term ‘denial’ is tantamount to scientific censorship.*

Readfearn goes on to say:

*But the vast majority of climate science deniers who warrant coverage in the news media are not weather vanes or disinterested observers on climate change. Many are activists. Some get funding from the very industries who stand to lose the most from action to reduce greenhouse gas emissions. Perhaps tellingly, several high profile and newly minted “climate change doubters” have welcomed AP’s decision.*

## Reactions to the new terminology “doubter”

What is wrong, then, with the new term, “doubter”?

Ronald Lindsay, CEO of the Center for Inquiry, which has offices in Washington, D.C., and Amherst, New York, agrees that “doubter” isn’t a great substitute for “skeptic” or “denier.” “Referring to deniers as ‘doubters’ still imbues those who reject scientific fact with an intellectual legitimacy they have not earned,” **he says in a statement.**

One climate change denier – no, not “denier” anymore but “doubter” — agrees with the connotations of the new term “doubter”– but, of course, *likes* the change: Marc Morano, who runs the contrarian site Climate Depot, **told *National Journal*** that he preferred the term “skeptic,” but that “doubter” still suggests there’s room for debate.

So what terms should be used otherwise? Those who accept the findings of climate scientists were perfectly happy, of course, using the word “denier”. Others, however, have other ideas. Professor Jean-Pascal van Ypersele, a climate scientist who is running as a candidate to be the next chair of the United Nation’s Intergovernmental Panel on Climate Change, **said he personally uses** the term “climate confusers” in most cases.

## Knowledge questions

Thus we are left with a few questions about the way journalists can communicate shared knowledge — and not just scientific knowledge. These questions can be applied first to the specific example, and then generalized to apply to all relevant knowledge:

1. Who should decide what a term like “climate change skeptic” actually means? Is it enough for each journalist to make his own terminology clear, or should there be a central body to make the definition?

**BROADER KNOWLEDGE QUESTIONS:** What is the role of definitions in language? What is the role of shared definitions in developing shared knowledge?

2. What arguments could be made for the use of the term “climate confusers”? What forces – political, economic, and so forth — influence the accumulation of connotations around terminology used in topics hotly contested in public media? Would it be fair to say that gaining public acceptance of a particular body of knowledge claims can be a matter of taking control of the language used on a topic, and having your own connotations take over? (Some reference to election campaigns or campaigns over racist and sexist language would be obvious here!)

**BROADER KNOWLEDGE QUESTIONS:** In what ways might the language we use affect the way we think? In what ways do our perspectives on the world affect the concepts we name and the language we use to describe them?

Ultimately, of course, the particular example of the Associated Press guidance on terminology of



climate change doesn't matter to us in TOK – except insofar as it opens up knowledge questions. The questions above come up most notably in treatment of *language as a way of knowing* (also *intuition, reason and emotion*) and the subsection *concepts/language* in the knowledge framework for areas of knowledge. But they thread their way through all of the critical thinking of the Theory of Knowledge course.

### Further Reading

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# Reliability in psychological science: methodology in crisis?

NOVEMBER 16, 2015 EILEEN DOMBROWSKI

“Scientific truth is a moving target,” wrote the editors of the *Public Library of Science* (PLoS) a decade ago. “But is it inevitable, as John Ioannidis argues...that the majority of findings are actually false?” In the decade since the editors posed this question, the psychological sciences have been shaken by further challenges to their credibility, including some widely reported controversies. It was August of this year, however, that brought the most significant shock waves, when the **Reproducibility Project of the Open Science Collaboration** announced its conclusions – that *most* of the articles published in leading psychological journals were unreliable. *Most!* This crisis in knowledge – in both its nature and its interpretations — is acutely relevant to us as teachers of Theory of Knowledge, aiming as we do to treat the human sciences with contemporary understanding.



## What’s the relevance for TOK?

So, first, what’s the problem? A quick refresher here – just to put it all in TOK context! It comes down to the reliability of the **methodology** of an area of knowledge, on which the justification for its knowledge claims rests. If the methods of gaining knowledge are faulty in the psychological sciences, why should we trust any of the knowledge claims of its results? There are good reasons for methodology to loom large in our **TOK knowledge framework!**

Central to the methodology of the sciences is reproducibility, the idea that single experiments have to be able to be *reproduced* before their results are treated as trustworthy:

- 1. A research group should test its hypotheses by *repeated* experiments to weed out errors

(“falsifying” and discarding hypotheses that are wrong) and gather a significant degree of confirmation (with statistically measured significance) before it treats any results as ready to submit for publication as shared knowledge; and

- 2. Any other scientific group, within the public and collaborative process of science, should be able to replicate the experiment and reach the same results. If not, the procedure, the measurement, and the interpretation demand further scrutiny – and the results stand to be discarded.

This is how science is *supposed* to work: the knowledge claims from experiments are always open to further testing and alternative interpretations, always open to change if contrary data is found. **But what if the findings in articles published in leading journals, after peer review, fail replication the majority of the time (#2 above)?**

### **What is the Reproducibility Project, and what did it find?**

The **Reproducibility Project: Psychology**, coordinated by the Center for Open Science, was an attempt to estimate the reproducibility of published results – that is, to find out just how reliable, on testing, were the shared findings of psychological experiments. The project was launched in November 2011 and published its conclusions in August 2015. In repeating the experiments of 100 studies published in highly ranked journals, a collaboration of 270 scientists following a rigorous procedure found that **only 36% of the replications** gave the statistically significant results that the original researchers had published. This Reproducibility Project was the “first in-depth explorations of its kind”. ([Open Science Collaboration](#))

Project leader **Brian Nosek** believes “that other scientific fields are likely to have much in common with psychology.” A reproducibility project in biology, in the study of cancer, is currently underway.

I recommend the following two articles for a good explanation of the project:

- Monya Baker’s article in *Nature*: “**Over half of psychology studies fail reproducibility test**”
- Ed Yong’s article in *The Atlantic*: “**How Reliable Are Psychological Studies?**”

### **What does the failure rate mean for knowledge in the field?**

The high failure rate could be even higher, some have argued, given that only highly respected journals were used as sources for the articles to be tested. After all, prestigious journals are believed to attract stronger work. But, even accepted as 36%, what does this failure rate *mean* for knowledge in psychology?

**First, what does it NOT mean?** For one thing, *it doesn’t mean that the original articles were wrong*: the issue tested in this research was *not the truth or falsity* of the knowledge claims but the **methodology itself** of reaching them. The point is that re-running the experiment achieved *different* results, regardless of whether the original turns out to be wrong, or the replication, or both. The essential problem is that published results have been presumed to be extensively tested and reliable – and it turns out they’re not.

Nevertheless, *there could be explanations for some of the replication failure*. Possibly, there were

subtle variations in methodology by the replicating scientists — raising the need for further testing. Moreover, although social psychology fared worse than cognitive psychology, there could also be a possible explanation, since the social interactions studied may themselves have changed over time, so that the replication was not studying the same thing.

Indeed, *the problem may be exaggerated*: it may be clear that a replication rate of 36% is a problem, but it is much less clear what an acceptable replication rate would be, given that journals are publishing the most recent findings in a field.

In addition, it could be argued that the degree to which findings can be replicated is not the best measure of reliability in any case. **Scientists Stroebe and Hewstone are critical** of the Reproducibility Project – critical, that is, of the *methodology* of the *critique of methodology* – and comment that meta-analysis is more reliable than replication as a way of evaluating research:

“Reporting the percentage of successful replications is not very informative. More usefully, the project could have identified aspects of studies that predicted replication failure. But here the report disappoints. Since meta-analysis permits us to evaluate the validity of research without the need to collect new data, one can question whether the meagre results of this project justify the time investment of 270 researchers and thousands of undergraduate research participants.”

***Still, however one mitigates the problem or proposes better ways of approaching it, it does not go away: the psychological sciences have considered their published results to be reproducible, and it seems that for the most part they are not.***

Does the failure lie with scientists publishing their findings without testing them sufficiently? Does it lie with the peer review process of journals, where some articles are accepted for publication and some rejected? Does it lie with an understanding of reproducibility? Or is psychology – as suspected by some in the “harder” sciences – not scientific at all?

### **Publication biases: How is the construction of knowledge in psychology affected by its context?**

And that brings us to what may be the most important revelation following from the Reproducibility Project: the impact on scientific results of the social context of research, especially in the importance of publication.

Publication bias is heavily toward scientists publishing only findings that lead to *positive results* by confirming a hypothesis, not to negative results that lead refute it and, for the immediate present, lead nowhere. Even though science works by systematically eliminating errors, *who* wants to publish, or read about, all the wrong guesses? Journals certainly aren’t looking for them!

Finding positive results, though, necessitates scientists interpreting their results to find correlations that are *statistically significant* – and offers the temptation of manipulating data to MAKE it significant. The significance of results has commonly been measured as its “p-value”. The manipulation of data to make results seem more significant – possibly deliberately, but possibly unconsciously (confirmation bias!) — is called “p-hacking”. This is the very kind of bias that

replication is designed to correct: bias on the part of individual scientists or groups is tested and corrected by others! (For a further explanation of p-hacking, with interactive examples to try out, I recommend a paper by **Christie Aschwanden: “Science Isn’t Broken”**. )

Publication bias is also heavily toward *innovation* – toward fresh and potentially exciting new findings. *Who* wants to do replication of *somebody else’s* work to test it when one’s own work is thereby stalled?

John Ioannidis, who flagged the problem a decade ago, insists that the **reasons for insufficient replication** lie in the working lives of scientists:

“with fierce competition for limited research funds and with millions of researchers struggling to make a living (publish, get grants, get promoted), we are under immense pressure to make ‘significant’, ‘innovative’ discoveries. Many scientific fields are thus being flooded with claimed discoveries that nobody ever retests. Retesting (called replication) is discouraged. In most fields, no funding is given for what is pooh-poohed as me-too efforts. We are forced to hasten from one ‘significant’ paper to the next without ever reassessing our previously claimed successes.....”

The conclusion of the Reproducibility Project acknowledges this discouragement of replication built into working conditions. It ends by emphasizing the challenge of balancing between novelty and replication, when incentives for scientists are all on the side of fresh discovery. “Journal reviewers and editors may dismiss a new test of a published idea as unoriginal”, **says the report**, but that test plays an important part in the development of science:

**“The claim that “we already know this” belies the uncertainty of scientific evidence. Innovation points out paths that are possible; replication points out paths that are likely; progress relies on both.”**

### **What do the psychological sciences learn from the Reproducibility Project?**

It is clear that this project, initiated and carried out by psychologists, has illuminated their own methodologies and some of its failings. The project’s significance *now*, though, depends on all the players – from scientists, to their employers, to their publishers, to the media. Cody Christopherson, one of the co-authors of the Reproducibility Project, **points out the need for all of them to recognize their roles in the problem**:

“To get hired and promoted in academia, you must publish original research, so direct replications are rarer. I hope going forward that the universities and funding agencies responsible for incentivizing this research—and the media outlets covering them—will realize that they’ve been part of the problem, and that devaluing replication in this way has created a less stable literature than we’d like.”

Some specific recommendations to fix the reproducibility problem have been put forward, including **these by Stuart Buck** before the project reached its conclusion: “Obvious solutions include more research on statistical and behavioral fixes for irreproducibility, activism for policy changes, and



demanding more pre-registration and data sharing from grantees.”

### **And so...what might Theory of Knowledge take from the Reproducibility Project?**

For TOK, I think the conclusions of the *Reproducibility Project: Psychology* demonstrate, once again, that knowledge is human and fallible. But the project and reactions to it also show that a careful *methodology* can make the knowledge better – and that critical scrutiny of methodology is crucial to improving its reliability. One of the most important things we learn from the sciences is *how to know* – and, through self-aware criticism, *how we can know better*.

For TOK, moreover, we might see this project as an example not of failure but of success in the development of knowledge. Taking the long view, we watch the development of whole areas of knowledge, and might recognize this crisis in the psychological sciences as a step in growing self-knowledge, toward increasing reliability.

Indeed, we may want to applaud the Reproducibility Project, and use it in class as an impressive achievement of science. As **Jason Mitchell from Harvard declares**,

“The work is heroic. The sheer number of people involved and the care with which it was carried out is just astonishing. This is an example of science working as it should in being very self-critical and questioning everything, especially its own assumptions, methods, and findings.”

And, finally, all of us following the way that knowledge is created, critiqued, and communicated – all of us in Theory of Knowledge – might well pause to appreciate the nature of the scientific enterprise. In the words of **one commentator**, “If we’re going to rely on science as a means for reaching the truth — and it’s still the best tool we have — it’s important that we understand and respect just how difficult it is to get a rigorous result.” Knowledge doesn’t come easy – and its fascination lies in how we seek to achieve it.

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## Refugees and risk: Can TOK encourage a more thoughtful approach?

NOVEMBER 23, 2015 EILEEN DOMBROWSKI

In the Theory of Knowledge classroom, we can't solve the problems of climate change, war, and terrorism. However, what we CAN do is much needed in this historical moment in the west: we can give our students a calm space to stand back from the high emotion and knee-jerk opinionating that surrounds many of them. We can encourage them to apply a more thoughtful and critical approach to how knowledge claims are made and justified, and in the process develop their thinking further for the messy world they are about to inherit. The past week in the world has given *far too many* examples for TOK topics, but I'll just suggest a few that stand out for me – and then I'll link you to an article on refugees that you're bound to find interesting.

### **1. How careful are we in classifying people – for instance, in the accuracy of observation, the consistency of criteria, and the relevance of the category to a discussion?**

I've blogged before on aspects of this topic, and you may want to glance back at any of the following for threads of ideas carried throughout:

“World Refugee Day: What do our categories leave out?” June 20, 2015

“Classification and implications: Who is black, or indigenous, or Jewish?” June 17, 2015

“‘Passing’ as black: classification and social implications”, June 14, 2015.

This week it seems important, bizarrely, to sort out the category “refugees” for people *fleeing violence* from the category “terrorists” for people *perpetrating violence* of a particular form. When fear of others and anxieties about sharing the world with them – especially sharing our own countries with them – become acute, then different categories of anxiety-inducing people can blur

together in a fearful mind. When fear is also accompanied by unfamiliarity and misinformation, then almost anything negative said about the “scary people” is often, in intuitive *confirmation bias*, accepted uncritically...and becomes difficult to refute.

In the classroom, I suggest asking students what *categories* of people they have encountered in recent media reports about refugees, compiling a list and working with students to sort out how the groups relate to one another (e.g. Syrians, Muslims, ISIS, ISIL, Daesh, jihadists, Christians, immigrants, migrants, refugees, criminals, extremists, terrorists, victims) Useful TOK tools: using venn diagrams, recognizing logical fallacies (e.g. argument from fear, hasty generalization, false cause), recognizing cognitive biases (e.g. confirmation bias, availability heuristic), and analyzing intersecting ways of knowing and the relationship between concepts and language.

It's worth knowing – only in case the misinformation comes up — that the terrorists who carried out the attacks in Paris have not been identified as refugees or Syrians, but so far as **European nationals**. An early news report claimed that a Syrian passport was found near the body of one of the terrorists but was later **confirmed to be erroneous**.

What and how we think carries implications for how we act. Arguments based on confused categories and fear have already undermined, in some regions, the humanitarian imperative to welcome desperate people seeking asylum.

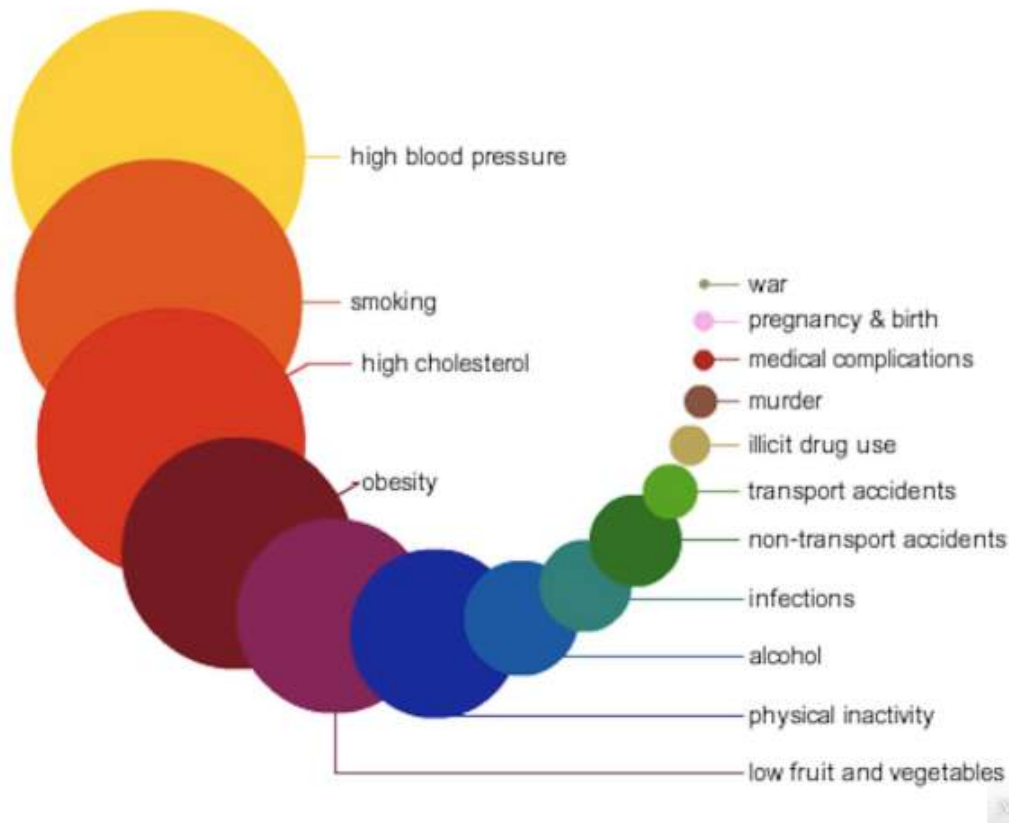
## **2. How rational are most people in assessing risk?**

If you've dealt already with the relationship between *intuition as a way of knowing* and *reason as a way of knowing*, then students are probably already well aware of the difference between the swift conclusions of intuition and the slower thinking of conscious reasoning. They will recall that people are demonstrably bad at assessing risk: many studies have shown that our intuitive reactions simply do not match rationally calculated statistical odds. Moreover, our cognitive biases (availability heuristic) incline us to seize on stories or incidents that come quickly to mind – such as an unusual and dramatic event – and to see them as representative. (See chapter 12, *Theory of Knowledge Course Book*.)

So how much more dangerous is the world today than it was a couple of weeks ago? What are the chances of being killed in a terrorist attack? Just for a sense of measure, I'd suggest two things. First, share the following infographic with the class, and ask them where they think increased money and attention would *best* be directed in order to save lives.

Lauren Friedman, “**The things most likely to kill you in one infographic**”, infographic from the United Kingdom National Health Service.

## Risks leading to death in perspective



Second, raise for question the power of a tragic incident to change our sense of risk and fear. Has the world *suddenly* become more dangerous – and in a way that *suddenly* demands extreme reaction? Did the attacks on Paris “change everything”, in a moment akin to the US tragedy of 9/11? Or, to some extent, has the tragedy in Paris drawn western media attention, and flooded social media, largely because the people affected were western Europeans? It’s not comforting to suggest that the world has been terrible all along – and you may not want to develop this idea far with your students! Yet you might feel that they should at least be aware that, while the western media paid attention to Paris, they were much less emotional about the bombing of the Russian plane and **largely ignored attacks in Beirut the day before Paris**. Why, you might ask? What counts as newsworthy – and to whom? (Other parts of the world will have covered events with different centres of interest.)

Similarly, you might – or might not — want to put the attacks in Paris in context of statistics on all the terrorist attacks of the past years. Again, it’s not comforting to do so, since those statistics represent real people whose deaths you wouldn’t want to minimize. Framing a single tragedy with others can risk sounding heartless, and taking too great a distance can risk seeming not to take seriously a very real threat. However, stepping back for a statistical approach might at least give students a way of recognizing the emotional wave of grief, fear, anger, and patriotism that can wash away other, better proportioned justifications for decisions on what actions to take. What’s emotional and immediate can loom disproportionately large!

### 3. In what ways can history use our past to give greater understanding of our present?

Below is the article I promised you at the beginning, and I hope you find it interesting. How would I use it in class? I'd ask students to pick out and quickly list the objections to refugees made in the article. If they've been following the news, that's probably enough for comparisons to resonate. You'll want to pose knowledge questions, of course, about patterns in history – and about the role of the historian in recognizing (or imposing) them. You'll also want to ask about *perspectives* — compared across time. But I leave this to you! I've talked enough for one day!

Lee Fang, “Anti-Syrian Muslim Refugee Rhetoric Mirrors Calls to Reject Jews During Nazi Era”, *The Intercept*, November 18, 2015.

You might also find interesting this 2011 article on the Canadian response to refugees from Sri Lanka: “Tamil, tiger, terrorist? Anti-migrant hysteria and the criminalization of asylum seekers”

### Conclusion

Whether we tackle *particular* issues in the real world and the media in our Theory of Knowledge classroom depends on how much time we have at a particular juncture, whether they are hot topics in our own part of the world, and whether students have learned the appropriate thinking skills by that point in the course. Yet, when we recognize that dominant social thinking is awash with faulty thinking and emotions that could damage political and personal decision-making, then we might feel compelled to seize, as much as we can, on the “teachable moments”.

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## Climate talks and IB education: What is the relationship between TOK and CAS?

NOVEMBER 30, 2015 EILEEN DOMBROWSKI



*Sunday, November 29, the day before the Paris Climate Talks begin. Today is a day of hope. Today, I finish painting my placard of a burning planet and join our local Climate March. I don't expect to change the world: a child of my acquaintance thought my first version of the burning planet was a jellyfish with tentacles, and “march” seems too vigorous a word for the friendly straggle of neighbours wandering down the streets of little Parksville. But all of us wanted to be part of a global*

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call to our leaders to commit to solving the problems of climate change.

So what does this have to do with TOK? How do we deal, in the IB Theory of Knowledge classroom, with arguably the most important issue of our times? How does TOK tackle climate change, and how does it connect, in so doing, with IB Creativity-Action-Service (CAS)? As I blog here on applying skills of critical thinking to current issues of our world, I would like to pause to draw a distinction between the roles of these two complementary parts of our IB education.

### **TOK as the commentator**

Theory of Knowledge simply does NOT deal with issues in the world – at least, *not as its subject matter*. The role of TOK is to stand back as a **commentator on knowledge** – how it is created, tested, justified, and communicated. It teaches an overview awareness of how the different areas of knowledge work. It teaches thinking skills for awareness and analysis, so that students can filter and judge the best basis possible for their growing knowledge, and can be reflective in the process.

However, thinking in a void is pretty useless, I'd say. We prepare skills *to apply them* – and I wouldn't give TOK a single hour more of my life unless I thought we could, through our course, prepare students to navigate the world a little better. We give them practice in thinking critically as we examine, as the class presentation for IB assessment calls them, “real life situations”. Many TOK teachers and students will never deal in the classroom with refugees or climate change, my own current preoccupations, but all of us do seize on topics to use as examples for applied thinking.

### **Climate change as an example to illustrate questions of knowledge**

Climate change is a particular rich example – not just of how knowledge is constructed but also of the crucial importance of constructing it well!

Clearly, almost every aspect of the world discussions on climate change bristles with **knowledge questions**: “How do they KNOW?” What is scientific methodology, what does it mean to say that scientists are “uncertain”, and why is likelihood often expressed as a percentage? What does “consensus” mean? What cognitive biases interfere with our intuitive grasp of issues around climate change? What should we understand about the role of images, statistics, and language in making knowledge claims? Aside from intuition and language, how do ways of knowing such as emotion, faith, and reason also interact to influence what conclusions we reach on climate change? How can we identify and assess reliable sources of knowledge amongst all those we encounter in the shared sphere around us? To what extent is knowledge that affects how we live — knowledge rife with implications! — created and communicated in a social context of economic interests and political ideologies, and how do perspectives within that context affect the knowledge claims? Does knowing bring responsibility for acting — and how do we know?

### **TOK passes the baton to CAS**

But in TOK we don't take action. That's not our role. Our role is to think clearly so that any action we take is thoughtful and well based, from the justifications for knowledge claims to the ethical appraisal of possible actions one could take to follow the implications of knowledge. And there we

stop.

There, Creativity-Action-Service takes over, to give students experiential knowledge and develop their skills in different kinds of action. So today as I finished painting my placard and joined the quiet local Climate March, I wasn't doing TOK. I was doing CAS.

And right now, as I think back on the day's experience, I suppose I'm doing both, as TOK and CAS meet in their different forms of reflection.

## “Yeah. But what about x?”: counter-argument, or just a tactic of diversion?

DECEMBER 7, 2015 EILEEN DOMBROWSKI

We're all familiar with tactics of diversion – various forms of evading or changing the subject. But journalist Andrew Mueller gives a particularly lively summary of one form in the following podcast: [Monocle, The Foreign Desk](#). November 21, 2015. (starts at minute 10:24.) Vehement, articulate, and somewhat provocative, his four-minute piece could serve to catch student attention to discuss methods of argument.

He deals with a tactic of responding *competitively* to the report of a problem – to trump the bad with the supposedly *even worse*. He calls it “What-about?-ery”.

“It is a form of discourse ideally suited to the querulous realm of social media because it is a form of discourse which allows those who employ it to be perpetually, unassailably and satisfyingly correct, however poorly informed, ill considered, recently acquired or patently self-serving their opinions. All one need do is wait for someone to say that a bad thing is bad to point out that another thing is as bad or worse, wait for the first person to disagree, down them as a callous monster and then plant your flag upon the moral high ground.” (minute 11:23 to 11:57)

This way of responding doesn't refute statements, but directs a listener to other situations that hijack interest and sympathy. Express sympathy for one group, for instance, and find it countered, sometimes scornfully, with sympathy for another (possibly their enemy). This reflex that Mueller identifies takes a particular form of either/or thinking, one that denies interest or concern for one issue by trumping it with another. It becomes a device for implying judgment and diverting attention – without ever giving consideration to the issue or arguments proposed.



## Counters, and counter-arguments

In Theory of Knowledge, we encourage our students to seek out, explore, and evaluate *counter-arguments*. That is, we want them *not* to seize on a position and argue for it *without* thinking about what can be said against it. So how can we teach them to recognize the differences between genuine counters to an argument and tactics meant simply to deflect or divert attention?

Below I offer one fairly short activity to encourage students to consider what's going on in an argument, and to help them "tune in" on counter-positions.

### **CLASS ACTIVITY: "What about x?"**

#### **1. Play the podcast clip: "What-about?-ery".**

First play the four-minute clip. Scroll ahead in the following podcast to start at minute 10:24.

**Monocle, The Foreign Desk. November 21, 2015.** In context of an interesting podcast on "Paris and the media", Andrew Mueller's piece runs from minute 10:24 to 14:30.

#### **2. "But what about x?"**

If you're *lucky*, students will groan with recognition and bubble with examples from their own experience. If you're *even luckier*, they will start to protest over Mueller's energetic contention. But it may take some questions from you to get them thinking, and to consider that the "What about x?" tactic in argument takes more forms than the one Mueller treats in the podcast. The question for discussion could be framed:

When is the question reasonable to suggest that a *different* issue is genuinely relevant and worthy of greater attention, and when is the question little more than a device to silence or distract?

Possible examples to fuel discussion:

- If someone running for office is critical of how her opponent has managed budgets, is it reasonable to demand, “But what about *your own* record? What about that incident last year?” When would you consider this to be a fair question, and when would you consider it to be a tactic of distraction from the topic at hand?
- If a community group is running an event to raise money toward children’s sports, is it reasonable to demand of them, as a criticism of their project, “But what about the new equipment needed in the hospital?”
- If someone is leading a drive to establish a homeless shelter in the community, is it reasonable to suggest his energy is misdirected by demanding, “But what about proper housing for our military veterans?” Is it reasonable to demand, similarly, “But what about all the people who are homeless because of war in the Middle East?”

It’s likely that students will acknowledge that the “What about x?” question is used in many different ways. It may be appropriate in some cases – such as to call attention to a political candidate’s hypocrisy, or to intervene if a pool of money raised for communal use is being directed without due process to a minor project. It may, however, simply be a verbal tactic to silence people, declare a lack of interest in their cause, or to divert attention to a different cause. Or it may be no more than a verbal reflex without much meaning attached!

Involved myself in raising funds for AIDS relief in parts of Africa, I personally encountered a protest from a neighbour recently, “But what about all the people who need help right here at home?” I think I managed to agree up to a point – but to suggest that we need to respond, as best we could, to *both*. But, although I could be wrong, I think I also recognized a tactic of generic protest against “do-gooding” – and I can guess which one of us *also* supports the local community services. The way I’d interpret the question “What about x?” has a lot to do with the context and the tone!

As soon as we take into account the social context and people’s motives for raising questions and protests, the distinction becomes fuzzier between the question “What about x?” used to claim attention for a relevant issues and the same question used simply to divert attention – or even imply a judgment on the worth of the original statements.

### 3. Concluding questions

This short activity is meant to encourage students to pay attention to what’s going on in argument, especially when issues or statements are *countered*. I’d end it with a general questions for brief class discussion:

- What’s the difference between an argument and a counter-argument?
- What’s the difference between a counter-argument and a tactic of diversion?

And clearly, a single activity doesn’t go far to tuning students in on tactics of *countering*. I’ll be



returning to this topic. Enough for today! Now, *what about* some dinner?

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## Science, ethics, politics: Dare we hope?

DECEMBER 15, 2015 EILEEN DOMBROWSKI

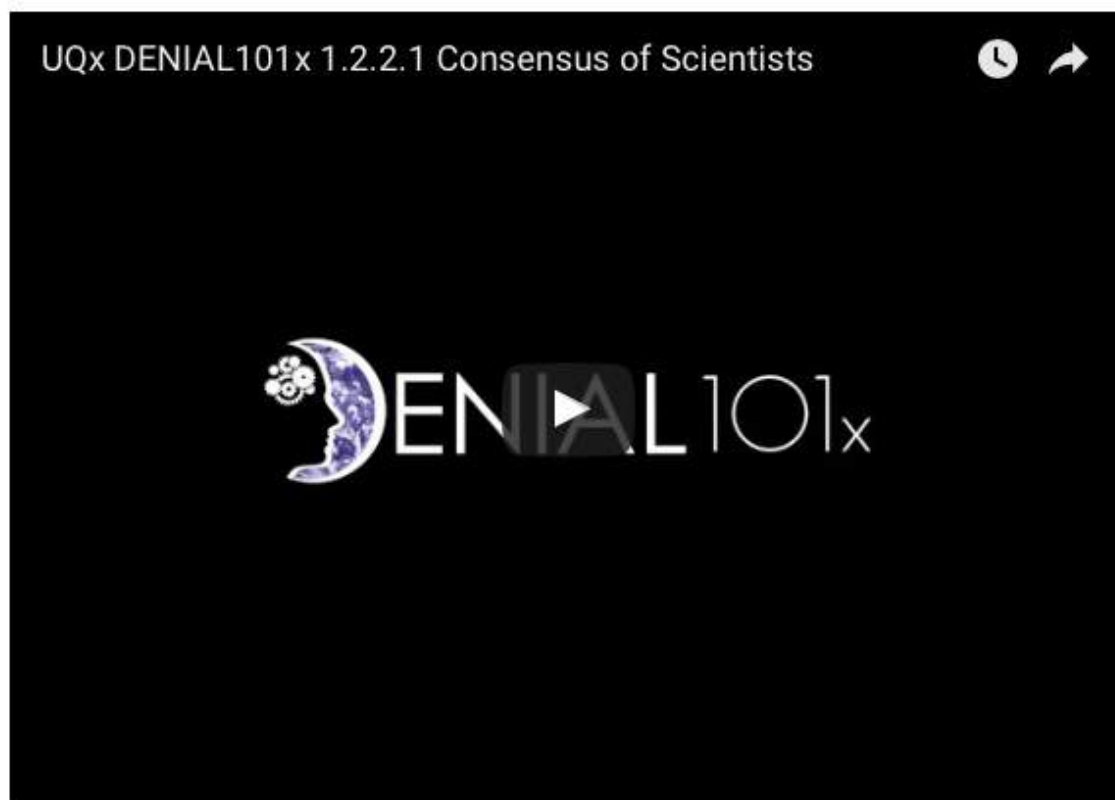
*Scientific agreement, ethical agreement, and political agreement* are entirely different. They’re not justified by the same means, not shared through the same process of communication, not brought to a conclusion through the same process of validation. But when they converge – when the *political representatives* of the world accept *scientific knowledge* as the basis for an *ethical* global agreement – then we have reason to celebrate along with the delegates.



Let us enjoy the moment! As the COP21 Paris Climate Talks yielded a world agreement just days ago, knowledge of climate science has won out, for the moment, over the well-financed forces of denial. And, for the moment, the ethical imperative to work together cooperatively for the common good has achieved a stronger articulation than many people believed possible as the talks of COP 21 began. Looming ahead in the future is the most difficult part for the world – improving and implementing the agreements. But, for the moment, let us recognize what *has* been achieved, and celebrate.

### Consensus on climate science

In TOK, we pose questions about knowledge. And all the questions we ask of scientific knowledge apply to climate science – all the questions about evidence, the roles of theories and models, prediction, the role of experts and expert consensus. For climate science, I recommend, as a summary, the following video from April 2015:



<https://www.youtube.com/watch?v=WAqR9mLJrcE>

We won't have seen the last of denying scientific knowledge – and certainly not the last of denying its implications in practice. But, for the moment, scientific knowledge based on evidence and the consensus of relevant experts has been significantly accepted in context of world power. Hurrah!

## Consensus on ethical ideas

Nevertheless, the Paris Climate Talks of COP 21 were not centrally about scientific knowledge. They were about *what to do about it*. They centered on the knowledge questions we pose in ethics as an area of knowledge, for instance:

- What responsibilities, if any, do human beings have to others – and how do we know them?
- To what others? To those in our own national group? To those we consider our economic allies? To all others on the planet? To the generations yet unborn?

The debates of COP 21 drew on the large ethical theories we consider in Theory of Knowledge – for instance, using the language of “principles,” “obligations”, and “rights” (deontological approach) and using the actual and predicted consequences of actions in the past, present, and future (utilitarian approach). The political representatives of the world claimed to be largely in agreement with many lines of ethical argument we could readily chart, theoretically, in Theory of Knowledge. And the world *did* reach an agreement. While the acceptance of demonstrable scientific knowledge merits applause, the acceptance of a common obligation to humanity and the planet, with *promises* of action, merits outright cheering. Double hurrah!

## Cynicism or naiveté: Dare we hope?

In my final blog post of 2015, I leave you with this question, “Dare we hope?”

I think of teaching as a forward-looking profession constantly fueled by hope — constantly attempting to help students reach their potential, and constantly encouraging them to contribute positively to the world around them. Ours is not a cynical profession.

At the same time, I don’t think experienced teachers can be naïve. We know the problems we face, and to some extent the problems that the world faces. In TOK, we come face to face with the forces that make knowledge difficult to gain and make understanding an elusive goal. We know, however indistinctly, much of what we’re up against.

If we act in any way as guides and models for our students, what do we model as we deal with knowledge relevant to the world they are entering as young adults? Are we too world-wise, to the point of cynicism? Are we, conversely, too positive or idealistic, to the point of naiveté? Can we aspire to be well grounded, but at the same time – dare to hope?

## References

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