Concerning literature criticism

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Introduction

There will always be room for more than one view about what is true or not, as long as there are more than one human being alive. Continuously examining, testing, developing and changing we strive forward, with the occasional sidestep. This is the governing principle that we must bear in mind when judging the reliability of scientific literature (or other information sources). We need not become overly cynical in our endeavors but a healthy portion of skepticism can be a good help when assessing the reliability of an information source.

This text is meant to give the reader some conceptual tools that can help when assessing literature containing scientific information. First the four classical criteria – *Age, Dependence, Authenticity* and *Tendentiousness* – are presented. Next we examine Leth and Thurén's [1] additional assessment points for internet sources and then an additional one is presented.

The problem with information overload

In a world where the accessibility and sheer size of the set of all existing knowledge is reaching absurd proportions, the most important tools in a searcher of information's arsenal must be the ability to evaluate the information found. To succeed with this task we may employ skills derived from; *the philosophy of science, one's knowledge of the subject at hand* and *general source critical principles*. The first two categories are only covered briefly in this text.

Philosophy of science

There's a ton of literature on the philosophy of science, with almost as many different opinions and theories concerning the nature of science as there are thinkers. Non the less a study of some of this vast material will give you some grasp of *what* one can find out with the aid of science and what is going too far, and thus ending up in the meta physical. For example; science should avoid topics like: gods, morals, etc.

Not only do we get some sense of *what* can be proposed through science, we also get some measure of intuition for *how* data should be collected. That is we get some sense of what the difference between our thoughts and conceptualizations about the world and the world itself can be. The main theme is the importance of method - method being a detailed plan for and description of data collecting and handling. Stig Stenholm has put it as generally as I have ever seen it written down as:

> If we want to add information beyond our immediate animal awareness, we have to act on our ambience and from the experienced response we must abstract the concepts of our scientific framework [2, p.2].

As you start reading the material you find the most important thing to remember is what you already know. But keeping your prior knowledge in focus you are better equipped to critically judge whether the information you have found is likely to be true (as true as anything get's anyway) or not. You subject knowledge should be used like a filter for new knowledge to test how it compares to what you already know, by this process you are more likely to spot possible errors in the texts you read (or in other sources; like films, radio programs or oral sources like lectures and presentations).

What types of information do we want

Depending on how the information we find is made up (its properties) we should be able to divide it into three different categories (types).

Data/facts

When collecting empirical data we are always to do the work guided by a good enough method in regards to research ethics and the rules of science (as shown to us in the philosophy of science). This means that a good way of analyzing a source is to look at the method used as well as the results. Two good questions to pose are: Could the method have been a different one? Would this have affected the result? In an ideal situation the data we are using should have been verified in a number of independent studies.

But facts are facts. How can a fact (piece of data) be wrong? The simple fact (pun intended) is that facts can change. With the progression of technology more and more accurate measuring is possible, which makes our data more specific. This is just one way. The most common one being that the researchers aren't in agreement on the definitions of the things they are measuring.

On the Swedish bureau for statistics (SCB) web page one can find the information that the population in Sweden 2010 was 9 415 570 [3]. On the web page for Wolfram Alpha the number is 9 290 000 [4]. This means that data is relative and that there are more and less accurate sources of the same information.

Explanations

In order to come to a conclusion regarding *why* a piece of data has a specific value an *explanation* is needed. So, how to judge the validity of an explanation? There might exist several explanations that all give the same accuracy in empirical testing, but that they are different in complexity. In this case; choose the least complex one which gives the best predictions. The important thing is not to reject new knowledge categorically or to be too fast at abandoning what is previously known to us.

Opinions

Usually we find *opinions* among the data and explanations in an information source. Within science (the natural sciences like physics and chemistry) it's important to only try to use data and explanations (because these can be verified empirically). This is however not entirely true in the science of technology. Here we find numerous qualitative user opinion studies that can be of

importance for the product [5]. This makes it important to separate the types of information that one uses and to know when and why to use which type.

Classical source critique

Here a checklist (similarly presented in [1]) for source critique is presented. There are 7 +1 aspects to take in consideration. The + 1 is at the time of writing not empirically verified but seems plausible and thus is recommended, it can be viewed as the opinion of this author.

Age

The age of an information source determines its ability to be accurate. Some theories or data might have changed.

If the source is oral there is the trouble of recollection deterioration over time and recollection being dependent on mood, setting, the nature of the question, etc. [6]

Dependence

Are all your sources dependent in some way? In this case you might be on the wrong track. Some ways in which two sources can be dependent are; same author, same journal, same publisher, same research team, presented at the same conference, etc. This is why it's important to try to find a wide selection of sources (i.e. using a reference database for searching), in order to get a truthful view of the subject area, since different authors might have different explanations and data (and of course different opinions).

Note that not all authors will be able to recollect a discussion in passing (maybe over lunch) that result in an influence [7]. This is a type of dependence that the authors might not even be aware of themselves.

Authenticity

Sometimes a source that has been considered to be reliable is revealed as a forgery. This is above all something to consider when inspecting information taken from websites since it's easy to make a web site look like something is isn't.

Tendency

Being tendentious means to have some concealed agenda or part in a case, which makes one want to present ones findings in a more positive way and acting in a manner to aid one's own interests. Leth and Thurén write that any source that has some reason for not being truthful must be suspected of lying [1]. Some examples of possible tendentious sources are:

- Governmental texts
- A company's external communication about products and services
- A non-governmental organization (NGO) that has certain investors

The analysis concerning tendency is important in regards to both data and explanations and it is more common that one attempts at hiding information than tell outright lies due to tendency [1].

Critique specific for internet sources

In their text about internet source critique Leth and Thurén define three more points of criticism specific for internet sources.

Credibility

Internet makes it just as easy to present obscure knowledge (more like opinions held by a few individuals) as established scientific (method based) knowledge. The main thing here is to look at the authority that has reviewed the information (i.e. university, government, etc.) to see where it stems from. This is so that we can determine the source's *credibility*. A credible source is:

- Impartial (peer-review is central here)
- Knowledgeable (it seems plausible that the author can know what he/she claims)

This means looking at the bibliographic meta-data (author, affiliation, etc.) in order to find information about the author, publisher, affiliates of the author, etc. and examining these.

Feasibility

Is it even possible that the author or organization could have come up with the information claimed? For instance: someone claims to have found a new particle without access to the multibillion dollar equipment needed for such a task.

Properties

Are there technical troubles that makes you suspect that the information might be misleading? This might be incomplete databases, link failures, etc.

Addition

There is an additional concern that might be important to consider.

Perceived immediacy

In psychology and pedagogy the concept of *immideacy* [8] which means that there is a buildup of trust and closeness between the sender of knowledge (information) and the receiver. This in turn affects how the information is received. As an example the immediacy between teacher and student can promote learning.

Today one might receive literature (or other source) tips by a friend/contact in a social network. Is this sender a true friend or a perceived one? Does this influence your thought about the material (information) presented there?

The checklist

Question	I've thought about and checked this
How old is the source? How does this affect its validity?	Yes/No
Are there any dependencies between this source and the other ones I'm using?	Yes/No
Does the source seem to be authentic?	Yes/No
Are there any reasons for the persons behind this source to lye or conceal information?	Yes/No
Is the author capable of knowing claimed knowledge? Has the information been tested by others (peer-review)?	Yes/No
Can the author or organization possibly have done what they claim (tests, experiments, etc.)?	Yes/No
Do you suspect that technical difficulties have affected the information you have found?	Yes/No
How did you receive the information? Is there a possible relation that affects how you think about the information?	Yes/No

References

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