How to critically appraise a scientific paper: Introducing a careful planning scheme

Mohsen Rezaeian

Correspondence:
Professor Mohsen Rezaeian
PhD, Epidemiologist
Social Medicine Department
Occupational Environmental Research Center
Rafsanjan Medical School
Rafsanjan University of Medical Sciences
Rafsanjan-Iran
Tel:03915234003
Fax:03915225209
Email: moeygmr2@yahoo.co.uk

Abstract

Appraisal of a scientific paper in your area of expertise or interest requires some skills and careful planning to make the most efficient use of your time. The most important skills you need are critical appraisal skills. A careful planning scheme for appraisal of a scientific paper however, largely depends on the reasons for reading i.e. to keep yourself up-to-date, to carry out a literature review in order to write a research proposal, or to conduct a journal club, etc.

Nonetheless, a careful comprehensive planning scheme should at the very least encompass some general steps and the aim of the present article is to provide the details of such general steps.

Key words: Scientific paper, careful planning for reading

Introduction

Efficient reading of a scientific paper in your area of expertise or interest requires some skills and careful planning. Otherwise, you might not get the most from your reading. The most important skills you need are critical appraisal skills which help you to identify the pros and cons of a published article. Careful planning also implies that you should divide your devoted time for reading into different related steps which make it possible to efficiently use your skills. In what follows I will try to provide you with the details of such careful planning.

Introducing a careful planning scheme

A careful planning scheme for reading a scientific paper largely depends on your style of reading and learning and the reasons for reading i.e. to keep yourself up-to-date, to carry out a literature review in order to write a research proposal, to conduct a journal club, etc. However, it should at the very least encompass the following steps:

1. As soon as you find your paper read its title and abstract. Take a look at the main parts of the article, especially its methods and results. Look at the tables and figures, if any exist, and read its conclusion. In addition, take a look at its references to find out if there are any references which you have already read.

2. By taking the previous step you are now in a position to decide whether to stop reading it further or put it aside for a while or continue reading. If the article is not relevant to your area of expertise and/or interest you should discard it. However, if the article is relevant to your area of expertise and/or interest but it is difficult to understand you should do some background reading on the topic by carrying out an appropriate literature review.

3. If the article is relevant to your area of expertise and/or interest and easy to understand then you should continue reading it. At this stage you should read the article in detail and thoroughly from its title towards its references. At this round of reading you should get the grip of the four main parts of your article i.e. Introduction, Methods, Results and Discussion and should comprehend the most important messages of the article.

4. Underline the most important bits as you go through. If there is jargon that is still unfamiliar do more background reading or look up a dictionary. It should be noted that a very useful source of background reading of an article would be the list of its references provided the author(s) did not miss some relevant works.

5. By accomplishing the previous steps you should now understand the main messages of the article. However, that is not enough since there is one more final step that you should take it and that is to critically appraise the article.

6. In the final step you should go through the article once more. The fundamental aim of this step is to find out the pros and cons of the article. Therefore in this round of reading you should read it more meticulously. Focus on your previously highlighted lines and also focus more on the Method section of the article. Always consider the Method section of an article as its heart.

While reading you might also ask yourself whether each part of the article could be written in a better way? For example:

- Could the author(s) write a more appropriate title?
- Could the author(s) write a better abstract?
- Did the author(s) correctly justify and articulate their aims?
- Are the methods correctly selected and specified in detail?
- Could the author(s) present their results in a better way?
- Did the authors fulfill all their specified aims?
- Did the authors somewhere in their discussion refer to their limitations?
- Are there any relevant references that have been missed by the author(s)?

Further Reading

Rezaeian M. How to teach medical students to critically appraise a published article in public health domain: An innovative approach reporting from Rafsanjan Medical School. J Educ Health Promot. 2013; 2:8.
Rezaeian, M. How to critically review a scientific, medical or business paper. Middle East J Business. 2011; 6(4) :13-15.
Durbin CG Jr. How to read a scientific research paper. Respir Care. 2009; 54(10):1366-71.
Al-Ateeg FA. Reading medical articles critically. What they do not teach you in medical school. Saudi Med J. 2004; 25(4):409-23.
Lozano JM1, Ruiz JG. Reading a journal article. Indian J Pediatr. 2000 Jan;67(1):55-62.