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## **Detailed commentary on a constructivist article**

Class discussion notes

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**Article chosen: Parkinson, J. and Adendorff, R.D. (2004) The use of popular science articles in teaching scientific literacy. *English for Specific Purposes*, 23 (4). pp. 379-396.**

Available online: [http://eprints.ru.ac.za/view/people/Adendorff,\\_R.D..html](http://eprints.ru.ac.za/view/people/Adendorff,_R.D..html) 31 Dec 2008

This article was published in the flagship journal of the ESP world, and can be taken to represent mainstream opinion. Therefore in criticising this article I am working on a credible acceptable article.

I know this is the second article on one text, and in no way do I aim this article as anything personal against the authors. The use of this material is purely practical. The article is readily available, and I thought it was time that my students actually read some material and interacted with it, instead of reading my lecture notes and articles. My aim was to give a page of fair representative quotations, with sentence numbers to facilitate the task, followed by detailed commentary, sentence by sentence. The material is also squeezed into four pages so that they can be cheaply given to the students as a one page "booklet".

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**Original Abstract**

1. This article considers the use of popular science articles in teaching scientific literacy.
2. Comparing the discourse features of popular science with research article and textbook science – the last two being target forms for students – it argues that popular science articles cannot serve as models for scientific writing.
3. It does, however, suggest that popular articles can make science more accessible to students, and so can play a useful role in the teaching of scientific writing as well as in the teaching of science.
4. This is because popular science articles view scientific findings as provisional rather than as incontrovertible fact as they are presented in textbooks or as they appear to be presented in research articles.
5. Another feature of popular articles is that they are peopled with large numbers of specific scientists, thus representing scientists as ordinary people rather than as a few exceptional people of iconic status in textbooks.

**Extract from the Introduction (page 4)**

6. As Myers (1989) shows, the authors of research articles establish their objectivity by removing people from the account.
7. This extends the western cultural association of reference to the personal with emotion, the polar opposite of reason and logic.
8. A proposition associated with a person may be viewed as that person's subjective opinion, perhaps influenced by emotion.
9. Propositions made impersonal by removal of people (often achieved by passivisation and nominalisation) give the impression of objectivity.
10. Textbooks take impersonalisation even further than do research articles, with few person references.
11. The few person references that are present are usually generic (scientists believe that. . .) rather than specific.
12. An example of impersonal language is:  
*The solid magnesium hydroxide is filtered and reacted with hydrochloric acid to form magnesium chloride MgCl<sub>2</sub>* (Chang, 1998).
13. In terms of register an interpersonal difference between the research article and textbook is the relative power of reader and writer.
14. The projected reader of the textbook is a student who thus is assumed to be less powerful than the writer.
15. In the research article, as Myers (1989) has argued, the reader is assumed to be more powerful.
16. The readers represent the powerful research community and, as a group, have the power to accept or not accept as fact the knowledge claims of the article.
17. As Latour and Woolgar (1979) have shown, the proposition proposed by a research article becomes fact only when accepted, cited, and used by members of the discourse community; that is, the readers of the research article.
18. Thus the reader of the research article and the writer of the textbook acquire their power from the same source: both represent the research community.
19. Another difference between textbooks and research articles is that the research article must propose new information.
20. The textbook by contrast contains nothing new but summarises the received information that has been accepted as fact by the research community.
21. In doing so it reifies the fact, buries the individual researcher, and completes the objectification of the fact by removing it not only from time and place (as in the research article) but from the individual researcher as well.
22. The appearance of information in a textbook is its stamp of having become a fact.
23. Popular science reports on propositions before they are endorsed as fact by the research community, i.e. before they become authoritative.
24. They also give voice to scientists other than those of iconic status (the 'great names' of science, such as Einstein), who are the only scientists found in textbooks.
25. "... popular science journals such as *Scientific American*, *New Scientist*, and *Technology Review*" p13. They go on to refer to *Time* magazine as 'popular' (p13).

## A. Introduction

Part of the training in an MA course is to interact with the research literature. In this lesson I want to interact with an article published in the flagship journal of ESP. As such it represents material that has stood the test of editorial review and selection in an important, highly credible journal. My other criteria for selection were that it should be readily accessible on the internet so that anyone can check what I write, and that it should contain a large number of statements representing the Social Construction of Knowledge viewpoint, a view which I have elsewhere attacked, but now wish to do so by extensive engagement with a constructivist text. For convenience I have added some line numbers.

A major part of the critique hinges on the concept of **validity**. As a reminder, there are many different kinds of validity. Here only the basic type is used: the question as to how generalisable the statements are. Does the author too quickly see a situation and think it is normative to other situations? Validity is enhanced by careful listing of the variables and extremely cautious extrapolation to other circumstances.

It is a fundamental principle of research that the outsider asks the expert insider what they think about what the outsider is saying. Some researchers do this, but probably not enough, and not anything like the extent that is needed. There is still the problem that the linguist outsider is presumed to be right. The balance of doubt is firmly against the outsider as being right. Whenever a Sociologist or a linguist looks at science, their work should be validated by the insiders, the experts. **Only if they insiders overwhelmingly endorse the work does it begin to have academic credibility.**

Working scientists should confirm the work of the linguists. This principle is so basic and so important that Werner & Schoepfle (1987 vol 1 p266)

We consider it *absolutely essential* that valid ethnographic data be the results of observations only if such observations have been subject to native comment. [italics in the original].

Gross & Levitt 1998:235

The critiques of science...common to almost all of them is failure to grapple seriously with the detailed content of the scientific ideas they propose to contest and with the scientific practices they wish to impeach.

## Lines 1 & 25. "Popular" science magazines

I have major problems describing the New Scientist and Scientific American as 'popular' magazines. I agree that Time is popular, but there is a world of difference between Time and Scientific American. We can also say that the British newspapers "The Sun" and "The Mirror" are also "popular". To equate Scientific American with them is absurd. Is Scientific American comprehensible to readers of The Sun?

The authors do not use the term "semi-popular" which is a pity. The authors group together what should not be grouped, therefore any generalisations they make from their very wide understanding of "popular science" will be suspect and are likely to have low validity.

## Line 2. The Research Article and the Textbook are the main genres to be learned

To this I reply, speak for yourself! This may be valid for the undergraduates under investigation, but was certainly not my experience as a science undergraduate. I had lab reports of different kinds to write each week, along with essays in the social sciences. I never wrote a research article until after my PhD and years later I wrote a textbook. As for reading, the main types I read were textbooks, of all different kinds, and review articles rather than research articles.

## Lines 1-3 Similarity of textbooks

The authors seem to assume that textbooks all follow similar formats, with similar styles. Again, I have problems with this. Even within the category of undergraduate textbooks, there are many different kinds. Only limited generalisations can be made when textbooks are not subdivided and classified.

### **Lines 3-4 Popular articles make science more accessible BECAUSE the findings are presented as provisional**

The absurdity of this argument beggars belief. It is obvious that popular articles make science more accessible. That fact is banal and rather obvious. But the reason is NOT because science is presented as provisional. On the contrary! The general public expects science to deal in certainties and has great problems when science deals in uncertainties, such as when the next flu pandemic is coming and how dangerous it will be.

Even from the point of view of syntax this statement is absurd. Apparently, 'findings presented as provisional' makes them more accessible to the general public. If I say " $E=mc^2$ " that is technical and hard to understand. But if I say "it is quite likely that  $E=mc^2$ " then that is more accessible???

### **Line 3-4 Popular science articles view scientific findings as provisional**

Who says so? On what evidence? Which popular science articles? The problem is made even worse by the way the authors have put Time with Scientific American.

### **Lines 3-4 Textbooks present only information as facts**

Maybe this was true for the textbooks the authors looked at, but there is no evidence in the paper that they had a detailed look. While textbooks often do present facts, it is totally wrong to say that they avoid controversy and avoid stating various viewpoints. It is common enough in textbooks to discuss the main theories for a phenomena. Some textbooks are even set out as a series of readings, in which differing viewpoints are defended.

### **Line 5 Popular texts use many names, textbooks use only a few**

Have the authors ever looked at the thousands of eponyms in medicine? Very few have achieved iconic status. The statement here lacks validity. There also seems to be an underlying reductionist assumption - only the greatest of science names are assumed to be there. It also feels very Greek: I do not expect textbooks to use a lot of names therefore I will not go looking for them. Have they ever bothered to count? [There are thousands]. Have they not noticed that theories are often labelled by the names of the main advocates? Are all of these 'iconic' and well known? I can assure Parkinson & Adenhorff that it is not just the iconic scientists who get named in textbooks. [validity question + ontological reductionism]. A student of mine, Hajer Zarrouk Hamrouni, in 2004 presented an MA thesis in Tunis "A comparative study of the English and French medical eponyms". When she started she wanted to study all of them, but fast found that she had to restrict herself to the 600 or so beginning with the letter A. She first consulted the website *whonamedit.com* which has over 15 000 eponyms in English with about 450 or so medical ones starting with the letter A, and then she found more from other sources. That is just a beginning!

### **Lines 6-12 The passive and objectivity**

1. Not all linguists accept the work of Myers.
2. It is perfectly possible that some of the time objectivity is expressed through the passive voice. But the case is not proven that objectivity is established by removing people from the account.
3. To the authors, the passive seems to give the impression of objectivity. But they seem to assume that everyone holds their impression. There is an entirely different viewpoint which the authors have completely ignored. They have ignored the fact that objectivity is inherent to science. Objectivity exists independent of any observer. Objectivity is maintained by rigorous experimental testing and rigorous reasoning. The testing and the reasoning is open to inspection and challenge.

There are also scientists, like myself, who would say that the passive has got little to do with objectivity. Before I studied linguistics I was barely aware of this viewpoint. The passive is much more related to other features, such as the desire to give prominence to the objects of verbs because in English, the beginning of the sentence is more prominent than the end.

Now I am quite willing to admit that there might be an element of objectivity associated with the passive. But to assert that this is the ONLY use of the passive, and the passive is a MAIN way science is objectified is to completely miss the point, and is extremely poor methodology.

When in another review after nine pages of argument I write as a conclusion, "I question the validity of the authors". Is that a subjective statement? Would my words be suddenly 'objective' if I were to write "the validity of this statement is questionable"?

### **Lines 11-12 Why textbooks rarely cite sources**

The authors insist that this is because they wish to appear objective, by removing the personal. The reasons are otherwise. Textbook writers usually have the freedom to avoid endless citation because this would clutter the text. This is the established convention. Extensive reading lists are often provided. In the best textbooks, most statements could be documented. It is purely a matter of convenience - it is not related to objective style.

### **Lines 13-16 Power relationships**

In my opinion this is a side track. Viewing textbooks and research articles in terms of power relationships is worth a try. But there are other viewpoints which are perhaps more important.

The student reading the textbook is not only less powerful, they are ignorant! They are seeking to learn as quickly as possible without following all the intricacies of how the knowledge was established. Remember, unlike the views of the authors, knowledge is established primarily through extensive observation, experimentation and rigorous sceptical reasoning.

The power of those reading the research article, is not that of objectifying propositions by accepting them. The power is that of scepticism - the ability to scrutinise. Any statement that survives the bombardment of the publishing process is highly likely to be true. If it is not, the statement is there, and objectively open to test and sometimes refutation.

### **Line 17. Facts are accepted propositions**

Latour and Woogar seem to conveniently ignore WHY facts are accepted. They are accepted by objective evidence and reasoning, often in the face of a desire for a different outcome.

### **Line 19. The research article must present new information**

If the authors mean new discoveries, new facts (they would say claims) then this is broadly true, but not always. A research article can also present a new argument, or could be a re-evaluation of previously published work. This is a small point.

### **Lines 19-22 The textbook reifies knowledge**

Textbooks sometimes present competing theories. Textbook summarises facts identified by scientists. Reifies is far too strong.

## **References**

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