

Science & Education **Style and Format Guide**

Please follow the journal's style and format conventions. This greatly reduces subsequent editorial and copyediting work, and contributes to a more consistent and professional looking publication.

Abstract

Usually 70-150 words with first word being **Abstract** in bold.

Citations

The Harvard, or in-text, citation system is used. So give author family name, year of publication (and page if a quotation) in the text. So: (Harris 2005, p. 10). Please place p. or pp. before page numbers.

Where four or more citations are given, introduce a footnote and place citations there with some suitable lead-in: 'See for example Brown (2000), Kelly (1985), Smith (1990), Wilson (2010). Long lists of citations within a text look unsightly and distract from reading, especially when there are multiple such long lists within a sentence or a paragraph.

For consistent appearances, and ease of locating citation in Reference list, please place lists of citations in alphabetical order (as above), not date order or random order.

Quotations

Long quotations (40+ words) should be indented with reduced font, with author, year and page placed in parentheses after final period of quote.

Indented quotes should not have invert marks or be italicized – the indentation identifies the text as a quotation so no further identification is required.

Author's name, date, page should follow the indented quote. The lead-up can be 'Kelly says:' but place (Kelly, 1985, p. 200) at end of quote after the period. Do place author's name, year and page in the parenthesis, not just year and page. This avoids problems of the quote being a long way from the mention of the author's name, but should be consistently used no matter how close the quote might be to the mention of the author's name.

Leave a one-line space before and after indented quotations.

For short in-text quotations, the citation is placed in parentheses after the final invert mark and before the period.

Footnotes

Footnotes, not endnotes are used in the journal. Digressions in the text should be placed in footnotes so that the structure of the argument is not obscured, but remarks germane to the argument of the text should be placed in the text, not in footnotes.

References

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text. Do not use footnotes or endnotes as a substitute for a reference list. For journal articles, just give numerals of page numbers; for book chapters use pp. x-y. Reference list entries should be alphabetized by the last names of the first author of each work. For ease of reading, the second and subsequent lines of an entry should be indented; use the 'hanging indent' format facility (see following).

Journal article:

Mahner, M. (2011). The role of metaphysical naturalism in science. *Science & Education*, 20(1), 1-23.

Article by DOI:

Slifka, M. K. & Whitton, J. L. (2000). Clinical implications of dysregulated cytokine production. *Journal of Molecular Medicine*, doi:10.1007/s001090000086

Book:

Hume, D. (2007/1779). *Dialogues concerning natural religion and other writings*. Cambridge: Cambridge University Press.

Johnson, P. E. (1993). *Darwin on trial (2nd edition)*. Downers Grove, IL: InterVarsity Press.

Book chapter:

Smith, K. C. (2001). Appealing to ignorance behind the cloak of ambiguity. In R.T. Pennock (Ed.), *Intelligent design creationism and its critics : Philosophical, theological, and scientific perspectives* (pp.705-735). Cambridge (Mass.): MIT press.

Online document:

Abou-Allaban, Y., Dell, M.L. & Cowell, V. (2006). Religious/spiritual commitments and psychiatric practice. Resource document. American Psychiatric Association.
http://www.psych.org/edu/other_res/lib_archives/archives/200604.pdf . Accessed 25 June 2007.

Journal names and book titles should be italicized when referred to in the text and when placed in the reference list; once titles are italicized inverts and underlining are not necessary.

Only author's initials, with periods, are used, not full given names.

List all names in multi-authored works; only use 'et al.' in text or footnote citation, not in Reference list

Ampersand

The ampersand (&) should be used to join co-authors in reference lists and when references are given in the text in parenthesis, but not when co-authored references appear as part of the text.

Do not write in the text: "Hershey & Chase's identification in 1952 of DNA as a transforming agent". This should be written as: "identification of DNA as a transforming agent (Hershey & Chase 1952)".

Remember that the official title of *Science & Education* journal uses the ampersand not the word 'and'.

Paragraphs

Try to create short paragraphs where possible. Where you can see an obvious point to break a long paragraph, please do so. Very long paragraphs overly tax the concentration of the reader, and can obscure the structure of an argument. If a paragraph goes on for more than 12-14 lines, you should begin to look for a natural break. If then a pronoun then begins the new paragraph, it should be changed to the proper noun to which it is referring.

The first line of paragraphs are flush left immediately after headings and subheadings, but indented thereafter without line spaces between paragraphs.

Headings

Headings are flush left and bold; the first letter of major words are capitalized; do not capitalize all words or underline headings.

Second-level headings are italicised with first letter of major words capitalized.

Personal Pronouns

For the most part the personal pronoun (I, my, we) should be removed as it is usually redundant. So instead of: 'I believe that Kuhn was wrong in asserting ...', simply say: 'Kuhn was wrong in asserting ...'. Or instead of 'We will argue that the correct interpretation of so and so is ..', simply say: 'The correct interpretation of so and so is ...' or possibly 'It will be argued that'

If a claim is made in a manuscript, the assumption is that the writer is making it, and also believing it. The 'we contend' or 'I believe' is almost always superfluous; there is no need to preface claims, assertions and intentions with a personal pronoun, the assumption is that it is the author who is making them or believing them.

Numerals

For low numbers, use words not numerals. So write 'in the past three years' not 'in the past 3 years'. Also use '1970s' not '1970's' or '70s. There is no possessive apostrophe or missing letter.

Et al. Use the abbreviation only in citations, not within the text. So instead of 'Smith et al. have shown that' write 'Smith and colleagues have shown that ...'

Font

Times-Roman 12pt is preferred, with 11pt for indented quotations and footnotes; use 14pt for title.

Sample Pages Follow

Errors in Science and Their Treatment in Teaching Science

Why Study Scientific Errors?

In the last decades, the subject of scientific error has been extensively covered in both scholarly and popular literature. A review of this literature shows, however, a considerable confusion about what 'error' actually is. For instance, some authors place under this label old scientific theories (geocentric system, phlogiston, the ether, and others) and pre-scientific views, such as astrology and alchemy (Grant 2006, Jastrow 1936). Others fuse old theories, false discoveries, and experimental errors with hoaxes and UFO (Brown 1998, Smith 2001, Youngson 1998). Still others conflate false discoveries with 'fraud', and 'misconduct' (Kohn 1986). Some authors separate a 'bad' (but honest) science from

a fraudulent one (Dewdney 1997), while others introduce a special term ‘misconceptions’ to denote old theories (Krebs 1999), and still others do not distinguish fraud from misconduct (Judson 2004).

Teachers’ Interests

So far, incorporating the subject of error into science education apparently has been limited to errors of measurement (Zachos et al. 2003) and ethical issues (Kowac 1996).¹ However, there are other issues of no lesser interest to teachers, especially those who are trying to incorporate elements of the nature of science in their science courses. Indeed, there is hardly a topic in this area, which can be dealt with without mentioning the notion of scientific error. For instance, when talking of one theory replacing another, students may ask: ‘Was the old theory replaced, because it was erroneous?’ Or, seeing that their textbooks do not mention scientific errors at all, students may ask if such errors occur very rarely. They are connected, because an improvement in teaching is based on the understanding of the origin of errors. In turn, to understand the latter it is necessary to know how scientists do research, because, as shown below, errors are a natural component of doing research. Thus, teaching about errors is recommended by many as a part of teaching of the nature of science.²

Uncovering an Error

Verifiability

Of all the aspects of error, sociologists focused on scientific ‘misconduct’ and fraud. Some of them claimed that it was verifiability of scientific results that prevented fraud:

The virtual absence of fraud in the annals of science... appears exceptional when compared with the record of other spheres of activity... Involving as it does the verifiability of results, *scientific research is under the exacting scrutiny of fellow experts*. Otherwise put...the activities of scientists are subject to rigorous policing to a degree perhaps unparalleled in any other field of activity. The demand for disinterestedness has a firm basis in the public and testable character of science and *this circumstance, it may be supposed, has contributed to integrity of men of science*. (Merton 1973, p.276)

Thus, scientists see replication of experiments as a tremendous loss of time without getting any credit for it. As some say: ‘Such is the evaluation of the situation in modern science’ (Broad & Wade 1982, p.215). Let us now see the situation with verification in the old science.

Verifying a Phenomenon

A phenomenon was usually verified when the author’s interpretation of its nature appeared dubious, as shown for several phenomena of magnetization.

In 1751, Benjamin Franklin (1706-1790) discovered magnetization of steel needles by an electrostatic discharge running through their length (Franklin 1752). The magnetism was the strongest if the needle was placed in the direction north-south, and weakest when it was directed east-west. In the latter case,

¹ Actually, the authors’ interest in the subject of error is not limited to errors of measurements. This paper ‘is intended to serve as a prelude to more extensive examinations of the role of error in science and science education’ (Zachos et al. 2003, p. 954).

² See for instance Christie (1826), Dyson (1993), Judson (2004), Kipnis (1996), Provostay & Desains (1849).

the polarity depended on the direction of the current, however, when a needle lay in the direction north-south, whatever the direction of the discharge, the northern end of the needle always became the north pole. Franklin thought the magnetization to be a direct effect of electricity, and so did the French scientist Thomas-François Dalibard (1703-1779) who repeated the experiment. However, Franz Ulrich Theodorus Aepinus (1724-1802), a member of St. Petersburg Academy of Science, supposed that the actual magnetization was accomplished by terrestrial magnetism with electrical discharge merely facilitating movement of the magnetic fluid, similarly to hammering a steel bar (Aepinus 1979).

References

- Babbini, G. (1813). Nachricht von fernern Versuchen über die magnetisirende Kraft des violetten Lichtes, *Journal für Chemie und Physik* 9, 215-16.
- Bauer, H. H. (1992). *Scientific Literacy and the Myth of the Scientific Method*, University of Illinois Press, Urbana.
- Hon, G. (1995). Going wrong: To make an error, to fall into an error, *The Review of Metaphysics* 49(1), 3-20.
- Kipnis, N. (1996). The early theories of x-rays. In D. Hoffmann et al. (Eds.) *The Emergence of Modern Physics: Proceedings of a conference commemorating a century of physics, Berlin 22-24 March 1995*, Università degli studi di Pavia, Pavia, pp.97-109
- Provostay, F. & Desains, P. (1849). Mémoire sur les anneaux colores de Newton, *Annales de Chimie et Physique* 27, 423-439.