

Communicating Science through Children's Literature – Part Two

by Dr Gina M Newton [article based on MSc Science Communication Thesis (2004, Australian National University) and published in the Women in Science Enquiry Network Journal in 2005 (J67)]

Part One of this article (J66, p.5-6) conveyed the great importance and potential of children's literature to improving science literacy in the community – and the golden opportunity that awaits scientists to dabble in this craft!

The Power of Story for Science

Storytelling is the oldest form of communication, in every culture. Humans are inherently storytellers. We experience and understand life as a series of ongoing narratives, as conflicts, characters, beginnings, middles and ends.

“Story takes the ordinary and binds it into all of human existence, revealing the significance of the trivial¹.”

Constructing stories in the mind - or 'storying', is one of the most fundamental means of making meaning; as such, it is an activity that pervades all aspects of learning. When storying becomes overt and is given expression in words, the resulting stories are one of the most effective ways of making ones' own interpretation of events and ideas available to others. Through the exchange of stories, therefore, teachers and students can share their understandings of a topic and bring their mental models of the world into closer alignment. Interestingly, when questioned about their favourite teacher, many people relate effective storytelling as the quality they remember most, not the ability to organise material or profound knowledge of the subject.

Storytelling has many benefits and values²: enhances imagination and visualisation; develops appreciation of language; increases vocabulary; refines speaking skills; improves listening skills; allows students to interact with adults on a personal level; enhances writing skills; develops reading interest and skills; enhances critical and creative thinking skills; nourishes intuition; helps students see literature as mirror of human experience; helps students understand their own and other's cultural heritage.

Story, Science and Culture

Storytelling is something we all do and understand. But can we communicate science through literary story - through science and art interaction? It seems so. Bruce Lewenstein, Associate Professor of science communication at Cornell University introduced the term *culture scientifique* to describe how science books have emerged in the last 30 years as important carriers of culture and of broad public discourse. For example, the science fiction (SciFi) genre has been recognised for many decades as an important backdrop for the exploration of science and technology. The *Bright Minds* project out of the University of Queensland recognised that students receive the majority of their scientific information from sources other than school³. They also recognised that effective education takes place when students control their own curriculum, when peer teaching is involved and, most importantly, when the student is actively involved and enjoying the educative process. Enter the story or children's book.

Childrens Literature

There has been a spectacular growth of children's literature over the past 50 years and there are currently over 60,000 English language children's books in print worldwide. This growth has been accompanied by an increasing importance of the illustration. Today the artist is an equal partner in the production of a children's book, receiving similar royalties to the author. Books with their wealth of stories and

pictures have become an outstandingly important factor in initiating children, on a broad basis, to literature, visual art and science.

Children's stories have always had an informative function; they lead children from their confined spheres toward a wider and more profound perception of life⁴. Books can also provide access to a range of experts and a variety of voices, and allow readers to move as slowly or as quickly as they wish through the material^{4,5}. It is never be too early to start reading to children, and babies can start looking at picture books, pointing to words and pictures, long before they can even talk.

The Fact to Fiction Continuum

In children's development as readers they will encounter two distinct categories of books - fiction and non-fiction. Non-fiction are considered those books offering readers representations of the 'actual' world from which that world can be learned about, whilst fiction is the category of stories and novels which are for pleasure, recreational reading and informal learning. The most common form of non-fiction is the 'information book'. Although children's information/non-fiction books are conceived, written, published and marketed in a different way from school textbooks, they are widely used in schools.

Unfortunately, there has been a consistent, if unconscious denigration of non-fiction for children – most (almost all!) prizes go to fiction, children's literature courses give non-fiction little attention, parents and teachers rarely read it aloud, librarians to not check it as thoroughly as fiction, schools tend to promote it for research only, and publishers lean toward the encyclopaedic style⁴. Elanor Stodart, children's author and critic, called for two types of non-fiction book for the primary school child – the encyclopaedic type in which facts are presented in an easily recognisable way, and the more subtle, imaginative kind from which the child can absorb facts and ideas together, ready for later use⁴.

It seems that the notions of fiction and non-fiction are neither useful nor helpful in contemporary children's learning – children do not need to distinguish categories – they find facts in both. I contend that the mingling of fact and fiction, i.e. 'faction', in communicating science through story may make it more approachable, absorbable and entertaining for children.

As stated by Meek (1996), 'I have yet to find a way to dispel in adults the belief that we begin by believing fairy stories and grow up when we tell ourselves the truth. My contention is that the hypothesis-making habit of the scientist begins with the 'what if' of the fairy story'⁶.

Even research at university level has found that asking students to read a short story before lectures makes it easier to introduce, explain and discuss complex scientific themes, such as evolution⁷. The short story can be used as a model that enables us to simulate complex processes and make them work in a particular situation and in a particular time-scale.

Writing Good Science Stories for Children

Writing for children takes no less skill than writing for adults. All important with children is clarity of meaning – sentences constructed according to basic grammatical patterns and wise use of words. When you are writing for children, make sure that every word counts, and that all your words match as closely as possible what is in your mind or imagination. It helps to remember that people learn new language best by experiencing the words in use and with writing that allows this to happen easily (this often requires good imagination!). Approach the work as if from a

child's lack of understanding (they have a viewpoint of limited experience), but most importantly avoid 'writing down' to them. Ensure that the story has an enticing beginning, enthralling middle and satisfying end and use and integrate (or know you can rely on) illustration and graphics where appropriate. A picture can tell a thousand words. [Note: publishers generally ask for manuscripts without illustrations and they like to appoint their own illustrator]. Try to aim for some level of emotional appeal and consider the suitability of the work for the age group you are targeting (i.e. can they translate the ideas?).

An excellent inventory of good science books for children is at <http://www.science.org.au/pi/goodbooks/index.htm>. Its authors⁵, Lynne Babbage and Elanor Stodart, found that there is a tendency for science books to impart information in a didactic way; that is useful for searching out facts but does little to convey the process of scientific thinking or the feeling that scientists have for their subject. These authors⁵ suggest that good science books do more than inform about facts - they convey ways of thinking and they are written in a way that helps children develop language skills. They also stress that narrative structure is important for science books, as structure aids memory and comprehension. They call for the use of a variety of styles, such as: purely informational (didactic); literary informational; deductive; expansive or open-ended; experimental; aesthetic; and those based on personal experience.

Scientists – We Need You!

Whatever the style, the literary story offers an effective and versatile means by which to communicate science. It would seem beneficial for the scientific professions to consider a greater involvement in the production of children's books as part of their communication activities. In addition to the production of the encyclopaedic, fact-finding types of science books for children there is a strong need for more creative and imaginative approaches to convey deeper understanding. Therefore the blending of non-fiction and fiction i.e. 'faction', may be a useful approach to break down the stereotypic barriers of traditional non-fiction and increase the 'readability' and 'enjoyability' of science books for both children and adults. So scientists, give it a go – I have!

References

1. Livo, N. and Rietz, S. (1986) *Storytelling: Process and Practice*. Littleton, CO: Libraries Unlimited.
2. Collins, R. and Cooper, P.J. (1997) *the Power of Story: Teaching Through Storytelling*. Second Edition. Allyn and Bacon, Boston.
3. Sadler, Tony (2002) *Brighter future in mind for science education in Australia*. Available at: www.fest.org.za/pcst/papers/sadler.pdf.
4. Stodart, Eleanor (1989) *Wings of Fact: Non-Fiction for Children*. In: 'Give Them Wings: The Experience of Children's Literature'. Second Edition. Eds. Saxby, M. and Winch, G., Macmillan, Melbourne.
5. Babbage, L. and Stodart, E. (1989). *Good Science Gooks for Children; An annotated list of select titles*. ACT Branch of the Children's Book Council of Australia, Canberra.
6. Meek, M. (1996) *Information and Book Learning*. The Thimble Press, Stroud, Glos. UK.
7. Negrete, A. (2003) *Fact via Fiction: Stories that Communicate Science*. Available at <http://www.pantaneto.co.uk/issue12/negrete.htm>

This article was developed from a dissertation for a Masters of Science Communication with the National Centre for the Public Awareness of Science at the Australian National University. Authors Note: Only about 1-2% of manuscripts for children's books are taken on by a publisher. But the important message is PERSEVERE – even 'Possum Magic' (the best selling Australian children's book of all time) was rejected many times, as was 'Harry Potter'!