The role of peer review in assuring research quality

Colleagues, thank you for the opportunity to say a few words this evening.[1] I ve had lots of advice about what I might say. It was suggested that I might talk about research and publishing, and about education, internationally, as it relates to the environment. I ve also been told to be useful, and to be provocative. So, I m going to try to do all these things as I focus on how we assure research quality.

This is a familiar topic for the Research Commission, of course. Sessions at past conferences have been devoted to research Quality, and many of us have been involved in one way or another. Nick Smith Sebasto has been more involved than most, and good things have emerged from these deliberations and from papers and monographs they gave rise to. But I want to think about quality from a different perspective that of the peer review process and its role in research publishing. Along the way, I shall use this focus to say a few words about the role that environmental education, and associated research, might have in relation to sustainable development and I ll finish with a few thoughts about the Research Commission s on-going role.

So, peer review. As an editor, I read a lot of research studies, and so the peer review process, and the relationships between editors, reviewers and researchers are things I am thinking about most the time. It is rare, however, for such relationships to be thrust into the harsh light of public scrutiny, but when it happens, it s always interesting, but only if it happens to someone else s journal.

In early September, I opened *The Times* newspaper to find a headline which said:

Flawed study shakes faith in journal

I assumed one thing immediately: this wasn t a story about researchin environmental education or about any of the journals whose editors, editorial boards, reviewers, and contributors are so well represented at this conference. *The Times* doesn t usually carry articles about environmental education, let alone environmental education research, even when there s a problem.

This was about medical research, and the journal in question was *Science* which recently withdrew an already published, and widely cited, paper. This is pretty unusual. The study in question was by researchers at Johns Hopkins who showed that monkeys, which had been given recreational doses of Ecstasy, developed the sort of brain damage that is linked to Parkinson s disease; and many of the animals died. Or the researchers thought that this was what they d done.

Science withdrew the paper when the scientists reported that it was methamphetamine, (Speed) and not Ecstacy that had been used. Wrongly labelled bottles, it seems. Bad science, of course, and a bad day for science. But maybe more than this, as it is the journal, rather than the researchers that is under attack. Colin Blakemore, who holds the Oxford University Chair of Physiology, wondered whether there was some compromise on the peer review process. This error, he says, could have been picked up by the most simplistic peer review a point he made immediately the study was published.

Now I don t know enough about this piece of research, or the field in question, to know how appropriate it might be to blame the reviewers. Clearly the authors are culpable, though no one seems to be making accusations of deliberate fraud just messy process (which may be just as damning an accusation, of course). Blakemore alleges that the paper might have been rushed to publication because the Congress was debating legislation to control Raves. Nonsense, says the editor; due process was followed. Editors tend to say things like this. Blakemore says there s an e/mail where the editor admits it all; and so it goes on.

I wonder if anyone here has ever come across an environmental education article that you felt its authors ought to withdraw because of flawed research. This is an issue I ll come back to. All this throws into stark relief the difficult but important role that reviewers and editors play in assuring the Quality of research, in communicating it to peers and others, and in the professional development of researchers. And it reminded me

[1] This is an edited version of an invited address to the North American Association of Environmental Education s Research Commission at the Association s Alaska conference; October 2003

of the price that we all pay for the fact that reviewers are allowed to do their work out of sight. I want to say something about all of these aspects.

I m not suggesting that we should stop the process of blind reviews; but I do wonder whether, once a paper is published, the reviewers should be identified in the journal, alongside the authors of the paper. After all, in many ways they are as responsible as the authors for the quality of what is reported. Such openness could have benefits for everyone. But it would change the nature of the dynamic between research and publishing.

As an editor, it often strikes me as very wasteful that some of the best bits of writing associated with peer reviewed publishing never get published. I say this because it is sometimes the case reviews are as well written, and as scholarly as the papers. And why wouldn t they be when you think of who does most of the reviewing. There are people at this conference, whose reviews are a professional joy to read.

Sometimes, of course, it is the best papers that get most engagement from reviewers and the peer review process becomes an in-depth professional discussion. There may well be merit in going even farther than this and publishing the comments of reviewers alongside the paper. This is one way of capturing aspects of the debates about papers that take place between author, reviewers and editor as the papers are considered for publication.

Of course, the *status quo* might be ok if the peer-review process always worked well. But it doesn t. I don t know about you, but I quite often find myself thinking: how did that get published? Or, and this is not quite the same thing, why did anyone bother to publish that, or even do the research. Even editors, when they look back at their own journals, have thoughts like these. I m not talking here about published papers that are merely badly written although there are too many of those. I m thinking about research that made you wonder how it ever got published in journals that take research, scholarship and the peer review process seriously.

I did ask some colleagues if they had examples of this sort of thing. Here s what they said (and I quote):

1. The sort of research that involves a ranking exercise. For example, students are given a list of environmental issues and asked to state which are the most important in an order of priority. Clearly this gives no indication of the relative importance that an individual student places on these issues. Nor does it give any indication of the relative differences in the importance placed on the issues by different students in the same survey.

2. Papers that are journalistic opinion pieces rather than scholarly research

3. Any paper that fails to provide a research design section or doesn t explain how interpretations are authenticated.

4. The sort of research where there is a control group, taught in the traditional manner, normally by one teacher and one suspects limited resources. This is compared with the outcomes from a well resourced programme with additional teaching support, often from the researcher. Here, unsurprisingly, the motivation and learning of the students who experience the research programme shows gains above the control group at least in the short-term.

5. Anything based upon sample sizes of 1-2 classes of students

6. Papers that are of the "research of the good advice" kind - ie how others should do things

These are rather general examples and its not immediately clear how or whether peer review is implicated. The next example is more specific:

7. A pre-test / post-test study which used a multiple choice test with children, their parents, and others. This claimed to be a measure of the understanding of the natural history and conservation of a particular species. The paper provided no explanation of how the test questions were developed, and so no argument that the test was a measure of anything in particular.

With this specific case, readers can t know whether it was the research that was flawed (the test was never formally developed in any sense), or whether the authors just didn t write about it. The authors will know, of course and the editor and reviewers should have asked. Such examples are not really new or novel, and they are by no means unique to environmental education. My final example has a relatively recent genesis, is specific to environmental education, and seems a growing phenomenon.

8. Papers that unthinkingly assume that it is now axiomatic that all environmental education has to be focused on the socio/political end of sustainable development

I want to dwell on this for a moment because of its contemporary significance. The role that environmental education might have in achieving sustainable development has been widely discussed over the past 10 years or so, and Stephen Gough and I looked again at this issue earlier this year in NAAEE s*Communicator*[2], where we set out nine *categories of interest* which, we argued, captured, albeit in a tentative fashion, a range of foci and objectives of those who espouse and promote what we called environmental learning.

These categories ranged from those interested in sharing the joy and fulfilment that can be derived from the experience of nature across to those promoting nature as a metaphor for a preferred social order, and we argued that the categorisation shows how emphasis and assumptions about both purpose and process vary markedly across different interests. For example, we showed that social change as an educational goal increases markedly as one shifts from category to category. We then argued that *all* the perspectives represented by such categories are both legitimate and valuable in that they all have something to contribute to learning about the human condition, and about our relationship with nature. We concluded that, individually, none of them can fully represent environmental education and its goals, and that this insight offers a positive way forward whereby teacher and researchers can select distinctive perspectives in order to pursue a particular line of investigation (or reasoning) with the full knowledge that doing so does *not* render illegitimate other perspectives.

It seems to me that there are increasingly firm policy stances towards sustainable development across societies and the international community. It follows that sustainable development is something that environmental educators (and researchers) need to take both seriously and critically, as, in the medium term, at least, the opportunities for environmental education to bring about learning in relation to sustainable development, can only increase, as can the inherent dangers of being of instrumental service to powerful institutions.

Going back to the broader issue of assuring research quality, it seems clear that research publishing problems occur across research traditions and approaches, although we don t always acknowledge this. Too many of us are still too keen to criticise others: those who work in the other paradigm. My main point here is that these examples of problematic research strike at the heart of the implicit contract that journals have with their readers. This is that the stories and ideas that they bring to the public gaze all meet certain standards. This is a relationship of trust. And the more novice the reader, the greater the problem if the trust is broken because novice researchers, and non-research readers alike, have fewer resources to bring to bear in analysing a situation for themselves.

If we were to turn this around, and part of the purpose of a journal was to allow readers to see something of the interchange between researcher and reviewer, this would radically change the process dynamic. Although no research journal that focuses on environmental education has taken this step, the model that *Environmental Education Research* uses in some of its specially-focused editions gets close to it. I m thinking of the Mind the Gap (Volume 8.3) special edition, and the more recent (Volume 9.2) special that reviewed the work of Paul Hart, Kathy Nolan and Mark Rickinson in their own reviews of research in environmental education which were published in *Studies in Science Education* and *EER*, respectively. In Volume 9.2, Paul and Mark got the chance to write reviews of their own work alongside those of 9 other writers, many of whom are at this conference. Most of the papers in these special editions are, in essence, long peer-review essays, themselves subject to peer review.

[2] Scott WAH & Gough SR (2003) Categorizing Environmental Learning *NAAEE Communicator* 33(1) 8

Of course, this approach is not unique, but it is useful to hear reviewers considered voices as a means of extending and deepening the consideration of issues, as a means of being less reactive to events, and as an attempt to focus debate. The serious point behind all this is to argue for approaches to publishing that help researchers do better research, and help readers make better sense of what then gets published.

I d like to go back now to the question of why problematic work gets published in the first place, and what editors do about poorly conceived studies, errors of data collection and analysis, problematic literature reviews, conceptual confusion, tendentious argumentation, unreflexive stances, and the like. In relation to the examples cited earlier, a number of questions come to mind:

1. Did the editors ignore the reviewers this happens and it cuts both ways.
2. Was the editor up against a deadline (as was alleged in the *Science* example I referred to earlier)?
3. Were inappropriate referees used? It happens. Indeed, were there any referees? Not all research in environmental education gets published in journals that use peer review in any systematic way, and it was very clear in Mark Rickinson s Critical Review of the Evidence in relation to learners and learning in environmental education , that much of the research published in such journals is of poor quality.

Well, poor quality or not, such research is out there and it is available. This is the inevitable consequence of the market in which journals compete, and is a necessary price we pay for freedom of expression. But are new researchers in this field skilled enough to see the problems? And are our training programmes good enough to help this? Indeed, is the idea of a training programme the right way of thinking about the sort of cultural acclimatisation that is needed? Or do we need new models of research learning communities where students work is situated alongside researchers in the research practice that they do.

How well do current PhD programmes do this? And how do we ensure that students have a catholicity of experience that allows them to appreciate how different research traditions and interpretations relate to each other, to comprehend absolute and relative strengths and weaknesses, and allows to develop critical faculties in relation to both? The evolution of PhD programmes to provide better and more appropriate ways of learning how to do research seems an important task. Is there a role here for this Research Commission? Might it look across existing environmental education PhD programmes in North America, and elsewhere, to see how novice researchers critical analytical skills are nurtured. Might it then provide the kind of support that the research development seminar that met last weekend sets out to do?

But who is to develop the skills of reviewers? By and large, it is not something that journals do, save through providing opportunities to carry out reviews. It seems to be regarded as one of those many professional skills that one picks up along the way. Is there a role for the Research Commission? Might we have pre-conference slots for reviewer professional development, run by the Research Commission with editors?

Might the Research Commission also act as a forum where researchers come together with users of research, as has recently happened in the UK, to create user reviews of research, and help them extend their capability to read and appreciate what research says and hence their ability to use it in their own contexts. The Research Commission does also have the capability of taking views across research approaches, to bring people together from different traditions, rather like the research development seminar tries to do. It might be able to do this on a more regular basis, and directly address issues of quality and professional development.

In conclusion, let me just say that there would seem to be opportunity here for NAAEE and its Research Commission to be proactive in a number of important arenas all of which, in different ways, would serve to enhance research quality and usefulness, whether in relation to: Reviewer expertise; Users ability to read and use research; and New researcher development It seems to me that development on all of these fronts is needed, and I hope that what I ve said has been useful (and maybe provocative even) in highlighting issues that the Research Commission might pursue.

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