

# Science teaching and health education: the challenge accepted!

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**"If the belief is still that 'science teachers are often ill-equipped or unsuited for the demands of contemporary health education', then I would challenge those who hold this belief to join the Secondary Science Curriculum Review in setting up working groups to enable science teachers to make a better-informed, and more effective, contribution to contemporary health education."**

"Science teachers... are often ill-equipped or unsuited for the demands of contemporary health education." Alan Beattie, in the article in the January issue of this journal, opens his challenge with these statements.<sup>1</sup> In many respects I would agree whole-heartedly with him. The face of health education in schools has changed radically over the past ten years, culminating in an even greater patchwork of provision than existed previously. One of the positive results of the vast amount of curriculum development which has taken place in health education, however, has been the raising of the level of awareness of all schools about the need for a concerted programme in health education. Science teachers have made a contribution to the field of health education both before and during this decade of heightened awareness, but for many reasons the quality of this contribution has remained, as Beattie points out, uninformed by the "vigorous debates within the field of health education".

## The Secondary Science Curriculum Review

I would like to take up Beattie's challenge by suggesting that despite quoting the existence of the Secondary Science Curriculum Review in his article, he then ignores the contribution that this major curriculum development is making in changing the attitudes of science teachers. Indeed, one could use the quote with which this article opens to suggest that many science teachers may often be ill-equipped or unsuited for the demands of contemporary science education! However, it would be very unfair of me to suggest that this applies to all science teachers, just as it is wrong of Beattie to generalise about science teachers as a group and ignore the work already being done. The Secondary Science Curriculum Review is the largest curriculum development project in science which has ever taken place in Britain. It employs a 'periphery to centre' model in which the central team act, not as producers of the

curriculum material, but as enablers and energisers of the teachers who, with the help of their Local Authority colleagues, are working on change and re-orientation of the science curriculum.

At present there are some 250 groups working with the Review. These comprise two and a half thousand teachers in over 80 local authorities in England and Wales and the five Education and Library Boards in Northern Ireland. This represents some 10% of the science teaching force. I would suggest that this is an indication of the "serious awareness" that science teachers have of the inadequacy of the contribution of science education to many areas of the pupils' lives, not the least of which is that of health education.

## Three questions, and three focus points

I should like to examine Beattie's models in detail and ask three major questions.

1. What contributions can science make to any or all of the models outlined?
2. Should science concern itself with all or any of these models of health education?
3. What aspects of change do the answers to these questions indicate?

The whole field of science education, since the publication of the 1979 ASE document,<sup>1</sup> has been undergoing arguments which are sharper now than at any other time in its history. There are three major focus points in these arguments which have implications for the questions above, namely:

1. Is science education about the acquisition of knowledge or scientific literacy?
2. Is science education to be shaped by the content of science or by the skills and processes involved in science?
3. Should science be available to all pupils and relevant to their everyday experiences?

I shall examine each of the questions and the science focus points within the framework of Beattie's models.

## Model 1: Education for Bodily Regulation

Many health issues involve at least a rudimentary understanding of body function before decisions can be made, and indeed one of the definitions of health education states that *Health education must be concerned with attitudes and skills of decision making as well as with the relevant knowledge*. It goes further and claims that *Health education can be seen as helping people to make such choices and decisions in the light of knowledge and the influences upon them*.<sup>3</sup> A large part of the contribution of science to health education has been to date the aspects of "knowledge imparting". In Beattie's Knowledge / Attitude / Behaviour (KAB) model, many science teachers have involved themselves only in the knowledge aspect, without the further objectives of changing attitude and behaviour. There has been little contribution to the skills of making decisions based on the use of acquired knowledge, either in the health aspects of science or the more traditional content areas of science.

With a major Review of science taking place, however, we need to examine what emphasis new science courses may place upon the skills aspects of the curriculum. The aims of the Review<sup>4</sup> state that pupils should be given opportunities to *develop the ability to design and carry out experiments, evaluate evidence, and solve problems*; and, within working groups set up by the Review, there is ample evidence of groups who are developing science courses which reflect this skills-based view of science.<sup>5</sup> Groups are more than willing to take on board our third science focus (item (3) above), making their work relevant to everyday pupil experience and available to all pupils.

## Model 2: Education for personal growth

The recognition of the personal parameters of science education is something that has been developed more fully by the Review than any other curriculum

development project in science education. Its aims state that pupils should have opportunities to:

1. Study those aspects of science that are essential to an understanding of oneself, and of one's personal well-being;
2. Discuss, reflect upon and evaluate their own personal understanding of key scientific concepts, theories, and generalisations.

At present, science teachers are willing to use evidence obtained from the natural world as long as it is impersonal and "objective" in some way; they are less willing to accept the *personal perceptions* of the pupil as variables that may have a bearing on the process of developing science cognitions. Many science teachers claim that the personal parameters are not "real science", being too subjective. I would argue, supported by the two aims quoted above, that from a pupil's perception much present-day science has little relationship with reality at all, and that a closer understanding of the personal development issues of science would create, for most pupils, a greater correlation with reality. Certainly the Review does not see the personal development model as one in which science cannot make a contribution.

Indeed, the early findings of the Children's Learning in Science Project<sup>6</sup> would indicate that there is an even greater contribution for science to make in this area, in that of enhancing self-esteem. Science has traditionally been viewed by many pupils as "difficult" or "hard to understand", and this may in part be due to the didactic image of science education, where science is a discipline supplying the *right answer* rather a *quest for answers*. Science teachers have often failed to take into account the intuitive ideas of pupils on the science issues being investigated. The result is a mis-match of concept, and a lack of confidence by the pupil in taking science concepts which are already part of everyday experience and changing them to take account of new experiences. In Kelly's<sup>7</sup> terms, science lessons are not



encouraging "man the scientist" to be a scientist; while the Children's Learning in Science Project states that

*learning cannot be viewed as a passive process of absorbing knowledge, but as one of modifying and restructuring of existing ideas by the pupil.*

It also suggests that science teachers should encourage pupils to talk about their own ideas of science concepts in small groups, as well as enabling pupils to appreciate that alternative theories are possible, by trying out different solutions to a problem. The Project talks of giving pupils the "confidence to use scientific ideas" and of encouraging activities on the part of the pupil and teacher that enhance this confidence.

These perspectives imply that organisations within science education are by no means blind to the role that science could play in the personal development model of health, and that science teachers have a place in building the self-esteem of the individual learner, whether the topic is a health one or not.

### Model 3: Environmental and political limits to health

A further examination of the aims of the Review would indicate that science educators are aware of the *obvious scope for science teachers... bringing the "social context" of science into focus in the school* (Beattie, *op.cit.* p.13). It states clearly that pupils should have the opportunity to:

1. Use their knowledge of science to design and develop solutions to technological problems, test and evaluate these solutions, and cost such exercises.
2. Study key areas of science and technology that relate to the world of work and leisure, so that they are better able to participate in a democratic society.
3. Study key concepts that are essential to an understanding of the part science and technology play in a post-industrial and technological society.
4. Appreciate that technologies are expressions of the desire to understand and control the environment, and that technologies change in response to changing social needs.

Even a cursory examination of these aims implies that the economic, political and social issues of science, and the constraints they place on scientific developments and solutions, are important issues for science teachers to consider. The recent political debates upon the social aspects of science have, however, tended to make teachers cautious, and a feeling of "lack of confidence in being supported if we explore these issues" is one science teacher's view of this particular hornets' nest.

### Model 4: Education for community action in health

This is the only area where the Review makes no firm commitment to the model that Beattie postulates. I feel that this may be due to an awareness of the complementary role played by community workers in this field, and a willingness to

"leave it to the professionals", rather than a reluctance to accept the challenge that outreach places on teachers' self-perceptions.

### Away from the "academic tradition"

This outline has shown what contributions 10% of the science teaching profession are, by virtue of their involvement with the Review, willing to make to the models outlined by Beattie.

As to whether science should concern itself with all these models, it must be obvious, from the arguments above, that within the development work of the Review science teachers are particularly concerned to move *all* aspects of their science teaching (and not just those of health) away from a curriculum that is "far too heavily influenced by academic tradition" and into a "new kind of content chosen for its value in living".<sup>8</sup> They also see the need for personalising science to "help learners to be more self-assertive" and to "consider and discuss alternative plans and to rehearse options through role play, etc." (Beattie, *op.cit.* p.12).

Some of the issues explored have highlighted the view that science should be available to all pupils and relevant to their everyday experiences — although they have not signalled whether scientific literacy or acquisition of knowledge is the more important aim. However, the informed decision-making model of health would argue for the former.

The most important question, however, must still be *What aspects of change are suggested by the answers to these questions?*

These aspects can be summarised in five statements.

1. The health aspects of all science curricula should be reviewed in full, from the points of view of skills and processes as well as content.
2. The methodologies of science teaching should be examined carefully for their contribution to the enhancement of the pupils' self-confidence, and the skills of problem-solving and decision-making.

3. The curriculum should be examined for its dependence on knowledge transference and relevance to pupils' experience and intuitive knowledge.
4. Science teachers should be prepared to step across the boundaries of the science department and merge skills with other colleagues.
5. Health issues should be considered, where they are relevant to science teaching, as providing another context such as biology, physics and chemistry for teaching the scientific process.

### Proposal for a working group

In his article, Beattie invited science teachers to join in a debate about the place of science in various contexts. On behalf of science teachers, the Secondary Science Curriculum Review has begun that very debate with a wide audience from industry, the education professions, and health professions, in its two consultative documents,<sup>4, 9</sup>

I would like to extend that invitation in a more concrete way to Alan — as a representative of an institution of higher learning — and to other participants in the 'fierce debate in health education about alternative strategies and approaches, about different theoretical models that can inform and guide practice' (Beattie, *op.cit.* p.10), to form a working group within the Review. If the belief is still that *science teachers are often ill-equipped or unsuited for the demands of contemporary health education*, then I would

challenge those who hold this belief to join the Secondary Science Curriculum Review in setting up working groups to enable science teachers to make a better-informed, and more effective, contribution to contemporary health education.

### References

1. Beattie, A.: Health education and the science teacher: invitation to a debate, *Education and Health*, 1984:1,9
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5. See, for example:  
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*Development of skills and processes* (Sunderland)  
*Social and vocational science* (Leicester)  
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