# Health Science Education in Primary Schools: Evaluation of procedures and results

**Michael J Reiss**

UCL Institute of Education, University College London
20 Bedford Way, London WC1H 0AL

## Abstract

Health education is an important component of school education, one that can be defended by an analysis of what the aims of education should be. Yet it is often undervalued by schools and suffers in competition with other subjects. Teaching health education well makes many demands on a teacher, and these differ for primary and secondary teachers. This paper examines the place of health education in the primary curriculum and discusses what is meant by good health and how a school might structure its curriculum and pedagogy to enhance the health of it students. It is important to evaluate health education interventions. I discuss the place of evaluation of procedures and of results and of formative and summative evaluation. The benefits of evaluation are stressed, along with action research and long-term studies.

## Evaluation

Evaluation requires some notion of where one wants to go (the 'results' in the title I have been given) and how one intends to get there (the 'procedures'). Standard books on the evaluation of health interventions (e.g. ØVRETVEIT, 1998) discuss a range of ways in which evaluations may be undertaken. Øvretveit starts from the premise that each of us undertakes evaluation all the time as we attempt to determine whether what we are doing is working. We are particularly likely to evaluate our behaviour when we do something new. Furthermore, evaluation may be undertaken from a number of perspectives; for example, an evaluation may be economic when one attempts to ascertain whether resources (money, time, etc) are being used effectively.

The approach I adopt here is therefore to begin by considering the aims of education in general and then primary education in particular. This is because I am interested in seeing to what extent there is an over-arching argument for improving health science education in primary schools that comes from the general purposes of education or whether we need lower-level arguments for its support.

## The aims of education

When one looks at what various authors have suggested might be the aims of education, one can discern two broad groupings (REISS & WHITE, 2014). First, there are those where the intention is to develop the individual for her/his own benefit; secondly, there are those where the intention is to develop individuals so that they may collectively contribute to making the world a better place. We may note that this is typical of much social policy in many countries. So, for example, under-age

pregnancy, illicit drug misuse and speeding are generally seen as bad both for the individuals concerned (loss of opportunities, mental and physical harm, risk of injury or death) and for the rest of society (financial cost, more burglaries, harm and upset caused to families and friends).

The proposition can be put more formally: with John White I have argued that there are two fundamental aims of school education, namely to enable each learner to lead a life that is personally flourishing and to help others to do so too (REISS & WHITE, 2013). These high level aims can be translated into more specific ones by considering how human flourishing requires, for most people, such things as the acquisition of a broad background understanding, moral education, a life of imagination and reflection, and preparation for work.

It seems clear, if one accepts these two fundamental aims of school education – to enable each learner to lead a life that is personally flourishing and to help others to do so too – that there are strong arguments for the inclusion of health education within the school curriculum. While there is much that children can learn from their parents and others in their families and from such outside-of-school sources as television and the internet about how to remain healthy, schools have a particular role to play in the provision of a more systematic coverage of the relevant issues than pupils are otherwise likely to obtain. For example, one family may be good at getting children to wash their hands after going to the toilet but poor at getting children to clean their teeth well. Another family, with older children, may be good at helping them to keep safe when cycling but not so good at helping them understand the changes that occur at puberty.

## Distinctive features of primary schooling

Primary (or elementary) schooling typically begins in most countries at the age of 5, 6 or 7 and continues until about the age of 11. All too often presumed to be simply a preparation for secondary / high school education (itself sometimes seen as a preparation for post-compulsory education), primary schooling manifests a number of distinctive features.

First, in primary schools it is premature for students to choose between subjects or between academic / vocational routes. In this sense, primary schooling is truly comprehensive. There is a presumption that what is being taught is relevant for all of a cohort. In this, primary schooling differs from the secondary schooling provided in most countries where, as pupils age, they begin to be able to choose between subjects and, at a more fundamental level, may choose between – or, more likely, be directed into – alternative pathways, typically 'choosing' between an academic route that is likely to lead to higher education and a more vocational route that is likely to lead more rapidly to a job or an apprenticeship or something similar.

Secondly, most subjects are taught by the same teacher. Indeed, in some countries, particular for younger pupils, all subjects are taught by the same teacher. In other countries, older pupils in primary school are taught by specialist teachers for certain subjects (e.g. music). This has a number of consequences, some advantageous, some less so. Advantages include the ability of a teacher to make links between subjects.

Indeed, some of the rather artificial distinctions that can exists between subjects in secondary schools (should Newtonian mechanics be taught in mathematics or in physics? Should soil be taught in geography or science?) simply disappear. Topics can be taught as appropriate rather than being pigeon-holed into subject disciplines that tell us more about the history of teacher education than about relevant disciplinary differences. Of course, a concomitant disadvantage is that we cannot expect a teacher who is teaching as many as ten subjects to be as expert in all of them as a teacher who specialises in just one subject.

Thirdly, and related to the point that in primary schools most learners spend all their day with just the one teacher, primary schools have much greater flexibility about the duration of lessons than do most secondary schools. Secondary schools typically have formal timetables that separate learning into discrete times blocks. If the standard allocation for a lesson is 40 minutes then all learning takes places in some whole number multiple of 40 minutes (so a double lesson last 80 minutes). This is an administrative convenience, even requirement, but can have negative implications for learning. For example, in an evaluation of practical work that I undertook with colleagues (ABRAHAMS, REISS & SHARPE, 2014), we found that teachers of science in primary schools wee typically better than teachers of science in secondary schools at having meaningful discussions with pupils after the practical work had been completed, before moving onto a new focus for learning. In secondary schools too often the end of the lesson appeared rushed with little time for meaningful discussion once the practical work had been completed and apparatus tided away.

Finally, it is often the case that primary schools are subject to fewer pressures of external assessment than are secondary schools. In a number of countries, including mine, schools, indeed individual teachers, are increasingly judged by the performance of their students in external assessments. Such judgements can have profound consequences. In particular, they can strongly affect perceptions of schools by present and putative future parents, leading to a self-reinforcing system in which particular schools presumed to be slightly better than average attract more applications and so are able preferentially to choose to admit learners likely to do well in external assessments, thus becoming 'better' than average, as measured by crude league tables of student examination performance.

These distinctive features of primary schooling have considerable relevance for health education, including a health education that takes science seriously. The fact that primary schooling is comprehensive is very appropriate for health education. Not all of us may need or want to learn Latin or bricklaying but we all need to learn about health. The fact that most subjects are taught by the same teacher makes it much easier to 'drip feed' something like health education (or environmental education or consideration for others) throughout the curriculum so that pupils have a more holistic understanding. The fact that lesson duration is more flexible makes it easier for teachers to continue an interesting discussion, e.g. about health, rather than having to rush on to the next timetabled activity. The fact that there are typically fewer external assessment pressures makes it more possible for a whole school, and/or for the individual teachers within it, to decide what is considered to be the central aims of the teaching. Health education is likely to do better in such a system than in secondary schooling where examinations may reward a narrow conceptualisation of education.

## The place of health education within the curriculum

For many of us, I suspect, the two most important things in our lives are the relationships we have with others and our health. Yet schools don't give a great deal of weight to either of these in their curricula. Both common sense and more formal sociological analyses of the classification and framing of school subjects (notably BERNSTEIN, 1996) reveal that there is a fairly consistent hierarchy with respect to which school subjects are high status (i.e. valued). At the top are a country's main language, mathematics and the sciences; beneath are other academic subjects (e.g. geography, history, other languages), beneath these are subjects with a more practical bent (e.g. art, music, physical education) and lower still are certain vocational subjects (e.g. home economics / domestic science / catering) and cross-disciplinary subjects such as health education.

The fact that health education is low status and interdisciplinary has major consequences for how we train teachers. In my own country, England, we have rarely provided specialist initial or continuing education for teachers of health education. When I was a beginning teacher, I was able to go on an excellent course that ran for a day a month over a year about how to teach health education, and when I subsequently worked in initial teacher education I taught an optional (though very well attended) health education course that ran for three hours a week for five weeks. However, such provision, both in initial teacher education and continuing professional development, is the first to be cut when finances are tight or when courses are restructured.

A consequence of all this is that very few teachers, in my experience, see themselves as 'health education teachers'. They are much more likely to see themselves as mathematics teachers, science teachers or music teachers. In other words, health education is rarely core to a teacher's identity. At secondary level, the best one gets is that biology teachers and physical education teachers see health education as part of their responsibility.

## Health education is demanding to teach

Furthermore, in addition to the fact that few teachers see health education as 'my responsibility', it is demanding to teach. If we think of the characteristics one would want one's ideal health education teacher to have, whether at primary or at secondary level, they fall into three main areas:

- First, one wants a health education teacher to have a good knowledge of biology. Suppose, for example, one is teaching about smoking. A good teacher would know precisely: *why* smoking is bad for one's health (the specific and different effects of nicotine, tar, carbon monoxide and other components of cigarette smoke on the cardiovascular system, gaseous exchange system, reproductive system, brain, skin and other organs) with consequences for increased rates of cancers, strokes and coronary heart disease, premature aging and reduced fertility; the extent to which such effects of smoking are reversed if one stops smoking; the additional risks to children from smoking; and the

effectiveness (or otherwise) of various ways to try to stop smoking (including e-cigarettes). Similarly, someone teaching about contraception should know how each methods works (including the various methods that rely on hormones), how effective each method is (as well as how this is affected by inexperience or forgetfulness), the long-term consequences of contraceptive use and the extent to which each method is reversible.

- Secondly, one wants a health education teacher to have a wide range of pedagogies at their command. Health education is not just about the imparting of information. It is about developing learners' abilities to think for themselves, make decisions and put such decisions into effect. It requires an ability to set up and run student discussions, whether in small groups or whole class plenaries. It is most effective if teachers can handle ethical debates and discussions where the issues are not only factual ones but ones to do with values (e.g. the acceptability of different forms of contraception to different people). It benefits from an ability to organise role plays in which students get the opportunity to act out both their own ideas and, just as valuably, the ideas of others. All this can pose a particular challenge for science teachers as they are generally less comfortable with discussion and debate than are humanities teachers (LEVINSON & TURNER, 2001).
- Thirdly, a really effective health education teacher can't do it all on their own. Health education, by its very nature as an interdisciplinary subject, requires some degree of co-ordination across subjects and, at secondary level, though not at primary level, this means co-ordination with other teacher colleagues. In addition, there will be co-ordination with other colleagues. Some countries have school nurses, who are often underutilised but can play a central role in health education, and there is a long tradition of inviting in outside agencies (whether doctors, theatre troupes or whoever) or of taking students on visits (e.g. to sexual health clinics).

**What is good health?**

There is a famous and oft-cited WHO definition of health: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". While this definition is sometimes criticised for its use of the word 'complete', one attractive feature, in addition to the three components of physical, mental and social health and the stipulation that health is not merely the absence of disease or infirmity, is its reference to 'well-being'.

There is now a large literature on well-being (e.g. CIGMAN, 2012). A key issue is the extent to which it in general and health in particular is objective or subjective. An early and highly cited piece of work is that by Brickman, Coates and Janoff-Bulman (1978). Brickman and his colleagues interviewed people who had won large amounts of money (typically several hundred thousand US dollars) in a lottery and used standard psychological survey responses to determine their happiness and compared the results with controls (non-lottery winners from the same geographical area). They found that the lottery winners were no happier *and* derived significantly less pleasure from such everyday activities as hearing a good joke or receiving a compliment.

Brickman and his colleagues also interviewed people who had become paraplegics or quadriplegics as a result of an injury within the last 12 months. Unsurprisingly, their happiness scores were lower than both the lottery winners and the controls. However, the differences were small and they reported *more* enjoyment of everyday pleasures than the lottery winners. In addition, all three groups reported similar expected future happiness levels.

The simplest way to interpret these findings is that our subjective measures of well-being are affected surprisingly little by major changes in our circumstances. While not everyone agrees with this interpretation of the study by Brickman and his colleagues, it receives some corroboration from a study that shows that most people with locked-in syndrome also report high levels of happiness (BRUNO *et al*, 2011).

**Structure versus agency**

The issue about the extent to which health is subjective as opposed to objective connects with fundamental sociological questions relating to structure and agency. To what extent are our lives the result of our own, self-determined actions (our agency) or our circumstances (the structures within which we live and move and have our being)?

As far as health education is concerned we want, drawing on the framework of human flourishing introduced earlier in this paper, young people to develop agency, but this needs to be within a framework of human flourishing for themselves and others. After all, one can manifest agency by choosing as a child to play where it is not safe or to take illicit drugs. Part of the job of education is to enable students to move through their school careers into positions where they are increasingly able to make and enact autonomous decisions that are good for them and for others. Poor schooling either provides an insufficient scaffold for this, so that students are left to sink or swim for themselves at too early an age, or remains over-controlling so that students leave schooling ill-prepared for the major decisions about work, relationships and lifestyles that they are already beginning to make.

**Procedures and results in health education**

A useful distinction can be made between two broad categories of outcomes that we might want from health education: results and procedures or processes.

Intended results include such things as students having healthy body mass indices (neither too low in weight for their height nor too heavy), reasonable fitness levels, low smoking rates, low rates of teenage pregnancy and so on. All of these seem obvious but a certain amount of care needs to be taken by schools when aiming to achieve such results. A particular problem is unintended consequences. A classic example of this is so-called abstinence education. Heavily funded under the previous Republican administration in the USA, this consisted of telling students that it was not right to have sexual intercourse before they were married. Such education was not accompanied by contraceptive advice. In common with most school sex education, such education typically had little if any measured effect. However, when it did have

a statistically significant effect it tended to do precisely the opposite of what was wanted. Unlike comprehensive sex education – which discusses the advantages of delaying sexual intercourse but does so in a less didactic fashion and also provides extensive contraceptive advice – abstinence education sometimes decreased the age at which teenagers first had sexual intercourse and increased the number of their sexual partners (KIRBY, 2007).

Another problem is with too crude a set of intended results. As is very well known, in an increasing number of countries, obesity is a growing health problem. Obesity education should encourage people to eat healthily and take appropriate amounts of physical exercise. However, not all students are overweight. Indeed, some are unhealthily underweight for a number of reasons. All health education, as with all education in general, needs to be tailored to the needs of each student. There is a danger that too overt and generalised an application of the message 'obesity is a growing problem' may be no good, or even harmful, for those students with incipient or borderline anorexia. Furthermore, obesity education can stigmatise obese children and do more harm than good for them too (WILLS, 2010).

A related problem is when attempting to reduce the incidence of relatively rare behaviours, e.g. use of illicit drugs. Done poorly, education can make some students *more* likely to try such substances (STEAD & STRADLING, 2010), if only because of the widely known phenomenon that many students, particularly teenagers, take a particular delight in doing the opposite of what they have been told.

These difficulties with too overt a focus on the results of health education provide one reason for putting more emphasis on the process of health education. Valuing the process (the procedures used) can have two sorts of benefits. First of all, it reinforces the value of the processes themselves, as I go on to discuss. Secondly, it may make it more likely that desired results are achieved.

One process that it makes sense for teachers to value is the views of students (FLUTTER & RUDDUCK, 2004). There are both intrinsic and extrinsic arguments for this. The intrinsic argument is that it is worth taking student views seriously because this is an important way of respecting them and students are worthy of respect. The extrinsic argument is that by taking student views seriously the desired results of health education are more likely to be attained. There are a number of reasons for this. For one thing, students are likely to be more motivated if their views are taken seriously. This leads to them being more engaged with lessons. Provided such lessons are well designed, their intended ends are more likely to be met if students are engaged. For another thing, health education is not entirely formulaic. A teacher needs to take account of the knowledge, the skills, the values and the dispositions of students (HALSTEAD & TAYLOR, 1996; HALSTEAD & REISS, 2003). These are more likely to be revealed when students are engaged.

A second process it makes sense to value is student discussions. The point of student discussions is not so much to reach a consensus. It is (cf. HABERMAS, 1984) for students to learn to listen to the views of others, to develop their skills of argument and to get into the habit reflexively of considering their own views. Secondary science teachers sometimes do not allow extended time for discussions, whether in

small group or in a plenary. Primary teachers, fortunately, are more used to managing discussions.

## Constituents of a health education curriculum in primary schools

Before I had read the account of the curriculum being provided in the Accademia's Health Science Education Programme (STEFANINI et al, 2015), I made a non-exhaustive list of the sorts of topics that I would expect to be covered in a primary health education programme. My list consisted of nutrition education, exercise, relationships education and going through puberty. Of course there are other things one can include but one needs to bear in mind that a school curriculum has to cover many subjects and it may be better to cover a few health education topics in depth than many topics more superficially.

Furthermore, my four topics – nutrition education, exercise, relationships education and going through puberty – are meant to enable a range of ways of learning about health education:

- Nutrition education can include such activities as pupil reviews of meals (see http://neverseconds.blogspot.co.uk). It also works best when schools work with parents (e.g. JAMES, 2010).
- Exercise obviously entails pupils actually undertaking exercise whether this is on school premises or not (e.g. walking to school). It is increasingly feasible (given various technological devices) for students to do such things as measure their pulse rates before, during and after exercise (e.g. the Harvard Step Test for children) and this can play a role in education about exercise.
- Relationships education is helped by discussion and role play as pupils think both about how they want others to behave to them and what sort of people they want to be.
- Education about puberty can be helped by internet searches and encouragement to write personal diaries at home.

In addition to the various ways that there are of learning about health, it is worth thinking about how health education intersects with the wider life of the school. Nutrition education, for example, is not just about individual pupils learning what is meant by a balanced diet. Pupils can look at school policies about such things as sugary drinks (often used to raise money in schools), vegetarianism, the provision of halal food and so on.

## Useful evaluation

This paper has used the distinction between the evaluation of procedures and the evaluation of results. A related and oft-used distinction is between formative and summative evaluation. Summative evaluation looks at the outputs and outcomes of an intervention and tries to determine whether the intervention has succeeded by comparing these with the original intentions of the intervention. Sometimes such evaluations can be undertaken with large samples, divided randomly into controlled and experimental (intervention) groups, thus fulfilling the criteria often thought to be ideal in medical studies, namely those of a random controlled trial (RCT). On other

occasions, allocation into groups may be done not randomly but intentionally (e.g. by suitable matching of participants with respect to a key variable) or natural variation may be used. Related decisions are about the unit of analysis, e.g. at the level of the school or the student.

Formative evaluations are also valuable and have the benefit that they can help one to understand why an intervention is working or not or, more precisely, which bits of it are working well and which bits less well and why. In a school context, formative evaluation can be especially valuable as it enables one to learn from a project and improve it as one goes along.

Allied to both formative and summative evaluation is action research where the researcher or research team undertakes successive cycles of implementing, evaluation and adaptation of the intervention using data gathered from the intervention. Such an research method can lead to a new approach to teaching becoming embedded in a school or group of schools, especially if the researcher / research team works closely with the participating teachers.

A final point about evaluations is that it is always good if the possibility of obtaining long-term data on efficacy is left open. One of the lessons learnt from longitudinal studies is that short-term benefits (and harms) are not always maintained long-term. My personal hypothesis, based on an Aristotelian perspective, is that health interventions are more likely to have long-term benefits if they get people into the habit of behaving healthily. I am all in favour of knowledge, especially knowledge about health underpinned by rigorous science, but knowledge alone does little for health. One needs to get into the rhythm of behaving healthily and that is favoured by the development of behaviours and structures that connect with one's developing sense of identity. For example, a young person may have no interest, quite the opposite, in running or in participation in team sports such as football as a way of maintaining physical health but may be attracted by high quality dance lessons, whether on or off school premises, that achieve the same end and lead to many years of regular dancing long after the lessons have ceased.

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