'Measuring' health education: health-related topics in the GCE

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It is suggested that the status of health education within the school curriculum is handicapped by the substantial 'non-examinable' component. However, imparted knowledge, which is measurable, can certainly influence health-related behaviour. In this article, the writer assesses how effectively health-related knowledge was examined in a recent O-Level paper, and suggests that a GCSE Mode III paper in this area of the curriculum is a practical possibility.

There are three areas or domains which may be explored in the evaluation of health education programmes. They are:

1. *The cognitive:* The gain and use of knowledge, including the development of intellectual skills.
2. *The behavioural:* Changes in behaviour which result from awareness and the gaining of knowledge.
3. *Affective:* The development of attitudes and feelings.

Conventional written GCE examinations, particularly in biological subjects, tend to assess the cognitive achievements of the pupils: questions which ask for easily-recognised patterns of responses are set, and these are marked with a high degree of consistency by a team of examiners. The importance of behavioural change, and the development of values, attitudes, and feelings, is being recognised more and more; but public examinations which can yield consistent statistical evidence of performance have not yet been devised. Thus, the analysis of results of conventional examinations in, for example, Human Biology and Social Biology, do not of themselves tell us much about the processes that have gone on in the classroom, although they do tell us about the pupil's ability to score in the examinations.

Even so, this assessment of knowledge and its application may be a useful indicator. Knowledge gained today may be applied tomorrow. Knowledge usually precedes insight into concepts, and hence into attitude and behavioural change. Human behaviour is complex, and, without wishing to sound trite, many approaches contribute to the total synthesis.

Health education in the curriculum

Unfortunately, the syllabus content of examination boards is often controlled by the assessment procedures available.

Thus in Human Biology courses fundamentals such as concepts of love, sexual behaviour, and making choices are not included because of the problems of examining them.

In secondary schools, pressures from the 'examinable' curriculum often preclude a separable health education programme; but subjects offering health-related topics within a GCE or CSE course can contribute considerably to an overall health education programme, especially in the 4th and 5th years. In the biological sciences, even if the approach is not experimentally based, courses can offer much to the personal and social development of pupils – much will depend upon the teacher, who may contribute to the 'preventative' or 'educational' models. (1)

In fact, aspects of health education may be covered in a wide range of subjects in schools. Contributions which different subjects may make at GCE and CSE level have been researched and reviewed by Jones & Hill (2). But Human Biology holds a central position among all others as a subject upon which much health education can be built, and if syllabuses also contain studies of the environment, they can add considerably to the total health-related package.

The Oxford Human Biology syllabus

This syllabus contains many areas that are health-related (3). Designed to meet *some of the needs and interests of students in contemporary society, to contribute towards their general education, and to help prepare them for responsible adulthood,* the examination sets out to measure, amongst other things, the attainment of the candidates in their ability to

1. **Apply knowledge to familiar situations, e.g. the need for hygiene.**
2. **Understand aspects of human behaviour referred to in the syllabus, which lead to good health.**

There will always be the problem of deciding upon material that is 'health-related'. Much of the syllabus could be regarded as health-related in the widest sense, but this decision will depend upon the attitudes of the teacher and the pupils. In this paper, 'health-related' is chosen in a narrow sense, and includes only those areas which can easily be identified as relevant.

Two sections of the syllabus are particularly health-orientated: Section 3 (*Health and disease*), and Section 4 (*Man's Place in the Environment*). The syllabus gives many opportunities for the good teacher to be informative, and to enable pupils to build value judgments.

Investigating the candidates' performance

A sample of 820 candidates' marks were analysed, and the results of Paper 2, which is less structured than Paper 1, are presented here. The paper, which is illustrated on page 52, consisted of eight equally-weighted questions, of which candidates were asked to attempt four. Questions 2c, 3d, 4d, 6, 7, and 8 were considered to be markedly health-related.

It is easy enough to write a prototype question on any topic, but it can be a considerable step from this stage to a 'useful' question, and a paper is likely to contain questions of different quality in this respect. In deciding the usefulness of the selected questions as indicators of 'health knowledge', it was necessary to apply two criteria:

1. *Facility* – how hard was the question to answer? (The higher the value, the easier the question.)*

*Facility can easily be calculated in a paper where all the questions are obligatory, by dividing the mean mark for the question by the maximum mark obtainable for that question. It can be expressed as a decimal or a percentage. Where there is a choice, as in this analysis, the calculation is more complex, as brighter candidates may choose particular questions. In Table 1, facility is calculated from the formula

$$F = Mp(\%) + Mq(\%) - (Mpq - Mq)\%$$

where Mp = mean mark for the paper as a whole
Mq = mean mark for the question
Mpq = mean mark for the paper for those candidates attempting that question (4).

Question	No. of attempts	Topic area	Mean mark	Facility (%)		Discrimination	
				Part	*Whole*	*Part*	*Whole*
1 a	229	Diffusion	10.5	60	41	0.32	0.62
b		Osmosis experiment	(25)	52		0.43	
c		Glucose movement		25		0.50	
2 a	613	Joints	12.3	53	51	0.29	0.44
b		Joint/bone damage	(25)	68		0.29	
c		Posture		26		0.28	
3 a	581	Pulse	11.2	45	45	0.41	0.56
b		Effect of physical activity	(25)				
		on pulse		72		0.32	
c		and breathing		31		0.47	
d		Exercise		41		0.42	
4 a	487	Alimentary canal	12.8	72	49	0.31	0.47
b		Digestion	(25)	62		0.36	
c		Secretion		47		0.32	
d		Energy and obesity		32		0.31	
5 a	159	Alleles	10.0	36	35	0.41	0.62
b		Mutation	(30)	33		0.37	
c		Sex linkage		30		0.44	
d		Continuous variation		9		0.24	
e		Fraternal twins		41		0.27	
f		Meiosis		31		0.24	
6 a	377	Ovulation	8.3	68	33	0.53	0.53
b		Menstruation	(25)	41		0.54	
c		Fertile part of cycle		15		0.38	
d		Contraception		26		0.31	
7 a	193	Sewage treatment	9.1	39	36	0.49	0.60
b		Water in body	(25)	35		0.49	
8 a	615	Smoking	10.9	60	44	0.29	0.50
b		Alcohol	(30)	47		0.30	
c		Stress		27		0.006	
d		Insulin		32		0.38	
e		Vitamin C intake		25		0.32	
f		Vaccines		29		0.25	

Table 1. The performance of 820 candidates in Paper 2 of the Oxford GCE O-Level in Human Biology, Summer 1984.

2. *Discrimination* – did the question differentiate satisfactorily between candidates of different quality? (The higher the value, the greater the difference in performance between strong and weak candidates.)

The discrimination figures given in Table 1 are obtained by using Pearson's correlation coefficient; anything higher than 0.3 is considered satisfactory, although parts of questions, bearing a small number of marks, may have to be less than this.

The 'health-related' questions

The most popular question of all was No. 8, and questions 2, 3, and 4 were chosen by over half the candidates. Analysis showed that questions 2, 3, and 4 were the easiest, and 5, 6, and 7 were the most difficult. Assuming that the examiners set a comparable standard of marking for all the questions, candidates may have found the 'hard' questions conceptually more difficult, or they may have been less well taught. Question 6, on the female sex cycle and contraception, was chosen by just under half the candidates, and in the sample was the least well done of any of the questions (mean mark 8.3 out of a possible 25). Candidates' knowledge of the fertile part of the cycle, and of the principles of contraception, was rather poor.

Health-related topics were variable in difficulty. Candidates found it hard to score highly on posture (2c), the fertile part of the cycle (6c), contraception (6d), and stress (8c), but they found the question parts on ovulation (6a) and smoking (8a) relatively easy. Overall there was no clear distinction between the health-related topics and the other questions in this respect, and this would seem to indicate that the health areas are as viable for examination as all the other areas in this paper.

The very low discrimination factor for question 8c (stress), with a facility of 27%, suggests that many candidates had not been taught about this topic, and the ones who managed to score best were both strong and weak candidates.

A 16+ health-orientated syllabus?

With the demise of the GCE in 1987 and the planned arrival of the GCSE in 1988, there will be different opportunities for teaching Human Biology. The new courses available should have more time for experimental work and discussion, and teachers will play an important role in the final assessment. If they wish to extend the areas of health within the new GCSE, no doubt some regional examination boards will be sympathetic about accepting a Mode III in Human or Social Biology, especially when a group of schools in an area can agree upon a syllabus.

The present doubt surrounding the introduction of the GCSE, and the pressures on teachers caused by industrial action, may make it difficult to contemplate such an initiative at the present time. But it is, potentially, a golden opportunity to promote the status of health education as an 'examinable' subject. I shall be most interested to hear from any teachers interested in taking the Human Biology/Health Education proposal a stage further.

References

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