abilities through the five years of a comprehensive for whom were simply not available. identified a new dilemma almost as soon as they Curriculum change has been central, and it is essays is that it spells out the difficulties and failures as well as the successes of six suming. At a time of falling rolls and lack of resources generally, it is enough to

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The Youth Training Scheme claims it will teach transferable skills to thousands of young people. But Harvey Goldstein and Alison Wolf argue that the Cockcroft Report — the basis of Government policy on mathematics teaching — skirts the issues.

The report whose sum total doesn't add up to much

THE Cockcroft report, Mathematics Counts, on the teaching of mathematics in schools, published by HMSO in early 1982, has become a reference point for curriculum development and research. So far, there has been little criticism, yet it is difficult to believe that mathematics educators are so united in their views that such a wide-ranging report is uncontroversial.

The report and recommendations embody important assumptions which are controversial, disturbing and unelaborated. The report tends to avoid controversy by restricting itself to general statements, rather than making concrete recommendations.

Mathematics Counts emphasises the importance of mastering crucial skills rather than gaining a smattering of many; and of relating school mathematics to application in the outside world. Our experience with young adults on Manpower Services Commission training schemes underlines how many young people are little able to cope with the mathematical demands of either employment or everyday life.

Two basic assumptions are implicit in many of Cockcroft's arguments and recommendations. One is that there is a relative level of attainment which is an abiding characteristic of a child, and unsusceptible to change during schooling, and the other is that there exists just one dimension of mathematics attainment.

Thus, in its recommendations for mathematics teaching, the report discusses at length different courses for pupils of "different levels of attainment." Insofar as the authors mean that, at a given point in pupil's careers teachers should avoid overloading them with half-grasped topics, or making them experience repeated failure, no-one could quarrel with them. But they do go further.

They advocate, especially for 14-16-year-olds, syllabuses for "the top 20s of the range of attainment in mathematics" for those who at present "achieve around CSE grade 4"; for pupils somewhere between these reference levels; and for "those pupils in about the lowest 40 per cent of the range of attainment" for whom "CSE is not intended." And they conceive of a unified 16 plus which would in practice solidify these divisions by encompassing only the first three recommended syllabuses for the top 60 per cent: and not that for the "lowest" group.

There is only a passing mention of the problems and possibilities of pupils switching between these syllabuses. Yet earlier performance provides only moderately good predictions of later performance, and so in practice demonstrably allows some freedom for relative attainment to change. Insofar as attainment is stable, this may have more to do with other factors such as an unchanging learning environment than any lack of pupil's potentiality for differential development.

As far as different components of mathematics attainment are concerned, we have searched the report in vain for a recognition that some children will be relatively better at some aspects of mathematics.

Yet the DES Assessment of Performance Unit (APU) chose to assess separately 13 sub-categories of mathematics attainment, and provides evidence in its published reports of differential sub-category differences, for example between boys and girls. For practical teaching purposes, pupils may often be ordered on a single average scale of mathematics "attainment". Yet, to conduct a discussion with the assumption that this is the only way of thinking about the teaching and learning of mathematics is not only theoretically unsound, it can also easily lead to educational rigidity.

The danger is obvious in the case of the report's recommendations for examinations. More subtle, but equally disturbing, is the way the committee's assumptions affect its own desired emphasis on mathematics applied to practical concerns. The report provides a core or "Foundation" list of mathematical topics; and stresses that it should be read with practical applications in mind and become the major component of the "syllabus of lower-attaining pupils". Higher attainers, by comparison, can go on to obtain "an appreciation of mathematics as a self-contained logical system". The view of mathematics as one-dimensional translates into simple theory and practical applications at one end and abstract mathematics at the other.

Translated into education practice, this is likely to mean the strengthening of the thread in our culture which assigns the abstract a higher status than the applied: and the view — already in evidence — that "practical maths" is really for the lowest 40 per cent. Yet the committee was aware, and our work with young trainees has underlined, how enormously widespread is the inability to apply quite simple mathematics to practical concerns. Do the report's authors appreciate how far their recommendations down - grade the importance of practical mathematics for the other 60 per cent.

The area of applying mathematics is one in which the report keeps to uncontroversial recommendations. For example, paragraph 457 says that "mathematics should be presented and taught in a context in which it will be applied to solving a variety of problems," and 471 says that "by 'embedding' the . . . syllabus in a wider context . . . mastery of the syllabus is enabled to develop."

Results from the APU show how difficult children find it to apply skills learned in one context to another — even to the extent of exhibiting different success rates when attempting similar arithmetic problems set out in different formats. We find that trainees frequently find it difficult to transfer school-taught mathematics skills to the work situation; and it seems likely that transfer between different areas of work will also prove difficult. For example, a 16-year-old may be able to apply complex manipulations to the task of working out a formal fraction. The same individual may be unable to apply these to the task of estimating quantities for a building job, or manipulating recipe quantities in a works canteen, or may be able to do one task, but not the other. This problem has been recognised for some time. To address it is to come face to face with how little we actually know about transferability, and about how best to provide pupils with the ability to apply, and generalise their skills. We certainly cannot assume that any and every "practical" application will advance understanding, any more than did the endless filling of baths from taps.

Yet these are the problems that Cockcroft skirts: and with reference not just to the "foundation list" but to the practical contexts appropriate to more advanced work.

One example is the use of statistical data where developments sponsored by the Schools Council and others have produced interesting materials. We welcome the report's call for further provision of such materials, but it is disappointing to find only a general exhortation to make use of "work in subjects such as biological science, geography."

It may seem surprising that a report can deliver what amounts to a swingeing indictment of current teaching practice, and be met with applause. The secret is to avoid precise directives. The danger, in this case, is that any context, suitable or otherwise, will henceforth be justified simply by referring to the report's recommendations: and they will be seen as an adequate blueprint for mathematics education rather than a stimulus to debate and research on educational fundamentals. That is not good enough; and could lead to a discrediting of "practical mathematics," rather than to a much needed improvement in our pupils' mathematical attainments.

Sally Brown discovers that answers to examination

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called enlarging parental choice, but I feel sure that what is brewing is something