

# Comments on the Report of the Working Group on 14-19 Reform

## Introduction

At a recent meeting, MEI staff discussed the Tomlinson Report and decided that we would channel our views through ACME. This paper outlines the points we made.

## The name “functional mathematics”

While initially uneasy about this name, and the possible interpretations that could be placed upon it in the absence of any definition of its meaning, we came round to the view that this uncertainty should be seen as an opportunity for the mathematics community to use its collective experience to ensure that the term is in fact interpreted appropriately.

We were particularly concerned that functionality should include addressing the current intellectual needs of those developing their thinking processes so that they can take more mathematics at a later stage.

## Does core mathematics mean less mathematics ?

Like many others, we are concerned by the possibility of large numbers of students doing core mathematics and nothing more, and of this becoming the standard provision in some schools. We would like to emphasise the danger. If the report is to result in less mathematics for many students, then the proposals are not fit for purpose.

## Assessment

### *Burden of assessment*

We believe that the proposals will result in an increased burden of assessment on teachers and less reliability in the results.

We perceive the proposals to be based on an underlying argument that since teachers frequently mark their students' work, the outcomes ought to be available for use within the overall assessment, thereby reducing the need for external assessment. Perhaps it is also felt that using the outcomes in this way is an act of support for the professional status of teachers. We see great danger in such arguments being accepted on the nod and would like to see them challenged in the ACME response.

It is our experience that teachers are, in general, able to rank their students accurately but that location is much more problematic. However, it is their location that will be reported on the proposed diplomas. This can only be done with any validity if a student's performance is compared with external criteria. If this is not going to be done by an external test, teachers will inevitably find themselves involved in increased bureaucracy checking each student's work against a list of required evidence, and submitting samples of the results for standardisation.

This approach to assessment is not only time-consuming but also fundamentally unsound. It is easy enough to get students to produce pages of correct work on a particular topic which you have just taught. It is quite a different matter to ensure that they can do it some months, or even weeks, later. Such assessment methods neither measure nor encourage true learning in mathematics.

However, our fears over such portfolio assessment go even deeper. We see that it could become a means of applying a straitjacket to teachers, with approved exercises and mark-schemes provided for them (either by QCA or the awarding bodies). This would further erode creativity in the classroom and provide the best teachers with a powerful reason to leave the profession. Such a course, consisting of a series of prescribed hoops to be jumped through, could also be guaranteed to put the best students off mathematics.

Paradoxically, we fear that the attempt to reduce the burden of assessment would actually have exactly the opposite effect, making it all pervading with no room for enjoyment or formative mistakes.

We hope that ACME will question the assumptions underlying the proposals in this respect. We believe them to be beguiling but false.

### *Underlying culture*

It is true that internal assessment can and does work in other countries but there are major differences to the environment in which it is taking place.

- Typically the school leaving age is 18 rather than 16.
- Students continue mathematics until they leave school.
- Consequently there is no need for way-stage certification (or diplomas) and so the purpose of internal assessment is more closely allied to advice on progress and possible future pathways.
- There are no league tables and teachers' prospects are less closely related to their performance.

The report pays no attention to the pervading culture within which internal assessment is to take place, and this jeopardises its conclusions. We are very sceptical as to whether it can work in this country under present conditions. We feel that the ACME response should say something along these lines.

### *Coursework*

Recently coursework has been found burdensome by both teachers and students and the report sees it in effect being replaced by an extended essay. There would seem to be a number of underlying assumptions.

- The extended essay and coursework will develop and assess the same skills.
- Coursework has no subject specific value.
- The amount of marking will be reduced.

In mathematics the first two of these assumptions are just not true. Take, for example, numerical methods at A Level. Because of the dependence on ICT and the nature of the work, the subject cannot be properly assessed in a timed, written examination; it needs some coursework. Sadly, the culture in this country is one in which anything that is not assessed is unlikely to be covered in everyday teaching. By contrast, where coursework has been done in A Level Mathematics, it has enriched the experience of many students, bringing fundamental processes such as modelling, sampling and the numerical methods into the mainstream learning of the various branches of the subject.

The third assumption probably would be true for mathematics teachers because few extended essays would be based in mathematics. However it probably would not be true generally as a great deal of time would be needed to mark all the students' essays.

Thus the extended essay risks maintaining the burden of assessment while undermining curriculum designs that allow important concepts to be afforded a natural place in the routine development of mathematics. We would like to see the report's assumptions in this area challenged in the ACME response.

## **Grading**

We have grave reservations about the proposal to extend A Level grading to A\* and A\*\*. The correct approach in mathematics should be to encourage talented students to take Further Mathematics. Extending the grading would have several deleterious side-effects.

- It would encourage grade inflation. Within a short time the new grade A would be the A\*\*, and the old grade A would be no more than a C.
- It would constrain the grading so that at the top end the difference between grades would be a measure of candidates' avoidance of careless mistakes rather than genuine difference in standard; at the other end the grade E would be awarded on pitifully low marks. The second of these effects can be seen in current GCSE grading with grade C being awarded on 14% on Edexcel's Higher Tier papers this summer.
- Mathematics is already more harshly graded than other subjects with a consequent lack of students continuing the subject after GCSE. The effect of significantly harder questions on mathematics papers will be to deter even more students, so that they take subjects where at least they can understand what the questions on the papers mean.

We would like to see these issues explored in the ACME response.

## **Credits**

The proposed diplomas are to be credit-based. This poses immense dangers for mathematics and, indeed, for other intellectually demanding subjects.

As an example, a student may do core mathematics but decide not to do main learning mathematics because it will be easier to pick up credit from main learning in another subject; the student's school, under pressure from league tables, may well agree that this is a sensible way of maximising the student's chance of a successful outcome, and deter the student from mathematics.

Any credit system, like league tables and the UCAS tariff, which applies the same rating system to different subjects is bound to disadvantage those subjects which are intrinsically more demanding. So the proposals will disadvantage not only mathematics but also subjects like physics and chemistry that are often taken together with mathematics.

We see this as a very important point.

## Quick wins

We are appalled by the suggestion that “quick wins” are available by instantly redesigning GCSE and A Level. As a result of this proposal, there is now serious talk of new A Level mathematics specifications being in schools in 2006 for first teaching in 2007; that would require development work to begin in the next few months. Have we learnt nothing from past fiascos that have resulted from hurried curriculum changes ? Too often in this country changes are proposed without any understanding of the design, delivery, assessment and cost implications

A completely new mathematics A Level is now in its first term of teaching and there is considerable optimism that it will result in better uptake and learning. Even to suggest meddling with it at this stage is simply irresponsible. It needs 4 or 5 years to bed down and then a proper evaluation. A change from 6 to 4 modules could not just be imposed on it; such a change would mean tearing up what we now have and starting all over again.

At GCSE the situation would, if anything, be even worse since any changes would require development of a Functional Mathematics syllabus, something that needs time for thought and trialling.

If applied to mathematics, the quick win proposals in the report have the potential to be immensely damaging. We trust that ACME will do all in its power to ensure that this does not happen.

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