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Metadata Record: https://dspace.lboro.ac.uk/2134/1669

Publisher: © Loughborough University

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ASSESSING DESIGN AND TECHNOLOGY IN THE NATIONAL CURRICULUM

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1. The present form of assessment, at least for public reporting of educational attainment, or the lack of it, was mainly inherited from an educational system where few attended school until 16 and where certain assumptions, rightly or wrongly, were made about the value system to which they subscribed. The end-weighting of conventional examination presupposed a deferred gratification model of activity, a justified assumption for those who, like the recipients of this paper, had shown that they could thrive over such hurdles. But what of the rest?

The coming of the Certificate of Secondary education (CSE) at the beginning of the 1960's gave an opportunity for many teachers to take hold of the examining system and introduce a good deal more relevance and a far greater element of continuous assessment. In the "technical studies" field, course work assessment and invigilated design-and-make forms of assessment grew in influence, although it should be noted that the Associated Examinations Board had earlier introduced "Design and Realisation" forms of examining under the aegis of GCE "O" level. Still, however, the end-weighting of the examination system predominated, with a minority of pupils seeing through courses in most curricular subjects so as to obtain any certification of their success. Meanwhile, undergraduates with the Open University could already profit from credit accumulation as a way of celebrating success en route to a degree.

Considerable emphasis was given, in 1984 to the need for short-term goals in education by the publication of "Improving Secondary Schools"(1), often known as the "Hargreaves report" which had as one of its major recommendations the need for better motivation of pupils so as to encourage better school attendance, especially among working-class children and to enhance the learning process for those who did continue with schooling. At that time, the single examining system at 16+ was reaching reality in the form of the General Certificate of Secondary Education (GCSE), having been set in train by the Waddell report (2) as early as 1978. The development of GCSE by the various examining Boards, now evolving towards Groups, saw considerable debate about the need for differentiation, and about ways of ensuring it, however, some of the methods in some subjects to achieve differentiation continued with the need to separate out sheep from goats before sitting what was ostensibly the same examination. "Differentiation by outcome" tended to be the route chosen in the CDT field. It is fascinating to reflect that with all the concern expressed for Raising the School Leaving Age in the 1960's (ROSILA) far more attention was paid to providing new accommodation for practical and vocationally orientated curricular offers than concern for motivation through new forms of assessment.

For some years there has been the growth of the movement to produce "profiles" which can say a good deal about the general development of
pupils as individuals, can have a powerfully motivating effect and at the same time give potential employers and the "gatekeepers" of the next phases of education valuable evidence. But about which pupils?

Profiling and Records of Achievement tend to be most valuable for pupils who are unlikely to do well at levels of attainment for which employers seek fairly objective evidence, and which will lead towards entry to Further and Higher Education. Until the publication of the report from the Task Group on Assessment and Testing (TGAT)(3) only the emerging Graded Assessment schemes being developed had shown the way towards assessing progress in subject areas that could lead to recognition for certification in a way that related to a National form of certification, yet was formative and offered aiming marks at regular intervals.

2. Teacher assessment forms the predominant feature of the TGAT proposals, with current news vacillating between 70% and 80% weighting compared with 30% or 20% given to Standard Assessment Tasks. We have to await the "Orders" for assessment to judge which will be right. In the meantime, debate continues about the articulation of the implementation of TGAT and the survival, if any, of GCSE. TGAT states, at paragraph 107:

"...We recommend that GCSE should be retained in its present form until the national assessment system is initiated at earlier ages."

The implication for Design and Technology is that with significant curricular change as defined in the programmes of study in Lady Parkes' Final Report,(4) and a radically changed form of assessment as set out in TGAT, the most familiar part of GCSE to remain would be the four initial letters of the title.

It is arguable that Professor Black and his group saved the profession and its pupils from a far worse fate. Could it be that earlier pronouncements about "testing" really meant just that, a cheap recall form of fact testing, which could well have destroyed CDT with its centrality for open-ended project work? But the implication for teacher assessment, that is by teachers, (not of teachers, although such a thought as the latter should not be too easily set aside,) in TGAT needs to be seen as a thoroughly prepared form of assessment if it is really to fit recognisable National criteria and thus lead to credibility as a National qualification. Many CDT teachers and departments have experimented in recent years with the development of home-grown forms of assessment. They are in most instances far better than what went before, eg., the award of "6 for a bookrack project" where the "6" meant just what it subjectively did to the teacher who awarded it and was perceived by the pupils as no doubt a fair marker for the rank order in that particular pupil group. But what relevance would it have outside the school, or even within that school in three years time, with a different group of pupils? And if it were to lead to a nationally recognised form of certification, what would be the rules of aggregation so as to permit the summation of many such awards to give a final recognition of achievement?

How then to set up criteria? A simple way would have been to define a
carefully prescribed course, with predictable outcomes for which a simple marking schedule could be arranged. This would be familiar to many older "technical studies" teachers from the days of woodwork, metalwork and engineering workshop theory and practice. Indeed, many vocationally orientated syllabuses today still operate in this way, which can work well if the outcomes of the course are simply to be pre-definable skills and processes. It is the open-endedness of CDT that makes for difficulties of assessment, but at the same time provides the rationale for the subject area and the transferable skills that, paradoxically by comparison with much trade training, make it attractive to many employers.

At the risk of oversimplifying, Graded Assessment in CDT, as developed by a team from ILEA, working in conjunction with Essex and the London East Anglian Group for GCSE has won approval from the Schools Examinations and Assessment Council (SEAC) in providing an equivalent yet alternative route for pupils to gain certification in CDT subjects by the following process:

The National Criteria specification for CDT subjects provides a broad framework for the assessment of Design skills and knowledge which students demonstrate in the context of open-ended practical project work.

The assessment of design skills in the GACDT scheme takes place under two headings of:

PRODUCT DESIGN which follows the familiar pattern of designing, making, testing and evaluation own creation and;
PRODUCT ANALYSIS which provides the assessment structure for critical appraisal skills, the focus of which are the products designed and made by others.

The assessment of knowledge in GACDT is arbitrarily separated from design skills and is also divided into two main headings of:

COMMON CORE which is about the assessment of the National Criteria prescribed core knowledge of energy, control, Design and society and materials common to the three endorsement titles and

SUBJECT RELATED SKILLS & KNOWLEDGE which provides flexibility for schools to elect extra areas of skill or knowledge, suiting the type of course emphasis they are able to offer in CDT, eg, D&R; D&C; TY.

Each of the design skill and knowledge areas listed above is sub-divided into "blocks". These have been named to convey the important skill or knowledge aspect being assessed, eg: Reseaching. Pupil competence at each block is compared with a set of five progression "can do" criteria statements which describe degrees of performance. These range from basic achievement (criterion 1) through to descriptions of full competence (criterion 5). It is interesting to note that five stages were the most that experience in the trial schools showed could be discriminated.

Rules of aggregation are set out to ensure a spread of demand and, to
equate with each of the ten levels of GACDT, a number of blocks to have been covered at an increasing level of sophistication, so that to reach level 10, which describes the best level of GCSE certification, all blocks have to have been covered and a high degree of ability and knowledge displayed in so doing. The notion of "mastery" is employed, that is, the pupil either can or cannot accomplish one of the criteria statements, there is no allowance for half-way. Statements of Attainment are awarded by LEAG when requested by the school, to relate to each level, and the whole pupil record is "traded in" for a GCSE certificate at the point when a pupil leaves school, provided that the levels obtained get on to at least the most humble GCSE equivalent.

At first sight, the scheme is forbidding because of its apparent complexity. But teachers in the trial schools find that once the original pain barrier has been gone through, life becomes more straightforward with growing familiarity. The process is set up using a course and project planner, operating in the manner described above, after which the projects which are necessary to produce a course can be analysed and assembled using a course planner, again using the overall scheme outlined above. One of the major advantages to be gained is the necessary check on and analysis of progression, so seriously lacking in many CDT programmes. The apparent complexity of the scheme at first sight is actually related with the flexibility of the scheme: it would have been far easier to prescribe a fixed course.

The TGAT report commends Graded Assessment as being very much in line with its own recommendations, and whilst it is not possible to claim at this point that the "Orders" for assessment of Design and Technology in the National Curriculum will require teachers to use GACDT, there can be no doubt that those who have gained familiarity with it will be at a considerable advantage. For the moment, moderation is provided by 'link teachers' in every department using the scheme and all schools can be visited by assessors, employed by the Examining Group. As assessment develops, SAT's will have an important moderating influence.

3. Standard Assessment Tasks (SAT's) are proposed as the method by which national moderation could be achieved. Clearly they have potential as a defining influence for the National Curriculum as the centrally imposed yardstick of standards. At the time of writing, we await the announcement about who will be commissioned to construct SAT's and it is understood that there will be three needs: some to use in the first round of reported assessment, some for in-service training purposes and some as a back-up stock so as to be able to replenish the supply rather than permit some teachers to encourage children to "practise" SAT's rather like the process of flogging through past examination papers, so familiar to many of us. Some of those in production already for Key stage 1, to be used at around seven years of age are beginning to emerge. The most attractive of them are project based, making it possible to review attainment in a cross-curricular manner. It would be very helpful if those produced for "Design and Technology" in the National Curriculum for Key stages 2, 3 and 4 could be of such a kind so as to enhance open-ended project
work rather than threaten us all with simplistic check-lists that would dominate assessment without demanding any real coherence. Whilst the Assessment of Performance Unit (APU) was set up to enable cohort rather than individual assessment, it will be interesting to see whether lessons learned from APU success could inform the production of SAT's through the establishment, quickly and cheaply, of a real design situation into which children could be put whilst performing SAT's rather than risk degeneration into cheaper pencil-and-paper tests.

The 'Final' Report on D&T says, para. 4.10: "We do not favour a "bank" of externally established standard tasks which may limit the pupil's chance to identify needs and opportunities"... elsewhere at 4.5: We have emphasised that this is integrative, meaning that the various aspects, (exploring, modelling, appraising) are continuously interacting with and influencing each other. It is important therefore that any assessment instrument respects and does not distort the nature of this activity"

Clearly, this policy would meet with approval from all CDT teachers, it is nevertheless necessary to have an analytical framework to establish project work at appropriate levels and to ensure progression at an appropriate rate.

An important contribution to the debate from the APU team at Goldsmiths' College says: "If real measures of capability are to emerge from SATs - as we believe they can - they must not be seen as isolated packets of capability. SATs may be focused but they should not be hermetically sealed." (6)

4. The issue of progression alluded to above is vital. Many pupils in years 1-3 (N.C.years 7,8,9) do more work as time goes on, but questions could be raised about whether any further intellectual challenge is made upon them. An analytical approach to course planning will be vital, partly to help ensure smooth transfer from school to school at around age 11. The considerable demands of the Final report will imply that no time will be available for wasting.

5. The question of where the time is to come from for assessment will have occurred to all teachers. It is not possible to set this worry aside, but three main suggestions can be made to help:

5.1 If improved course and project planning as outlined above to ensure progression became more common, a good deal of increased intensiveness in the learning process could release considerable time for pupils and teachers.

5.2 Assessment has been found in the trial schools for Graded Assessment necessarily to be part of the teaching and learning process and thus has to take place in timetabled time. It has to be recognised that workshops are potentially dangerous places, and this aspect of the problem cannot be set aside, but nevertheless, experienced teachers find it possible to set a minute or two aside to concentrate with a pupil on what is to be achieved in a project and what has been achieved. It may well be that for probationary teachers, where suitable support systems are not already available,
they will need setting up as a matter of urgency. It is helpful to consider just how much assessment is really required during a five-year period: it is not all confined to a short period, although some element of end-weighting is inevitable.

5.3 Information Technology can come to the help of the teacher through the provision of the Optical Mark Reader. This device, when linked to a computer of the kind commonly found in schools, can translate an A4 sheet of paper on which squares have been blocked in to signify a pattern of attainment in course elements for a teaching group into a series of written statements of attainment. It must again be emphasised that these aspects of attainment will not have been arrived at in isolation, but as elements in an integrated designing and making project. None of this relieves the teacher from the responsibility to make a professional judgement, but some of the hack-work of report-writing can be eliminated. Alternatively, attainment can be directly keyed into a computer, loaded with a suitable program. The output from such a program can be integrated into a pupil's record later.

6. One of the principles of TGAT resides in the notion of unlatching age of the pupil from attainment. There are, of course, difficulties associated with this in terms of class management and any feeling of labelling on those pupils inevitably left behind. However, from the point of view of assessment, experience in trial schools with Graded Assessment demonstrates that individuals or small groups can be working at different conceptual levels, being assessed in terms of their own achievement as necessary.

7. At the time of writing, debate continues at an influential level about the articulation of TGAT and GCSE. It has been demonstrated that a form of assessment closely related to TGAT has, for science and for CDT, found a way forward without formal end-loaded examination, nor with papers sent in from outside. All this takes place in an environment where some still feel that public confidence demands conventional examinations. The Final Report sets out a suggestion for Key Stage Four which seems very much like a Core-plus-options recipe, with safeguards to ensure a variety of experience. Such an arrangement could be assessed using the experience of graded assessment, even if a two-plus-two teaching periods arrangement were proved necessary. For the moment, some of the subjects areas who could potentially contribute to Design and Technology in the National Curriculum have not developed Graded Assessment schemes, but there is no reason why the scheme should not be extended so as to make this possible, given that any contributor has to fit the Attainment Targets which are very familiar to CDT teachers. Another challenge that remains, of course, is to modify the scheme to take account of Primary Design and Technology: no insuperable problems seem to exist here, although it has to be noted that any circumstances which mean that children who do not speak the same language as their teacher are at a serious disadvantage where assessment, particularly negotiated assessment, is concerned.

8. Any attempt to register attainment is bound to face, at some stage, the question "what do we mean by more difficult than?" In a subject like mathematics, there would be general agreement that this
is about encountering more difficult concepts. Few would disagree that simple equations are less demanding to solve than quadratics, and so on. But in a subject which is about analytical skills such as designing in a technological context, whilst knowledge is highly relevant, and not to be divorced from skills, the matter is less obvious. After long debate, the GACDT developers came to the conclusion that in Design and Technology, increasing difficulty was mainly about the growing demands of coping with a problem that grew in complexity, rather than one in which just the knowledge component became more difficult. A crude analogy would be that in juggling, the number of oranges to be kept in the air at any one time is in direct proportion to the level of difficulty. Less crude might be a comparison with a complex molecule whose complexity was not just about the nature of the atoms which comprise it. A highly demanding "A" level D&T project is one where the student has to manage a considerable collection of aspects: some of the individual skills and knowledge items may be simple. So the issue of discrimination of levels has to be about a gradient in the amalgam of skills and knowledge that characterises design and technological capability. If at the outset, assessment in design and technological capability seems forbidding, this is why.

ACKNOWLEDGEMENTS
Chris Langley and Chris Fowler, leaders of the Graded Assessment team over the years and their colleagues, teachers in the trial schools, officers of LEAG who administer the scheme.

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