RAISING ACHIEVEMENT THROUGH FORMATIVE ASSESSMENT IN DESIGN AND TECHNOLOGY

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by

Valerie June Pridmore

Department of Education, Brunel University

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Abstract

This study explored the use of assessment procedures within Key Stage 3 design and technology and identified current practice and the key features that contribute to the raising of achievement.

Assessment of design and technology has traditionally focused on the mastery of practical skills and the quality of the finished product and this practice has continued despite the considerable changes in the curriculum, given the subject is now a National Curriculum foundation subject demanding assessment against level descriptions designed to assess capability. There has been little research in the field of assessment in design and technology with no real substantive work based on generic research into formative assessment. Research findings in the field of formative assessment identifies that achievement can be raised through the use of formative assessment strategies.

Three in-depth case studies of schools where there has been a declared focus on raising achievement through assessment and where pupils' attainment in design and technology is higher than in their other subjects were carried out. Four data collection sources were used; documentation, archival records, interviews and classroom observations including work sampling.

The evidence gathered from the three schools has identified successful assessment procedures and the key features that contribute to raising achievement in design and technology. The data generated show that where there was a whole school approach pupils were more involved in the process and had a greater understanding of their own ability and their potential. At department level there was a commitment to the process, where all ascribe to the procedures and strategies and teachers had a clear understanding of design and technological capability. Other dimensions identified included: good quality documentation that was used consistently across the department and curriculum planning, where assessment was an integral part of the units of work and individual pupil needs were addressed. Assessment as an on-going process was exemplified in practice and effective feedback strategies were identified.

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CONTENTS

PAGE

ABSTRACT i
AKNOWLEDGEMENTS ii
CONTENTS iii
LIST OF FIGURES viii
ACRONYMS and SHORTFORMS x

CHAPTER 1

INTRODUCTION

THE CONTEXT OF THE STUDY 1
- The Role of the LEA Advisory Service in School Improvement 1
- The Local Perspective 1
- The National Perspective 2

RATIONALE 3
SUMMARY 5

CHAPTER 2

DESIGN & TECHNOLOGY and its ASSESSMENT (Institution Focused Study)

THE NATURE OF DESIGN & TECHNOLOGY 7
ASSESSMENT 10
- Purposes of Assessment 10
  - The Tensions between Formative and Summative Functions of Assessment 11
  - Reconstructing Assessment 12
- Research Studies 14
  - Evidence from Research 14
  - Evidence from Current Practice 16

ASSESSING DESIGN & TECHNOLOGY 17
- Developments in the Assessment of D&T 17
- The Use of Assessment Data to Raise Achievement 20
  - Target Setting 21
  - Value Added 22
  - Using and Analysing Data 22
- Research Studies in the Assessment of D&T 23
  - Examples in Evidence 24
  - Small Scale Research Projects 27
  - Evidence from OFSTED Inspections 28
- School Focused Curriculum Initiatives 29
- Resource Materials 30

Guidance and Support Materials from Statutory Bodies 31
Materials from Professional Associations 32
Commercial Resources 34
Support for Pedagogy 35
CONCLUSIONS 35

CHAPTER 3

RESEARCH DESIGN

INTRODUCTION 37
METHODOLOGY 37
Rationale 37
Components of the Research Design 38
Pilot Study 38
Conceptual Framework 40
Case Questions 40
Sample Strategy 42
Sources of Evidence 43
Quality of Research Design 44
METHODS 44
Literature Review 44
Data Collection Techniques 45
Document and Archival Source Review 45
Interviews 45
Observations 47
DATA ANALYSIS 49
Analytic Strategy 49
Analysis during Data Collection 50
Preparation for Analysis 51
Contact Summary Form 51
Document and Archival Sources 51
Processing the Interviews 52
Processing the Observations 52
Development of Coding Categories 52
Revising Codes 54
Defining Codes 54
Analysis on Completion of Data Collection 54
Data Display 54
Constructing the Matrix 55
Drawing and Verifying Conclusions 55
Drawing Conclusions from the Matrix Data 55
Testing the Findings 56
Triangulation 56
Quality of Conclusions 56

CHAPTER 4

THE CASE STUDIES

CASE STUDY 1 – SCHOOL C 57
Departmental Documentation 58
Policy Documents 58
Pro-formas 60
Information Documents 61
Scheme of Work 62
Departmental Pupil Data and Records 63
The Head of Department's Perspective 64
The Teacher's Perspective 66
The Pupils' Views 67
The Lessons 71
Work Sampling 72
DISCUSSION 73
CASE STUDY 2 – SCHOOL H 79
Departmental Documentation 82
Policy Documents 83
Pro-formas 86
Information Documents 87
Scheme of Work 88
Departmental Pupil Data and Records 89
The Head of Department's Perspective 90
The Teacher's Perspective 93
The Pupils' Views 94
The Lessons 97
Work Sampling 98
DISCUSSION 100
CASE STUDY 3 – SCHOOL T 105
Departmental Documentation 107
Policy Documents 107
Pro-formas 109
Information Documents 111
Scheme of Work 112
Departmental Pupil Data and Records 113
The Head of Department's Perspective 113
The Teacher's Perspective 116
The Pupils' Views 118
The Lessons 121
Work Sampling 122
DISCUSSION 123
STRATEGIES CONTRIBUTING TO THE RAISING OF ACHIEVEMENT 128

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

CONCLUSIONS: INDIVIDUAL SCHOOLS 132
School C 132
School H 133
School T 134
CONCLUSIONS: ACROSS THE SCHOOLS 134
CONCLUSIONS: KEY FEATURES OF RAISING ACHIEVEMENT THROUGH ASSESSMENT 139
General Characteristics 139
Assessment Documentation 140
Policy Documents 140
Guidance Materials 140
Recording Pro-formas 140
Planning 141
Long-term Planning 141
Medium-term Planning 141
Short-term Planning 141
Assessment as an On-going Process 141
Feedback 142
Individual Target Setting 142
Using Assessment Information to Monitor Progress 142
End of Key Stage Assessment 142
IMPLICATIONS FOR DEVELOPING PRACTICE 143
OUTCOMES OF THE STUDY 144
Impact on Policy and Practice 145
REFLECTIONS 145
FUTURE RESEARCH 145

APPENDICES

1. THE ORIGINS OF DESIGN & TECHNOLOGY 147
2. NATIONAL CURRICULUM STATUTORY ORDER FOR DESIGN & TECHNOLOGY 150
3. THE CONTEXT OF DESIGN & TECHNOLOGY EDUCATION AS DEFINED BY THE APU 153
4. NATIONAL CURRICULUM – D&T LEVEL DESCRIPTIONS 155
5. PILOT CASE STUDY – SCHOOL A 157
6. OVERVIEW OF THE RESEARCH DESIGN 176
7. EVIDENCE SOURCES USED TO SET THE STUDY IN CONTEXT 177
8. DOCUMENTS AND ARCHIVAL RECORDS 178
9. TECHNIQUES FOR INTERVIEWING & OBSERVATION 179

10. INTERVIEW FOCUS: HEAD OF DEPARTMENT (DRAFT & REVISED VERSIONS) 181
11. INTERVIEW FOCUS: TEACHER (DRAFT & REVISED VERSIONS) 184
12. INTERVIEW FOCUS: PUPIL PERSPECTIVE (DRAFT & REVISED VERSIONS) 186
13. OBSERVATION CHECKLIST AND OBSERVATION PRO-FORMA 188
14. CONTACT SUMMARY FORM 190
15. DOCUMENT EVALUATION CHECKLIST 191
16. ARCHHIVAL SOURCE EVALUATION CHECKLIST 192
17. DOCUMENT SUMMARY 193
18. REVISED CODES AND DEFINITIONS 194
19. MATRIX FORMAT USED FOR THE MAIN STUDY 195
20. SCHOOL H OVERVIEW OF PUPIL TRACKING & TARGET SETTING 196
21. SCHOOL H MARKING & FEEDBACK POLICY (extract) 197
22. SCHOOL T EXTRACTS FROM THE OFSTED INSPECTION REPORT RELATING TO ASSESSMENT 198
23. SCHOOL T BENCHMARK PORTFOLIO GUIDANCE 199
24. SCHOOL T ASSESSMENT GUIDANCE FOR A UNIT OF WORK 201
25. SCHOOL T UNIT OF WORK: RESISTANT MATERIALS 202

REFERENCES 203

LIST OF FIGURES

CHAPTER 2

PAGE

2.1 Model of technology education 8
2.2 The APU model of interaction between mind and hand 9
2.3 The four purposes of assessment proposed by TGAT for the national assessment framework 11
2.4 Five key factors identified through the research of Black and Wiliam 15
2.5 Constraining factors identified by the Assessment Reform Group 15
2.6 Issues identified by Weedon and Winter to be addresses before assessment for learning will be successful 16

CHAPTER 3

3.1 Diagrammatic overview of the research design – conceptual structure 41
3.2 Case framework 42
3.3 Validity tests 44
3.4 Generic codes developed for the main study 54
3.5 Code Definitions (extract) 54

CHAPTER 4

SCHOOL C

4.1 Assessment and Recording Policy extracts 59
4.2 Extracts from marking Policy 60
4.3 Part Student Record Card – Year 7 61
4.4 Extract from Key Stage 3 Attainment Targets for D&T 61
4.5 Unit of Work Framework 62
4.6 Exemplar of teacher annotation of overall judgement of Level awarded 63
4.7 Extracts from Pupil Discussions 68
4.8 Extracts from Pupil Discussions 68
4.9 Extracts from Pupil Discussions 69
4.10 Extracts from Pupil Discussions 69
4.11 Extracts from Pupil Discussions 70
4.12 Extracts from Pupil Discussions 70
4.13 Extracts from Pupil Discussions 71
4.14 Examples of questions posed by Teacher C 71
4.15 Teacher comments extracted from Work Sample 72
4.16 Teacher comments extracted from Work Sample 72
4.17 Teacher comments extracted from Work Sample 73
4.18 Extract from Year 9 Food Technology Unit of Work 78

SCHOOL H

4.19 Extracts from OFSTED Report 80
4.20 School devised definitions of Level sub-divisions 81

4.21	Statistically valid basic baseline: extract from KS3 Minimum Target Levels	82
4.22	Extracts from Assessment, Recording and Reporting Policy	83
4.23	Extract from Assessment, Recording and Reporting Policy	84
4.24	Extract from Assessment, Recording and Reporting Policy	84
4.25	Marking and Feedback Policy: Principles	85
4.26	Extract from Marking and Feedback Policy	86
4.27	Section of a Year 7 D&T Assessment Sheet	86
4.28	Extract from Designing and Making Grid showing strands of the ATs with expectations for levels and linked with PoS	87
4.29	Unit of Work Framework	88
4.30	Extract from Unit '*Going Public*' Characteristics of Level 4	89
4.31	Example (part) of KS3 Tracking Sheet	90
4.32	Extracts from Pupil Discussions	94
4.33	Extracts from Pupil Discussions	95
4.34	Extracts from Pupil Discussions	95
4.35	Extracts from Pupil Discussions	96
4.36	Extracts from Pupil Discussions	96
4.37	Example of Teacher H using the open questioning technique and involving two pupils	98
4.38	Comments extracted from Work Sample	99
4.39	Extracts from the 'Teacher Comment' boxes on a D&T Assessment Sheet illustrating the improvements in comment writing	100

SCHOOL T

4.40	Assessment strategies listed in the 'Actions' column of the Departmental Development Plan	106
4.41	Extract from school PANDA Report	107
4.42	Extract from the Assessment and Marking Policy	108
4.43	Extract from the Assessment and Marking Policy	109
4.44	Example of D&T KS3 Record Profile	110
4.45	Performance Management Targets for 1999	111
4.46	Extract from the Coursework Grading Guidance	111
4.47	Extract from Guidance for Assessing D&T Capability	112
4.48	Extracts from Pupil Discussions	118
4.49	Extracts from Pupil Discussions	119
4.50	Extracts from Pupil Discussions	119
4.51	Extracts from Pupil Discussions	119
4.52	Extracts from Pupil Discussions	120
4.53	Extracts from Pupil Discussions	120
4.54	Example of Teacher T exploring problems that a pupil had encountered during the previous lesson, using the open questioning technique involving several pupils	122
4.55	Extract from a moderated Year 9 Unit of Work illustrating teacher annotation of evidence of Level 5	123
4.56	Strategies used by schools to raise achievement	129

CHAPTER 5

5.1	Summary of the shared views of department heads and teachers in the case study schools	138

ACRONYMS and SHORTFORMS

AAIA	Association of Assessment Inspectors and Advisers
APU	Assessment of Performance Unit
AT	Attainment Target
CAD	Computer aided design
CAM	Computer aided manufacture
CAT	Cognitive Ability Test
CDT	Craft Design and Technology
CEO	Chief Education Officer
CPD	Continuing professional development
D&T	Design and Technology
DATA	Design and Technology Association
DES	Department of Education and Science
DFE	Department for Education
DfEE	Department for Education and Employment
DMA	Design and make assignment
EDP	Education Development Plan
FPT	Focused practical task
GCSE	General Certificate of Secondary Education
HMCI	Her Majesty's Chief Inspector
HMI	Her Majesty's Inspectorate
ICT	Information and Communication Technology
INSET	In-Service Training
KS3	Key Stage 3
KS4	Key Stage 4
LEA	Local Education Authority
LED	Light emitting diode
MTL	Minimum target level
NAAIDT	National Association of Advisers and Inspectors in Design and Technology
NC	National Curriculum
NCC	National Curriculum Council
OHMCI	Office of Her Majesty's Chief Inspector
OFSTED	Office for Standards in Education
PANDA	Performance and Assessment Report
PoS	Programme of Study
QCA	Qualifications and Assessment Authority
QTS	Qualified teacher status
RCA	Royal College of Art
SAT	Standard Assessment Task
SCAA	School Curriculum and Assessment Authority
SEAC	School Examinations and Assessment Council
SEN	Special Educational Needs
SMART	Specific, measurable, achievable, realistic and time related
STAMP	Setting targets and monitoring performance
TEP	Technology Enhancement Programme
TERU	Technology Education Research Unit
TGAT	Task Group on Assessment and Testing
TTA	Teacher Training Agency
VR	Verbal Reasoning
VRQ	Verbal Reasoning Quotient
WO	Welsh Office

CHAPTER 1

INTRODUCTION

This study explores the use of assessment procedures within D&T, focusing on KS3, the first three years of secondary schooling; to identify the key features of assessment practice that contribute to the raising of achievement and to exemplify current practice. The outcome objectives of this study have been devised in order to:

- establish the aims and principles of assessment within D&T;
- identify the range of assessment strategies planned and used;
- identify and promote best practice;
- provide guidance for teachers on assessment procedures, that contribute to the raising of achievement.

The Context of the Study

Role of the LEA Advisory Service in School Improvement

Attention in recent years has focused on developing a clear vision for the self-improving school and how best it can raise standards of teaching and learning. "They [the LEA] also have an important role in supporting school improvement..." (DfEE 2000b, p.3). The advisory service has a major part to play in this process as exemplified in the LEA's *EDP* (Buckinghamshire County Council 1999), which provides a blueprint for education within the County and guides the work of the advisory service. It lists the priorities for the advisory service and specific actions that will help the LEA to work with schools to raise standards of achievement. The annual report of the Chief Adviser identifies priorities for action to be considered and addressed by governors and their schools.

The Local Perspective

The *Report of the Chief Adviser* (Buckinghamshire Advisory Service 1999) noted that at Key Stage 3 teachers' use of assessment to help plan pupils' future work was an issue for one school in seven; and across all key stages, identified that improvement was needed in two main aspects of assessment:

> The use of day to day assessment (and marking) to influence planning and teaching, and help pupils understand how to improve their work.
>
> Tracking and measuring pupils' progress systematically over time and using that information to help raise standards.
>
> (Buckinghamshire Advisory Service 1999, p.15)

With specific regard to D&T the report recognised that the quality and use of assessment had improved but still remained a relative weakness. "Teachers do not make enough use of the information they gain from assessment to help individual

pupils to improve and to plan future work." (ibid. p.46) The points raised to consider for D&T includes one related to assessment and asks of schools, "Do the assessment procedures used for design and technology give a clear view of the attainment and progress of all pupils? How is this information used - both to plan future work, and to help pupils improve?" (ibid. p.47).

The *EDP* has seven key priorities for school improvement, and these are linked by the theme 'recognising and disseminating best practice'. Priority 2 focuses on the quality of teaching and of the six activities identified (through OFSTED reports, advisory monitoring and review visits and LEA data) one is concerned with developing teachers' use of assessment in teaching. This study addresses the identified needs of this aspect of the *EDP* with specific reference to D&T.

The local perspective has been informed by my work as a specialist adviser and inspector of D&T which has provided an insight into a significant number of schools, giving an overview of the strengths and areas for development in individual schools within the LEA. The range of tasks has been varied, monitoring and reviewing D&T departments, pre and post OFSTED work, advice and guidance, and staff development. This work has provided the opportunity to observe first hand the work of many different D&T departments, ranging from the outstanding to those who have a significant number of weaknesses. The LEA dimension has been highlighted through reference to the LEA three year *EDP* and the annual *Report of the Chief Adviser*, based on LEA data, OFSTED report findings and advisory service work in schools.

The National Perspective

The national perspective, is drawn from current debate in the specialist journals, the few relevant research projects (see Chapter2), first hand experience working as an inspector on behalf of OFSTED and as a consultant adviser in other authorities and the issues raised by HMCI year on year in the annual report on inspection findings. The assessment of D&T has featured consistently in the main findings of OFSTED reports as an area of weakness. For example the Key Issues (1996) highlight:

> Assessment practice needs to be consistent across departments. There is a continuing need for staff to agree the purposes of assessment, the range of assessment strategies available and the use of assessment to plan and evaluate work. For example, few schools analyse the results of assessments to identify areas of strength and weakness. In addition, many teachers still assume that the assessment in design and technology only requires them to mark projects, rather than to make judgements about pupils' capability by drawing on evidence from several sources such as observation of pupils working, discussion with them, homework and short written tests.
>
> Greater attention needs to be given to matching tasks more closely to both the past experience and the capabilities of pupils, to ensure that there is adequate progression in what is taught...
>
> OFSTED/HMCI. 1996, p.9)

With the introduction of the 1995 revised National Curriculum (NC) for D&T, OFSTED noted an improvement in curriculum planning and associated assessment, but warned that, overall assessment remained a relative weakness and was "insufficiently used to help pupils improve their future work." (OFSTED 1999b, p.2). The assessment issues raised by OFSTED and HMCI are discussed in more detail in Chapter 2.

Rationale

Before the issues of assessment can be addressed it is necessary to review the development of D&T to identify the distinct changes that have taken place; to define the nature of the subject as an integral part of the school curriculum; and to establish what is meant and understood by the term design and technological capability. It is not until this has been established and understood that an examination of ways of assessing the subject is possible.

There is a lack of research in the D&T curriculum area (Penfold 1988, Kimbell 1996, Barlex 2000), whilst researchers in other subject areas have been able to refer to a well-established tradition of curriculum practice. The *Design and Technology Interim Report* exemplified this issue, "...design and technology lacks a research base in pupils' understanding and learning such as is available in the cases of mathematics and science." (DES/WO 1988, p.7).

Appendices 1 and 2 provide the historical context that shows D&T as one of the fastest growth areas of the contemporary school curriculum, where considerable developments and changes have been made over the past thirty years, most significantly with the introduction of the NC in 1990. It has become recognised as a distinct area of education and there is an increasing consensus as to its nature and what constitutes the subject area. Within the professional experience of many teachers currently in school, "an acceptance of a skills-based apprentice model has been overturned in favour of an intellectually demanding problem-based model requiring many different sorts of skills and knowledge." (Banks 1994, p.2). Due to the nature of D&T and its relatively recent introduction into the curriculum there is less clarity about traditions and practices than in other subjects. "We must learn from the various *traditions* because they encapsulate strongly held views and years of experience that will remain even after we have an established area of technology education." (McCormick 1992, p.3).

D&T has evolved over many years, the origins of the subject can be traced back to the 1880s when manual training was first included in the curriculum of elementary schools with an emphasis on the development of utilitarian motor skills and was seen largely as pre-vocational training for the rapidly growing ranks of manual workers. These 'craft' subjects eventually became established in secondary modern schools where emphasis was placed on practical skills training with assessment focused exclusively on the quality of finished product. Black and Harrison (1985) argued that

such 'craftwork' was "inadequate in helping pupils to learn to design and to make decisions in pursuing a creative task." (p.11). The development of craft design and technology (CDT) and home economics started to overcome much of this inadequacy; and teaching methods promoted by HMI (DES 1985a, DES 1987) advocated active learning and a problem-solving approach. Although the emphasis had shifted to a problem-solving approach and there was a growing awareness of the need to develop capability, assessment procedures remained relatively static, the focus remaining on the quality of finished product and the acquisition of practical skills with little or no account taken of process.

The statutory Order, *Technology in the National Curriculum* (DES 1990) represented a fundamental change for many schools, especially so, for those who had continued to teach traditional subjects with a strong craft bias and for those who had not included this aspect of the curriculum at all. At the heart of the Order lay the need to adopt new approaches to the teaching and learning of D&T, without which it would be unlikely that the high demands of the levels of attainment would be reached. The Order made no mention of a number of issues. Issues to do with capability raised questions such as 'What does capability look like in D&T, and how does it develop?' and most significantly, for this study, 'How can a pupil's capability be assessed?'

From the outset teachers experienced difficulty in interpreting the detailed statutory requirements, "The launch of the National Curriculum for Technology...was a major step forward for the subject, but with hindsight, it was an unmanageable model for development of the subject." (DATA 1995a, p.5). Not surprisingly, in June 1992 a review was announced, to reduce the complexity, to clarify what should be taught and to facilitate assessment by specifying more clearly the skills and knowledge required. The conceptual framework was not to change. The revised Order (DFE 1995), finally providing teachers with a document that was clear, concise and straightforward to interpret. The complex statements of attainment were replaced with level descriptions and these were designed to help teachers make rounded summative judgements at the end of a key stage about a pupil's performance. It was made explicit that they were not designed to be used to 'level' individual pieces of work. The Programmes of Study (PoS) outline what pupils should be taught and provide a basis to plan work and specify objectives for teaching and everyday teacher assessment. However, yet again schools are left to develop formative and diagnostic assessment procedures for themselves. "Decisions about how to mark work and record progress in relation to these objectives are matters for schools to consider in the context of the needs and achievements of their pupils." (SCAA 1996a).

The term 'teacher assessment' is commonly used to describe both everyday assessment that takes place throughout a key stage, and the judgements made by teachers at the end of a key stage. Everyday assessment, the assessment for learning, should be an integral part of teaching and learning, Alexander, Rose and Woodhead (1992) stress that "assessing, diagnosing and providing feedback are...an integral part of the process and not an 'add-on' at the end of the task or project." (p.35). Brown (1990), Sutton (1992), (SCAA) 1995a and QCA (1999) support this view

and emphasise that this is how teachers gain knowledge of their pupils' needs, achievements and abilities. Statutory teacher assessment involves teachers using the knowledge gained from everyday assessments to make and record their judgements on pupils' overall attainment at the end of a key stage. Properly planned and co-ordinated assessment procedures can help alleviate some of the burdens on individual teachers. It helps to develop a collective view on assessment, a shared expertise in the planning of teaching and assessment, and an agreed understanding of standards, expectations and pupils' achievements throughout a department as well as throughout the whole school.

Design & Technology in the National Curriculum states that "pupils should be taught to develop design and technology capability through combining their designing and making skills with knowledge and understanding in order to design and make products." (DFE 1995, p.2). This means that assessment of D&T capability requires consideration not only of how well pupils are designing and making, but also the extent to which they are applying their knowledge and understanding. Examining the physical outcomes of pupils' work can assess some of these aspects, others require information about pupils' actions and decisions. The latter is more difficult to obtain, and its collection needs to be planned. Thus, there has been much uncertainty and confusion since the implementation of the *Technology in the National Curriculum* in 1990 and only a relatively short period of stability since the revised Orders of 1995 came into force. Teachers initially concentrated on developing schemes of work to meet the statutory requirements and made little progress towards assessment procedures that addressed more than summative project marking. Recent reports, detailed in Chapter 2 clearly indicate a need for schools to focus on assessment. The rate of change over the past few years has required teachers to focus on planning and implementing schemes of work that comply with the latest version of the NC, thus leaving little time to address assessment issues. Where schools have allocated the time to address assessment policy and practice, the D&T department has found very few specialist resources to help them devise appropriate strategies. This study is an attempt to address these concerns.

Summary

Chapter 1 introduces the research study, firstly, by outlining the local perspective of the LEA context and secondly, by showing how this relates to the wider national perspective. The rationale for the study provides an overview of the development of D&T, identifies the context in which the study is set and highlights the scarcity of research in the D&T curriculum area. It establishes the need to review the development of D&T in order to understand the assessment needs of the subject in terms of opportunities to raise achievement.

Chapter 2 is the Institution Focused Study and is in the form of a literature review. This review, firstly examines the nature of D&T and the development of its assessment, from the traditional role of assessment which focused exclusively on the mastery of practical skills and thus awarded a summative judgement on the quality of

the finished product through to the assessment of design and technological capability using the NC level descriptions. It is important to identify the changes that have taken place, as these have implications for the way the subject is assessed. The second strand, is that of generic assessment and its role in raising achievement. A review of the relevant research, together with evidence from current practice aids the identification of key features and successful practice to be used and applied within the context of D&T. The third strand focuses directly on assessment within D&T. Here, an initial review of recent developments identifies current requirements of summative procedures and formative strategies. The use of assessment data to raise achievement is explored through target setting and 'value-added' analysis. Research studies and school focused curriculum initiatives carried out specifically in the area of assessment of D&T are reviewed and the nature of these studies and initiatives is discussed. The final part of this chapter looks at the resources available from statutory bodies, professional associations and commercial companies to support teachers in the process of assessment.

Chapter 3 sets out the components of the research design, exemplifying strategies to ensure that the aims and outcome objectives of the research could be successfully achieved, using a case study approach. The major strength of case study data collection is the opportunity to use a number of different sources. Here a literature review, documents, archival records, interviews, observation and work sampling, have been used. Four schools were selected, one was used as a pilot study to test and refine the data collection instruments. The analysis of the data collected has relied on the basic principles of grounded theory method and on the procedures that help to provide some standardization and rigour to the process.

Chapter 4 outlines the main findings of the three case studies. The context and the current practice of each school is identified from the information provided by the school. Each study looks closely at the relevant departmental documentation, the KS3 SoW and the departmental pupil data and records. Interviews with the department head and a teacher in each school provide an insight into their views and understanding of the use of assessment to raise achievement. Pupil discussions provide another dimension. Lesson observations and work sampling provide evidence of what actually happens in practice. The data is presented through the themes that emerged during the data analysis and is supported by data extracts from the documentation, interviews, discussions and pupils' work.

Chapter 5 draws together the key points raised in the discussion of each case study school, first on a school-by-school basis and then across the three schools. From these findings key features of raising achievement are exemplified. The implications for developing practice are outlined prior to the identification of the outcomes of the study and its impact on policy and practice. The chapter concludes with a reflective view of the research study and proposals for future research.

CHAPTER 2

DESIGN & TECHNOLOGY

and its

ASSESSMENT

D&T has evolved rapidly as a subject in the school curriculum. Significant and profound developments that have taken place within a relatively short period of time, much within the teaching experience of many of today's D&T teachers. It is important to gain an insight and understanding of the nature of the subject and how it has developed in order to understand the 'what', 'when' and 'how' of assessment. "The two stories (defining the discipline and assessing pupil capability) are intimately interwoven in a way that is quite unique in the curriculum." (Kimbell 1997, p.3).

The Nature of Design and Technology

Craftwork in schools has been one of the major areas from which D&T has developed. The realisation that such work was inadequate in helping pupils to learn to design and make choices and decisions about their work whilst pursuing a creative task was one of the main reasons that helped bring about change. The Assessment of Performance Unit (APU) (1981) report, *Understanding Design and Technology*, set the parameters for subject development and helped to provide the framework for GCSE. It argued the case for D&T to be equated intellectually alongside traditional academic subjects but recognised how it differed from them, especially in the extent it crossed subject barriers. Significantly, the report attempted to identify the unique features of D&T. "The dominant feature of activity in the area of design and technology is the bringing together of skills, experience, knowledge, understanding, imagination and judgement, whatever their limitations, in the execution of a specific task." (APU 1981, p.2).

The developments during this period demonstrated an understanding of the nature of design and technological capability. "Teaching facts is one thing; teaching pupils in such a way that they can apply facts is another, but providing learning opportunities which encourage pupils to use information naturally when handling uncertainty, is a challenge of a different kind." (Hicks 1983a, p.1). Black and Harrison (1985) in *In Place of Confusion* provided a theoretical underpinning for technology. They posed two fundamental questions about how we should educate pupils in and through technology: "What is technology?" and "What purposes should it play a part in pupil's education?" In order to educate pupils with a view to maximising their individual potential they proposed a model for technology education and defined capability as "to perform, to originate, to get things done, to

make and stand by decisions." (Black and Harrison 1985, p.6). Learning was seen as taking place through the interaction of resources and tasks culminating in the development of capability. The listing of the three dimensions in the written word does not exemplify how they interact, and it is not until we see them illustrated in what must be the most often replicated diagram of design and technological theory that we can begin to understand how they perceived the development of design and technological capability. (see *Fig. 2.*1).

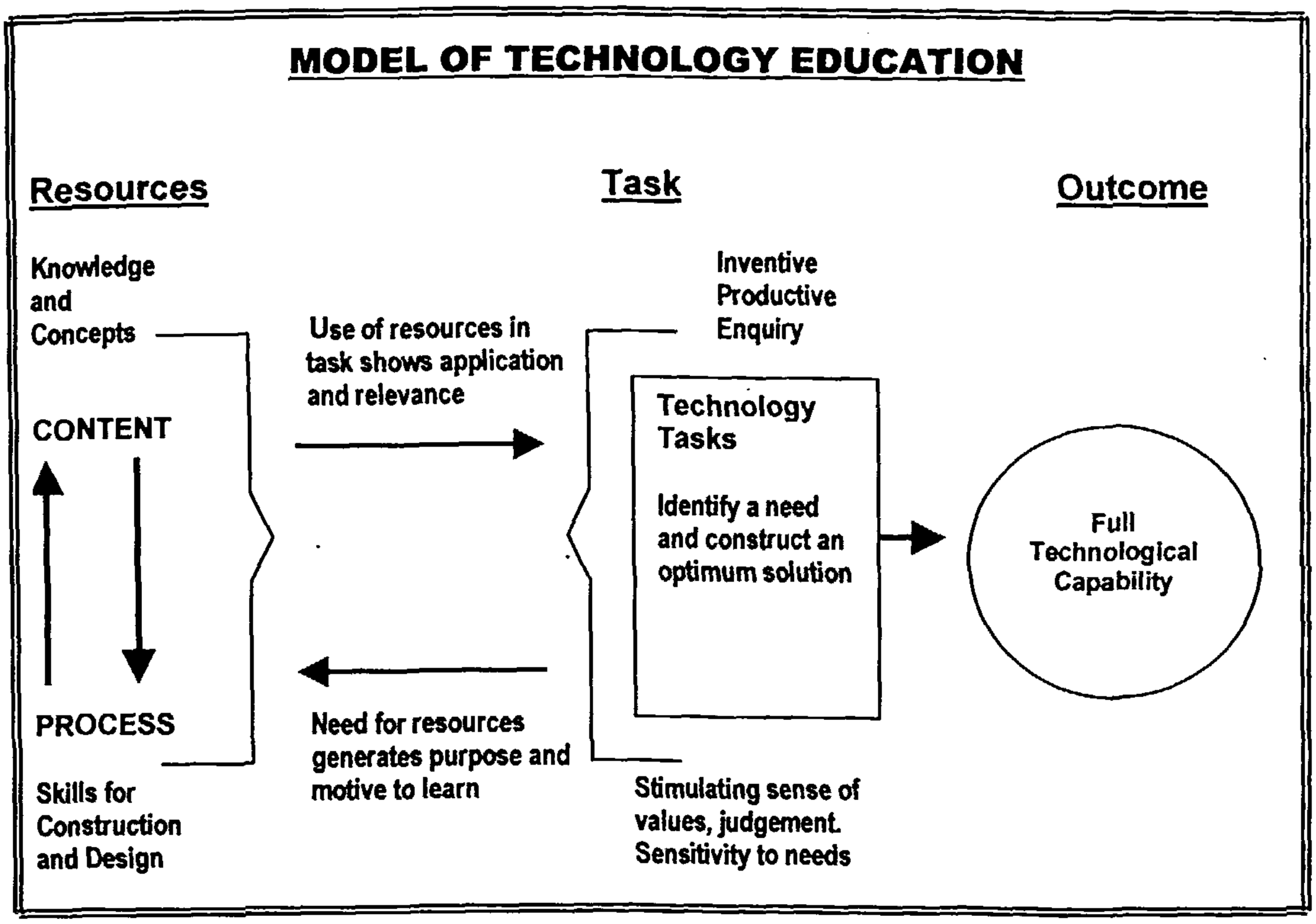

Figure 2.1 **Model of technology education (Black and Harrison 1985 p7)**

The model clarified Black and Harrison's view that the experience of tackling tasks is essential if pupils are to develop design and technological capability and awareness. Through such tasks, how to use and apply resources of knowledge and skill is learnt. The acquisition of such resources does not confer the ability to apply them. Thus the relationship was mutual, the needs of real tasks can provide a reason for acquiring new knowledge and skills or for reinforcing those already learnt.

Firstly by defining technology in an educational context, the inadequacies of traditional craft teaching to fulfil the requirements were clearly evident. To perform any technological task, however simple or complex there is a necessity to have a sound knowledge base and both intellectual and physical skill relevant to the task. This full capability requires both action-based qualities and the resource of knowledge, skill and experience at the same time. Secondly the status of a technology curriculum was important and thus a redefining of 'practical' in this context. The School Technology Forum (1986) in their review of the technological aspects of the *Curriculum 5-16* were concerned with the use of the word 'practical' by HMI. "...such a curriculum will be practical in that it serves useful purposes and it is seen to do so..." (DES 1985b, p.45).

The Forum felt that 'practical' activity was still seen by those in academic circles, as being a lower level of activity and recommended that a concerted effort should be made to rehabilitate the word 'practical' as "the best description of everything which tends to make a curriculum relevant and of use to the individual in the outside world" (School Technology Forum 1986, p.24).

In 1987 the APU published *Design and Technological Activity: A Framework for Assessment.* Here they succinctly defined capability and helpfully reinforced what it was not, for the benefit of those who continued to assess D&T in a fragmented way, awarding marks or grades for the acquisition of specific knowledge or the mastery of a particular craft skill. "Capability in design and technology involves a complex integration of processes, concepts, knowledge and skills. The possession or otherwise of individual bits of knowledge or skill is not itself any indication of design and technological capability." (APU 1987, p.20). The APU D&T research team identified two distinct aspects of capability that need to work alongside each other as pupils tackle a task: 'Reflective', thinking around the task; and 'Active', taking action on the task. These two aspects of capability are linked in what they describe as an iterative process involving to-ing and fro-ing between thought and action. This model was subsequently refined and developed for the final report of the APU D&T project (Kimbell, et al. 1991), thought and action becoming mind and hand. The model illustrated in *Fig. 2.2* exemplifies this process.

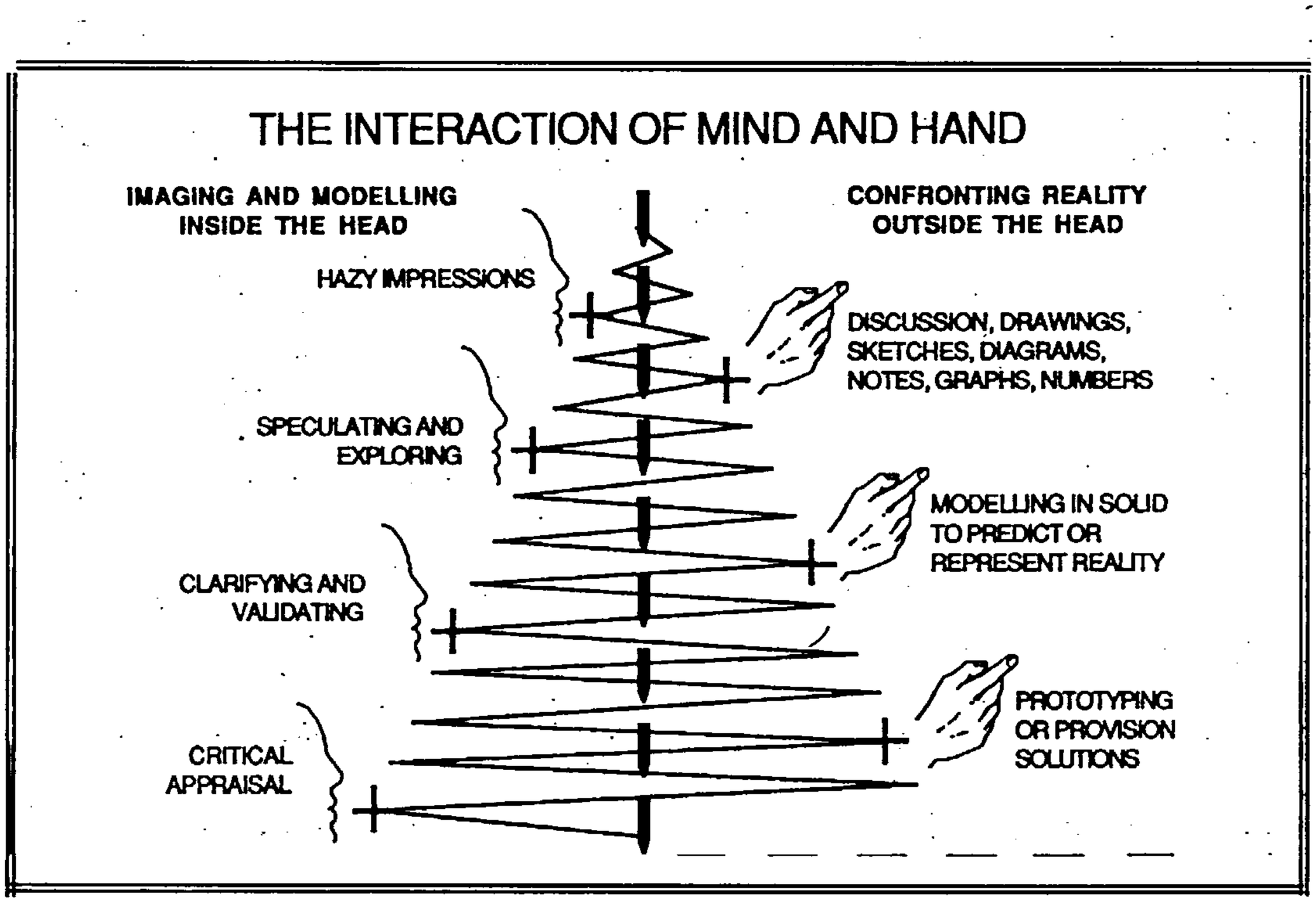

Figure 2.2 **The APU model of interaction between mind and hand.**

(Kimbell, et al. 1991, p.20).

Having identified the two distinct aspects of capability and demonstrated through the diagram the iterative nature of the process, the APU reinforced the view that fully developed D&T capability can only be seen where "these two abilities are completely

integrated in a pupil's response to a task, allowing each aspect to feed and enhance the other." (SEAC/APU 1990, p.3). Recommendations published in the final report (Kimbell, et al. 1991) constituted a major document not only on assessing, but also on teaching the subject and the report itself developed a major restatement of D&T education. Appendix 3 includes extracts from the report that illustrate the major restatements.

McCormick (1999) challenged the role of knowledge in these models (*Fig 2.1 and Fig 2.2)*, referring to the statement heading up the PoS for each key stage in the revised Order (DFE 1995) which stated that capability is developed through 'combining' designing and making skills with knowledge and understanding. He questioned how the 'combining' takes place. This issue has been present in the models of capability that emerged during the 1980s, as was evident in those of Black and Harrison and the APU. These models started with the recognition of the combination of process and content, where Black and Harrison (1985, p.61) emphasised the link between thinking and action and saw capability as being able "to perform, to originate, to get things done, to make and stand by decisions." The APU model, likewise linked thought and action through the model of interaction of mind and hand, and its link of process and knowledge has always been evident in ideas of capability, but "its relationship to the process is unclear, as is how knowledge is used in action." (McCormick 1999, p.5). McCormick argued that the meaning of capability must be reappraised and that the role of knowledge must also be located.

Assessment

Having reviewed the development of D&T, defined the nature of the subject and established what is meant and understood by the term design and technological capability, ways of assessing the subject that facilitate the raising of achievement or strategies that have the potential to do this can now be examined. However, before looking at assessment within D&T, it would be helpful to look at generic aspects of assessment and to review the strategies that have been shown, in other fields, to contribute to the raising of achievement.

Purposes of Assessment

Assessment has progressed from the traditional notion of 'testing' for selection purposes and is now seen as a much broader concept. Murphy and Torrance (1988) refer to Macintosh and Hale's (1976, p.12) much quoted breakdown of six possible purposes of assessment: "diagnosis, evaluation, guidance, grading, selection and prediction." This list is helpful in pointing to the wide range of functions that educational assessment can perform, although by the mid 1980s the desire to increase pupil motivation was widespread and this has subsequently introduced an additional purpose in the range of functions listed by other writers, Brown (1990) and Harris and Bell (1990). The report of the Task Group on Assessment and Testing (TGAT) (DES 1988a), whose brief was to invent a system of assessment, which would calibrate and help raise national standards advocated four purposes for the national assessment framework. (see *Fig. 2.3*)

• formative	supporting learning: planning the next steps
• diagnostic	identifying learning difficulties
• summative	systematic recording of attainment at the end of key stages
• evaluative	judging the effectiveness of teachers, schools and LEAs by using assessment data as performance indicators

Figure 2.3 **The four purposes of assessment proposed by TGAT for the national assessment framework.**

The recommendations proposed by the TGAT report were broadly accepted and adopted as the basis for NC assessment. The report outlined the rationale for assessment:

> Promoting children's learning is a principle aim of schools. Assessment lies at the heart of this process. It can provide a framework in which educational objectives may be set, and pupils' progress charted and expressed. It can yield a basis for planning the next educational steps in response to children's needs. By facilitating dialogue between teachers, it can enhance professional skills and help the school as a whole strengthen learning across the curriculum and throughout its age range.
>
> (DES 1988a, para. 3).

Helpfully, TGAT also stated very clearly what assessment was not; the assessment process itself should not determine what was to be taught: "It should be the servant, not the master, of the curriculum."; it should not be "a 'bolt-on' addition at the end...it should be an integral part of the educational process, continually providing both 'feedback' and 'feedforward'." (ibid. para. 4). The TGAT report concluded that a national assessment framework, effectively designed, 'could and should' pursue formative and summative purposes. They argued that it was possible to build up a comprehensive picture of the overall achievements of a pupil by aggregating, in a structured way, the separate results of a set of assessments designed to serve formative purposes. This has led to confusion in schools. Harlen and James (1997) quote examples where teachers have failed to recognise the need for reliability in summative assessments, preferring to rely on classroom validity. Similar evidence is put forward by Sutton (1992), Gipps (1994) and Lambert and Lines (2000).

The Tensions between Formative and Summative Functions of Assessment

The findings of Black and Wiliam (1998a) identify a lack of clarity about the formative/summative distinction in much of the literature. Arguments have continued since the publication of the TGAT report, as to whether a single assessment system could possibly serve different purposes. Gipps (1992, p.2) contends that it cannot, "since these require different timing, different involvement of the teacher and different

use of results." Murphy (1990, p.38) demonstrates, by citing examples from APU surveys and DES reviews, that "assessment practice over the years has indicated quite clearly that an assessment can usually only be designed for a specific purpose and thus its use for others is inappropriate." Lawton (1992), takes the opposite view and applauds the TGAT report and the emphasis that it placed on teacher assessment and its assertion that formative procedures could contribute to summative purposes. Wiliam and Black (1996) stress that the task of assessing pupils summatively for external purposes is clearly different from the task of assessing on-going work to monitor and improve progress. They concur with the view of TGAT that information gathered for formative purposes with selection and reinterpretation can contribute to a summative assessment. Wiliam (1999, p.2) argues that we must refuse to accept the incompatibility of summative and formative assessment. Instead "we must find ways of mitigating that tension, by whatever means we have."

The TGAT report was supplemented with a further report (DES 1988b) that explained in more detail, the implications of some of their recommendations. These were followed by the DES (1989) publication *'National Curriculum: From Policy to Practice'* which set out the purposes for NC assessment, firstly by stressing that it was to serve several purposes, not just for summative judgements and statutory information. "Formative, in providing information which teachers can use in deciding how a pupil's learning should be taken forward, and in giving the pupils themselves clear and understandable targets and feedback about their achievements..." (DES 1989, para.6.2). The document went on to highlight 'teachers' own assessments' as an essential part of the system, thus ensuring a place in assessments for rounded, qualitative judgements. Wiliam (2000b) argues that educational assessment has become divorced from learning and proposed the development of a system that integrated summative and formative procedures that would improve both the quality of learning and the quality of assessment. He contends that the present summative system only considers as important, those aspects of learning that are easily measured. This view does not reflect the research and development in the field of D&T where there has been a considerable focus on the assessment of capability rather than practical skills, knowledge and understanding. However it could be said to be true of practice in many schools as exemplified in the annual OFSTED/HMCI Reports. Wiliam proposed a system where the test results for individual pupils should be derived from teacher assessments, rigorously moderated by external assessors.

Reconstructing Assessment

In November 1993 a letter was sent to all chief education officers and all schools, (Sutherland, Dearing and James) announcing significant changes in assessment. It indicated a move to separate the evaluative purpose of assessment from the summative and formative purposes, hence pupil assessment would consist of a broad judgement about which level best describes each pupil's attainment. Kimbell (1997), concurred with this proposal arguing that the TGAT multiple functions of assessments conflated into a single system did not work.

It is helpful here to refer to the distinction made by the Assessment Reform Group (1999) between "*assessment* ***of*** *learning* for the purposes of grading and reporting which has well-established procedures and *assessment* ***for*** *learning.*" (p.2). Wiliam (1999) suggests that summative assessments are best thought of as retrospective. TGAT, despite its controversial view of assessment did make it clear that whilst they considered formative assessment could be aggregated in some way for a summative purpose, the reverse was not possible. The AAIA (1996) supported this view, exemplifying for schools how aspects of teacher assessment could be used as an end-of-key-stage process.

The term formative assessment has only recently been defined as a function of assessment. Bloom, Hastings and Madaus (1971, p.117) were the first to use the term and defined it as, "A type of evaluation which all who are involved – student, teacher, curriculum maker – would welcome because it is so useful in helping them improve what they wish to do." Wiliam quotes Ausbel's famous assertion reinforcing this view that "The most important factor influencing learning is what the learner already knows." (Ausbel [1968] quoted in Wiliam 1999 p.1). However, establishing what a pupil already knows and what new knowledge, understanding and skills are desired to be acquired is not enough in itself. Something must happen to fill the gap, and this is where 'feedback' comes in to play. An assessment may have been designed to serve a formative function, but may fail to have any impact on future practice. Sutton (1992) and Black and Wiliam (1998b) argue that to be effective feedback must be understood and utilised by the pupil to 'alter the gap' and thus serve a formative function.. The fact that formative assessment has been somewhat neglected in this country (Torrance and Pryor 1998), is exemplified by Gipps (1996, p.6) who refers to the results of international studies which locate England on a continuum. "The most extreme, focuses on external testing to force accountability and change onto schools and teachers...It seems to be a peculiarly English obsession to want to test every child..." An underlying problem, noted by Black and Wiliam (1998a) was that the term 'formative assessment' was not common in the assessment literature and other terms were often used such as 'classroom evaluation', 'curriculum-based assessment', 'formative evaluation'. Two years later Lambert and Lines (2000, p.107) indicate that nothing had changed, stating that "assessment, in the classroom [their definition] occupies an ambiguous and uncertain position in the world of education." It is evident that formative assessment is not well understood and this has contributed to poor practice in some schools. OFSTED reported that:

> The failure to use **assessment information** to inform planning and teaching, and in particular, to match work to pupils' attainment may also result in low expectations on the part of teachers. Despite some improvement ...the majority of schools make too little use of assessment data...In about one-quarter, [of schools] the quality of marking is poor: commonly, for example, marks and grades are given without comment or explanation...
>
> (OFSTED/HMCI 1997, p.23).

Clearly the expectations of OFSTED inspectors with regard to formative assessment

are demanding. Through their scrutiny of pupils' work, teachers' planning and lesson observation they were looking for assessment that:

- helps teachers plan future work;
- informs pupils of the standards they have reached;
- shows pupils what they need to do to improve;
- is diagnostic of strengths and weaknesses;
- is constructively critical.

The TGAT (DES 1988a) report promoted the use of formative assessment procedures and argued that they should be incorporated systematically into teaching strategies and practices at all levels. The report defined the purpose of formative assessment, "so that the positive achievements of a pupil may be recognised and discussed and the appropriate next step may be planned." (ibid. para.23). Clarke (2000) has built on the foundations of formative assessment to raise achievement, as outlined in the findings of Black and Wiliam (1998a) by developing practical strategies for teachers to use in the classroom.

Research Studies

Research in the area of assessment was until recently, dominated by the interest in technique and technology, as most research into assessment was undertaken by examination boards. Until the mid 1990s research on assessment which had taken place outside the confines of the examination boards was: "Concerned to monitor changes in assessment practice and procedures. It has rarely preceded, far less informed such changes." Torrance 1989, p.173).

Evidence from Research

In their extensive review, Black and Wiliam (1998a) synthesised evidence from over 250 studies (from a total of 580 articles and chapters) linking assessment and learning. They presented evidence from studies, which focused on: quality of questions, quality of feedback, sharing criteria with learners and self-assessment. With regard to feedback, two studies are of particular interest, firstly Butler (1988), who investigated three kinds of feedback: marks or grades, marks or grades with comments and comments only. The findings showed that if pupils were given only marks or grades or a comment alongside a mark or grade, the gain in achievement was significantly lower than for those pupils who had received comments only. Secondly, Boulet et al (1990) examined the effects of different methods of feedback that could be used. They found that pupils given oral feedback, the nature of their errors identified and a chance to correct them achieved more than those who were given written praise, a list of weaknesses and a work plan to complete. Throughout their review they found overwhelming evidence that improving the quality of formative assessment could lead to considerable increases in pupil achievement. (Effect sizes in the order of 0.4 to 0.7, the equivalent of between one or two GCSE grades). Black and Wiliam (1998b) indicated that raising achievement through assessment depends on five key factors. (see *Fig. 2.4*).

- Feedback to any pupil should be about the particular qualities of his or her work, with advice on what he or she can do to improve, and should avoid comparisons with other pupils.
- For formative assessment to be productive, pupils should be trained in self-assessment so that they can understand the main purposes of their learning and thereby grasp what they need to do to achieve.
- Opportunities for pupils to express their understanding should be designed into any piece of teaching, for this will initiate the interaction whereby formative assessment aids learning.
- The dialogue between pupils and a teacher should be thoughtful, reflective, focused to evoke and explore understanding, and conducted so that al pupils have an opportunity to think and to express their ideas.
- Tests and homework exercises can be an invaluable guide to learning, but the exercise must be clear and relevant to the learning aims. The feedback on them should give each pupil guidance on how to improve, and each must be given opportunity and help to work at the improvement.

(Black and Wiliam 1998b, pp.9-13 extracts).

Figure 2.4 **Five key factors identified through research that raising achievement through assessment is dependent upon.**

The Assessment Reform Group (1999) argue that much current assessment practice emphasises the assessment of learning rather than assessment for learning and thus misses opportunities to use assessment to improve learning. A number of constraining factors were identified. (see *Fig. 2.5*)

- quantity of work and presentation assessed rather than the quality of learning;
- greater attention given to the marking and grading rather than giving advice for improvement;
- a strong emphasis on comparing pupils with each other which demoralises the less successful learners;
- feedback to pupils often serves managerial purposes rather than helping them to learn more effectively;
- teachers not knowing enough about their pupils' learning needs.

(Assessment Reform Group 1999, p.5)

Figure 2.5 **Constraining factors.**

Weeden and Winter (1999) responded to the evidence produced by Black and Wiliam (1998a) and took forward an aspect of the research by looking at the role of the relationship between teacher and learner in raising standards. Their specific aim was to find out how pupils understood the purpose, requirements and assessment of the courses that they followed and how they thought they learnt best. Their findings raised a number of issues that need to be addressed before assessment for learning will be successful. (see *Fig. 2.6*)

- most pupils equated assessment with summative assessment;
- little reported evidence of systematic self-assessment;
- few pupils recognised having the opportunity to develop their knowledge and understanding of this skill;
- the quality of feedback was commented on critically by many pupils.

(Weeden and Winter 1999, p.1)

***Figure 2.6* Issues to be addressed before assessment for learning will be successful.**

Ronayne (1999) looked specifically at the impact on pupils of different types of teacher feedback and investigated patterns of teachers' feedback and pupils' perceptions of that feedback, to discover what made formative assessment an effective learning tool. The findings, which concur with the views of Sadler (1998), indicated that verbal feedback was generally more effective as it was pertinent to the task and related precisely to the pupil's starting point, whereas the majority of written comments simply encouraged pupils to think again and a large proportion also related to aspects of the task other than the stated learning objectives.

In later work Wiliam (2000a and 2000b) turned his attention to summative procedures, identifying fundamental limitations of the process. He acceded that no measuring instrument was perfect and set out to investigate how the key ideas of reliability and validity are used by test developers, seeking to publicise to the users of educational tests that they needed to understand the limitations of this technology. To some extent this challenged the views of many experts, for example Gipps (1994) and Tufnell (2000) as to the reliability of summative assessment data.

Evidence from Current Practice

There is a wealth of research evidence and abundant school inspection reports to indicate that the every day practice of classroom assessment is one of the weakest aspects in schools. Black and Wiliam (1998b) presented evidence that the use of formative assessment, in schools all over the world, was relatively underdeveloped. Dwyer (1998) states that: "Improving student learning with the help of classroom assessment is a formidable educational challenge." She argued that despite the fact that educational assessment has undergone a series of transformations over the last twenty years, these changes remain, more in the realm of theory than of practice. This is reinforced by evidence from OFSTED inspections, OFSTED/HMCI (1996), OFSTED/HMCI (1997), OFSTED/HMCI (1998) and OFSTED/HMCI (1999), the findings of which indicate that day-to-day assessment continues to be the weakest aspect of teaching.

The research carried out by Black and Wiliam (1998a) has clear implications for the design of future research investigations. They draw attention to the fact that most of the studies they reviewed did not attend to some of the important aspects of the situations being researched.

Assessing Design and Technology

Assessment in the generic context has been reviewed by looking at recent relevant research studies and their findings, and account has also been taken of the views of those leading the current debate. This has provided a current picture of both formative and summative processes which have been established and the strengths and weaknesses in implementation in schools. It is now appropriate to narrow the focus and examine the issues of assessment within D&T.

Developments in the Assessment of D&T

DES HMI (1985a and 1985b) identified the principles of assessment for D&T teachers. The Home Economics specialist HMIs stated that:

> ...if teachers are truly concerned that children are learning, assessment is inseparable from the whole learning process, for unless they know what stage of development children have reached, which areas of content they have grasped...they cannot properly provide relevant teaching material or adopt appropriate teaching techniques...The primary use of assessment by teachers in the subject should be as a diagnostic tool so that the discovery of gaps and discrepancies in the mastery of the work can be remedied and progress maintained at the rate appropriate to the individual.
>
> (DES 1985a, p.17/18).

Two years later, CDT specialist HMIs (DES 1987) looked beyond the generic principles outlined by their Home Economics colleagues and considered the issues of assessment within the context of the subject. HMI (DES 1985b) had seen very little good practice and were critical of practice often observed in schools whereby performance information was merged into a series of global marks and grades.

The articulation of the process of design and development enabled early assessment schemes in D&T to be used to measure pupil performance against the whole process instead of just the quality of the finished product of that process. The advent of the GCSE led to the need for standards to be defined in advance, thus criteria that could be applied consistently by teachers needed to be established. Thus "a pupil's capability was no longer to be described by comparison with *other pupils* performance, rather it was to be *defined* through a series of 'can-do' descriptors." (Kimbell 1997, p.12). Throughout the 1970s and 1980s the focus for assessment was largely confined to public examinations and little changed at Key Stage 3 (DES 1985b). Despite the development of the subject relatively little attention has been paid to the ways in which this new curriculum area could be assessed, Johnstone, Reeve and Dick (1986), Webb (1988), Eggleston (1996 and 2000) and Kimbell (1997).

The 1990 NC Order stated that pupils should be assessed using the Statements of Attainment as general objectives; but made no reference as to how a pupil's capability could be assessed. The only 'advice' on offer was that of the DES (1990) recommending teachers to build on existing assessment and recording procedures.

The 1990 NC model of design and technological capability was represented in four attainment targets and intended to reflect an approach to the assessment of design and technological performance based, (presumably) on the nature of the activity. This model drew attention, for assessment purposes, on the stages of the activity in progress and not as the APU (1991) model demonstrated, an iterative process; thus raising the issue about the extent to which a model derived from assessment needs may get in the way of developing capability. "..its [1990 model of four attainment targets] usage for assessment purposes leads to attempts - doomed to predictable failure." (Norman and Roberts 1992, p.10). Some useful suggestions to help make the task of assessment manageable were published in specialist books and journals (see page 34), but most were usually limited to general principles rather than the 'nitty gritty' of 'what', 'when' and 'how'. Doherty et al. (1994) suggested that to make the teaching of the NC D&T, and ultimately assessment possible, teachers should be encouraged to focus on particular aspects of each Attainment Target to a high profile whilst covering the remainder to a lower profile. They clarified two approaches that need to be taken for assessment of D&T: "That of 'holistic' assessment where an 'overview' method is adopted, looking globally at the way children engage in design and technology activities; [and] 'focused' assessment where aspects of activities are used for the basis of assessment over a key stage. (Doherty et al. 1994, p.122). The highly atomised assessment regime had forced teachers to look at bits of detail rather than the whole and then tick or not tick countless boxes. Thus in trying to make sense of the detail teachers often lost sight of the 'big picture'. "To treat judgements as independent points to be scored is seriously to misjudge the interdependence of the elements that go to make up technological capability." (Kimbell 1997, p.25).

Hardwick (1993) was given the task of eliciting the views of teachers with regard to the proposals for the first revision of the NC for D&T. He stressed that most teachers were very well aware of the lack of progression, and ambiguity in the Statements of Attainment and had significant difficulties when trying to use them for assessment. The working group, charged with the task of revising the Order were determined to create a structure where interactive evaluation would happen, acknowledging the lessons learnt from the APU research (Kimbell et al. 1991), arguing that it was vital that pupils have the opportunity to evaluate their work at every stage of its development. However, they were also very much aware of the problems created by 'contrived adjectival increments' in the Statements of Attainment. It was the view of the 'revision' working group that there were some aspects so fundamental that it was preferable to find a different way to highlight the importance of evaluation to teachers.

No development work took place during the revision period so it was not until a new Order for Design and Technology (DFE 1995) was published, that curriculum development moved forward again, the revised Order finally providing teachers with a document that was clear, concise and straightforward to interpret. The new Order did not replicate the numerous statements of attainment which teachers found extremely difficult and time consuming to use. Instead level descriptions were introduced. (See Appendix 4) The essential function of level descriptions was to help teachers make rounded summative judgements at the end of a key stage about a pupil's

performance. It was made explicit that they were not designed to be used to 'level' individual pieces of work. The PoS for D&T outline what pupils should be taught and provide a basis to plan work and specify objectives for teaching and everyday assessment however, "decisions about how to mark work and record progress in relation to these objectives are matters for schools to consider in the context of the needs and achievements of their pupils." (SCAA 1996a, p.2). This new approach left schools to develop formative and diagnostic assessment procedures and systems.

With regard to assessing capability, it is important to distinguish between pupils who have only had a set of teacher led experiences, perhaps not moving beyond the *focused practical task and product analysis, and pupils who have developed capability* through those experiences by providing them with the opportunity to apply the skills, knowledge and understanding gained in a design and make activity. In order to achieve this distinction Black suggests "reflection by pupils on what they have done, and involvement of pupils in the assessment of what they have done as part of the evaluation...an essential target if we are to help pupils develop capability." (Black 1991, p.243). Farrell (1992), in her review of capability in NC assessment, highlights the importance of teacher understanding of what design and technological capability actually is:

> Unless they [teachers] are clear about the goal of enabling pupils to be capable, it is very difficult to plan a curriculum route which will help pupils on that journey, and even more difficult to determine whether or not pupils are capable as a result of these experiences.
>
> (Farrell 1992, p.40)

She stressed that the purpose of assessment should be directly related to pupils' learning and progression and not, as much of her work with teachers indicated, pupils required to carry out tasks in order to be assessed.

Tufnell (2000) charted the developments of criterion-referenced assessment in the context of the summative assessment of design and technological capability. He emphasised the need to assess capability and argued for the use of Attainment Targets as the objectives for the teaching as they set pupils clear targets. In this context criterion-referenced assessment is used formatively by "uniting teaching objectives and assessment allows assessment to support learning." (Tufnell 2000, p.105) Barlex (2000d), discussed the research elements of the *Nuffield Project* and made recommendations about the assessment of on-going coursework. He emphasised the use of formative strategies suggesting that conversations supported by written comments added to the work whilst talking with a pupil during a lesson was of more use than comments written after the work had been completed, citing the findings of Black and Wiliam (1998). This guidance is evident in the commercially published resources of the *Nuffield Project* (Barlex 1995 and 2000) where an emphasis is placed on pupil self-assessment as part of an overall assessment framework.

The Use of Assessment Data to Raise Achievement

The original intention was for D&T to be assessed using SATs at the end of KS3. A number of agencies (Consortium for Assessment and Testing 1990 and Middlesex Polytechnic/MEGNAP 1990) were involved in the development of tasks that could be used as assessment devices. SEAC (1991a) considered them too time consuming and a remit for a more tightly focused activity was set. The resultant tasks (SEAC/DFE 1992) were so focused that the product outcomes looked almost identical. Such were the constraints imposed, that pupils had very little opportunity to design and develop, and, ironically drastically reduced the extent to which the activity could be used as a reliable measure of technological capability. The Key Stage 3 Assessment Arrangements: Non-core Subjects 1997 (SCAA 1997a) did not require statutory testing of D&T; however there are statutory requirements for teacher assessment to provide for each pupil at the end of KS3. For 1997 and subsequent years, teachers are required to make a judgement about the level which best summarises each pupil's attainment in D&T.

> Teachers will use their knowledge of a pupil's work to judge which level description best fits the pupil's performance. In reaching a judgement, teachers should use their knowledge of a pupil's work over time, including practical, written and oral work. The aim is for a rounded judgement.
>
> (SCAA 1997b, p.1).

National data is now collected to provide national summary results for schools for inclusion alongside individual pupil's results and summary results from the school. In order to assist teachers identify pupils' levels of attainment and to support the process of teacher assessment SCAA (1996b) produced optional test and task materials which provide examples of appropriate methods of assessing D&T at KS3. The materials were designed to provide teachers with information about pupils and also to plan further learning objectives by linking the quality of pupils' responses to the characteristics described in the level descriptions.

Although summative assessment does not contribute directly to strategies for raising achievement, the resultant data can be used for target setting and value-added analysis. "In order to raise achievement one first needs an accurate measure of where one is, then to set SMART (realistic and challenging) targets to attain." (Buckinghamshire Advisory Service 1998, p.4). Where assessments are used to predict future performance it is important to bear in mind that it is done on the basis of present capabilities, thus the need for regular reappraisal.

One important change in education in recent years has been the increase in the amount of information that is available to schools, on the performance of their pupils. Data relating to end of key stage assessments and external examinations is available in the Autumn Package (DfEE 1999a), produced for each key stage. In addition to this national data schools receive an individual (confidential) PANDA Report[1] from

[1] PANDA (Performance and Assessment) Report

OFSTED contextualising the school data in comparison with national data and in comparison with similar schools. Data is also available on the QCA and DfEE websites[2]. Many LEAs (Hill 1996) are able to provide their schools with sophisticated departmental performance information to assist with their value added analysis. However, statistical analysis does not provide the answers on its own, it is how the information is used that makes the difference:

> The statistics provide questions to be asked. They should form the...process through which senior managers conduct their regular departmental reviews. Heads of department will wish to confirm that they contribute as fully as possible to the achievements and the growth of each individual pupil...
>
> (Hedger 1996, p57).

In response to Black and Wiliam (1998a), Sebatane (1998) refers to research findings of Kellaghan et al. (1982) that indicated that the provision of diagnostic information based on the performance on standardised tests of primary school pupils, compared to the performance of norm-referenced information only, has been found to improve pupils' achievement. Thus, Sebatane argues, that changes in assessment can have a role in improving pupil learning without radical changes in teacher pedagogy as outlined by Black and Wiliam.

Target Setting

Target setting is an approach to raising standards by establishing specific measurable goals for improved pupil performance. The DfEE (1997, p.6) stressed that pupils' performance targets are especially valuable in clarifying goals and providing specific measures against which to judge success. "Target setting...helps a school focus on pupil performance." Chidgey (1998) provided guidance for D&T teachers in the *Croner Technology Briefing* publication stressed that subject specific information for D&T target setting is still in its infancy. He highlighted the following points:

> Teachers need to take targets seriously and take responsibility for utilising them as a mechanism to assist with raising standards.
>
> It is also necessary to engage pupils with the process and encourage them to strive to achieve their own performance targets.
>
> Targets should be designed to stretch pupils, and their achievement will demand application and hard work.
>
> (Chidgey 1998, p.2).

The DfEE (2000a) consultation on the proposals for target setting at KS3 announced that a whole curriculum programme 'Transforming Teaching' had been devised, and that learning and individual target setting had been included as strategies for raising achievement.

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[2] www.qca.org.uk, www.standards.dfes.gov.uk

'Value Added'

Dearing (1993) recommended that work be commissioned into 'value added' performance indicators for schools. This finally became a reality in 1998 when the first 'national value added' analyses were published by QCA. The term 'value added' in education is "shorthand for what schools...add to their pupils' knowledge, skills and understanding between one age and another." (DfEE 1996, p1). Saunders (1999), in her critical review of 'value added' discussed what is meant by 'value added' in an educational context and the implications of it for the school improvement agenda. In her overview paper she emphasised that the 'added' is over and above normal expectation and also extends the definition to encompass "a whole range of connected but distinct activities." (Saunders 1998, p.1). In the context of this study specifically looking at KS3 the following activities are relevant:

- making like with like comparisons with other departments and classes performance;
- representing pupils' progress as well as their achievement;
- identifying which departments/classes are currently performing above or below predictions;
- identifying which individual pupils are likely to perform above or below predictions.

Research findings (QCA 1998), indicated pupils' prior attainment as the most important factor when predicting their likely future performance. As the national picture of individual pupils' attainment at successive key stages develops, this data can be used to provide 'value added' measures for use in the improvement process at subject department level. The relationship between pupils' previous attainment and their current attainment gives a measure of their progress. By comparing the progress individual pupil's make against the average progress made by other pupils, a useful picture of the value added to pupils' learning emerges for the subject department.

Using and Analysing Data

'Value added' analysis, which allows for pupil target setting gives a clear view of some of the strengths and weaknesses of the department. The analysis is based on the collection and comparison of pupil level data. It uses past and present data to help predict potential performance and hence focus on challenging pupils to raise achievement. At department level, end of KS3 teacher assessment levels and KS4 examination results are routinely collected and can be compared with schools of similar type, with other departments within the same school, and with results from previous years in order to look at trends. To compare D&T GCSE grades with those achieved by other departments it is advised (OFSTED/DfEE 1996) that subject indicators are calculated and used instead of raw grades. This will ensure that variation in the capabilities of pupils taking optional courses is ignored. These are based on the comparison of pupils' achievements in each subject with their achievements in other subjects. This process will also facilitate comparisons between the specialist options within GCSE D&T. At the end of KS3 Level Descriptions are used and comparisons can be made with:

- national average for teacher assessment levels;
- LEA average for teacher assessment levels (where available);
- school average for other subjects.

Some schools are using STAMP (Setting Targets and Monitoring Performance) which relies on accumulating a sequence of grades for pupils at six monthly intervals. The purpose of this process is to move beyond the useful retrospective analysis of past performance to a prospective view of likely performance. In this way schools are encouraged to consider not only a minimum level of achievement which might be reasonably expected of pupils and subject groups but, more importantly, challenging upper levels of achievement which are derived from the performance of comparable pupils and subject groups.

Research Studies in the Assessment of D&T

Having established the current requirements of NC assessment for D&T and the generic issues within assessment specifically concerned with raising achievement; it is now time to look at what research studies concerned with the assessment of D&T have been published. Whilst researchers in other subject areas have been able to refer to a plethora of studies, there is a significant lack in the D&T area as cited by DES/WO (1988), Penfold (1988), Agar (1990), Kimbell (1996) and Barlex (2000c). In his DATA lecture, *Preparing Design and Technology for 2005,* Barlex highlights the criticism levelled at the lack of research in the D&T subject area by Zuga at the 1999 International Technology Education Association Conference. Zuga considered that there were only four examples of useful work in total; three of these, Kimbell (1997) and his work on assessment in D&T, McCormick's work on the role of problem solving[3], and Patricia Murphy, who investigated the area of co-operative problem solving[4], emanate from the United Kingdom. Of these, Kimbell's work is the only one of relevance to this study. In recognition of the lack of research in D&T, Eggleston (2000) drew together what he considered to be some of the most significant works. Of the ten contributors to his book, several of whom had not previously published in a research context, two are relevant to this study. Barlex focused on the Nuffield Design and Technology Project and made reference to assessment issues and Tufnell charted the history of criterion-referenced assessment within NC D&T.

The literature search to locate previous work in the area of formative assessment in D&T with specific interest in KS3 was conducted through key word searches using electronic access to journal citations. This was followed up by reviewing the reference lists of articles found. A number of small scale and action research studies are regularly published in the subject specific specialist journals investigating a wide range of D&T topics. A search for articles, written since 1980, specifically concerned with the assessment of D&T has produced very few titles, even fewer with reference to KS3. The most significant research carried out with regard to the assessment of D&T is that of the APU team, of which Kimbell was a member and the director of their final report

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[3] McCormick, R. (1996) *Journal for Design and Technology Education,* 1(3), pp.230-241.

[4] Hennessy, S., and Murphy, P. (1999) The Potential for Collaborative Problem Solving in Design and Technology. *International Journal of Technology Education,* 9. pp.1-36.

1985-1991, and Kimbell's later work studying international trends '*Assessing Technology*' (1997). Nevertheless, a review of other studies, as well, was essential to ensure that this study would not replicate previous work and would take account of implications identified for further study. Of the few related research papers, the following provide relevant background detail or raise issues to be borne in mind when planning my own study.

Examples in Evidence

In 1986 a Welsh Office research project *'Schools in Action'* looked at assessment and recording in a range of subjects, including CDT. They recognised that a number of school courses were developing a wider range of knowledge, skills and attitudes and that a greater emphasis was placed on understanding than had hitherto been the case. This had led some teachers to consider whether traditional assessment procedures were geared sufficiently to course aims and learning objectives. The aim was to introduce new practice where discordance was evident. This pre NC survey recognised the change in the nature of D&T [CDT] principally through the introduction of GCSE and sought to identify what teachers were doing with regard to KS3 (they took for granted that new GCSE assessment requirements for examination purposes would be well documented by the examination boards). The findings suggested that many schools had delegated the task of assessment revision to departments on the grounds that each discipline had unique subject specific criteria which required the attention of a specialist. Thus the head of department was given the fundamental role as the person in charge of the quality of learning in the subject area. In exemplifying attempts to broaden the range of assessment techniques used the research team provided a generic overview of a sequence of assessment implementation, recommending that the school procedures were looked at as a whole as evidence suggested that "many ideas are transferable across departmental boundaries." (Welsh Office 1986, p.145). The D&T [CDT] findings were disappointing, despite referring to the work of the APU (1981) which suggested that the subject should seek to assess the bringing together of skills, experiences, knowledge, understanding, imagination and judgement within a task, the exemplars of good practice were merely tick box format, albeit addressing process not just the completion and quality of the finished product.

The APU Research

The largest and most significant research study in the area of assessment of D&T is that of the APU (Kimbell et al. 1991), this followed on from their earlier work, APU (1981), and DES and APU (1987); and from the other national projects (*Project Technology* and *Education through Craft and Design*). As described on pages 9-10, the APU project team's early work involved the re-assessment of the nature of design and technological capability and the process through which both the activity evolves and the capability is displayed. Thus this earlier work has derived a coherent and acceptable description of the activity of D&T, noting the features of performance which, because they are central to development, would need to be taken into account and used for monitoring in future research. In respect of assessment issues, the APU

(1981) working group who reported on understanding D&T were unable to fulfil the brief set for them. The third and final task required them "to suggest how these aspects of pupils' development [tasks related to the understanding of D&T] might be assessed." (p.1). Through their work on clarifying what is meant by 'understanding D&T' it became clear that assessing D&T was far more complex than originally supposed. "When considering the question of monitoring performance in this area, assessment should go beyond awareness and understanding, important thought they are, and centre on technological capability." (p.2).

The APU (Kimbell et al. 1991) research project commenced in1985 and was directed by Kimbell; it was large scale and produced reliable and detailed data. The brief focused the research on the summative aspects of assessment of pupils in KS4, based largely on limited measures (short tests) of capability. It did not address the issue of raising achievement through the use of assessment procedures, never-the-less, and most importantly, this study clearly exemplified the 'what' and the 'how' of assessing D&T capability. The sophistication and fine detail of such a large study has produced clear findings that need to be taken into account when implementing formative assessment procedures. Thus, these findings provided underpinning contextual data clarifying what D&T capability is and how it should be assessed.

The research team identified that one of the most intractable difficulties that they were dealing with was that processes (as opposed to products) were difficult to assess because they could not be seen but that the outcome was tangible. Likewise investigation or evaluation were not seen but yet the results were. "So any assessment of intellectual processes (rather than knowledge or skills) must be conditional upon our ability to get inside the pupil's mind and share their intentions." (Kimbell et al 1991, pp.23-24). Buried within the text, a salient point that should have had more prominence, drew a distinction between those things that should properly be assessed (i.e. how well a pupil does something) and those things that it is not appropriate to assess but very important to monitor.

The testing and assessment framework was devised by the APU team to 'evidence' the two aspects of pupil activity (of mind and hand). This focus for the assessment of both intentions and outcomes as a way of assessing the designing was not new, but its use in the assessment of pupils' D&T work was. "The definition of excellence in D&T was a fluid combination of the reflective and the active capabilities, in moving ideas from the vague towards reality." (Lawler 1996, p.7). Three kinds of category of capability were derived from the assessment framework; procedures, communication and concepts. The tests carried out in the 1988-9 survey were assessed using a total of fourteen judgements derived within these categories.

> It is our belief – supported by the weight of data collected in our survey – that these qualities lie at the heart of capability in design and technology, and that a clear understanding of each is crucial to a teacher's ability to identify capability in young people.
>
> (Kimbell et al. 1991, p.147).

The team also examined how the performance levels related to the general ability, gender and curriculum experience of pupils. The findings indicated that there were clear differences between ability groups and gender according to the context of task, structure of test and what pupils found helpful and unhelpful in relation to their work. A detailed account of these findings was published in the final report of the APU (Kimbell et al. 1991). The research team concluded that it proved impossible to constrain their activities to assessment in isolation. Kimbell (1988, p.112) questions the curriculum consequences that follow such a study and reports positive feedback from teachers. He concluded that the greatest test of an assessment system is that it should not "merely report on capability, but that it should provide the means of improving capability."

Kimbell (1997) published *Assessing Technology: International trends in curriculum and assessment.* This research study focused on summative assessment, firstly outlining in great detail the historical facts relating to the assessment of D&T in Great Britain, followed by four case studies; Germany, USA, Taiwan and Australia, reviewing their technology curricula and the associated assessment. The study itself does not address the formative issues relating to raising achievement or how the resultant assessment information is used for data analysis and target setting or value-added functions. However, a number of issues explored by Kimbell have direct implications for the development, or lack of development of formative strategies for raising achievement. Interestingly, Kimbell reported that none of the international studies had a single united system of assessment as the NC had provided us with. In most countries, the evidence suggested that two of the three functions of assessment could be unified, but not the third. In Germany, Australia and Taiwan, formative classroom assessment was successfully linked to summative awards and certification of various kinds, but nowhere had this been linked to the formal evaluation of schools. This system-wide monitoring function was typically conducted either by some version of APU testing using small representative samples of pupils, or by inspection procedures, or both. Kimbell goes on to exemplify these procedures in detail. (Kimbell 1997, Chapters 7-10).

Further Developments based on the APU Research

Stables and Kimbell, (2000) continued to develop a research instrument to assess performance in D&T, initially developed as part of the APU project (1991). Having discovered that the key to short-term assessment was the 'portfolio response booklet', they identified a problem with the conventional style of the booklet, which required page turning, thus hindering the iterative nature of the subject. The outcome of this research project was the 'unfolding portfolio response booklet', and their concluding remarks refer to its use, "to help in the teacher and student self-diagnosis of strengths and weaknesses in their own capability." (Stables and Kimbell 2000, p.202). This paper provides a simple but extremely effective tool for teachers to adopt, not only for its original purpose of measuring performance but also for its formative use in the quest to raise achievement.

Small Scale Research Projects

Johnstone, Reeve and Dick (1986) investigated assessment of KS3 D&T. They were concerned that the assessment/s used did not reflect the activity undertaken by the pupils, citing 'design' work being assessed by the same criteria as traditional craftwork. They found that despite a plethora of literature concerned with D&T education generally, there was little aimed directly at the criteria for assessment of the subject, particularly for KS3. However, this piece of research appears to be significantly flawed on a number of fronts. Firstly, they do not say where the 'Model Criteria for Design Work Assessment' they propose derive from; the 'model criteria' muddle aspects of process with motivation and effort and are of questionable use for assessment purposes. Secondly, the questionnaire was only circulated to three schools for completion and by admission it was misinterpreted by two of them. Johnstone et al., acknowledged that statistically, the results of their study would not allow generalisation but felt that the results showed a lack of consensus in both ranking and weighting of the 'model criteria'. Such an outcome is hardly surprising in view of the proposed criteria.

Two years later, Webb (1988, p.145) embarked on an action research project, attempting to provide Nottinghamshire schools with a feasible package of assessment for a CDT foundation (KS3) course. He referred to the lack of research in this area, but incorrectly states that "there is only one piece of research work available at present on assessment in CDT [citing] Johnson, Reeve and Dick 1986." Webb stated that there was a consensus that pupils needed to be assessed and informed of their performance and progress but did not back up this claim with evidence or references. He set out his rationale, referring to "HMI...who argue that any assessment should be beneficial in some way..." (DES 1987, quoted in Webb 1988, p.145) and goes on to stress that "there must be a shifting of emphasis so that teachers regard assessment as part of the process of learning rather than a chore." (ibid p.145). Additionally he set out 'pertinent' aims of a profiling system. The first was concerned with formative assessment ("involve learners in the learning process and try to provide feedback" (ibid p.145)), and the remaining four were all summative aspects. It was evident from statements such as "if assessment is done 'correctly'...teachers have to be educated or enlightened to the benefits that assessment has for them." (ibid), that Webb saw assessment only as a summative task to inform teachers, pupils and parents as to what had been achieved.

Newton and Hurn (1996) and Newton (1997) carried out a more rigorous research project investigating the effect of curriculum organisation on teacher assessment of D&T. Although the focus of this study is not of direct relevance, it provided some useful background data. The study classified three different organisational structures used for the KS3 delivery of D&T - integrated, federated or specialist. They developed three tasks, each involving the use of a different material, all comparable with the 'extended projects' devised by the APU (Kimbell et al. 1991). Newton and Hurn questioned if teachers in different organisations, possibly with different subculture norms saw the same degree of merit in a pupil's work. With this hypothesis in mind

the study set out to compare the assessment such teachers made of different kinds of activity carried out by 14-year-old pupils in D&T. The aim was to test the view that teachers in these different organisations might see different degrees of merit in the same work. The results showed that a pupil could receive a remarkable revision of levels of attainment if his or her work was regraded by teachers in a different organisational structure; thus, if teachers did not have a shared understanding of what constitutes design and technological capability, they favoured different types of project when awarding levels. Those from a traditionalist perspective favoured projects with a strong focus on the making of a product whilst those who worked in more integrated teams saw greater merit in broader context tasks where pupils applied knowledge, understanding and skills and thus the process was of greater significance. The findings also indicated that moderation procedures may well fail to correct this bias and difference of opinion as to what constitutes "proper and worthy design and technology." (Newton and Hurn 1996, p.23). However Kimbell et al. (1991, p.238) argue, supported by their research findings, that with suitable training "there is amongst teachers a sufficiently established public construct of capability to make holistic assessment a valuable and reliable tool for the assessment of integrated activities."

In 1998, Kent and Towse, having established 'good assessment practice' from the literature, set out to determine the extent to which this was matched in a random sample of local schools. They referred to the work of Black and Atkin (1996) and used their hierarchical three level definition to make judgements. Kent and Towse reflected that evidence from their pilot sample was disappointing, citing that in two thirds of the schools teachers had found it hard to adapt. They found planning for progression from KS2 was virtually non-existent, that most teachers' used a 'tick sheet' grid for on-going assessment purposes, with most coursework projects being assessed summatively and that there was little evidence of feedback as a diagnostic tool. They did find a few schools where a unified faculty approach to the monitoring and assessment of pupils and the regular appraisal of PoS had raised pupils' and teachers' awareness, expectations and standards. The use of a random sample here has reflected the findings of successive OFSTED/HMCI annual reports (see below), and reinforces the need for a case study approach concentrating on exemplary practice.

Evidence from OFSTED Inspections

Since the introduction of the NC in September 1990 OFSTED/HMCI have published their annual inspection findings. Initially in separate subject reports (OFSTED/HMCI 1992, 1993, 1994, 1995, and 1996), and from 1997 onwards, in generic reports on teaching and learning with reference to the foundation subjects only where relevant. (OFSTED/HMCI 1997, 1998, and 1999). The assessment of D&T had featured consistently each year as an area of weakness. Firstly, recognising the difficulties of working with the original Order for D&T, the main findings of the report concluded that "schools have devoted a great deal of time and effort to considering assessment and recording D&T, but few have developed satisfactory policies and practices." (OFSTED/HMCI 1992, p.9). Four years later it was evident that little had changed.

Their report (OFSTED/HMCI 1996) continued to identify issues concerned with assessment for D&T at Key Stages 3.

With the introduction of the 1995 revised Order for D&T an improvement was noted "Curriculum planning and associated assessment have improved as a consequence of the more 'user friendly' formulation of the National Curriculum." (OFSTED 1999c, p.3). Nevertheless "overall it [assessment] remains a relative weakness...[and] is insufficiently used to help pupils improve their future work." (ibid p.2). The assessment issues raised by OFSTED and HMCI in these annual reports have been discussed in more detail (see pp. 13-14).

School Focused Curriculum Development Initiatives

A number of articles, written by teachers have been published in the subject specialist journals, relating specifically to the assessment of D&T. These have been studied to explore the ideas and suggestions put forward as exemplars of practice.

Ager (1990), concerned that most work undertaken on assessment strategies in D&T concentrated on GCSE and on the methods of external assessment (APU 1987), constructed an 'Assessment Framework' specifically for use with KS3. The following criteria were identified:

- It must make use of the assessment structure identified by *Technology in the National Curriculum* (DES 1990).
- The assessment should be carried out whilst pupils are involved in the programme of activities which have been devised by the school in order to develop D&T capability.

The criteria were sound and encapsulated many of the essential and desirable features including: "The framework should act as a formative assessment tool." (p31). It was disappointing, therefore to discover that the resultant pro-forma consisted of 'pupil-speak', I can/can't do statements, each having to be achieved three times with the teacher's agreement before the 'level' can be said to have been achieved. Agar suggested that the framework should be seen as the assessment tool for the whole of the key stage. In effect a summative monitoring pro-forma mapping levels achieved in a range of generic skills and materials specific aspects, which failed to address the formative purpose of assessment.

Griffiths (1996), outlined an assessment scheme developed for Key Stage 3, however the aims were mainly concerned with summative aspects and ways to enhance teacher understanding of assessment procedures, thus significantly different to the aims of my study. Here the school devised, trialled and modified several schemes. Firstly, they criticised one based on the NC Attainment Targets, suggesting that it restricted the development of the pupil's capability by placing too much emphasis on the acquisition and repetition of manipulative skills and restricted the development of the pupils' knowledge of the design process. The second scheme used the APU definition and accompanying qualities of capability, but this too met with concerns raised regarding the length of time the process took and that in order to meet all the

requirements pupils had to possess a deep understanding of the design process, many of whom did not have this. At this stage one questions, firstly, the teachers understanding of capability, secondly the planning of a scheme of work that did not sufficiently address the development of design skills and thirdly, what would appear to be a mismatch between learning objectives and assessment criteria. A third scheme was devised, it was evident that the link between learning objectives and assessment criteria had not yet been made despite their review of the second scheme. They cited the 'planning' statements as an example, the top level of which required "An excellent, logical and concise order of work" but complain "Many of the pupils had very little experience of devising an order of work..." (Griffiths 1996, p.159). In the conclusion to this article it was interesting to note that a consensus of opinion as to what constitutes design and technological capability is a fundamental necessity for the development and use of assessment procedures.

Horrell (1998), having read widely from the field on assessment puts forward his perspective of assessment used within special educational needs and reflected that many aspects are equally relevant in mainstream schools:

> Assessment is fundamental to good teaching, and that by making assessments during the key stages you will build up your knowledge of individual pupils' strengths and weaknesses. This in turn is an integral part of the planning and development of any course, enabling you to set objectives either for groups of pupils or for individuals.
>
> (Horrell 1998, p.60).

The paper set out a clear rationale and addresses the pertinent key issues regarding raising achievement through the positive use of assessment procedures and recognised the part that monitoring, evaluation and target setting had to play within the context of assessment.

The experience of piloting the KS3 SATs was outlined by Helliwell (1992), this demonstrated the difficulties of trying to address the 'Test' requirements whilst juggling the display, marking and moderating of GCSE course work at the same time! The long task, as described, was not significantly different from a regular unit of work apart from the additional summative assessment requirements and no doubt would not tell the teachers anything they did not already know about the levels of achievement of individual pupils.

Resource Materials

It is clear that D&T teachers have had to contend with a great deal of change in a relatively short period of time. Whilst the curriculum has evolved rapidly, alongside this has been the frequently changing requirements for summative assessment. A critical review of the support and guidance materials looks at what is available to help teachers address the issues of assessment and implement efficient and effective strategies and procedures in school. In broad terms these resources can be grouped into three categories.

Guidance and Support Materials from Statutory Bodies

The non-statutory guidance materials (NCC 1990) produced to support teachers with the implementation of the NC D&T did not address assessment at all and stated that guidance would be offered by SEAC. Thus *'Teacher Assessment in Practice - Key Stage 3* (SEAC 1991b) was published, designed to provide a basis for discussion about teacher assessment within and across departments. However, most of the exemplars were drawn from the core subjects and were principally concerned with arriving at summative judgements, such generic documents rarely find their way into subject departments, unless a whole school approach and initiative is in place. Subject specific guidance was published (SEAC 1992) but again only addressed the summative aspect leaving teachers to look elsewhere for guidance on formative strategies. Nevertheless, the exemplars of assessed D&T work (SEAC 1992 and SCAA 1996a) provide a useful reference point for teachers to check standards against when making judgements on the award of summative levels at the end of the key stage and to support them in making consistent judgements about their own pupils' work. In coming to judgements about pupils' attainment they recognised and encouraged a broad view of what pupils have achieved, before examining the evidence more closely. This recommendation echoes the findings of the APU (Kimbell et al. 1991) research that identified assessors' greater accuracy and consistency when first awarding an holistic level prior to detailed examination. With regard to the assessment of capability it is significant in its almost total absence throughout both publications. To address the issue, raised by OFSTED, of inconsistent practice within schools, SCAA (1995a) provided useful constructive guidance on consistency in teacher assessment. This booklet also identified strategies for the 'what' of formative assessment but not the 'how'. Also in the same year they published specific information regarding the new requirements at KS3 (SCAA1995b). OFSTED/DfEE (1995) produced exemplification of good practice in D&T. This identified the purposes of formative and summative assessment within a D&T context, thus providing schools with a framework from which to develop their own strategies. Within the context of the nature of the subject they stressed the vital role of discussion with pupils to provide essential feedback. In recent years a number of generic publications have been produced, OFSTED/HMCI (1997), SCAA (1997a), SCAA (1997b), OFSTED/OHMCI (1997), OFSTED/OHMCI (1998) and QCA (1999) again suggesting the 'what', 'when' and 'why' but not the 'how'. The TTA (1998a and 1998b) have now outlined in their national standards for QTS and subject leaders, the expectations for assessment.

Optional tests and tasks were produced by SCAA (1996b) to promote consistency in teacher assessment, although specifically designed for summative end of key stage assessment, they provided the first real practical help regarding the 'how', by demonstrating what teachers might look at formatively. The tests focus on aspects of capability which are difficult to assess by other means. Typically, these relate to pupils' thinking and decision making, and to the ways in which they apply their knowledge and understanding. Assessment criteria are provided in each unit, drawn from the level descriptions and the programme of study, but most significantly, written in terms of the unit task. Two forms of the tasks are presented, a basic task and a more

challenging extended version. Given the difficulties that teachers were experiencing with assessment, this suite of tasks goes a long way to provide the answers in terms of summative assessment of capability and also provides ready made procedures to adapt or use direct for formative assessment. Disappointingly, there was very little evidence of their use in schools, teachers having been through the 1993 statutory assessment tasks, perceived that they would create more work rather than providing ready made assessment procedures to use or adapt.

When one considers the significant judgements made regarding assessment during school inspections, it is interesting to note how little guidance is provided by OFSTED in their Framework for the Inspection of Schools relating to assessment procedures and practice. The original OFSTED *Framework for Inspecting Schools* (1992) and the first revised OFSTED *Handbook for Inspecting Secondary Schools* (1995), whilst reinforcing the principle that assessment is an integral part of teaching and learning, failed to identify the key features of good assessment practice, similarly the second revision of the handbook (OFSTED 1999a) is no more enlightening on this matter. Subject specific guidance for inspectors is similarly bereft of guidance on assessment matters, listing only one point, "how well pupils' attainment and progress are assessed and monitored both in designing and making and in knowledge and understanding." (OFSTED 1999b, p.8). A number of useful publications, DFE (1996), OFSTED/DfEE (1996), DfEE (1997), DfEE/Standards and Effectiveness Unit (1997), DfEE (1998) and QCA (1998) have been produced to support schools in the use and analysis of data. (see page 20).

Materials from Professional Associations

The NAAIDT and DATA produce publications to support the delivery of D&T. These generally give sound advice and are of high quality, having been produced by, or commissioned from acknowledged experts in the particular field. DATA have produced a proliferation of useful materials, however, only a minority address assessment. It must be noted that this minority is significantly more than can be found elsewhere. Firstly, the handbook for heads of department (DATA 1997) provides dedicated, detailed sections on monitoring standards using test and examination analysis and also a departmental assessment policy framework. In addition, a section is devoted to assessment issues and this includes brief advice on the assessment of capability; something which all the publications produced by statutory bodies fail to mention. DATA has also produced an assessment handbook (Crompton and Farrell 1997), significantly, the only publication dedicated to the formative assessment of D&T, this provides guidance and strategies for implementation. Pro-formas to replicate or adapt are provided, each with detailed guidance identifying the 'what', 'when' and 'how'. It is evident that those responsible for the writing of this handbook know a great deal about D&T as they have clearly identified the 'what' of assessing capability but their continued guidance to grade or award marks for on-going work indicates little knowledge of formative assessment strategies to support raising achievement. To exemplify the national standards for subject leaders (TTA 1998b) DATA produced subject specific guidance (DATA 1999), which highlighted issues of

particular concern for D&T. DATA has also published support materials specifically for KS3 (1995b), this consists of a pack of units of work, but apart from a pro-forma that places the Level Descriptions for 'Designing' and 'Making' alongside one another, there is no other reference to assessment.

NAAIDT, although primarily concerned with the support of the work its members, have also produced materials to support schools. These materials are produced in response to an identified need, in this case through inspection work, monitoring and review of LEA schools, it was evident that assessment was a weakness, especially at KS3. *'Assessment of Design and Technology at Key Stage 3'* (NAAIDT/Berkshire 1997), was designed to assist teachers with making end of key stage assessments of the D&T capability of Year 9 pupils. NAAIDT had identified that teachers were having difficulty using and agreeing the level descriptions, so this publication provided separate sections comparing the features of pupils' work at a variety of levels, using the same context and DMA, thus making direct comparison between different levels very straightforward. A year earlier, despite the recommendation from SCAA that level descriptions were to be used as a 'best fit' at the end of a key stage, an assessment pack was produced (Cater 1996) in response to teachers requests for the levels to be translated into 'pupil speak' statements. This resource attempted to give teachers the 'how' as well as the 'what' of assessment but by doing so the level descriptions were atomised to such an extent that in isolation each statement became meaningless. This attempt to use a summative process for a formative purpose provides evidence that this does not work, as has been argued earlier in the chapter. Nevertheless, the 'project assessment sheet' was designed to ensure that assessment was integral to planning and that assessment criteria (to be defined by schools) were linked to specific projects. To support departments involved in raising and monitoring D&T standards a publication (NAAIDT 1997) was produced, translating the OFSTED framework into specific materials and subject detail, to enable subject-specific strengths and weaknesses to be identified, prioritised and monitored. The questions raised in the assessment section asked a range of insightful questions but omitted to ask if the use of assessment procedures leads to raising achievement. *Quality Through Progression* (NAAIDT 1998) was published in response to the need to help teachers address progression, whilst using a 'carousel system' to deliver units of work. This resource provides a comprehensive view of progression within and across key stages and aids the planning of work at the appropriate level. Detailed charts link the PoS with 'Levels' and accordingly map progression through the key stages. These enable learning intentions to be targeted to pupils of different attainment levels and also provide a clear focus for assessment. An example of a summative assessment pupil record card illustrates how progression can be mapped over the key stage. This information could also be used for target setting and value-added purposes. The publication does not however suggest how ongoing assessment might be used formatively.

Both associations (DATA 1997, NAAIDT 1999) have produced helpful guidance regarding data analysis and target setting within the context of D&T, augmenting the support materials available nationally.

Commercial Resources

Most of the educational publishing companies produce a range of textbooks and teachers' guides covering KS3, but in most, little reference is made to formative assessment. A number of commercial schemes (for example, Nuffield, RCA and TEP), covering KS3 have been produced for schools to adopt in their entirety or to 'pick and mix' from. Most also include some reference to assessment for each unit of work, however they do not all link their chosen assessment foci to the programmes of study. The Nuffield project first introduced self-assessment to pupils through a process of 'In-built assessment through reviewing' (Barlex, Black and Harrison 1994) which involved active pupil participation at three stages during a unit of work. This aspect was further developed in the *Study Guide* (Barlex 1995a) which included two more sections providing guidance to support self-assessment, 'Being good at design and technology' and 'Getting better at design and technology'. These sections also addressed progression through the key stages by including three levels of guidance. *The Teacher's Guide* (Barlex 1995b) provided advice regarding the assessment of pupils' work. These resources have been further enhanced with self-assessment guidance and support for pupils and further information for teachers in the second editions (Barlex 2000a and 2000b).

Farrell/TERU at Goldsmiths College (1995), produced diagnostic tests in D&T. These were focused on assessing capability and made clear distinctions between formative and summative procedures.

> A picture of capability cannot be gained by separately assessing each of its aspects on different occasions through different projects and lumping them together to give a whole view...It is possible to chart a developing view of whole capability through formative assessment, but this is different from assessing separate parts of capability and then piecing them together as if they could be aggregated into a meaningful whole.
>
> (Farrell 1995, pp.7-8)

The printed pupil worksheets are the same format as recommended by Stables and Kimbell(2000) based on their extensive research in this area, enabling pupils to move from stage to stage and still see the previous workings. The tasks are differentiated into three 'bands' to meet the needs of both lower and higher attaining pupils. This resource addresses the very complex issue of assessing D&T capability and provides all the information needed to carry out the tests; its main disadvantage is the context 'Issues for Elderly People in the Home', which as a topic does not have a high motivation factor for pupils. Nevertheless, this has to be one of the most comprehensive and useful resources in terms of the 'how' of summative assessment and within it, implications for formative procedures.

Shepard, Fasciato and Jarratt (1998) produced pupil level statements for each level in each material area as an attempt to involve pupils in the assessment of their own work . However, the process of atomising the level descriptions and turning them into 'pupil speak' reduces them to simple individual tasks, unrelated to D&T capability. One

of the few publications exclusively for KS3 assessment has been produced by Shepard, Fasciato and Mitchell (1998), but unlike Farrell's (1995) materials this does not provide guidance on the holistic nature of D&T capability and how to assess it. The resource itself is highly structured, leading pupils through the process, to such an extent that there is little opportunity to demonstrate capability.

Overall, there are very few resources to support teachers with the 'how' of everyday formative assessment within D&T and thus the need to look beyond the subject, to generic resources to provide a lead. There are, as this review demonstrates a few very good resources to support summative end of key stage assessments.

Support for Pedagogy

A limited number of books have been published specifically about D&T, the majority of these present papers written by various authors, mostly national figures within the field of D&T. The majority of these books include a chapter related to an aspect of assessment, even these were usually focused on KS4 or summative procedures, Kimbell (1982), Cross and McCormick (1986), Murray (19900, McCormick, Murphy, and Harrison (1992), Banks (1994), Eggleston (1996), and Kimbell, Stables and Green (1996), Eggleston (2000). With regard to books written specifically about assessment in D&T, there is only one (Kimbell 1997) and even this is focused on KS4 and international comparisons. A number of subject specialist journals are available and contain a variety of articles, but as the literature search revealed, very few are concerned with assessment.

Conclusions

D&T has evolved over many years, from its craft based origins where quality of finished product was the prime purpose to the NC subject of today where the focus is on developing design and technological capability. The rapidly changing nature of the curriculum area has necessitated equally rapid developments in assessment instruments. This situation highlighted the interdependence of the two stories, one of D&T, the other of assessment. "Unfortunately this interrelationship made us subject to all the evolving conventions of assessment – some of which were completely flawed." (Kimbell 1996, p.6). Throughout this period the emphasis has been on summative assessment, rather than on formative procedures which are devised to enhance learning and achievement. Nevertheless, it is vital to be aware of, and understand all that is known about summative procedures and instruments as each summative assessment can also be used as a baseline or benchmark from which to set future targets. During the 1970s and 1980s assessment policy and practice in D&T became increasingly concerned with details and specifics and less concerned with broad judgements. The progressive atomisation of assessment was exemplified in the first NC Order for D&T in 1990. Kimbell (1994) argued that the NC assessment requirements were inappropriate, cumbersome and lacked reliability. The revised Order (DFE 1995) made significant changes, requiring only an end of key stage teacher assessed level derived from an holistic judgement.

Research findings from studies of generic assessment (QCA 1998), indicate pupils' prior attainment as the most important factor when predicting their likely future performance, thus reinforcing the need to have accurate and reliable summative procedures in place. From this information it is then possible for departments to set targets for individual pupils and cohorts that 'add' value, thus planning to raise achievement above the expected level. Research studies (Black and Wiliam 1998a) have shown that if pupils are given only marks or grades for their work they do not make as much progress as those who receive comments only.

The review of research findings in the field of D&T and its assessment highlights the fact that there has been very little activity in this area, and what has been carried out is mostly concerned with summative procedures. The findings of the APU (1991) research have illustrated D&T capability and how capability can be assessed summatively. This research has identified what needs to be taken into account when implementing formative procedures. The small-scale research projects in the main lack reliability and validity of research methodology, several also demonstrate a lack of understanding of the purposes and types of assessment.

Most of the resource materials published have established broad principles outlining policy, or have been designed specifically to provide a basis for discussion, SEAC (1991b), SCAA (1995a) and SCAA (1997a) or have provided case study exemplars drawn from subjects other than D&T (SEAC 1991b); or lastly, are specifically related to end of key stage summative assessment. The review established that very little material or guidance has been published to support teachers' with the formative assessment of D&T.

CHAPTER 3

RESEARCH DESIGN

Introduction

The aim of the study was to explore the use of assessment procedures within D&T, focusing on KS3:

- to identify key features that contribute to the raising of achievement;
- to exemplify current practice.

The outcome objectives of such a study should:

- establish the aims and principles of assessment within D&T;
- identify the range of assessment strategies planned and used;
- identify and promote good practice;
- provide guidance for teachers on assessment procedures, that contribute to the raising of achievement.

The objectives identified to accomplish the research aim required in-depth knowledge and understanding of a school and of NC D&T. A research strategy that would provide the opportunity to develop detailed, intensive knowledge about a small number of schools was needed.

Methodology

Rationale

The most important condition for differentiating between research strategies according to Robson (1993) and Yin (1994), is to identify the type of research questions being asked. The research questions for this study were essentially exploratory, to find out what schools were actually doing. The questions posed to contextualize the research settings were,.by the nature of the information required, descriptive.

The technique of case study is all about context. It is interested, not in making claims about general patterns and trends, but in uncovering the dynamics of particular institutions and situations, viewed from several different perspectives. Simons (1989, p.115) puts forward the view that a case study recognises the particular contexts in which innovations are embedded and "aspires to describe and analyze the processes by which, and the conditions in which innovations are implemented." Robson (1993, p.146) defines a case study as a strategy for doing research which, "involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence." In other words, it is concerned principally with the interaction of procedures and events, described by Hamel, Dufour and Fortin (1993) as an all encompassing approach. The strength of the case study strategy for this study was that it would concentrate on a specific situation and attempt to identify the various interactive processes. Thus the opportunity to study in-depth,

within a number of schools a range of assessment procedures to identify practice and strategies which contributed to raising achievement.

As a research strategy the case study has a number of critics. Atkinson and Delamont (1985) cited a number of issues that they perceived as being serious shortcomings for this approach. They refered to studies produced by Jenkins, Simons, Stake and Walker, to demonstrate that there is no consensus definition of case study, that there are confusions with terminology and a lack of methodology. Case studies, because of their intensive nature, can usually only focus on a small number of cases and this leads to questions about rigour, the representativeness of the findings, whether they provide an adequate base for both the development and the answering of research questions and also objectivity. Walker (1983) and Adelman and Young (1985) raised concerns about the difficulty of maintaining a suspension of judgement; of relying too heavily on a single source of evidence. Stenhouse (1982) identified a lack of experience of the problem of writing up case study material. In response to these specific weaknesses, close attention to ensure rigour was paid to matters of design, data collection, analysis, interpretation and reporting. Yin (1994) demonstrated how the case study, as a research strategy comprises an all encompassing method:

> copes with the technically distinctive situation in which there will be many more variables of interest than data points;
>
> relies on multiple sources of evidence, with data needing to converge in a triangulating fashion;
>
> benefits from the prior development of theoretical propositions to guide data collection and analysis.
>
> (Yin 1994, p.13)

Stenhouse (1982) sought to define the boundaries of case study research and to develop its methodology for use specifically in the study of education. Bassey (in Bell, 1993) considered that case studies were valid forms of educational research if they were aimed at the improvement of education, were systematic, critical and reliable, and if they extended the boundaries of existing knowledge. Thus the case study has many strengths, if carried out rigorously, with thorough planning and preparation. Yin (1994) describes the research design as a "blueprint", much more than just a plan of the work to be done, the design should be well thought out, detailed and rigorous. To facilitate such an approach he identifies five essential component parts of the design:

> a study's questions,
> its propositions,
> its unit(s) of analysis,
> the logic linking the data to the propositions,
> the criteria for interpreting the findings.
>
> (Yin 1994, p.20)

Components of the Research Design

It was important that the design of the case study was seen as a sequence that connected the study through its various stages, from the initial research questions through to its conclusions, thus it:

> Guides the investigator in the process of collecting, analysing, and interpreting observations. It is a logical model of proof that allows the researcher to draw inferences concerning causal relations among the variables under investigation. The research design also defines the domain of generalizability, that is. whether the obtained interpretations can be generalized to a larger population or to different situations.
>
> (Nachmias and Nachmias 1996, p.78)

Whilst Yin (1994) argued for the need for rigorous preparation and detailed pre-planning, Robson (1993) took a more flexible approach to the operationalization of the design. He advocated an initial plan that did not need to be complete at the beginning of the study and highlighted the advantages of being able to develop and refine in the light of experience. The design of this study has addressed the issues of rigour required by Yin (1994), and encompassed the flexibility recommended by Robson (1993). Thus the conceptual framework and the research questions devised were not seen as definitive, they were reviewed during the process, formally after the pilot case data collection and initial analysis. The iterative nature of 'designing' and 'doing' required an open-minded approach and thus modifications and refinements were carried out when necessary.

Pilot Study

Robson (1993) is relatively dismissive of the need for, or benefit of a pilot study, advocating that there is no substitute for involvement with the 'real' situation. Certainly, in studies where there is only one case to be considered or in circumstances where there is no realistic equivalent to act as a pilot, this view is very valid. Yin (1994), on the other hand, whose philosophy for case study is for detailed rigorous planning at the design stage prior to data collection, puts forward the opposite view and exemplifies the value and necessity of pilot work. Thus a pilot study may reveal:

- inadequacies in the initial design
- that the selection of cases may have to be modified because of new information about the cases
- interview questions may need to be modified/extended
- observation schedules/checklists may need refinement

The identification of inadequacies; refinement or modification is viewed by Yin (1994) as an appropriate and desirable use of pilot studies. This view is reinforced by Blaxter, Hughes and Tight (1996) who stress the importance of testing the research instruments. For this study it was felt that the benefit and experience gained from a pilot study outweighed the 'learn on the job' approach of Robson (1993) and thus the decision to test the research techniques and instruments in the 'real' situation was

made. Thus the final preparation for the data collection was rehearsed through the pilot study.

The pilot study was planned, firstly to ensure that the aim of the research study could be realised, secondly that the outcome objectives could be accomplished and thirdly, that the research questions would actually produce the information sought. Finally, the pilot study was used more formatively to assist in the development of relevant lines of inquiry and also to provide some conceptual clarification for the research design. Thus the purpose was to refine data collection plans with respect to the content of the data and the procedures to be followed. Yin (1994) argued that the analysis of case study evidence is one of the least developed and most difficult aspects of doing case studies. Hence, in addition to the benefits of testing the research techniques and methods to discover inadequacies, the need to ensure that the data collected was analysable and that valid conclusions could be drawn from it was paramount. Thus heeding Yin's (1994) strong recommendation that the analytic approach be developed as part of the case study protocol, the analytic strategy was developed in parallel with the research techniques. The pilot study is detailed in Appendix 5.

Conceptual Framework

A conceptual framework was produced as a starting point, developed initially from the aims and objectives identified. A diagrammatic overview of the structure is detailed in *Fig. 3.1.*

Case Questions

The aim of the study, operationalized through the outcome objectives required a predominantly exploratory approach, supported by some descriptive contextual background. Yin (1994) regarded the development of the research questions as the most important step to be taken in a research study. This view of the importance of good questions was emphasized by Stake (1995, p.33) "because case and context are infinitely complex and the phenomena are fluid and elusive." The literature review provided the context and the background to this study. A review of previous research studies of assessment within D&T, despite their relative scarcity, helped to develop a sharper and more insightful range of questions. "Good research is not about good methods as much as it is about good thinking." (Stake 1995, p.20)

The initial research questions developed to achieve the aim of the study are as follows:

- **How is assessment used in raising achievement in D&T?**
- **What assessment strategies are used for raising achievement in D&T?**
  - What do heads of D&T departments understand as the purpose of assessment?
  - What do heads of D&T departments perceive as effective procedures /strategies to raise achievement?

DIAGRAMATIC OVERVIEW OF THE RESEARCH DESIGN

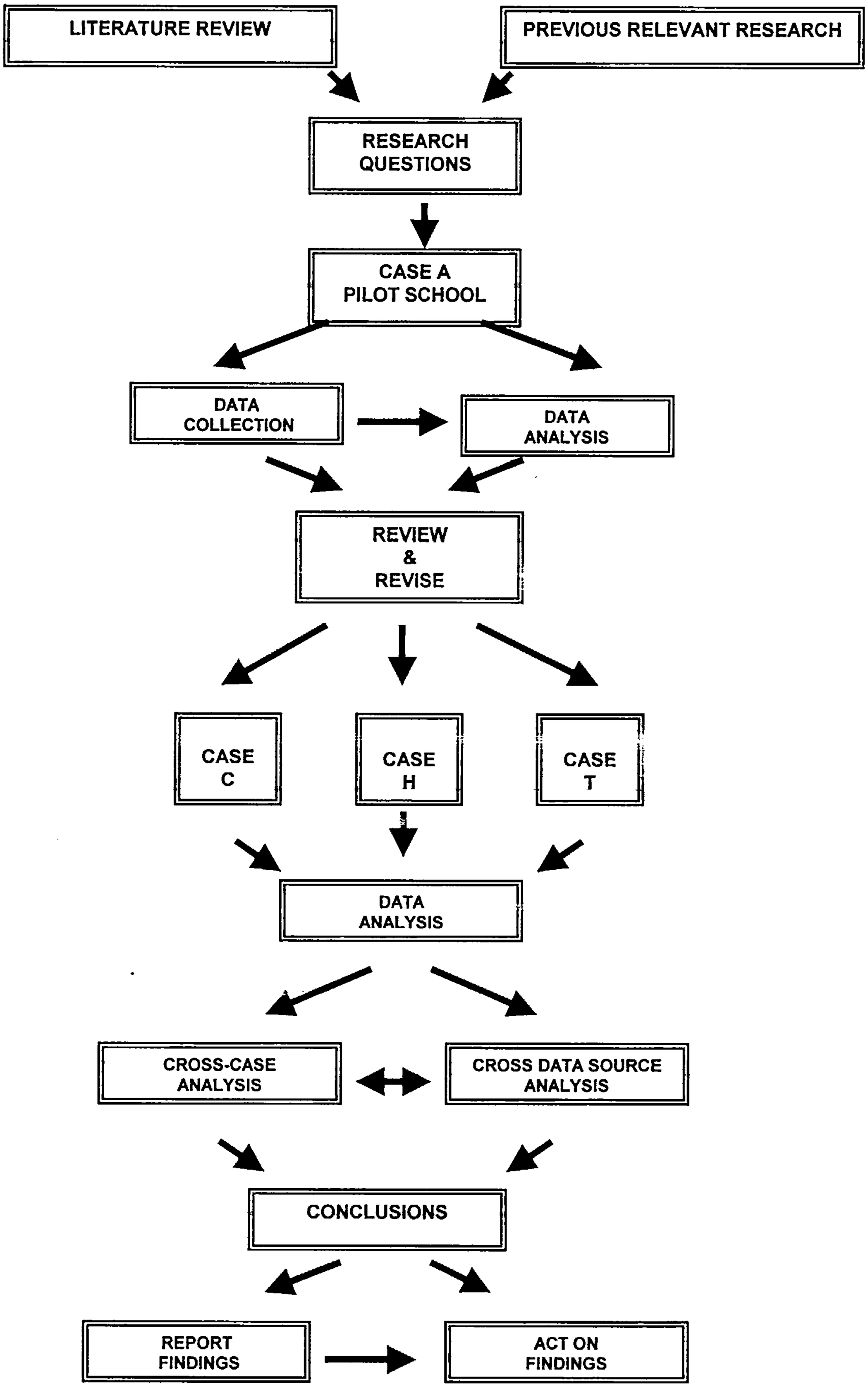

Figure 3.1 **Conceptual Structure**

- What do teachers of D&T perceive as effective procedures/strategies to raise achievement
- What do teachers do in practice?

- What is the pupils' understanding of assessment and its purposes?
- What experiences have pupils had of assessment?
- What does assessment tell pupils?
- Do pupils consider that assessment helps them to do better?

Fig. 3.2 illustrates how these questions were further developed through the range of data collection techniques.

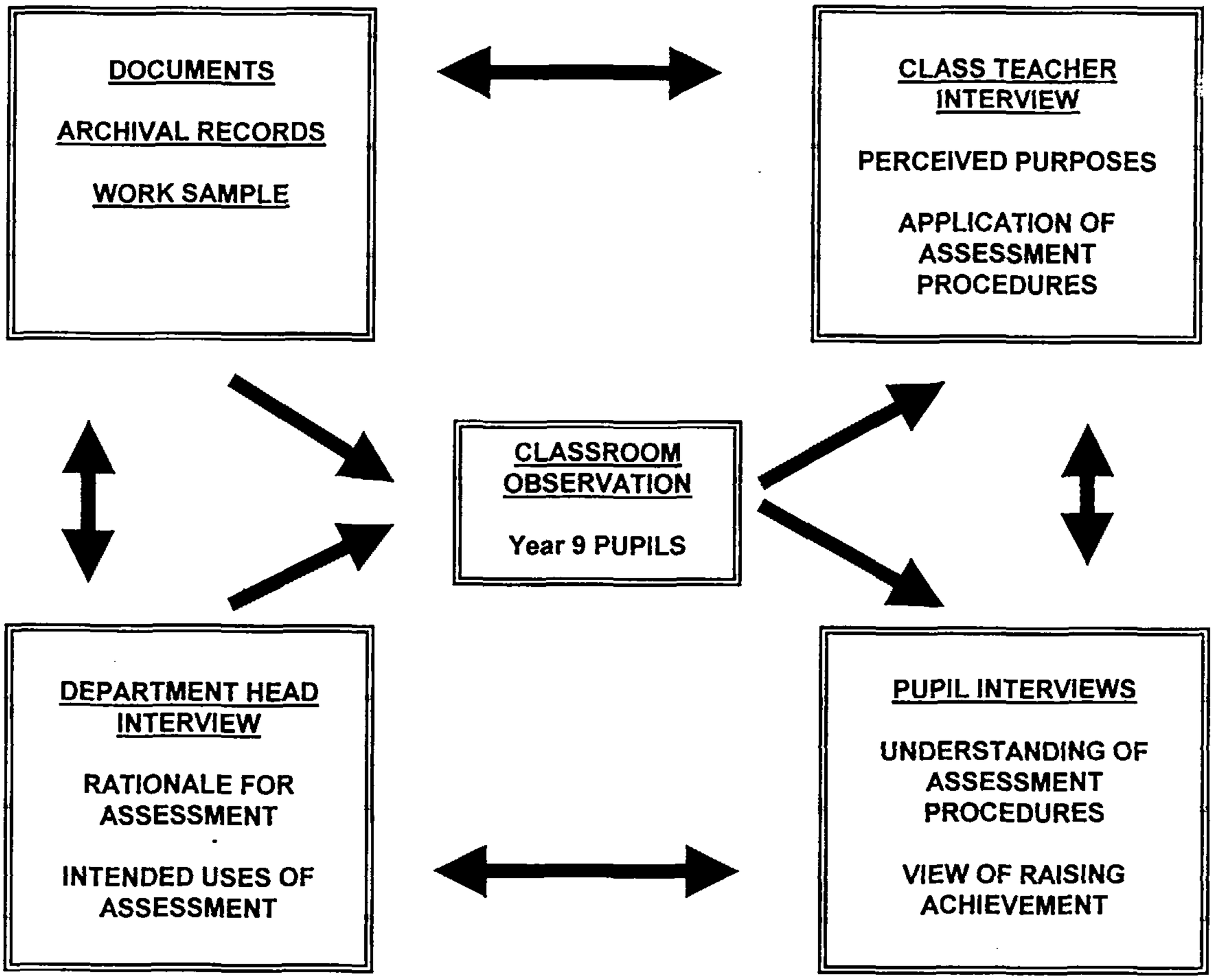

***Figure 3.2* Case Framework**

Sample Strategy

The selection of research sites (case schools) had implications not only for the data collection, but also for the data that were available for analysis and dissemination. Burgess, Pole, Evans and Priestly (1994) describe the problems of selection of case study sites; recognising that by using a case study strategy a random, representative sample was not possible to achieve. The question for them was, how four sites should be identified within one local education authority, and on what criteria should they be selected. They justified their final choice by referring to Bryman (1988) who stated that the principles of selection involved may, in some respects be seen as the kind of

compromise which is common in research, allowing research and evaluation to be conducted rigorously, yet within the parameters of a specified budget.

To select four case schools (one for a pilot and three for the main study), a purposive sampling technique was used as outlined by Robson (1993) and Miles and Huberman (1994). The selection was based on the researcher's judgement as to typicality or interest. In the majority of case studies where only a small number of cases were involved purposive sampling gave 'better purchase' on the research question according to Robson (1993). On this basis, four mainstream secondary schools within one local education authority were selected, primarily for their declared focus on assessment strategies to raise achievement. The multiple-case sampling, using three cases, added further confidence to the findings. The conceptual framework, which governed the questions to be asked, determined the parameters of the sample within each case. The range of participants is illustrated in *Fig. 3.2.* Yin (1994) argued that the use of multiple-case designs should follow a replication, not a sampling logic and should serve in a similar manner to multi-experiments; with similar results (a literal replication) or contrasting results (a theoretical replication) predicted explicitly at the outset of the investigation.

The four schools selected were approached to seek their willingness to participate in the research project as the subject of a case study. School A was asked to be the pilot case to test the research instruments. Initial visits to the schools were organised to introduce the investigation and to secure effective co-operation. The identification of key individuals for subsequent interviews and feedback took place at this stage. Relevant documentation was agreed and arrangements made for its collection.

Sources of Evidence

A major strength of case study data collection is the opportunity to use many different sources of evidence: data was collected from multiple sources; a literature review; documents; archival records; interviews and observations. The most important advantage of using multiple sources of evidence was the development of "converging lines of inquiry" (Yin 1994, p.92), a process of triangulation which strengthen the findings of the case study. The data collection process for case studies is more complex than the processes used in other research strategies. "The case study investigator must have a methodological versatility...and must follow certain formal procedures to ensure 'quality control' during the data collection process." (Yin 1994, p.100). For this study four sources were identified within the case framework (see *Fig.3.2*):

- documentation
- archival records
- interviews
- observation

An overview of the data collection methods identifying the range and scope of each method is detailed in Appendix 6.

Quality of the Research Design

To establish validity, to ensure that the findings were 'really' about what they appear to be about, tests common to all social science methods were applied (see Fig.3.3).

Tests	Case Study Tactic	Phase
CONSTRUCT VALIDITY	Multiple sources of evidence	Data collection
INTERNAL VALIDITY	Pattern matching	Data analysis
	Explanation building	Data analysis
EXTERNAL VALIDITY	**Replication logic**	**Research design**
RELIABILITY	**Case study protocol**	**Data collection**
	Case study database	**Data collection**

Figure 3.3 Validity Tests

Methods

Denzin (1978) stressed that the usefulness of the research method was determined by the way in which it was applied and the rigour behind its application. A four-fold approach has been used for this study:

- literature review
- review of departmental documentation and archival records
- interviews with teachers and pupils
- classroom observation and work sampling

Literature Review

The purpose of the literature review was to provide a report that would be a synthesis of the relevant literature, a gathering of information to "support or refute arguments" (Bell 1987, p.15). The review has enabled the researcher to develop a picture of the current state of knowledge and of the major questions posed in relation to the assessment of D&T and how it is used to raise achievement. Verma and Beard emphasize the importance of the 'theory' to help the researcher summarize previous information and guide the future course of action:

> Sometimes the formulation of a theory may indicate missing ideas or links and the kinds of additional data required. Thus, a theory is an essential tool of research in stimulating the advancement of knowledge still further.
>
> (Verma and Beard 1981, p.10)

The literature review provided a critical summary of the range of existing materials relating to assessment within D&T and also of current generic assessment materials. Previous research was reviewed to develop sharper and more insightful questions about assessment and its role in raising achievement in D&T. The review also provided a conceptual and theoretical context in which assessment and its contribution to raising standards of D&T at KS3 was situated. Appendix 7 lists the sources used to set the study in context.

Data Collection Techniques

Document and Archival Source Review

Documents, because of their overall value, play an explicit role in any case study data collection. For a case study the most important use of the documents is to provide specific details, and to corroborate and augment evidence from the other sources. Most archival records are produced for a specific purpose and specific audience (other than the case study) and these conditions were fully appreciated in order to interpret their usefulness as records. Time was allocated during the preliminary field visits to the case study schools for the collection of current documentary evidence together with any relevant documents that had been superceded and put into 'cold storage' and for the examination of archival evidence such as record sheets and other pro-formas of on-going pupil assessments.

A detailed review of departmental documentation, relevant to assessment procedures was planned and carried out. This included policy and planning documentation together with copies of pro-formas used; to identify the purposes of assessment and the range of assessment procedures the schools had actually planned to use. A complete list of documents sought from schools is detailed in Appendix 8. The following archival evidence was also scrutinised where available:

- baseline on entry - for example, NC KS2 level/VR score
- end of KS3 teacher assessment
- on-going pupil assessment pro-formas
- departmental assessment portfolio
- pupil portfolios

The documentation was evaluated with regard to accuracy and worth. Firstly to establish that the document itself rather than its contents was authentic (external criticism) and secondly having established its authenticity the next task was to evaluate the accuracy and worth of the data it contained (internal criticism) (Cohen and Manion 1989). For case studies "the most important use of documents is to corroborate and augment evidence from other sources." (Yin 1994, p.81).

Interviews

The interview, argued by Yin (1993) as one of the most important sources of case study information, was selected as a technique because it also provided a flexible and adaptable way of finding things out; it offered the possibility of modifying the line of enquiry and follow up of interesting responses. Interviews are conversations with a

purpose according to Cohen and Manion (1989) who refer to the definition offered by Cannell and Kahn as:

> a two person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information and focused by him on content specified by research objectives of systematic description, prediction or explanation.
>
> (Cannell and Kahn in Cohen and Manion 1989, p.307)

The different interview techniques used in case study research as identified by Powney and Watts (1987), Oppenheim (1992), Robson (1993), and Yin (1994) were reviewed, in order to select the most appropriate to acquire the information required. The approaches and techniques were critically appraised. (see Appendix 9). The semi-structured interview technique was selected in order to focus the research questions to provide relevant data. Using this approach, the interviewee was asked for factual information as well as their understanding and view of the topic. By asking interviewees to suggest their own insights into factors contributing to raising achievement through the use of assessment, these propositions were then used as a basis for further inquiry. The shortcomings of using interviews as a data collection technique was kept in mind and were considered as verbal reports. As such, they were subject to bias, poor recall and sometimes inaccurate articulation. (A multiple method approach using methodological triangulation to validate the data was planned to overcome this shortcoming). The qualities demanded of interviewers were reviewed, Lofland and Lofland (1984), Oppenheim (1992) and Bell (1993) to ensure the interview was conducted in an appropriate manner.

Planning the Interviews

Head of Department and Teacher Interviews

Interviews were planned for the head of D&T in each school and also for the teachers who taught the Year 9 groups of pupils observed. Schedules were devised, following a common framework but ensuring that the different angles were covered. The following aspects of assessment of D&T at KS3 were explored:

- purposes of assessment
  (summative, formative, diagnostic, ipsative)
- policy and guideline generation
- assessment as an integral part of teaching and learning
- the range of assessment strategies used
- recording assessments
- how the information gained from assessment about pupil strengths and weaknesses is used
- strategies to identify when pupils have difficulties or are not making good progress or conversely make unexpected progress
- standardizing assessments
- cross-phase issues - from KS2
- base line assessment and the use of data for value added
- end of KS3 assessment

- use of portfolios
- pupil self-assessment
- target setting based on assessment information.

The interview questions planned for the head of department sought an over view and rationale for assessment within the department and its role in raising achievement. The policy, procedures and strategies used were also explored. In addition to the questions relating specifically to assessment it was necessary also to have some contextual background relating to the organisation and management of D&T at a departmental level, and with specific reference to KS3. The teacher interview sought primarily to find out what they did in practice with regard to raising achievement through assessment, thus a focus on the procedures and strategies they implemented (with reference to the group observed). The draft list of questions and prompts devised for each interview schedule for the pilot study, together with revised versions for the three case studies are detailed in Appendices 10 and 11 respectively. Additional questions or prompts within questions, which arose as a result of the documentation review were added individually for each school as appropriate.

Pupil Interviews

Five Year 9 pupils from the class observed in each school were interviewed, during their normal D&T lesson time. This was agreed as being the least disruptive to their work and also potentially less stressful by remaining within the teaching room. This aspect of the study focused primarily on investigating the understanding, views and opinions of pupils about assessment. The questions and prompts were used consistently in all the interviews, together with specific prompts to follow up interesting lines of enquiry. The following aspects relating to assessment were explored:

- did pupils know what they are supposed to be learning?
- did they know what they have achieved?
- did they know how they can improve?
- were there opportunities to reflect and talk about their learning and progress?
- self-assessment
- marking
- the purpose of assessment
- were they aware of assessment procedures used?
- did they understand the systems in place?
- did they know how well they are doing?

The interview schedules were modified where necessary after the pilot study. (Draft and revised versions are detailed in Appendix 12)

Observation

Observation was selected as a technique because the actions and behaviour of teachers and pupils are central in virtually any school focused enquiry and it also provided the opportunity to observe 'real life' in the 'real world'. Thus, to watch and record what teachers do, then describe, analyze and interpret provided another

dimension. Observational evidence provided information about how policy was implemented in practice, to discover if the actions identified during the interviews actually took place in the workshop, mindful of Robson's warning that, "Interview...responses are notorious for discrepancies between what people say they have done or will do and what they actually did." (Robson 1993, p.191). Observation techniques were used to complement information obtained by the other techniques and thus aid validation through triangulation. For this data collection activity a series of workshop observations to find out what D&T teachers actually did with regard to assessment procedures during lessons, were carried out. As with the interview data collection activity, the first task was to critically examine the range of observation techniques available to identify the most appropriate approach to use for this activity. The approaches and techniques were critically appraised (see Appendix 9) and an unstructured narrative style was selected as being the most appropriate technique to use. A narrative approach had been used by the researcher to record evidence of teaching and learning whilst carrying out OFSTED inspections. This experience provided a basis to develop observational skills for the more focused observation required by the task identified for the data collection activity; taking into account the view of Nisbett, "Observation, is not a 'natural' gift but a highly skilled activity for which an extensive background knowledge and understanding is required, also the ability to spot significant events." (Nisbett in Bell 1993, p.88)

Planning the Observation

The most appropriate technique was selected, whilst taking account of the researcher's experience of the narrative approach used for lesson observations during OFSTED school inspections. A checklist was drawn up to ensure that the observation was focused on the strategies specific to and related to assessment. A pro-forma was devised to collect the data on what was happening during the lesson in narrative format. (See Appendix 13 for completed examples from School H). To observe lessons at a similar stage it was decided that the observations would be carried out towards the end of modules (units of work) when practical projects were well underway. Thus ensuring that teachers had had time to make use of any existing assessment information and to assess some work in progress and provide written and/or verbal feedback.

The Classroom Observations

Lesson observations of Year 9 pupils were carried out in each school. This strand of the study focused on the use of assessment procedures in the classroom, to observe the characteristics of the individuals (teachers and pupils) involved which was impossible to discover by any other means; to see what actually happened rather than what teachers perceived to happen. Observations also provided opportunities for discussion with pupils actively involved in assessment procedures. The purpose of the observation, and that it would be recorded in the form of field notes, was made clear to all the teachers who were to be observed.

Data Analysis

The analysis of qualitative data has long been challenged, attributed to the fact that methods of analysis were not well formulated. The traditional image of field research is one that keeps pre-structured designs to a minimum, a flexible, emergent, inductively 'grounded' approach to gathering data. Wolcott (1982, p.157) concurs with this view but stressed that "it is impossible to embark upon research without some idea of what one is looking for and foolish not to make that quest explicit." The analysis of case study evidence is one of the least developed and most difficult aspects of doing case studies. The ultimate goal is, according to Lincoln and Guba (1985), Wolcott (1994) and Yin (1994), to treat the data fairly, to produce compelling analytic conclusions, and to rule out alternative interpretations.

The structure of the methodology of this case study was aligned with that of a social anthropological 'refinement of theory' approach. The conceptual framework was developed prior to testing in the field for refinement and/or qualification. This approach has informed much of the work of the work of Glaser and Strauss (1967), Miles and Huberman (1994) and Yin (1994), however the latter two have tended towards more fully codified research questions, more standardized data collection procedures, and more systematic techniques for analysis.

The data analysis consisted of examining, categorizing, tabulating the evidence to address the initial questions of the study, but bearing in mind, Wolcott's warning that "...we are never going to get it *all* right, analytical efforts are necessarily focused on parts or constituent elements and how they interact." (Wolcott 1994, p.173). The process of analysis and interpretation involved disciplined study, creative insight, and careful attention to the purposes of the evaluation. The analysis brought order to the data, by organising what was there into patterns, categories, and basic descriptive units. Interpretation of the data then involved "...attaching meaning and significance to the analysis, explaining descriptive patterns and looking for relationships and linkages among descriptive dimensions." (Patton 1987,.p.144)

Analytic Strategy

The process used for this study contains references to the work of Glaser and Strauss (1967) and Strauss and Corbin (1998). The recognition of 'grounded theory' was evident by its inclusion in key methodology texts of Bogdan and Biklen (1982), Burgess (1984), Hammersley (1992) and Bryman and Burgess (1994); and also of those relating specifically to case study methods from, Yin (1994) and Stake (1995). Strauss and Corbin (1998, p.12) defined grounded theory as "theory that was derived from data, systematically gathered and analyzed through the research process", thus, the researcher starts with an area of study and allows the 'theory to emerge from the data'. The theory thus derived from the data in this manner was more likely to resemble 'reality' and was more likely to provide "insight, enhance understanding and provide a meaningful guide to action." (ibid. p.12).

Grounded theory has frequently been cited as a prominent framework for the analysis of qualitative data and is often referred to as the approach used when researchers report their results, a number cited the work of Glaser and Strauss (1967) and Strauss and Corbin (1990). This was exemplified in the contributions made to Bryman and Burgess (1994), however, it is rarely used in its entirety, tending, instead to be used as a general indicator of the desirability of making theory from data, rather than a guide to a method for handling data. Bryman and Burgess suggested that grounded theory has had two influences on data analysis:

> Firstly it has alerted qualitative researches to the desirability of extracting concepts and theory out of data. Second, grounded theory has informed, in general terms, aspects of the analysis of qualitative data, including coding, and the use of different types of codes and their role in concept creation.
>
> (Bryman and Burgess 1994, p.220)

The analysis of the data collected for this study relied on the basic principles of the grounded theory method of developing theory and on the procedures that help to provide some standardization and rigour to the process. For example the importance stressed by Strauss and Corbin (1998) of very detailed 'line-by-line' analysis to generate initial categories and to discover the relationships among concepts. The approach taken by Bogdan and Biklen (1982), founded in grounded theory, emphasized the need for the constant engagement in preliminary analytic strategies during data collection in the field. The strategies they put forward have been used as a guiding principal for the analysis of the data collected:

- to force oneself to narrow down the focus of the study
- continual review the field notes in order to determine whether new questions could fruitfully be asked
- writing memos about what has been found out in relation to various issues
- to try out emergent ideas.

Analysis during Data Collection

There is not a precise point at which data collection ends and analysis begins, nor, in practice are analysis and interpretation neatly separated. Patton (1987) argued that the overlapping of data collection and analysis improved the quality of both, so long as the researcher was careful not to allow initial interpretations to bias additional data collection. Miles and Huberman (1994, p.56), stressed that, "the challenge is to be explicitly mindful of the purposes of your study and of the conceptual lenses you are training on it – while allowing yourself to be open to and re-educated by things you didn't know about or expect to find." In preparation for the data collection, which generated large quantities of notes, field notes and interview transcripts; strategies to condense and organise the data for analysis were devised. To fulfil the analytic strategy ideals, an iterative, reflective approach was essential.

Preparation for Analysis

In preparation for analysis, draft pro-formas were devised to help organise the data collected in a form that was easily accessible. These were modified following the pilot study and revised versions produced for the main study.

Contact Summary Form

For each field visit, to facilitate the early analysis process, a pro-forma consisting of basic contextual data questions followed by a series of prompts to maintain the focus of the research questions and to summarize the salient points of the contact was produced. Space on the right hand side of the sheet was allocated for coding information. (See Appendix 14 for a completed example from School C)

Document and Archival Sources

Bell (1987) stressed the importance of subjecting the contents of a document to rigorous analysis and recommended key questions. The following checklist was developed and was applied systematically to the contents of the documentation and archival records provided by the case schools:

- what kind of a document is it?
- what does it actually say?
- who produced it?
- what was its purpose?
- when and in what circumstances was it produced?
- how did it come into existence?
- is it typical or exceptional of its type?
- is it complete?
- has it been altered or edited?

It was important to establish whether fact or bias was the main characteristic of a document. The detection of bias did not necessarily mean that the document was dismissed as cautious analysis and comparison with evidence from other sources was carried out. Documents were reviewed for specific details to corroborate information from interviews and observations. Completed examples of the Document and Archival Source Evaluation Checklists from School C are detailed in are detailed in Appendices 15 and 16 respectively. The draft formats are included in Appendix 5.

Document Summary Form

Content analysis of the documentation was used as a supplementary method in this multi-method study and was used in the triangulation of data process. Content analysis was carried out prior to the fieldwork visits to each school to address specific points for the interviews, observations, archival record review or work sampling. The starting point for this process was the research questions, which established the exploratory and contextual nature of the study. By focusing on these questions a prompt sheet was formulated, thereby ensuring that "content analysis

gets the answers to the question to which it is applied" (Carney, 1973 in Robson 1993, p.275). The pro-forma thus devised for the pilot study and a revised version for the main study provided a means of summarising and clarifying documents for future analysis and includes the following:

- context of the document
- purpose/specific use (if relevant)
- significance of the document
- significance of document in relation to the research questions
- significance of document in relation to:
  - heads of department
  - subject teachers
  - pupils
- summary of contents.

(See Appendix 17 for a completed Document Summary from School C.)

Processing the Interviews

The head of department and teacher interviews were tape recorded and the dialogue was transcribed verbatim. "When transcribing, it is important to write the actual words spoken by your informants, however repetitive, slangy or ungrammatical." (Riley 1990, p.25). This process also stimulated analysis, when a concept or idea arose it was noted. "For out of these bits and pieces of analysis you will be able to build the larger analysis that will become your research report." (Lofland and Lofland 1984, p.61). The pupil interviews were recorded in the form of brief hand-written notes, these were expanded immediately after the interview, and before interviewing the next pupil.

Processing the Observations

Each observation was written up in the form of narrative field notes, together with the checklist before another observation was carried out. This ensured that aspects of a latter observation were not imposed on the former. Writing up these more detailed notes also acted as a check to ensure that the aspects identified as relating to 'assessment' on the checklist had been correctly identified. "....notes by which the past is retained in the present, is an absolutely necessary...condition for comprehending the objects of observation." (Lofland and Lofland 1984, p.62)

Development of Coding Categories

The biggest challenge for the analysis came from the multiplicity of data sources and the sheer volume of information. To maintain manageability the conceptual framework and the research questions were kept in focus, thus reinforcing that the data collection was "inescapably a *selective* process, that you do not 'get it all' even though you might think that you are." (Miles and Huberman 1994, p.55). Nevertheless, the need to remain open-minded was paramount; to this end Miles and Huberman offer a range of safeguards against tunnel vision, bias and self-delusion; these are utilised at the stage of drawing and verifying of conclusions. An

inductive coding technique, based on that developed by Strauss (1987) and described in Strauss and Corbin (1998) was used. The purpose of coding procedures can be summarised as to:

- build rather than test theory
- provide researchers with analytic tools for handling masses of raw data
- help analysts to consider alternative meanings and phenomena
- be systematic and creative simultaneously
- identify, develop and relate the concepts that are the building blocks of theory

and viewed by Miles and Huberman (1994, p.65) as "efficient data-labelling and data-retrieval devices. They empower and speed up analysis."

Coding was seen as the key process since it served to organise the extensive notes, transcripts, observation schedules and documents that have been collected and it also represented the first stage in the conceptualization of the data. 'Open coding' Strauss and Corbin (1998), Miles and Huberman (1994) was used. The main purposes of which, was to build rather than to test theory, to help the researcher consider alternative meanings of phenomena, to be systematic and creative simultaneously and to identify, develop and relate the concepts that were the building blocks of theory. To aid the coding process during the early stages of analysis, marginal notes, pattern coding and memoing were used.

All the initial data were written up prior to a line by line review from which codes were generated. The line by line codes were then reviewed and clustered into related, but more abstract generic categories, in a similar manner to pattern coding. Glaser (1978) used this strategy in his 'constant comparative' method. He described the process of subsuming particulars into more general classes as a conceptual and theoretical activity in which the researcher iterates between the first-level data and the generic categories that evolve and develop through successive iterations until the category is 'saturated'. Memos, as defined by Glazer (1978, p.83-84) as "the theorizing write-up of ideas about codes and their relationships as they strike the analyst whilst coding...it exhausts the analyst's momentary ideation based on data with perhaps a little conceptual elaboration", were used primarily to tie together different pieces of data within and across schools. Used in this way they are "one of the most useful and powerful sense-making tools to hand." (Miles and Huberman 1994, p.72).

One of the most important goals of qualitative research is the development of concepts, from which the building blocks of theory can be produced. (Strauss and Corbin 1998). In the early stages, the concepts were little more than extensions of codes; at a later stage more abstract conceptualization was achieved. The contributors to Bryman and Burgess (1994) exemplify many insights into conceptualization in their analyses, however, they are more guarded about the emergence of theory.

Revising Codes

Throughout the data analysis of the pilot study the generic codes developed, some were refined, some did not work, for example 'organisation' was deleted whilst new codes, 'threats' and 'weaknesses' were included. Others had too many codes categorised under them, for example 'Context' became too large and was subdivided into 'Internal Context' and 'External Context'. *Fig.3.4* shows the revised list of generic codes.

GENERIC CODES	
Informants' perspectives	External context
Communication	Internal context
Procedures	Threats
Monitoring	Purposes
Feedback	Weaknesses
Speculation	

Figure 3.4 **Generic codes developed for the main study**

Defining Codes

To ensure that the codes were applied consistently to the data collected from the main case study schools, operational definitions were created "because codes will drive the retrieval and organisation of the data for analysis, they must be precise in their meaning." (Miles and Huberman 1994, p.63) *Fig.3.5* is an extract from the list of definitions produced for this study, a complete list is located in Appendix 18.

DESCRIPTIVE LABEL	CODE	DEFINITION
COMMUNICATION	COM	How information is disseminated to facilitate a shared vision
Philosophy	COM-PHI	Department's belief and underlying principles for assessment.
Information	COM-INF	Passing on assessment information to pupils/teachers/archive.
Systems	COM-SYS	Procedures in place as a conduit for information transfer.
Work sampling	COM-WS	Shared understanding/expectation for assessments to agree consensus view.

Figure 3.5 **Code Definitions (extract)**

Analysis on Completion of Data Collection

Data Display

A matrix format promoted by Robson (1993) and Miles and Huberman (1994) was selected to display the data, firstly single case (individual school) and followed by multi-case (all schools).

Constructing the Matrix

Throughout the process of developing the matrix the research questions and the concepts arising from the analysis of the data drove the format. The first decision related to how the data would be partitioned into categories of variables – the types of rows and columns. Having analysed and coded the data, column headings relating to, the case, the personnel, their roles and the organisational framework within which they operated was the starting point; thus the following column headings evolved:

- department head
- teacher
- pupils
- documents
- archival sources

For the rows, the generic codes were used, these having been developed with the specific research questions in mind, and thus provided a framework that would display relevant and meaningful cell content. The level and type of data to be entered in the cells was reviewed, the following range was considered essential to be included:

- summaries
- research explanations
- direct quotes from interviewees
- direct quotes from documentation
- extracts from field notes

For the main case study one table for each case (school) was constructed and comparisons were made across each axis for individual aspects. The matrix framework developed during the pilot study in preparation for the main study is illustrated in Appendix 19.

Drawing and Verifying Conclusions

At this stage of the analysis it was important to be able, firstly to see "added evidence of the same pattern [and secondly to remain] open to disconfirming evidence when it appears." (Miles and Huberman 1994, p.246). From the initial stages of the research design to the final stage of drawing conclusions the trustworthiness of the data and the validity of the process has influenced the decisions relating to methods and strategies chosen at all stages. Mindful of the criticisms levelled at case study method (see pages 37-38) close attention was paid at all stages to ensure rigour.

Drawing Conclusions from the Matrix Data

The test of any matrix is what it helps you understand and how valid that understanding is, taking account of Miles and Huberman's (1994) view that the conclusions drawn from the matrix can never be better than the quality of the data entered. The conclusions drawn were written up in the form of analytic text,

enabling the researcher to add interpretations. The conclusions were arrived at by noting patterns and themes together with the building of a 'logical chain of evidence'. This was achieved by tracking from the documents to the teachers and through to the pupils. This process stimulated further analysis and encouraged a return to the field notes to find the detail not summarised in the data display.

Testing the Findings

At this stage in the process the issue of validity was confronted. The data quality was addressed predominantly through triangulation of method and source and was backed up by checking for representativeness, checking for researcher effects and weighting the evidence. Wax (1971) in Miles and Huberman.

Triangulation

Robson (1993), Johnson (1994) and Yin (1994) argue that triangulation is a valuable technique in the analysis of qualitative data where trustworthiness is usually a concern. It provided a means of testing one source of information against other sources. If the other sources of evidence led to a broadly similar picture there was more confidence in the conclusions. The triangulation of the different methods of collecting data (methodological triangulation) was used in this study, together with triangulation of data sources (data triangulation) which corroborated the same phenomenon across the different methods. Denzin (1985), Patton (1987) These techniques were used to verify results thus strengthening the validity of the research results. Additionally with triangulation, the potential problems of construct validity were addressed; the multiple sources of evidence essentially provided multiple measures of the same phenomenon. Hammersley and Atkinson (1989) pointed out, that what was involved in triangulation was not the combination of different kinds of data *per se,* but rather an attempt to relate different sorts of data in such a way as to counteract various possible threats to the validity of analysis. The use of multiple sources of evidence provided the opportunity to develop 'converging lines of inquiry' to increase the rigour of the process. (Yin 1994) This strengthened the findings and conclusion of the main study.

Quality of Conclusions

To help judge the quality of the conclusions the tests for validity, common to all social science methods, as outlined earlier in the chapter, were used in conjunction with those devised specifically for qualitative data by Lincoln and Guba (1985). They considered the conventional criteria inappropriate and proposed four alternatives; credibility, transferability, dependability and confirmability. These parallel the conventional tests to a considerable extent but were more sensitive in their questioning of the techniques under scrutiny. At this final stage the early, somewhat vague conclusions became explicit or 'grounded' as defined by Glaser and Strauss (1967).

CHAPTER 4

THE CASE STUDIES

This section of the study contains the main findings. The data has been analysed using the basic principles of grounded theory as described in Chapter 3 and is presented here through the themes that emerged during the data analysis, supported by relevant extracts from the documentation, interviews and discussions. References are also made to classroom observation and work-sampling. The context and current practice of each school have been identified from the information provided by the school and the D&T department teams. Head of department interviews also provided contextual data.

Case Study 1 - School C

This is an over-subscribed six-form entry, 11-18 school situated in a small rural town. Entry is restricted to first choice applicants living in the reserved area of the town and some of the outlying villages.

The D&T accommodation is within the main school building; food and textiles located a short distance from the workshops and the staff work area. The library and an ICT suite are close by. All areas are resourced with traditional machines and equipment, and most have some CAD/CAM and ICT provision. Machinery has been relocated to provide multi-material working in both workshops. The textile room has recently received ICT and CAD/CAM equipment, to deliver the relevant parts of the NC.

The D&T team consists of four full-time and two part-time specialists, covering the full range of materials and aspects. A full-time technician and a part-time administration assistant support them. All staff have worked at the school for at least four years. Department Head C is responsible for the overall leadership and management of the department and takes specific responsibility for KS3 and Post 16 and a number of other aspects. The second in department takes responsibility for KS4 and Assessment. All members of the team have specific responsibilities assigned to them. The team is line managed by one of the deputy headteachers. All staff qualified as specialist teachers' pre NC and thus took courses in Home Economics or CDT. Department Head C has encouraged his team to be forward thinking and pro-active in developing units of work that meet the requirements of the D&T Order with its emphasis on the development of design and technological capability. All staff are given the opportunity to attend training courses and conferences to keep themselves abreast of current developments in the subject area. A condition of release for such activities is that the teacher will disseminate information back to the department, or relevant members, through internal training sessions.

For the delivery of D&T each year group is divided into two equal cohorts. At KS3 these are divided into four mixed ability teaching groups, each consisting of about twenty two pupils. D&T is allocated two, fifty-minute periods per week, accounting for 6.66% of curriculum time. This increases to three periods (10% curriculum time) for KS4. KS3 is delivered using a carousel of four units of work each year; each unit lasts approximately nine weeks (sixteen hours). Units are devised to cover the NC PoS and are delivered through food, graphics, resistant materials and textiles. Staff changeover is kept to a minimum and wherever possible each group will be taught by two teachers each delivering two units. The pairings and the groups they teach generally remain the same throughout the key stage.

The attainment in core subjects at KS3, in comparison with all schools is broadly in line with the national average and in comparison with similar schools, is well above average. (DfEE 1999a). However, at KS4 the average total point score per pupil is below the national average in comparison with all schools and is broadly in line when compared with similar schools. (DfEE 1999b). In D&T teacher assessment at the end of KS3 indicates that the percentage of pupils attaining Level 5 and above is higher than that in their other subjects, with the exception of Art and English. At KS4, subject performance indicators demonstrate higher achievement in D&T than in most of their other subjects.[1]

In 1997, the school had a major focus on assessment, this consisted of a whole school training day led by the LEA assessment team which resulted in the adoption of a new Assessment, Recording and Reporting policy, followed by development time for each department to work together to integrate the new whole school policy into their subject specialisms. The focus for the foundation subject departments was to introduce a more robust form of assessing end of KS3 levels. All staff make summative 'level' assessments at the end of each term. Formative, assessment for learning, has not received so much attention in some departments and they have continued to use their traditional systems and this has resulted in a lack of consistency across the school. The subject areas that have developed new strategies and have concentrated on diagnostic marking are those where achievement is highest at the end of KS3.

Departmental Documentation

The documentation produced by School C was organised in a departmental handbook and each member of the D&T team had a copy. These handbooks are updated on an annual basis, in July, to be ready for the forthcoming academic year.

Policy Documents

Assessment and Recording Policy

The department's *Assessment and Recording Policy* was developed by the D&T team from the whole school policy but relates specifically to the needs of the

[1] Relative Performance Indicators: design and technology 0.30; art 0.70; English literature 0.45.

subject. The opening statement of the policy clarifies the department's underpinning philosophy for assessment and within the policy the purposes of assessment are identified. These are detailed in *Fig. 4.1*

> Assessment is an integral part of the teaching and learning process, and can provide essential information about the students' experiences, performances and progress. In turn, the analysis of these outcomes can yield important evidence regarding the appropriateness of the learning involved, the suitability of the learning experiences provided, and the effectiveness of teaching
>
> **Purposes**
> - to assess and record on what students know, understand and can do;
> - to raise expectations of teachers, students and parents;
> - to help individuals target more clearly specific areas for effort and improvement;
> - to identify and remedy shortcomings as soon as possible;
> - to assess student progress against National Curriculum level descriptions;
> - not to be administratively burdensome.

***Figure 4.1* Assessment and Recording Policy extracts (School C. Document 1, p.1)**

The policy provides succinct guidance, outlining the different types of assessment and the range of strategies to be used for everyday teacher assessment. It outlines procedures to ensure that summative assessment data is collected at the relevant time and is available to inform those 'who need to know', when 'they need to know'. Greater emphasis is given to formative strategies and these are further detailed in the *Marking Policy*. The principal method for assessing and recording summative progress is the *Student Record Card* (see *Fig. 4.3*). Its purpose and how it is to be used, is set out. The policy also makes references to the active participation of pupils in the assessment of their own work. Other requirements, such as internal moderation of KS3 work are also included.

Marking Policy

A separate marking policy, developed alongside the *Assessment and Recording Policy* by the D&T team is also based on a school policy. It clarifies the roles and different purposes of formative and summative assessment procedures. Here again, the policy is concise and provides a rationale for marking and guidance on the strategies to be employed. Similarly, like the *Assessment and Recording Policy*, this policy also seeks to ensure that procedures are both purposeful and manageable. One of the 'guiding principles' defined states that, "Marking is a normal part of each teacher's workload, but it should never be so burdensome that it prevents staff from a life outside school." (School C. Document 2, p.1).

The emphasis on formative procedures throughout the *Assessment and Recording Policy* is exemplified in this policy. The rationale (see *Fig.4.2*) emphasises that the

main purpose of marking is formative. The purposes of marking that focus on formative assessment are listed in *Fig.4.2*.

Rationale

...helping students to see how their work can be improved and developed, identifying practical means of establishing suitable high expectations of each student.

Purposes of Marking

- to motivate students' further effort;
- to provide the teacher with evidence that work has been learned and understood;
- to inform the teacher of the learning gaps, i.e. to diagnose problems
- to point out a strength in a piece of work, and what needs to be done to improve, i.e. setting targets;
- to reliably assess a given performance against nationally agreed criteria.

Figure 4.2 **Extracts from Marking Policy (School C. Document 2, p.1)**

Guidance is given for the strategies to be used at KS3 and 4 and Post 16. For KS3 'end of unit' summative assessment, the NC level descriptions are required together with a word to describe effort, based on a five level scale. This ranges from 'excellent' to 'poor'. The use of the *Student Record Card* (*Fig. 4.3*) to record this information is made explicit; that these will follow the pupils to each unit of work throughout KS3. "Teaching staff are responsible for the assessment of the course unit; for the safe keeping of the records, and for passing them on to the next designated teacher at the agreed changeover date." (School C. Document 2, p.2). For on-going work a comment is required, "to point out a strength in a piece of work and what needs to be done to improve." [the policy expects that this will] "Motivate students' further work." (ibid. p.2). The effort scale can be used where and when appropriate or relevant. Exemplification is provided to assist teachers when writing comments and a standard procedure for correcting work is also detailed. The policy requires that common standards are applied when awarding NC levels and to ensure that this happens teachers are required to attend internal moderation meetings to agree levels.

Pro-formas

Fig. 4.3 shows the Year 7 section of the Student Record Card, a pro-forma used for recording pupil achievement throughout KS3. In use it provides up-to-date information about NC Levels of Attainment and effort. The table in *Fig. 4.3* is replicated for Year 8 and Year 9, provision has been made to include KS2 levels.

YEAR 7	NC Levels 1-8		TEST %	EFFORT		COMMENT	SIG	DATE
	DESIGN	MAKE		DESIGN	MAKE			
FOOD								
GRAPHICS								
RES MATS								
TEXTILES								
BEST			LEVELS: + top of level - just achieved level EFFORT: excellent, very good, good, fair, poor					

Figure 4.3 **Part Student Record Card – Year 7 (School C. Document 4)**

Information Documents

To enable pupils to take an active part in mapping their own progress and to know what they need to do to reach the next 'level', the team have developed their own 'stranded' version of the NC Level Descriptions, *Key Stage 3 Attainment Targets for Design and Technology.* This sheet identifies progression within each level, in each strand (Research and Generating Ideas, Developing, Planning, Making, Review and Evaluation. *Fig. 4.4* exemplifies the 'Research and Generate Ideas' and 'Developing Ideas' strands.

	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7
RESEARCH AND GENERATE IDEAS	Students generate ideas and recognise that their designs have to meet a range of different needs	Students generate ideas by collecting and using information	Students draw on and use various sources of information	Students draw on and use a range of sources of information, and show that they understand the form and function of familiar products	Students use a wide range of appropriate sources of information to develop ideas. They investigate form, function and production processes before communicating ideas, using a variety of media
DEVELOPING IDEAS	They make realistic plans for achieving their aims. They clarify ideas when asked and use words, labelled sketches and models to communicate the details of their designs	They take users views into account and produce step by step plans. Communicate alternative ideas using words, labelled sketches and models, showing they are aware of constraints	Clarify their ideas through discussion, drawing and modelling. They use their understanding of the characteristics of familiar products when developing and communicating their own ideas	They make models and drawings to explore and test their design thinking, discussing their ideas with users	They recognise the different needs of a range of users and develop fully realistic designs

Figure 4.4 **Extract from Key Stage 3 Attainment Targets for Design and Technology (School C. Document 6)**

Scheme of Work

The *Key Stage 3 Scheme of Work* (School C. Document 3) was developed to meet the statutory requirements of the *National Curriculum Order for Design and Technology* (DFE 1995) by the whole team, each contributing units relating to their material specialism/s. These are planned from the KS3 PoS (ibid) and all have a generic focus to facilitate progression through the generic skills, knowledge and understanding; this aspect is overseen by Department Head C. Subject specialists have the responsibility of ensuring progression through the skills, knowledge and understanding relating to specific materials and aspects of the units they have developed. The scheme has a three year overview, the long term plan for years 7 to 9; this maps progression through generic skills, knowledge and understanding.

A common framework format is used to produce the medium term plans for each Unit of Work. This is detailed in *Fig. 4.5*

Framework for a Unit of Work

Unit context;

- Programme of Study focus
- Designing
- Making
- Knowledge and Understanding
  - Materials and Components
  - Systems and Control
  - Structures
  - Products and Applications
  - Quality
  - Health and Safety;
- Focused Practical Tasks;
- Investigate, Disassemble and Evaluate Familiar Products and Applications;
- Design and Make Assignment;
- Links with other subjects
- Opportunities to work – independently, in pairs or in teams;
- Differentiation;
- Extension Activities;
- Assessment Opportunities.

***Figure 4.5* Unit of Work Framework (School C. Document 3)**

Assessment is a central part of each unit, with assessment opportunities included in the medium term plans and specific assessment foci identified on the weekly planning sheets. Diagnostic marking features frequently on these sheets, discussing work with individual pupils and 'question and answer' sessions are also prominent strategies. The penultimate unit for Year 9 has been devised especially for end of KS3 assessment, it has been developed from the *Optional Task 'Keep it Contained'.* (SCAA, 1996b).

Departmental Pupil Data and Records

The school provides all departments with individual pupil profiles. These provide KS3 and GCSE indicators based on a 'Cognitive Ability Test' (CAT); the indicators are given within an 80% confidence band. For KS3 these are only in the core subjects, whereas for KS4 GCSE they are provided for all the subjects that the school offers. These sheets are centrally filed within the department and are readily available but are not used for predicting potential levels or target setting for KS3. Some use is made of the GCSE indicator, but only retrospectively to check against the grade actually achieved. The information is accessed for individual pupils if there are problems with progress or if a pupil is felt to be underachieving. Master copies of the *Student Record Cards* are also centrally filed, these are up to date, providing a complete record of pupils' progress through KS3.

To support teachers in making judgements about NC Levels attained, the department has created a departmental portfolio of assessed work, one for each key stage. The KS3 folder contains exemplars from a variety of sources to illustrate good and weak 'level' attainment. The exemplars cover Levels 3 to 7 and represent the full range of materials and aspects taught. To augment the school's own exemplars, a number of assessed units from *Assessment of Design and Technology at Key Stage 3* (NAAIDT and Berkshire Education Department, 1997) have been included, together with a copy of *Design and Technology Exemplification of Standards at Key Stage 3: Consistency in Teacher Assessment* (SCAA, 1996a). All the school originated exemplars are annotated to indicate why a particular level was awarded. *Fig. 4.6* is an example of teacher annotation written on a 'good' Level 5 Year 9 Graphics project in the departmental portfolio.

Designing
This pupil has generated ideas that draw on external sources and his understanding of the characteristics of the materials used for packaging food products. He has clarified his ideas through discussion, drawing and modelling, using knowledge and understanding of the programme of study, he has made simple evaluations of his ideas and has demonstrated a clear understanding of the qualities required for the product in use. **(Level 5)**

Making
The pupil has worked from plans that he has produced, modifying them to overcome weaknesses in the original design or difficulties identified for future manufacture. He has selected the most appropriate materials, tools and processes to construct the packaging effectively. He has worked accurately and safely. He has tested his container in use. **(Level 5)**

There is some evidence of **Level 6**, a preliminary model to explore and test the packaging idea was tested. On balance this pupil's performance is best described by **Level 5** in both **Making** and **Designing.**

Figure 4.6 **Exemplar of teacher annotation of overall judgement of Level awarded (School C. Department Assessment Portfolio, Year 9 pupil)**

The Head of Department's Perspective

Department Head C expressed the need for a whole school approach to assessment so that pupils were clear about the procedures and understood the processes. Summative assessment using NC levels has been established across the whole school. However, with regard to the assessment of effort, there was, he said, some considerable variation in practice across the school and that the D&T department was taking a retrogressive step to fall in line with other departments who had continued to use the existing procedure. "For the overall benefit that conformity to one system brings." (School C Transcript 1. p.3) Thus they had abandoned a '+3 to –3' scale for effort that had been seen working successfully elsewhere and had now reverted to a five point word scale.

To ensure that all staff were fully aware of the purposes of assessment and the strategies selected to support them, Department Head C felt it was important that manageability of the system was crucial, thus to serve this purpose the documentation contained in the handbook was concise and kept to a minimum. Several times throughout the interview he used the phrase "not burdensome [of staff]" (ibid. 1, p.3,4 and 5) when referring to the time requirements of assessment strategies.

In response to the question regarding purposes of assessment, his view of assessment was, firstly, for on-going work [formative] and that "Marking should be used diagnostically to identify, for pupils, what needs to be improved and how, or what needs to be tackled next." (ibid. p.4). He stressed that it was important to use a summative levelling procedure at the end of each unit of work to track progress and at the end of the whole KS. "It's vital, unless we know where they are and an indication of what they are capable of we could not enable them to make the best progress." (ibid. p.5). With the additional complication of a carousel method of delivery, pupils move on to different teachers during the year so that the procedures need to be such that up to date assessment information would be available for the next teacher, otherwise "with the carousel some could underachieve unbeknown to the teacher." (ibid. p.5). With regard to the role of assessment in raising achievement he went on to explain the need for a simple but effective procedure that could be completed at the end of a unit of work and the information passed to the next teacher before or at the start of the next unit. He also referred back to his view of diagnostic marking as an essential tool to support raising achievement.

To enable pupils to take an active part in mapping their own progress and to know what they need to do to reach the next 'level', the team use their own progression document *Key Stage 3 Attainment Targets for Design and Technology.* (*Fig. 4.4*) "It's a useful sheet and again it's a document that staff can use quickly...not burdensome..." (ibid. p.5). Summative end of unit assessment is carried out in discussion with pupils on an individual basis using this sheet to agree levels to be recorded on the *Student Record Card.* This one-to-one end of project discussion to decide NC levels is seen by Department Head C as an important process that has

been in place a number of years and that it worked successfully. The involvement of pupils in discussions about their work forms the basis for the summative comments written by the teacher at the end of the unit. To ensure that the team had a consensus view of standards Department Head C stressed the importance of the formal cross department moderation of the end of KS3 assessments. These, he explained took place every year and samples of work from each aspect were subjected to rigorous examination by several teachers and discussed at length. The benefit of such a process he said was that the team not only developed a consensus view of standards but also gained an insight and an understanding of the other materials aspects beyond their own specialisation.

The marking of on-going work was viewed as one of the most significant strategies when assessing pupil progress, thus the exemplification of what information should be provided in a written diagnostic comment had been included in the *Marking Policy*. In response to "How do you know if you are raising achievement?" Department Head C referred to the *CAT Profile* and the *Student Record Card* as indicators of progress and achievement. This review he said is generally at the end of the key stage after the end of KS3 assessments. The CAT information is not generally used to predict a level and thus become a target to reach or exceed. He suggests that more use could be made of the baseline information but that it is not yet part of departmental practice. "We have all the information we need on the Student Record Cards and this alerts us to underachievement. We ought to include the CAT information as this identifies potential end of KS3 levels in core subjects". (ibid. p.7).

To encourage pupils and to help them improve the quality of their work Department Head C highlighted three points. Firstly that learning objectives and the assessment criteria should be made explicit in all lessons. Secondly that diagnostic comments should be written on on-going work to help pupils identify what to do next and thirdly to provide verbal feedback whenever possible during lessons. With regard to the role of assessment in raising achievement, Department Head C asserts that assessment is "vital, unless we know where they [pupils] are and an identification of what they are capable of we could not enable them [pupils] to make the best progress." (ibid. p.5).

Department Head C identified the carousel delivery of the D&T curriculum as a concern, and that unless assessment information was consistent and informed teachers when they need to know, there was the potential for underachievement and lack of progression to go unnoticed. He referred to the organisational strategies that they had put in place to overcome these problems.

Some teachers (food technology), he reflected, had not made as much progress in moving away from traditional craft teaching to a design and technological approach. Thus the assessment opportunities are more limited in the food technology units of work where they focus on the acquisition of practical skills and knowledge. He went on to say that an ongoing INSET programme was gradually making an impression

here and that significant changes were currently being made to the Year 7 and 8 units of work for implementation next year.

The Teacher's Perspective

The teacher interviewee in School C was also the D&T team member with responsibility for assessment within the department and also a member of the school working group on assessment.

Teacher C considered that it was very important that procedures actually did what they were supposed to and that it was also important for teachers to know what was to be assessed and why it was to be assessed; and that all assessment data and information collected was used for the purpose it was intended for. "...No point in collecting data to store in a filing cabinet and not to use it." (School C. Transcript 2, p.2). He viewed the *Student Record Card* as the main strategy for communicating assessment information to teachers to enable them to match the delivery of their new unit of work to the range of abilities within the group. Realistic differentiation of task from the start was possible as those who needed to be challenged and those needing extra support were readily identifiable.

> As we do our end of project assessment with the students in the last lesson [of the unit] it means that the card [Student Record Card] can move on with them; so I get the cards for my new lot before they come for their first lesson and that is really helpful. I then know which students to extend and which are perhaps needing to be pushed...
>
> (ibid. p.1)

Teacher C held similar views to those of Department Head C and identified a number of purposes. Firstly, "to identify what students know, understand and can do" and "to identify what are the next steps in learning [for individual pupils]." Assessment also "tells us as teachers where students are at and thus those that need to be challenged, those that need to be pushed and those that are experiencing difficulties." (ibid. p.2). Secondly, the summative purposes such as the end of key stage teacher assessment, also the end of unit levels, although part of a formative process, these were also used summatively to record levels achieved on the *Student Record Cards* for progress tracking. In addition he refers to how assessment information might lead to a unit of work being modified and also the use of assessment information for the completion of reports to parents.

Since the decision to include a 'plus' or 'minus' to the level achieved on the *Student Record Card* to indicate if a pupil was working at the top of a level or had only just achieved it, progress was much easier to see from unit to unit. "Generally students move up approximately half a level per year, so a student might start Year 7 on a Level 4 and still be a Level 4 in Year 8, now we would see 4-, then 4 and then 4+." (ibid p.3) Teacher C felt that by knowing what level a pupil was at, and whereabouts

within the level and how long they had been at that point enabled him to plan what the pupil needed to do to improve.

> That sometimes means providing extension tasks from the beginning of a project, not when they have finished ahead of the rest and finding the task too easy; it's too late then. I discuss progress with them during practical working sessions or when they are doing individual research. You have to plan that in so you don't miss the opportunity. By the time they get to Year 9 they are quite good at asking for themselves, which shows that many are becoming good independent learners.
>
> (ibid. p.5)

Teacher C also talked about the use of assessment information for individual pupil target setting as a means of enabling pupils to make the best possible progress but emphasised that this was not yet an agreed strategy as he was still trialling it, thus not common practice across the department.

For Teacher C the use of the *Student Record Card* to track progression had been greatly improved by the extension of the scale by adding a plus or a minus to indicate whether a pupil was at the top or bottom of a level. Previously, with just the levels recorded it was slow to pick up any underachievement.

With regard to innovation Teacher C had two suggestions to make that he felt would aid raising achievement. Firstly, the department archive contains CAT score data for all pupils but that very little use is made of it. He proposed that information relating to end of KS predictions could, and should be used to predict potential achievement in D&T. He suggested that by using a combination of the end of KS mathematics and science predictors, a predictor for D&T could be produced and then included on the *Student Record Card* for tracking and target setting purposes. Secondly, he would like to see assessment 'level' information for each unit of work, produced in the style of that in the *Design and Technology Optional Tests and Tasks: Key Stage 3* (SCAA 1996b). This development, he felt, would help focus assessment more closely on the teaching and learning within specific units of work and provide greater clarity of what was required from pupils.

The Pupils' Views

Five pupils, in School C were interviewed to elicit their views about the assessment of their work.

All pupil responses to "Do you know how well you are doing?" made some reference to the *Student Record Card* and the recording of levels for all units of work from Year 7 onwards. Examples of pupil responses, explaining how they knew how well they were doing are detailed in *Fig. 4.7.* They also described how written comments gave them information about what they had done well and for most it also told them how they could improve their work. All pupils interviewed were able to explain what they were intended to learn during the unit of work, Pupils C04 and C05 gave very

detailed explanations, referring to the learning objectives written on the board for the current lesson and also for the whole unit of work.

Do you know how well you are doing?

Yes, the tracking sheet [Student Record Card] shows our levels for each unit we do. They are there right from the first one we ever did in Year 7. (Pupil C01)

Tracking sheet the teacher has levels for all the work we have done (Pupil C03)

The record card tells you what levels you have got for each project we do. (Pupil C02)

***Figure 4.7* Extracts from Pupil Discussions (School C)**

Pupils' views in response to the question "Why do teachers mark/assess your work?" brought forth a variety of reasons, exemplified in *Fig. 4.8.* Consistent throughout was the view that assessment was for the teacher's benefit, so that the teacher could find out how pupils were doing and so that they could check up to make sure that work required had been completed. Two of the pupils saw assessment as a strategy to help them to do better work in future. Other views included the teacher's points of view, firstly, to identify where work had been missed, and secondly, to help teachers know what they needed to do in terms of progressing the project or consolidating aspects pupils have not understood.

Why do teachers mark/assess your work?

So they know where we are with our work. (Pupil C01)

To help pupils get better. (Pupil C02)

To see how we are doing. They then help if they see we are getting it wrong or don't understand (Pupil C04)

To tell us what we have done well, but mostly to see what we have missed out...To make sure we have done it. (Pupil C03)

To help teachers know what they need to do. (Pupil C02)

***Figure 4.8* Extract from Pupil Discussions (School C)**

The pupils identified a number of strategies used by their D&T teachers to assess their work, see *Fig. 4.9.* They referred to the *Student Record Card* and the comments that were written on their work during and at the end of the unit of work. One pupil suggested that the teacher also assessed as he circulated the workshop and discussed work on a one-to-one basis.

How is your work assessed?

We get levels at the end, we have a say too about what level. [reference to the Student Record Card] (Pupil C03)

At the end of the unit the teacher talks to us about how we have done and what we think about it. Mr C tells us what we need to work on in the next unit [reference to target setting pilot]...he writes it on a post-it so we can copy it into the next unit. [Prompt – Do other teachers do this?] No, only Mr C, its helpful because it makes me remember what I need to do to get a higher level. (Pupil C02)

Comments written on our work. (Pupil C05)

Refer to the chart on the wall. [reference to Document 6] (Pupil C03)

Sir looks at our work during the lesson and usually says something about it...its good or that something needs to be thought about. (Pupil C04)

Figure 4.9 **Extracts from Pupil Discussions (School C)**

In response to Question 8 "What assessment information do you find the most useful?", all pupils felt that the comments and notes written on their work were the most useful and helpful (see *Fig. 4.10*), just knowing what level they were on did not help them identify what needed to be improved or developed. However, despite finding progress through the levels too slow, four of the five pupils found the *Student Record Card* useful as a means of tracking their progress from year to year.

What assessment information do you find the most useful?

The written comments of how to improve in my design folder. (Pupil C05)

The written comments on my work and also the levels but progress to the next level up always takes a long time. I think it is too slow but it does show progress over the years, now that there are plus and minus as well it is better. (Pupil C03)

The levels as all teachers use them. I find the notes [teacher's written comments] on my work helpful. (Pupil C04)

Figure 4.10 **Extracts from Pupil Discussions (School C)**

All pupils were able to describe how well they were doing in comparison with their other subjects (see *Fig 4.11*). They explained that all teachers used the NC levels, usually on a termly basis.

In comparison with other subjects, how well do you think you are doing in design and technology?

This [D&T] is my best subject, we can compare the levels we get in different subjects. (Pupil C04)

All teachers use levels [whole school policy] so it is easy to see. I'm Level 5, nearly [Level] 6 for design and technology but in maths I'm on 4 but nearly 5..I do find maths hard. (Pupil C03)

My design and technology is about the same as my science and maths but not as good as English...all my teachers use Levels. (Pupil C05)

Figure 4.11 **Extracts from Pupil Discussions (School C)**

All pupils refer to a range of methods of feedback used by their teachers. Reference is made to teachers taking an active part in the process by discussing work with individuals on a regular basis and discussing the summative 'end of unit' NC assessment level attained. Pupils described how they knew what to do in order to improve their work. (see *Fig. 4.12*). They refer to notes and comments written on their work and how they use this information. Pupil C05 [one of the higher attaining pupils in the group] considered that as he found the work relatively straightforward, the teacher rarely found fault with his work and therefore he was never challenged.

Do you know how you could improve/do better?

The teacher writes on my work to say what I need to work on. I also look at the chart [Document 6 displayed on the wall of the workshop] to see what I have to do to get to the next one [level]. (Pupil C04)

If the project was harder I think I would get more information about how to do better. (Pupil C05)

The comments on my work tell me, also the teacher talks to me when he comes round. (Pupil C03)

The notes written in my design folder [by the teacher] and what the teacher says when he comes round the room to talk to us and help us. (Pupil C02)

Figure 4.12 **Extracts from Pupil Discussions (School C)**

Pupils did not like critical comments, preferring those written in the form of targets to achieve. Not all comments were understood or acted upon. *Fig. 4.13* exemplifies the pupil views.

Sometimes when you have really tried hard and think you have done really well its disappointing when and a teacher just writes that it is OK. Some teachers are really good at making you feel good about your work and then say how to do even better. (Pupil C02)

I don't always know what it is I am supposed to do so I wait for the teacher to come round, then he explains what he has written, it makes sense then. (Pupil C01)

Figure 4.13 **Extracts from Pupil Discussions (School C)**

Four of the pupils expressed concern at the slow progress through the levels before achieving the next level. The minus and plus symbols to indicate 'just achieved' or 'top of level' have improved the process (these symbols were introduced whilst they were in Year 8 in a bid to give progression more transparency) but they still felt that they would like to have more evidence of progress. (see *Fig 4.10*)

The Lessons

The lessons observed were part of a Year 9 resistant materials (plastics and electronics) unit of work. The design and make task was to produce a game for a child (circuit with membrane switch and LED/s). The medium term plan and the weekly planning sheets formed part of the *Key Stage 3 Scheme of Work.*

Learning objectives were outlined at the beginning of each lesson and pupils were reminded of the assessment criteria that were to be used. Both lessons started with a question and answer session to consolidate recent work and relate it to the current lesson. Pupils were reminded in the second lesson that their design folders had been marked and the comments that the teacher had written would need to be reviewed prior to continuing. Most pupils started by reading what had been written, several discussed their work with a neighbour. Throughout the practical sessions the teacher circulated around the group. He discussed work with individuals and sometimes called several pupils together for a specific purpose, helping pupils identify for themselves what to do next and what might need to be improved. Examples of the questions posed by Teacher C are detailed in *Fig. 4.14.* Praise where there was success or effort was frequent.

How are these two pieces going to fit together?

What other tool could you use?

Have you thought about...?

Which of these do you think will work best? ... Why?

Figure 4.14 **Examples of questions posed by Teacher C (School C)**

Most pupils had an accurate and realistic view of their achievement; some were disappointed with their finished (or nearly finished) products. These were quality outcomes that worked effectively and met the requirements of the specifications the pupils had drawn up; they felt that they could have achieved a higher level had there been greater opportunity for more complexity within the task.

Work Sampling

Folder work indicated that marking was carried out on a regular basis and mostly by comment. The comments were generally positive in tone, rewarding good work with praise but not all provided clear guidance as to what needed to be addressed, developed further or where to move on to. *Fig. 4.15* exemplifies these comments, the first provides clear guidance to direct future work, the latter, whilst encouraging it fails to identify the next steps in learning for the pupil.

Positive Comment with Guidance
Well done, you have developed a range of product ideas that respond to most of the criteria you have listed in your specification. Now you need to think about the criteria 'lightweight'. Look at the Fabric Chooser Chart, this may help. Will you need to do any fabric tests to find out which fabric is the most suitable?

Positive Comment
This is a good start, your planning sheet shows that you have thought about your design ideas and you have developed them well.

Figure 4.15 **Teacher comments extracted from Work Sample (School C)**

Comments for lower attaining pupils tended to be more constructive and helpful in diagnosing what needed to be reinforced and what should be done to improve. Conversely, the comments written on higher attaining pupils work were more likely to be congratulatory "well done" with little or no guidance or challenge as to where next. These are exemplified in *Fig. 4.16.*

Comment (lower attaining pupil)
Well done, you have addressed all the aspects we talked about in the lesson. Your specification is realistic and lists all the important things you need to consider when designing a clock for your own room. The next stage is to design the clock, you may like to work on the computer to create your design.

Comment (higher attaining pupil)
Excellent work again. Well done.

Figure 4.16 **Teacher comments extracted from Work Sample (School C)**

Through the process of reviewing completed units of work it became evident that pupils did not always address the issues raised by the comments. Where teachers

picked up on this and wrote a reminder, the incidence of non-response reduced significantly. (See *Fig. 4.17)*

> You have made a good attempt with this specification, however it could be a lot better. Please refer back to the notes I wrote last time about making a checklist.

Figure 4.17 **Teacher comment extracted from Work Sample (School C)**

This review process also found that it was most frequently the lower attaining pupils who ignored the written comments. Pupil C01, for example, did not always understand what was meant by the comment and waited until the teacher was available to advise him on what to do, and thus continued to make progress. The work of some lower attaining pupils deteriorated through the unit of work.

A review of a sample range of completed projects demonstrated that consistency had not yet been fully achieved with regard to on-going assessment from all team members. Here it was evident that most, but not all teachers were providing useful constructive feedback, or, having made a useful point, when the pupil has successfully accomplished it no reference is made by the teacher in recognition.

Summative end of unit assessment was more consistent, especially where the unit of work had clearly defined assessment criteria. Where criteria were less well defined, for example those units devised for food technology, the marking tended to address the traditional 'making' skills and the quality of the finished product. Here, for example, pupils were required to research different types of flour and different topping ingredients to make a 'healthy eating' pizza. The assessment then virtually ignored the research and the resultant choices made by pupils and assessed instead the appearance of the finished pizza and how well organised the pupils had been during the sessions.

Summative end of KS assessment was carried out using a modified version of the *Optional Tasks 'Keep it Contained'* (SCAA 1996b). The assessment focused on the criteria set out and these had been shared with the pupils. Consistency here was high and there was evidence that there had been moderation between the different material areas and other teachers had countersigned units of work. This process followed the guidance contained in the department handbook and highlighted by Department Head C as an important strategy to develop a consensus view of standards.

Discussion

The data collected from School C led to some interesting findings. This case study demonstrated that there was an overall consistent approach to assessment within

the D&T department and strong links via Teacher C to the whole school assessment working group. Initially, from the different data sources, it appeared that there was consistency of application throughout, but on closer examination of the documentation, interviews and work sampling it became evident that this was not always so. With regard to the summative strategies, these could be tracked through from policy to practice and were consistently used across the department and similarly across the whole school according to the responses made by pupils. However, the formative strategies, emphasised as being the more important in the quest to raise achievement were consistent with regard to application but there was some differences in teacher understanding of what was to be assessed. Department Head C has maintained a strategic overview, emphasising manageability, fitness for purpose and clarity. Teacher C has the delegated responsibility for assessment within the department and for this purpose has developed some expertise in this area.

The emphasis on assessment in 1997 as a whole school initiative brought about changes that resulted in a greater consistency of approach across the whole school, especially where summative procedures were concerned. This focus has been maintained by the retention of a whole school working group made up of representatives from all departments. The D&T department demonstrates the strong assessment links developed between whole school and subject departments. Department Head C and Teacher C both held the view that a whole school approach was needed for assessment so that pupils would not be confused by different procedures. This was exemplified by the *Assessment and Recording Policy* and to a lesser extent the *Marking Policy*, both of which have been developed from whole school policies. The strength of feeling for a common approach can be seen in what Department Head C describes as a retrogressive step for the department in returning to a previously discarded effort grading system as some other departments had refused to move on. The whole school approach to summative assessment is evident through the consistent use of 'levels' enabling pupils to make accurate comparisons between their subjects, knowing which are genuinely their strengths. (see *Fig. 4.11)* The advantage was that all teachers used the same procedure and this has resulted in pupils having a thorough understanding of how their work was summatively assessed. Formative assessment was not uniform throughout the school and a variety of procedures using grades and marks as well as comments were used. Within the D&T department itself there was a consistency in the use of comments but the usefulness of these varied from teacher to teacher as the work sampling indicated. (see *Fig. 4.12* and *Fig. 4.13*).

The purposes and aims of assessment outlined in the department's *Assessment and Recording Policy* and *Marking Policy* (see *Fig. 4.1* and *Fig.4.2)* were developed from sound principles founded in the literature on assessment. These principles have been set out by organisations such as AAIA (1996) and DATA (1997), to support implementation of successful strategies in schools. These purposes, identified in the department's policy documents have to some extent been achieved through the strategies put in place by the D&T team. However the findings

suggested that there were improvements to be made and this was confirmed by Teacher C who, having trialled a particular modification and seen the benefits of another was keen to introduce them to the whole department, thus addressing some of the weaker aspects of assessment practice. "To help individuals target more clearly specific areas for development [and to] identify and remedy shortcomings as soon as possible." (School C. Transcript 2, p.1). The purpose "To motivate students' further effort [by the writing of comments on pupils work]." (School C. Document 2, p.4) has met with mixed views from pupils, as can be seen by their responses. (see *Fig. 4.12* and *Fig. 4.13)* Pupils wanted feedback that identified how they could improve their work, but at issue was the way it was written. Critical comments were not liked though recognised as potentially helpful. The outcome of unpicking this indicated that if a criticism was turned into a positive through the setting of a target, this was seen as far more encouraging.

The first strategy introduced by Department Head C with a view to raising achievement through progression was the organisation of the carousel delivery for KS3. Department Head C was mindful of the criticisms made by HMI in the D&T annual OFSTED/HMCI reports (1997 and 1998) regarding the lack of planning of rotational courses which fail to ensure that work becomes steadily more complex and demanding. To address this issue the department adopted, in 1998, an organisational approach that OFSTED has since exemplified as good practice.

> Rotational courses are most successful when teachers plan their lessons to build on pupils' earlier experience and make sure that when a module is taught later in the year it is more demanding than when taught earlier. An increasing number of schools are deciding to organise the Key Stage 3 curriculum differently to reduce the number of times pupils move from one teacher to another.
>
> (OFSTED 1999c, p.4)

The minimising of staff changeovers, so that each group is shared by two teachers, has enabled staff to plan progression into the generic elements of their units of work. Staff also had the opportunity to get to know their pupils better over the course of two units and thus identify the strengths and weaknesses of individual pupils. It is not possible to comment on Department Head C's view, that work is now better matched to the abilities of individual pupils, as there is no 'before or after' evidence. However, the work sampling showed that there is evidence of differentiated tasks being introduced to pupils at the start of units and additional support resources used with lower attaining pupils. Pupil interviews indicate that despite these introductions, some of the tasks are not sufficiently challenging for the higher attaining pupils. (See *Fig. 4.12.* Pupil 005).

Department Head C's strongly held belief in the need to minimise the assessment burden on staff is evident in the streamlined documentation and minimalist procedures in place, the use of one pro-forma to map pupil progress and to inform teachers. The use of the *Student Record Card* for both formative and summative

assessment information appears to be doing what the much maligned TGAT Report (DES 1988a) recommended; that assessment could, and should, be used for formative and summative purposes. In this situation pupils understood 'levels' as they were used consistently across all departments, the 'sub-levels' enabling progress to be mapped more precisely. Hence: "Formative, in providing information which teachers can use in deciding how a pupil's learning should be taken forward, and in giving the pupils clear and understandable targets and feedback about their achievements." (DES. 1989, para.6.2)

The three points made by Department Head C regarding ways to encourage pupils and to help them improve the quality of their work were evident during the lesson observations and through the work sampling. Learning objectives and assessment criteria were shared with the group at the beginning of both lessons and reference was made to them during the lessons. Diagnostic marking was evident in the work sample provided (from all D&T teachers), however, it was evident that although virtually all work had regular comments written by the teacher not all were useful to the pupils. Verbal feedback, in the form of questions rather than solutions, was a regular feature in the lessons observed, and found by pupils to be helpful. (see *Fig. 4.14*)

The *Student Record Card* was the strategy that the teachers referred to most frequently with regard to raising achievement. Pupils had a different view, they felt that the marking of their work with comments contributed most to their understanding of what they needed to do to improve, and the linking of these comments with the *Attainment Targets for Design and Technology.* (School C. Document 6) Pupils made use of these stranded level descriptions, to identify what they needed to do to improve to reach the next 'sub-level'. The involvement of pupils in one-to-one discussions about their work at the end of each unit and the consultative way levels were agreed with pupils also enhanced their understanding of progress. These level assessments together with the summative written comment provided pupils with a clear picture of what they had done. Discussions with pupils indicated that.this information was rarely used, with the exception of Teacher C, to set targets for future work. (see *Fig. 4.9.* Pupil C02)

Discussion with pupils provided a range of views about the assessment of coursework. Written comments while appreciated were not always used by pupils. A number of reasons for this were found during the work sampling and confirmed by pupils during discussion. Firstly, some lower attaining pupils did not always understand what was required of them. Secondly, for higher attaining pupils, comments tended to be more congratulatory and sometimes lacked the 'where now' and sufficient challenge to extend them further. Thirdly, a variation in teacher approach, exemplified by Pupil C03 "Some teachers always check back to make sure you have done what they wrote, others don't seem to look," and this sometimes led pupils to ignore the comment. Teacher C wrote comments in the form of targets and these were seen as particularly helpful by pupils, as they found them easier to understand and they could usually tell for themselves when they had accomplished

the task successfully. Teacher C was still piloting writing comments as targets with his groups to ensure that it was both manageable and beneficial, thus other staff had not yet seen it in operation.

The work sampling provided an opportunity to review the assessments made by all the teachers in the department. This uncovered more variation in the marking of pupils' work than the interview information indicated. The vast majority of marking is in fact in line with policy in that it provides comments instead of grades or marks. I found that the teachers were not all equally skilled or experienced at this type of assessment. All were good at praising what a pupil had done well, thus addressing "to point out a strength in a piece of work." (School C. Document 2, p.1), not all go on to fulfil the requirement, "Point out what needs to be done to improve, i.e. set targets." (ibid. p.1). Of those that do identify aspects for improvement, the comments are not always acted upon, especially by the lower attaining pupils. (see *Fig. 4.17*) Some comments sound negative and these had a tendency to demotivate pupils (see *Fig. 4.13*), who then fail to do anything about it, thus not fulfilling the Marking Policy purpose "to motivate students' further effort." (ibid).

On closer examination differences between the comments written on higher and lower attaining pupils emerged, those on the lower attaining pupils' work were more constructive and helpful in identifying aspects to be strengthened and how to go about it. The comments written on the work of higher attaining pupils were those of a more congratulatory style with little or no reference to the next stages of learning or challenge to inspire higher achievement. (see *Fig. 4.16)*

The end of KS3 assessments indicate that in comparison with most other subjects, a significantly higher proportion achieve Level 5 and above, whereas at Level 6 there was no difference. This demonstrates that the lower and lower middle attaining pupils make better progress in D&T than they do in most of their other subjects. However, at Level 6 there was no difference, indicating here that the achievement of the high middle attainers is no different in D&T to that in other subjects. This analysis demonstrates that the best progress is made by the lower attaining pupils who achieve Level 5 rather than Level 4. Thus the strategies for raising achievement are successful here but are not having the same effect for the high middle attainers who do not achieve Level 6.

On close scrutiny the *Key Stage 3 Scheme of Work*, although produced using a common format had some anomalies in the food technology units. These provided hierarchical complexity in terms of the practical making skills but limited development in other aspects and the opportunity to apply them in a real design and make task. The assessment criteria for these units were also very much focused on the end product rather than the process or the pupils' ability to apply the knowledge, understanding and skills acquired. (see *Fig. 4.18*). Thus in terms of the development of design and technological capability as defined by the APU (1987) and the emphasis put on the application of knowledge, skills and understanding by the DFE (1995), food technology contributes little in this respect.

Assessment Criteria (Weekly Planner- Week 5)
Assessment Criteria – Designing

Questionnaire results – identification of end user preferences
Choice of recipe

Assessment Criteria – Making

Accuracy in measuring out ingredients
Quality of finished product

Figure 4.18 **Extract from Year 9 Food Technology Unit of Work (School C)**

Shared understanding and expectations are developed through work sampling moderation sessions and through the use of the KS3 portfolio of assessed work.

Throughout the interview with Department Head C attributed the following assessment strategies and procedures as contributors to raising achievement:

- a consistent approach across the department;
- assessment criteria identified in the units of work and detailed in the weekly lesson plans;
- involvement of pupils in a discussion about their performance;
- the use of diagnostic comments written on a regular basis on ongoing work.

He referred to the CAT score data available in the department but stated that it was not used to its full potential. Teacher C expressed almost identical views, but related them more specifically to individual pupil achievement and to knowing whether or not pupils were achieving their full potential. He had three suggestions to make regarding the introduction of new strategies that he felt would enhance the procedures already in place, both of which are detailed in the literature. Firstly the suggestion to use pupils' prior attainment (CAT score data) to predict an end of KS3 level as a basis for target setting, is, according to research findings (QCA 1998) the most important factor when predicting likely future performance. (see page 22) and having made this prediction to set realistic targets to achieve it and challenging targets to surpass it. Secondly, to improve the quality of comments written on pupils' work by wording the tasks to be undertaken in the form of targets. A third suggestion related to the development of assessment level criteria specific to individual units of work along the lines of the *Optional Tasks and Tests* (SCAA 1996b). This development would also benefit teachers whose understanding of the assessment of design and technological capability is more limited, when they are planning assessment into units of work.

The benefits of having a team member (Teacher C) on the whole school working group was evident from the proactive nature of his assessment work in the classroom, trialling refinements prior to the adoption by the department. He was also specifically responsible for assessment within the department, and thus able to bring expertise gleaned from the whole school working group.

Only a few weaknesses were identified, and with the exception of one, these were already either rectified or on the way to being so. Department Head C had raised the issue of potential underachievement through the use of a rotational delivery of the course; however the main problems as identified by OFSTED (1997 and 1998) had already been addressed and the system in operation enabled the school to offer maximum progression. The most significant weakness, identified by department and evident in the *Key Stage 3 Scheme of Work* (School C. Document 3) and also through the work sampling was that of teacher understanding of the subject and how it had changed. Thus, however good the assessment and marking policies are regarding assessment, if the philosophical understanding of design and technological capability is not present then the assessment planned by that teacher will most likely be flawed as is the case of the 'healthy eating pizza' unit. (see page 73).

Pupils had a different perception of weaknesses, their main concern was the length of time it took to progress through the levels, even with the inclusion of a plus and a minus to the scale, they wanted a system that showed the smaller steps of progress. However, this being a whole school strategy is beyond the remit of the D&T department to amend, but nevertheless is something to be fed back to the whole school working group. Judging from the end of KS3 results this did not appear to have a detrimental effect on their progress in D&T.

Case Study 2 – School H

School H is sited on the outskirts of a large village, approximately six miles from the nearest town. Pupils are drawn from the village and the surrounding small villages as well as from the nearby town. The school, designed as five form entry, has 750 on roll, including a small sixth form and is oversubscribed.

Accommodation for D&T is located within the main school building. All rooms are relatively close and have been extended and refurbished. This upgrading of facilities has provided, clean, dry areas within each of the workshops and a small network of computers accessible from all D&T teaching areas. All rooms are adequately resourced with a traditional range of machines and equipment. Recent acquisitions included a range of CAD/CAM machines and equipment to meet the requirements of some of the NC PoS.

The D&T team is made up of four full-time specialist teachers, a full-time workshop technician and a part-time food technician. All teachers take responsibility for a material aspect (control, food, resistant materials and textiles) and a management aspect (KS3 curriculum, KS4 curriculum, Post 16 curriculum, primary liaison and individual achievement). In addition, the Department Head H takes specific responsibility for assessment and the pupil tracking system within the department. All heads of department are expected to lead on development. Three of the team qualified as specialist teachers prior to the NC but have kept abreast of developments in the subject by attending INSET courses provided by the LEA and

national bodies. They have taught at the school for a number of years. The fourth member of the team was recruited in 1999 and is in his third year of teaching. Between them they are able to teach the full range of specialisms available at GCSE level and to cover the NC PoS. The workshop technician is responsible for the day to day maintenance of machinery and equipment; this includes the machines used for textiles.

For D&T delivery year groups are divided into two cohorts. At KS3, to ensure a maximum group size of twenty pupils, this is achieved by dividing the cohort into a three form and a two form block. The larger block is divided into four mixed ability groups and the smaller into three groups. The subject is allocated two fifty minute periods per week, timetabled as double periods and accounting for 6.66% of teaching time. For KS4, time allocation is increased to 10% of timetable time to enable all pupils to study for a full GCSE. KS3 is delivered using a 'paired teacher' system. Teaching groups are allocated two teachers who are then responsible for delivering four units in Years 8 and 9 and five units in Year 7. The additional unit in Year 7 is an introductory unit designed to provide baseline assessment data. Each unit lasts approximately eight weeks in Year 7 (fourteen hours), plus the introductory unit of six weeks; and nine weeks (sixteen hours) in Years 8 and 9. Units are devised to cover the NC PoS and are delivered through control/electronics, food, resistant materials and textiles. The third unit of Year 9 is used as the end of KS3 assessment and pupils are grouped according to their chosen GCSE specialism. The final unit has a focus on the application of a number of generic skills and areas of knowledge and is delivered through an industrial application task.

For this case study it has been important to establish the school context within which the D&T department is operating, prior to looking at the specific focus of how assessment is used in raising achievement in D&T and the strategies that the department use to do this.

The first OFSTED report (School H. Document 10) in 1996 identified assessment as a key issue, highlighting weaknesses in procedures and practice in KS3 (see *Fig.4.19).* The report stated that attainment was slightly below that of similar schools by the end of KS3 and KS4.

> In many subject areas in KS3, including those in the core, teachers have yet to collect examples of pupils' work which exemplify achievement at each National Curriculum level, and standardisation of assessment is weak. Most teachers mark pupils' work diligently in accordance with school and subject policies but practice is not consistent across the school or within departments and requires monitoring...A few teachers use assessment information to inform their planning and teaching, however there is scope for the development of more coherent systems of assessment within departments and across the school, particularly in KS3.

Figure 4.19 **Extracts from the OFSTED Report (School H. Document 10, p.14)**

The resultant school OFSTED Action Plan was the starting point for a major initiative to "develop good practice in raising pupil achievement through monitoring and tracking individual pupil progress and target setting." (School H. Document 7, p.3). The school adopted the OFSTED definition of an effective school as one "whose pupils progress further than might be expected from consideration of their prior attainment," (ibid. p.5) and in order to do this accurately the school highlighted the need to know exactly what the prior attainment is when pupils arrive in Year 7.

School H took advantage of the increasing amount of reliable assessment data becoming available to secondary schools for the new cohorts of pupils and used this as the basis of the data that they then used to establish prior attainment baselines in individual subjects. Initially the school bought into a commercial assessment system, (MidYIS from the University of Durham's Curriculum, Evaluation and Management Centre) to provide additional information to help establish an accurate baseline assessment for each pupil from which to predict end of KS3 levels. An internally devised baseline is now used with MidYIS being purchased now and again to act as a double check. National data is available for progress between the end of KS2 and KS3, providing a data bank to enable schools to predict average progress based on prior attainment with reasonable statistical accuracy. (*Autumn Package* published annually by the DfEE). They are now able to establish minimum target levels for all pupils, in all subjects for the end of Years 7, 8 and 9. School H recognised that, for pupils, moving one and a half or two levels in three years was not a great incentive and adopted the same approach as the primary sector where levels were already being broken into three sub divisions a, b and c, as parents were already familiar with this (see *Fig.* 4.20). "Such refinements are essential if we are able to demonstrate progression through KS3, giving incentive to pupils, teachers and parents." (School H. Document 7, p.8).

DEFINITIONS of SUB-DIVISIONS for NATIONAL CURRICULUM LEVELS

c	indicates that the pupil is just achieving this level most of the time
b	indicates that the pupil is consistently working at this level
a	indicates consistently working in the top range of this level and starting to achieve the next level.

Figure 4.20 **School devised definitions of Level sub-divisions (School H. Document 7, p.8)**

Four and a half years after the 1996 OFSTED report, school data (*1999 PANDA Report* for School H) indicated that at KS3 attainment in the core subjects and GCSE results overall had improved significantly and now graded in comparison with

similar schools as A*[1]. School records of teacher assessment at KS3 show that in D&T similar improvement was made. The data also demonstrated that faster progress had been made in D&T than in most of the other subject areas, with the exception of English and French. An overview summary of the individual pupil tracking and target setting procedures is detailed in Appendix 20.

Pupils are assessed on entry to the school using KS2 SAT results; VRQ scores; primary school teacher assessments and the school's own internal subject specific assessment tasks. From this data the staff establish a baseline level for all pupils in all subjects, for D&T this is completed within the first half term. The principal guide to this baseline is the average KS2 SAT score that gives staff a statistically valid basic baseline, detailed in *Fig. 4.21.* Departments may then 'add' one progression point (eg 4- to 4) if the pupil achieved above the average KS2 SAT score in the subject specific baseline assessment; or 'subtract' one progression point if the pupil scored below. If staff want to change the baseline score by more than one progression point there must be evidence to support it. Throughout KS3 pupils have at least one termly summative assessment, made using these NC levels.

AVERAGE KS2 SCORE	BASELINE START OF YEAR 7	MINIMUM TARGET LEVELS		
		END OF YEAR 7	END OF YEAR 8	END OF YEAR 9
5.67	5a	6c	6a	7c
5.33	5b	5a	6b	6a
5.00	5c	5b	6c	6b
4.67	4a	5c	5a	6c
4.33	4b	4a	5b	5a
4.00	4c	4b	5c	5b
3.67	3a	4c	4a	5c
3.33	3b	3a	4b	4a
3.00	3c	3b	4c	4b

Figure 4.21 **Statistically valid basic baseline: extract from KS3 Minimum Target Levels (School H. Document 6, p.2)**

Other factors influencing attainment were recognised. School H identified effort, behaviour and homework as crucial factors influencing pupil progress. For these aspects they used a six point scale from 3+ to 3-, each accompanied by a detailed descriptor.

Departmental Documentation

The department has produced a considerable amount of documentation, some held centrally for reference and some needed on a regular basis or for procedure protocols has been distributed to team members via the departmental handbook.

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[1] OFSTED definition of category A* "pupils' results are **very high** in comparison with the average for similar schools."

Policy Documents

Assessment, Recording and Reporting Policy

The department has adopted the school policy, recognising the need for a common approach across the school but have exemplified aspects in relation to D&T. *Assessment, Recording and Reporting Policy for Design and Technology* (School H. Document 1).The policy sets the scene by stating the underpinning philosophy and principles for assessment adopted by the school. It also provides a rationale as to the purposes of assessment. These are detailed in *Fig.4.22.*

Philosophy

We believe that assessment is at the heart of effective teaching and learning and when it has an effect on planning and informs teaching it raises standards. In our assessment procedures we recognise the individuality of all pupils.

Purposes

To enhance the learning of pupils assessment:

- actively involves the pupils in their learning through discussion, provision of information about progress and ensures that pupils are aware of the purposes of teaching;
- motivates the students through identifiable achievement;
- highlights the strengths and weaknesses together with strategies to manage them;
- provides reliable and credible information to support continuity and progression in the learning process;
- provides valid information to assist with setting individual student targets;
- identifies students who require support and students who require extension.

To aid and support teachers in evaluating their teaching, assessment:

- indicates strengths and weaknesses in the teaching programme;
- informs planning by identifying the next steps in the teaching programme;
- indicates strengths and weaknesses in the teaching style.

To provide information for others:

- pupils;
- teachers;
- parents;
- outside agencies;
- LEA, OFSTED, DfEE

Figure 4.22 **Extracts from Assessment, Recording and Reporting Policy (School H. Document 1, pp.1-2)**

The policy outlines the generic strategies identified in the school policy that should be employed for the different types of assessment. Where relevant these contain specific examples or guidance related to D&T. Summative assessment procedures are identified for baseline, end of unit and end of KS3 to establish what pupils know, understand and can do and thus enable their teachers to identify progress and

establish the minimum target levels which form an integral part of the school tracking system. Formative, assessment for learning, takes greater prominence in the policy. (*Fig. 4.23*).

> Assessment is a continual process and should be an integral part of the normal teaching and learning activities in design and technology ... planned opportunities for assessment should be incorporated into both medium term (units of work) and short term (lesson plans).

Figure 4.23 Extract from Assessment, Recording and Reporting Policy (School H. Document 1, p.3)

Examples of possible teacher assessments are suggested and the policy goes on to illustrate how to match D&T evidence to assessment methods. This is detailed under headings identifying the aspects of designing and making, an example of which is shown in *Fig 4.24.*

DESIGNING	EVIDENCE	METHOD
WORKING WITH BRIEFS	• Discussion about project aims and key points to consider	Oral questioning
	• List of questions for client or end user	Scrutiny
	• Discussion with client or end user (about needs, product features, views and preferences)	Observation of process
	• Copy of the pupil's brief	Scrutiny
	• Specification (listing main requirements)	Scrutiny of drawings and written material

Figure 4.24 **Extract from Assessment, Recording and Reporting Policy (School H. Document 1, p.4)**

Marking and Feedback Policy

The success of the school strategy for pupil tracking relies on common practice across all departments. The *Marking and Feedback Policy* (School H. Document 2) provides a rationale for teachers of D&T, but first and foremost it emphasises the importance of the school perspective by stating the school's agreed principles. (see *Fig 4.25*). The policy goes on to identify the different purposes of marking; marking of learning and marking for learning. Again, in line with the *Assessment, Recording and Reporting Policy,* there is a greater emphasis on formative procedures. The policy sets out the requirements of marking, by describing two different procedures to be adopted according to circumstance; 'quality marking' and 'selective marking'.

Shared Principles:

- it provides opportunity for prompt and regular written or spoken dialogue with the student;
- teachers and students are clear about the learning objectives of a task and the criteria for success;
- teachers provide constructive suggestions about ways in which the student might improve his/her work;
- teachers agree the next steps with the pupil;
- teachers follow up the agreed targets with the student to see how far they have achieved them.

Teacher-Centred Principles

- teachers are selective in the aspects they choose to comment on;
- teachers comment on specific, positive aspects of the assignment;
- teachers recognise effort as well as quality; not in a vague or generalised way, but linking effort to specific skills or understanding;
- teachers use the information gained together with other information to adjust future teaching plans.

Student-Centred Principles

- students are encouraged to comment on the work themselves before handing it in or discussing it with the teacher;
- students are praised when they focus their comments on the learning objectives for the task;
- students are given time to act on the feedback they are given.

School-Centred Principles

- everyone's practice is consistent and in line with the overall school policy;
- the marking policy is reviewed at intervals to ensure that it is understood by all new members of staff, that practice continues to reflect school policy, and that everyone has the chance to share and develop practice further.

Figure 4.25 **Principles, Marking and Feedback Policy (School H. Document 2, p.3)**

The policy states that not all work can be 'quality marked' and that there needs to be a clear understanding about whether a piece of work will simply be acknowledged, specific aspects marked or whether it will receive detailed attention. An aspect stressed as crucial is 'follow-up' after marking, recognising that pupils will not respond in terms of improving their work if no follow-up discussion occurs. "The teaching team needs to establish, share, maintain and evaluate the routines it uses to give pupils sufficient time to read and act on the comments they receive". (School H. Document 2 p.6). The policy includes extensive guidance on giving feedback and the importance given to this aspect is encapsulated in the rationale, (see *Fig. 4.26*). The policy outlines the characteristics of effective feedback and provides guidance on feedback in written form when marking work. This is detailed in Appendix 21.

Rationale
Feedback is an essential element in assessment for learning. Teachers need to develop methods to interpret and respond to assessment information in a formative way. It is important that there are safe and secure relationships so that trust is established between teacher and student, prior to giving feedback.

Students benefit from opportunities for formal feedback through group and plenary sessions. Where this works well, there is a shift from teachers telling students what they have done wrong to students seeing for themselves what they need to do to improve and discussing it with the teacher.

Therefore, giving feedback involves making time to talk to students and to teach them to be reflective about both the learning objectives and their work/responses.

Figure 4.26 **Extract from Marking and Feedback Policy (School H. Document 2, p.9)**

Pro-formas

A *Design and Technology Assessment Sheet* is used for recording pupil achievement. (a different colour for each year). Each sheet has provision for four Units of Work and the range of levels listed are raised for each subsequent year. These are also used for recording agreed pupil targets for the next Unit of Work. An example is given in *Fig. 4.27.*

DESIGN & TECHNOLOGY ASSESSMENT SHEET												
NAME:							**FORM: 7**					
UNIT:							**DATE:**					
TEACHER COMMENT: **Teacher Initials:**												
STUDENT TARGETS : • • • •												
LEVEL ACHIEVED	**AT1 DESIGNING**	**3c**	**3b**	**3a**	**4c**	**4b**	**4a**	**5c**	**5b**	**5a**	**6c**	**6b**	**6a**
	AT2 MAKING	**3c**	**3b**	**3a**	**4c**	**4b**	**4a**	**5c**	**5b**	**5a**	**6c**	**6b**	**6a**
EFFORT:		**BEHAVIOUR:**						**HOMEWORK:**					

Figure 4.27 **Section of a Year 7 D&T Assessment Sheet (School H. Document 4a)**

Information Documents

The department adopted, for summative assessments, the NAAIDT *Quality through Progression* stranded version of the Attainment Target Level Descriptions. (1998, pp.99-101) This is displayed in all teaching areas and all pupils have a reference copy in their design folders. (School H. Document 9a). For ongoing work, to support formative assessment the team have modified other grids from the same publication, (an extract of the *Designing and Making* grid is detailed in *Fig. 4.28*).

DESIGNING & MAKING SKILLS: KS3				
STRANDS	**GENERAL FEATURES**	**LEVEL4- 5**	**LEVEL 5-6**	**LEVEL 6-7**
CLARIFYING THE TASK	**Understanding the task.** **Interpreting the task.** **Specifying the design criteria.**	**PoS: 3a 3b 3c 3d** Identify constraints posed by the task and acknowledge them when formulating a design brief. Show an awareness of resources as a constraint. Find and select information which informs and clarifies the task described in the design brief.	Level 4-5 + Take appearance, function, safety and reliability into account. Formulate a design specification. Recognise critical factors that should be used as design criteria.	Level 4-6 + Select information sources, gathering and sorting that which will help with ideas for, and decisions about the design. Draw up a design specification for the product detailing the design criteria which reflect a user's needs.
GENERATING IDEAS		**PoS: 1c 3e**		
DEVELOPING IDEAS		**PoS: 3f**		
COMMUNICATING INTENTIONS		**PoS: 3j**		
PLANNING		**PoS: 3h 3i 3k 4i**		
WORKING WITH MATERIALS		**PoS: 3g 3h 4a 4b 4c 4d 4e 4f 4g 4h 9a 9b 9c 9d**		
HEALTH & SAFETY		**PoS: 10a 10b 10c**		
EVALUATING		**PoS: 3l 4j 4k**		

Figure 4.28 **Extract from Designing and Making grid showing strands of the ATs with expectations for levels and linked with PoS. (School H. Document 9b pp.2a-2d)**

A similar grid for *Knowledge and Understanding* was constructed using the following 'aspects' instead of 'strands':

- Products and Applications and Quality;
- Industrial Practice and Applications;
- Structures;

- ICT;
- Materials and Components;
  - resistant materials
  - food
  - textiles
- Systems and Control;
  - electrical and electronic
  - mechanical
  - pneumatic and hydraulic.

These grids are also displayed in each teaching area.

Documents giving guidance and detailing procedures for pupil tracking (School H. Document 5) and target setting (School H. Document 6) have been produced to ensure consistency of application.

Scheme of Work

The *Key Stage 3 Scheme of Work* (School H. Document 3) was devised, firstly to ensure full coverage of the 1995 NC PoS; secondly, to provide a baseline unit and an end of KS3 assessment unit; and thirdly to address the differing levels of ability within each cohort. Over the years the units have been revised and developed in response to evaluations undertaken by teachers and pupils. A long term plan provides an overview of the SoW, mapping the units across years 7 to 9 and highlights progression through the generic and material specific skills and knowledge, thus identifying the prior learning required for each unit. Units are produced to a common format for the medium term plans. These have been developed along the lines of the *Optional Tasks and Tests* produced by SCAA (1996). The range of information outlined in each unit of work is given in *Fig.4.29.*

Content Framework for a Unit of Work

- Overview of the unit:
  - Context;
  - Brief;
  - Design requirements;
- Basic and extended versions;
- Prior learning requirements;
- Managing the unit:
  - Resources;
  - Product analysis tasks and FPTs to develop new knowledge, understanding and skills in preparation for the DMA;
  - Suggested time allocations for tasks;
- Learning objectives;
- Assessment opportunities during the unit;
- Assessment criteria written specifically for each unit and linked to level descriptions;
- Pupil task sheets (basic and extended versions);
- Guidance on evidence to be produced.

Figure 4.29 **Unit of Work Framework (School H. Document 3)**

Assessment features throughout a unit, firstly providing guidance on the opportunities that present themselves during the unit, thus enabling staff to make formative assessments; and secondly through the material/unit specific criteria which are listed for a range of levels. An example of the links to level descriptions is shown in *Fig. 4.30.*

LINKS TO LEVEL DESCRIPTIONS **Characteristics of Level 4 as shown when:**	
DESIGNING	**MAKING**
Carry out research (for example into novelty products, community issues and consumer preferences) and use their findings in developing their own ideas. Comment on findings about people's differing preferences and suggest alternative ideas for meeting them. Produce labelled sketches of how their design meets constraints (for example having a novelty value whilst being able to be produced in batches). Describe how their product appeals to consumers and links to the community. Try out and test more than one variation on the batch production system. Give simple reasons for choosing between the ideas. Produce a flow diagram to show the batch production process.	Draft a step-by-step plan which lists tools, materials and processes required to produce their final batch of novelty products. Measure, mark out and cut various materials during trailing and production of their products. Try out and test ways of adapting recipes to their design needs. Demonstrate accuracy when trialling ways of producing their batch of products. Check quality of assembly and finish to make sure size, shape and appearance are consistent. Identify the successful, weak of problematic parts of their ideas and final batch products.

Figure 4.30 **Extract from Unit '*Going Public*' Characteristics of Level 4. (School H. Document 3)**

Departmental Pupil Data and Records

The school provides departments with individual pupil data relevant to the needs of the subject. For D&T this consists of the KS2 average score and the VRQ score for each pupil. The department use their own baseline unit of work to assess pupil capability during the first half term. This result, together with the individual KS2 average score, is used to calculate a baseline level and minimum end of year level for each pupil (see *Fig. 4.31*). The department use a school pro-forma for recording pupil progress across KS3 (see *Fig. 4.31*). These track pupils from baseline to the end of Year 9; the minimum target levels for the end of each year are included and a column is also allocated for a revised target to be added each year. The resultant pro-forma is very complex, but made easier to interpret by the use of colour coded entries in the 'Level Achieved' column (green: one or more sub-levels above MTL, black: same as MTL and red: one or more sub-levels below MTL). As soon as the baseline has been established the MTL columns are completed across the sheet. These sheets (one per group) are centrally filed within the department and are readily available. In addition each teacher is provided with a copy. The regular updating of these sheets is carried out by trained central administration staff.

STUDENT TRACKING SHEET

NAME	VRQ	AV KS2 SAT	BASELINE	YR7 UNIT 2	YR7 UNIT 3	YR7 UNIT 4	MTL	L ACHIEVED	YR8 UNIT 1	YR8 UNIT 2	YR8 UNIT 3	YR8 UNIT 4	MTL	EL	L ACHIEVED	YR9 UNIT 1	YR9 UNIT 2	YR9 UNIT 3	YR9 UNIT 4	MTL	EL	L ACHIEVED

TARGET SETTING LEVEL DEFINITIONS
Minimum Target Level (MTL)
Calculated from the DfEE 'National Value Added' chart.
Estimated Level (EL)
Teacher set level representing what the student is likely to achieve at the end of the key stage/course if he/she continues to work at present rate.
Current Level (CL)
What the student would be likely to achieve if he/she sat an end of year/key stage/course at the present time. (The current level should enable students to demonstrate progression.)

Figure 4.31 **Example (part) of KS3 Tracking Sheet (School H. Document 4b)**

To support members of the team making summative end of unit assessments the Department Head H holds regular moderation sessions. A portfolio of previously assessed work is used to support these sessions.

The Head of Department's Perspective

Department Head H emphasised the school involvement in the pupil tracking system and the resultant standardisation and consistent use of assessment and marking procedures across the school.

> An issue that emerged as a result of developing a detailed tracking system, was the co-ordination of the assessment and marking policy. Consistency across departments became critically important. Even the need to clarify the levels and grades you are using at different times becomes vital.
>
> (School H. Transcript 1, p.9)

He referred to the *OFSTED Report* (School H. Document 10) that led to the initiation of the pupil tracking system as a strategy to raise achievement. "By tracking pupils very closely we believed that this was the key to higher achievement, it is true that our GCSE grades are improved and pupils get more GCSEs." (School H. Transcript 1, p.4)

Good communication at all levels was seen as crucial by Department Head H. The team he said were provided with guidance materials and pro-formas to ensure the consistent application of procedures. Pupils, he said, understand the procedures used and are actively involved in the process. The burden of regularly updating the tracking sheets has been removed from teachers and instead the school has trained members of the administration team to do this. This is done quickly and distributed to teachers to keep them informed of current performance. Through this system underperformance is quickly recognised and remedial action discussed.

Department Head H's response to the question relating to the purposes of assessment was that its prime function was in the role of raising achievement through formative strategies. He stressed the importance of assessing work regularly on a diagnostic basis to help pupils raise their level of achievement as they progress through a unit of work.

> Coursework is usually marked with a comment to focus pupil on what to do next and to identify aspects that need to be strengthened...here we are assessing the pupil against his own previous work as well as monitoring progress for the tracking sheet.
>
> (School H. Transcript 1, p.4)

He went on to explain that unless teachers had a clear idea of the learning needs of individual pupils and the range of ability within a group they would not be able to plan or teach as effectively, thus it was imperative for teachers' to have details of their pupils' previous levels and the targets set for the next unit, "so they can add challenge for the higher attaining pupils at the beginning of a unit of work and provide support or modified work for lower attaining pupils." (ibid. p.4). He viewed summative assessment as an essential part of the tracking and target setting process for identifying potential progress, referring to the KS3 units (Baseline unit in Year 7 and the end of KS3 assessment unit in Year 9) designed specifically to provide an accurate level based on the pupil's D&T capability. He clearly distinguished between 'assessment for learning' and the 'assessment of learning'.

Another purpose of assessment the tracking system addressed was the identification of underachievement. "The tracking sheet, [*Fig. 4.31*] picks them up almost at once, each teacher knows the expectation of each pupil in his or her own group from this sheet and can pick underachievement up very quickly...so you see the system is very tight." (ibid. p.9).

Department Head H articulated the view of the staff in general when he outlined what he understood to be the experience of pupils of the assessment of their work and the impact that the tracking system had had.

> Feedback at consortium meetings suggests that pupils appreciate the detailed analysis of their academic performance. They know their academic potential, know their academic performance and can see for themselves where they are under performing. They value the detailed one to one discussions on their attainment, even when this is challenging. Short term target setting has been shown to give a real incentive to improve. Pupils feel valued, are keen to know the results of reviews, and evidence strongly suggests pupil attainment improves at all levels.
>
> (ibid. p.8)

The department developed the *Design and Technology Assessment Sheet* (see *Fig.4.27)* to enable pupils to take an active part in the assessment of their own work by identifying their strengths and aspects for development. This is completed by the

teacher at the end of a Unit of Work and the 'Student Targets' box is completed in consultation with the pupil. Department Head H emphasised the importance of generic targets that pupils could realistically work towards in their next unit of work whatever material focus it happened to have. "Pupils are very much aware of these as they discuss their progress regularly with us and also with their form tutor." (School H. Transcript 1, p.8). Another document that provided pupils with information about their progress in relation to the levels of attainment was a stranded version of the *Attainment Target Level Descriptions* (NAAIDT 1998). This was considered by the Department Head H as important and was displayed in all rooms with individual copies provided for each pupil. Pupils, he said, found them helpful in determining their personal targets.

Department Head H viewed the involvement of pupils in their learning is seen as crucial, he went on to identify further strategies he saw as essential for raising attainment. He described the steps they had taken as a department to include pupils in the process, firstly by sharing with them at the start of a unit of work the assessment criteria that would be used for the summative assessment and the lesson-by-lesson identification of specific learning objectives. Secondly, to encourage and help pupils improve the quality of their work through the use of discussion whilst observing process being carried out during practical sessions. Thirdly, marking consists of comments only. "A comment is supposed to be helpful in telling the pupil where next and what needs strengthening." (School H. Transcript 1, p.8).

The tracking system was also, he said, a monitoring device. "We have to try to add as much value as possible. Our [D&T] results show that as a department we are doing well, and better than many other departments." (ibid. p.3).

Through the departmental monitoring and evaluation process Department Head H had identified two aspects that needed further development, firstly the writing of constructive comments on pupil work when marking. "We know we need to do some more work here as you can see, some comments are clearly not helpful [reference to a teacher comment on a piece of work 'neat presentation'] (ibid. p.8). Secondly, the writing of targets needs to be improved to ensure that they are all effective and relevant. Department Head H went on to describe how they had already addressed the organisational aspects that they considered hampered pupil progress, such as the carousel delivery of the D&T curriculum by reducing the number of teachers each pupil visited during the year. The planning documentation had also been written with a view to identifying progression throughout the year.

Department Head H explained that initially many teachers felt threatened by the tracking system. "We cannot hide the fact that close tracking and monitoring will not only reveal under performing pupils but also under performing departments and under performing members of staff". (ibid. p.9)

The Teacher's Perspective

Teacher H was the most recently appointed member of the team, now in his second year at the school. He considered communication between class and teacher as very important and had implemented all the support systems devised by the department to help his pupils. Firstly he referred to sharing the learning objective with the class at the beginning of the lesson, "so they know how much progress is expected during the lesson and this also says to them what the focus of the assessment is for the lesson." (School H. Transcript 2, p.1). To reinforce the importance of 'focus' all pupils have a copy of the unit information in their folders. He also saw the need to keep parents well informed and thus the need for informative reports.

Teacher H held similar views to those of Department Head H regard to the purposes of assessment, he considered as most important, that each pupil made the best possible progress and that assessment was the key to achieving this. He described the data available when pupils entered the school and the department's baseline assessment carried out in the first half term and how they, the department, then worked out the minimum target levels for each pupil, he described how this information was used to set challenging targets for all pupils, and also to pick up on any underachievement quickly. "With this information we can match work to the ability of each pupil very accurately." (ibid. p.2). Teacher H explained that assessment was also used as a tool to identify gaps in learning and that if several pupils had the same gaps "it means we need to amend the unit of work." (ibid. p.2)

He described the strategies he used. He talked about an INSET session at the school led by Professor Paul Black that greatly influenced the way he marked pupils work by the use of comments rather than marks or grades. "Listening to him talk about the research he and Wiliam carried out and reading *Inside the Black Box* gave us as a department the confidence to stop grading work as well...and it works." (ibid. p.1). Secondly, the tracking system, used by the school was seen as the key strategy for monitoring progress, challenging pupils appropriately and identifying underachievement. Teacher H talked about the use of the *Design and Technology Assessment Sheet* to set generic targets for the next Unit of Work to help pupils make the best possible progress and also to remind the teacher what the pupil needed to focus on. "If a pupil knows exactly what they need to do to improve, they are much more likely to target that goal in the next Unit of Work." (ibid. p.4). He stressed the need for these to be completed punctually so as to be available in the first lesson of a new Unit of Work and even more crucial when pupils were moving to a different teacher.

Teacher H explained that with such a detailed and rigorous tracking system, detailed evidence of the 'value added' by each teacher was readily available and used by the senior management team and Department Head H. This he said could be a source of anxiety for some teachers.

In response to the question, "In your lessons, how do pupils know how well they are doing?" Teacher H gave a very positive view of the tracking system and its role in raising achievement:

> All pupils throughout the school know exactly how well they are doing, the focus is very much on individuals, how well they are doing in comparison with their expected progression rather than in competition with each other. The tracking system is very good in this respect...because all departments do the same thing the pupils understand and so do their parents...In my previous school all departments did something different, there was no consistency and I think much confusion.
>
> (ibid. p.5)

When asked if there were any strategies or procedures that he would like to introduce, the answer was an unequivocal 'no'. "This system we have here is very good, I don't think we need anything else...but we continually refine the system that we have got. That's why the assessment sheets [Document 4a] are slightly different for each year group."

The Pupils' Views

When asked if they knew how well they were doing all pupils gave very similar responses. They described the information given by the teacher at the beginning of a Unit of Work, detailing the focus for assessment and the lesson objective written on the board every lesson. They talked about levels recorded at the end of each completed Unit and the targets set in discussion with the teacher for the next Unit on the *Design and Technology Assessment Sheet (Fig.4.27).*

Do you know how well you are doing?
Yes, we have these sheets [Design and Technology Assessment Sheets, (*Fig. 5.29)*] they have our levels and progress from when we first came here. We are also told what we are expected to get [MTL]. It's the same everywhere, all the teachers do the same thing. (Pupil H02)

Yes, the teacher fills in our Assessment Sheet and helps us to write our targets for the next Unit. (Pupil H01)

Yes, he puts it on the board every lesson [learning objective] and at the start of a new Unit we always get stuff about what we will be assessed on at the end and each lesson we know what to concentrate on. (Pupil H03)

***Figure 4.32* Extracts from Pupil Discussions (School H)**

Pupils views in response to the question "Why do teachers mark/assess your work?" were varied, but consistent throughout was the positive benefit to the pupils, to help them to make better progress. Most also held the view that it was also so that teachers could find out what they knew and understood.

Why do teachers mark/assess your work?
To help us get better so that we know what we have got to do and also so that they can fill in our levels and write on our assessment sheets. (Pupil H01)

Because they need to know what we have done and to make sure we are doing things right. (Pupil H03)

Figure 4.33 **Extracts from Pupil Discussions (School H)**

The pupils responses to the question asking, "How is your work assessed?" were similar. They referred to the end of 'Unit' summative assessment resulting in a judgment about the level achieved, and that this was usually fairly predictable as in each work area 'level statement' charts were displayed on the wall (*Attainment Target Level Descriptions* Document 9a) and they had copies of the former in their folders. For ongoing work they referred to assessment grids, also displayed in each teaching area (*Fig. 4.28).* These, they said were used regularly by the teacher when outlining expectation. Frequent reference was made to the use of diagnostic comments on ongoing coursework. One pupil also referred to discussions with the teacher during practical sessions to help him understand what was meant by the written comments. When asked if these assessment procedures helped them do better, some pupils were less certain.

How is your work assessed?
At the end of each unit we are given a level on our [*Student*] *Assessment Sheet.* The teacher also writes a comment on it and we have to decide what our targets are going to be for the next Unit. (Pupil H03).

Comments are always written on our coursework. (Pupil H05)

The teacher always refers to the charts on the wall when he talks about how he will assess our work and he always refers to the learning objectives that he has set for us. (Pupil H02)

Does this assessment help you to do better?
Yes, [the teacher] is always reminding us to look back and use his comments to make our next bit of work better. (Pupil H04).

It says what I have done well. That is good because I know that what I have done is OK, but this tells me how I could do even better. (Pupil H01).

Yes, as long as the comment helps, sometimes it is difficult to know exactly what to do. (Pupil H05)

Sometimes it is difficult to be sure what to do. (Pupil H02)

Figure 4.34 **Extracts from Pupil Discussions (School H)**

All pupils had a clear idea of how they were doing in D&T in comparison with their other subjects; they referred to the *Tracking Sheets* (School H. Document 4b) and

explained that form tutors discussed these with them on a termly basis. When asked if they knew how they could improve their work all referred to the marking of ongoing work with written comments and to the targets they had set in discussion with their teacher prior to the commencement of a Unit of Work. Most talked enthusiastically about exceeding their MTL recorded on the *Student Tracking Sheet (Fig. 4.31).*

Do you know how you could improve/do better?
Our work is marked with comments, we don't get grades or marks like my brother gets at his school. The comments are supposed to tell us what we need to do better and also says what I have done well. (Pupil H02).

When the teacher marks my work he usually writes a comment...that tells me what to do next or sometimes what I have missed out...so that tells me what to do next. (Pupil H05)

When we started at this school we were all given a level [baseline level]. They had our scores from [primary school] and we did some tests. They then worked out where we should have got to by the end of this year [Year 9]. (Pupil H01).

Figure 4.35 **Extracts from Pupil Discussions (School H)**

In response to questions about assessment information relating to previous units all pupils recounted virtually the same information. Most found the target setting difficult as they often wanted to include a target that was specific to the current material and this would not be relevant in the next unit.

When do you get assessment information about your previous 'unit'?
It comes with us so that our new teacher will know all about us. (Pupil H02).

How is this information used?
They put the level on the *Tracking Sheet* [*Fig. 5.33*] to make sure we are making progress, my form tutor is quick to find out if I've not done so well. (Pupil H03)

He [the teacher] puts it on the *Assessment Sheet* [*Fig. 5.29*] and also on the *Tracking Sheet* with all the other levels from our other subjects. (Pupil H05).

Does it help you with your current work?
The target setting does but it is sometimes hard to write one that will be OK for the next unit because it is nearly always a different material and I might want to say that I need more practice at using a sewing machine but I can't because I might be moving to food. (Pupil H02).

Figure 4.36 **Extracts from Pupil Discussions (School H)**

The Lessons

Two Year 9 lessons were observed towards the end of a Unit of Work focusing on mechanical control. The brief given for this unit was to "Design and make a product with a novelty appeal for an event, attraction or service in your local community. The item should have moving parts operated by the user." (School H. Document 3). Pupils had previously investigated the context, evaluated existing mechanically controlled novelty products and had explored a range of mechanical systems. They had produced models of their own mechanism using card and other modeling resources so that they could evaluate and test the success of their idea/s as a product designed to meet specific requirements. The brief was common to all pupils but was differentiated into 'basic ' and 'extended' tasks through the 'task sheets' and 'checklists' issued. Detailed planning, conforming to the departmental *Content Framework for a Unit of Work* (*Fig. 4.29*) was used.

Both lessons followed the same format, consisting of an introductory session followed by individual work and ended with a plenary session. The first lesson commenced with a whole group session. Firstly there was a brief recap of the previous lesson, accomplished through the question and answer technique. The teacher skillfully introduced the learning objective for the lesson, relating it to the previous work and introduced his expectations for the lesson. More question and answer followed, this time referring back to the card models made and how they had tested and evaluated them and to consider how these techniques could be adapted to be used on the finished product prototype. The questioning here became more challenging as open questions requiring extended answers were asked. Pupils were also expected build on a previous pupil's response or to give an opinion, (see *Fig. 4.37*). When the teacher was confident that the majority, if not all pupils, were ready to work independently he sent them to the workbenches to continue with their prototypes. Next, he ensured that a small group were clear about their work before he set about circulating the whole group. At this stage a technician appeared from the preparation area and supervised the drilling task. The teacher systematically visited groups of pupils, starting with the group working on the extended task. A brief discussion was held with the group, then he talked to individuals, often referring to their design folder prior to engaging with the individual. Before moving on to the next pupil, the teacher often made a note in the pupil's design folder. This was repeated at each of the five benches, occasionally interrupted by a pupil needing specific advice that the technician was unable to provide. The lesson ended with a plenary session focusing on the progress made to accomplish the learning objectives set for the lesson. The teacher asked pupils to hand their design folders in at the end of the lesson.

The second lesson started in much the same way as the previous one, pupils knowing the routine do not waste any time in organizing their work stations before grouping around the front table. During this introductory session the teacher again focuses the class on the learning objective set for this lesson and the question and answer work ensues, but this time the teacher makes frequent references to design

folders he has assessed since the last lesson. Before the group return to the work area the teacher reminds them to review the assessments he has made of their work and suggests that if they would like to discuss any aspect to write their name on the board and he would visit during the lesson, if anyone was completely stuck and unable to continue to put a star beside their name. Two stars appeared and the teacher responded to these first, he then circulated the groups around the room, as in the previous lesson but this time in a different order and armed with his assessment book.

T	How could we test this...Lets look at stability...Do you think this is stable enough?
P1	No
T	Can you think of alternative ways to reinforce this?
P1	I would...
T	Jason, what do you think about John's suggestion, will it work?...
P2	...
T	and how would you develop it?
P2	...
P1	But if I did that surely...

Figure 4.37 **Example of Teacher H using the open questioning technique and involving two pupils[2]. (School H)**

Work Sampling

The review of pupils' work was carried out on a range of Year 9 design folders, all of which had been assessed. The sample provided covered the full range of ability, all teachers in the team and examples from each of the Year 9 units. A copy of the *Design and Technology Assessment Sheet Year 9* (see *Fig. 4.26*) was attached to each folder, providing a picture of each pupil's progression through Year 9 (Year 7 and 8 sheets were centrally stored in the department and were available for reference. A copy of the *Student Tracking Sheet* was also provided to demonstrate the mapping of progression from the start of Year 7 (baseline) to the current stage of Year 9.

The folder work had been assessed on a regular basis throughout the unit, the teachers' comments written in pencil. Occasionally a pupil had responded with a written reply either explaining in more detail why they had done something or with an answer to a query the teacher had written. All assessments were comments, there was no evidence of marks or grades. Comments were generally positive in nature, rewarding good work with praise and virtually all identified the next steps for the pupil to take whether it was to move on to the next stage, to refer back to earlier work before moving on or to develop aspects of the current task. Comments written

[2] T = Teacher H, P1 = pupil (John), P2 = pupil (Jason).

at the same stage of a unit but to pupils of different ability made different demands of the pupils.

Comment (lower attaining pupil – basic level task)
Your research to find out about existing products has produced some interesting results about people's different likes and dislikes for novelty items. Now you will be able to develop your own ideas for a product based on what you have found out. Use the design development sheet for this. I think it would be helpful if you thought about the material/s you are going to work with when designing your product.

Comment (higher attaining pupil – extended level task)
You have carried out a very detailed investigation to find out about existing publicity items and souvenirs. Before you start producing design ideas write yourself a specification – see the specification headings list on page 3 of your booklet to develop the criteria you might like to use.

Figure 4.38 **Comments extracted from Work Sample (School H)**

Comments tended to be focused on the assessment criteria linked to level descriptions (see example in *Fig. 4.30)* and hence identified for pupils what they needed to accomplish in order to achieve a particular level. It was evident through subsequent comments that teachers regularly reviewed previous comments to ensure that pupils were making use of the guidance given. Reference was also made to the generic targets listed for each pupil on their *Design and Technology Assessment Sheet* when this was relevant.

The opportunity to review individual pupil's progress from baseline to Year 9 provided a useful insight, not just into the rate and variations of progress but into the development of comment writing by teachers and the sort of targets set jointly by pupils and teachers. There was a significant difference in the quality of the comments in 'Teacher Comment' boxes on the *Design and Technology Assessment Sheets.* Year on year these have improved to the current day, however, there was a noticeable difference in the style of feedback that took place from the comments written from Autumn 1999 onwards, as the examples taken from the assessment sheet belonging to one pupil shows. (see *Fig.4.39*). All comments completed for the year 9 'Spring 2000' in the comment boxes were of a similar quality to the example in *Fig.4.39*. A review of a sample range of completed units demonstrated consistency from all members of the team with regard to the assessment of on-going work, although not all comments were of the same calibre, they endeavoured to provide useful and constructive feedback.

Summative end of unit assessment also had a high level of consistency. However, here the comments were related directly to assessment criteria written specifically for each unit (see *Fig. 4.30)* and significantly more focused on the requirements of the learning objectives. The linking of assessment criteria to level descriptions made the award of levels easier and simplified the moderation process.

Year 7 – Autumn 1997
Very neat folder and good box.
Works hard.

Year 8 – Spring 1999
Well presented design folder.
Good graphic skills.
Well organised in practical sessions and able to work independently.
Soldering OK but too much solder.
Good oral contribution in class to discussions.

Year 9 – Spring 2000
Designing
Independent research. Used findings about existing products to develop ideas.
Produced clear labelled sketches to show the construction process and a flow diagram to show the batch production process.
Making
Trialled a range of materials and decorative techniques and gave detailed reasons for final choice.
Demonstrated accuracy and control when machining and produced a quality finished product.

Figure 4.39 Extracts from the 'Teacher Comment' boxes on a D&T Assessment Sheet illustrating the improvement in comment writing.

The summative end of KS3 assessment was carried out using a unit developed from the *Optional Task 'Going Public'*. (SCAA 1996b). Again consistency was high, all team members having very detailed criteria to assess against. Moderation had been carried out and the initial assessments countersigned by other team members.

Discussion

This case study has produced considerable data from a variety of sources, due principally to the whole school approach. A major focus on assessment to raise pupil achievement was included as a school initiative following an OFSTED inspection in 1996 and resulted in a pupil tracking and target setting system. The analysis of the data has demonstrated that there was a consistent approach to assessment across the school and within the D&T department. Policy could be traced through to practice within the department and, according to responses made by the teachers and pupils, across the school. The policy documents indicated an emphasis on formative procedures and it is these procedures that have prominence in practice. Summative assessment is well documented and structured to ensure that formative assessment information is also used to inform summative judgments.

The school tracking and target setting system was introduced in 1997 to a receptive staff, a significant number of them had been involved in the planning stages and others kept well informed through staff development sessions. The importance of this initiative was evident; firstly, through the views held by teachers, "we believed

that this was the key to higher achievement." (School H. Transcript 1, p.4); and secondly in the archive data available which showed the considerable amount of time dedicated to staff involvement in the planning of systems and the production of support materials and pro-formas and also the use of a high profile, nationally renowned speaker to lead the staff development sessions. Departmental documentation reflects the school system and the strategies set up to ensure consistency across departments, as is exemplified by the *Assessment, Recording and Reporting Policy* and the *Marking and Feedback Policy,* both of which have been developed from school policies and where necessary replicate generic information, within the context of D&T. The department has integrated the school strategies and systems and developed subject specific approaches where appropriate for example the *Design and Technology Assessment Sheet.* (see *Fig. 4.27*). The different data sources confirm that there is consistency of application of procedures throughout the department and evident throughout the school.

Good communication was seen by Department Head H and Teacher H as an essential prerequisite to the successful implementation and continued consistent application of the school tracking system. Thus departmental documentation, for example the *Key Stage 3 Scheme of Work* (*Fig. 4.29*) and the design of the pro-formas, were developed to ensure that all members of the team and pupils were kept informed. The school approach to the application of the tracking system was evident through the consistent use of the 'levels' enabling pupils to make reliable comparisons between their subjects and to know which subjects (and aspects of subjects) were strengths. Pupils used this information, in consultation with their teachers to set themselves realistic and challenging targets. (see *Fig. 4.32*) School through to department communication was also effective in terms of providing detailed individual pupil data; the D&T department used this, together with the results of their own in-house baseline assessment unit to calculate a baseline level for each pupil and entered on the *Student Tracking Sheet* (*Fig. 4.31*). The advantage of the consistent use of the tracking and target setting strategies was the fact that pupils had a thorough understanding of the procedures. They knew how their work was assessed and could identify for themselves aspects that needed strengthening, had a clear idea of which were their strongest and weakest subjects, and thus could make informed decisions about where their efforts needed to be directed.

The awareness raising of the purposes of assessment through staff development and training has been of benefit to the D&T department who have investigated how to assess capability rather than knowledge and understanding and to put in place pro-formas tailored to record appropriate assessment information. Department Head H articulated a number of purposes that he perceived assessment to fulfill, but that in his view the prime function of assessment was the role of raising achievement through formative strategies. This was echoed by Teacher H, who considered it important that each pupil made the best possible progress and that assessment was the key to achieving this. These views are exemplified through the aims and purposes of assessment that are stated in the department's *Assessment, Recording*

and Reporting Policy and *Marking and Feedback Policy* (see *Figs. 4.22* and *4.25*). The principles adopted and promoted here are very much in line with those promoted by the Buckinghamshire Advisory Service (1998a) and those set out by the AAIA (1996). The purposes outlined in the departmental assessment policy have all been accomplished through the strategies put in place by the team. The six criteria identified "to enhance the learning of pupils" (*Fig 4.22*) can be evidenced through a number of sources. Firstly, the archive data that shows rising standards at the end of KS3 and the increase in value-added between baseline assessment and the end of KS3 final assessment. Secondly, the work sampling demonstrated evidence of the work undertaken by pupils in response to comments written by teachers. Thirdly, the comments made by pupils during discussion. (see *Figs 4.34* and *4.35*). Other purposes identified both through school policy and departmental policy were to provide teachers with details of pupils achievements to enable them to plan suitably challenging work, adapt plans to meet individual learning needs and to identify underachievement. These requirements of assessment and the way in which it was used align very closely to the purposes promoted by TGAT (DES 1988a), where assessment was seen as "the servant, not the master, of the curriculum...an integral part of the educational process...providing 'feedback' and 'feedforward'." (DES 1988a, para. 4).

The D&T team when faced with the implementation of the school tracking system realised that, with KS3 they would be disadvantaged in comparison with other departments as the D&T carousel meant that pupils moved on to different teachers at regular intervals and no one had an overview of each individual pupil or detailed knowledge of long term progress and potential, other than a level marked on a *Student Tracking Sheet.* At the same time the team were considering the issues raised in the OFSTED Report (1996) subject paragraph about progress being hampered by a lack of continuity and progression brought about by the number of different teachers each pupil visited throughout each year. Simultaneously, with the introduction of the tracking system the department revised their method of delivery and reduced the teacher contact from four to two per year, described by Department Head H as a procedural development to facilitate formative assessment. This reduction in staff changeovers, has, according to the Department Head H, enabled staff to plan collaboratively and to address progression through the generic aspects of the PoS. This is evident in the planning of schemes of work and the detailed assessment foci for each unit of work. Teachers have also had the benefit of knowing their pupils better over an extended period of time and thus can identify individual pupils' strengths and weaknesses. Work sampling and reviewing archive copies of completed *Design and Technology Assessment Sheets* indicate that teachers have knowledge of pupils' previous work and use this, together with knowledge of current work when writing comments and target setting.

Policy guidelines (School H. Documents 1 and 2) ensure that rigorous, straightforward procedures are developed and that teachers have a clear understanding of assessment methods, exemplified in *Fig. 4.24.* The use of selected information documents displayed in each teaching area, for example modified grids

from *Quality through Progression* see *Fig.4.28* ensures that all staff and pupils are working to the same criteria and have the same expectations of the different levels. Pupils made reference to the frequent use of these by the teacher when outlining expectation (see *Fig. 4.34*)

The Department Head H considered the active involvement of pupils in the assessment of their work as very important in the process of raising achievement. This view is evident in a number of procedures devised by the department, for example the *Design and Technology Assessment Sheet* that requires pupils and teacher inputs; the display of 'level' information (School H. Documents 9a and 9b) within the department and the sharing of learning objectives and assessment criteria with pupils at the beginning and during the course of units of work.

Another aspect perceived by Department Head H and Teacher H to have real potential in the quest to raise achievement was the procedures adopted for marking work, the use of comments written to inform the next stages and to motivate pupils. The stimulus for departmental staff to be committed to writing comments on pupils' work and the cessation of awarding marks and grades stems from the staff development session led by Professor Paul Black. Pupils were appreciative of the comments written on their work and in most cases they believed that this type of assessment helped them to do better as exemplified in *Fig. 4.34.* The review of research undertaken by Black and Wiliam (1998a) refers to earlier studies (Butler 1988) where the findings had demonstrated that pupils made the best progress when they received comments only. Work sampling provided a wealth of evidence of the sort of comments written by teachers and how pupils had responded to them. Mostly they were positive in nature but the pupils' reaction cannot be determined from the work sampling. However, in discussion pupils said that if comments were positive they were motivated (see *Fig. 4.34*). When reviewing the work of individual pupils over the three years of KS3, there was a significant change in style of comment writing that took place between Spring 1999 and Spring 2000. This needed an explanation, thus a return to the school documentation to discover the exact date of the INSET session led by Professor Paul Black that Teacher H referred to. Comments written on *Design and Technology Assessment Sheets* after his session were certainly different in style, the aspects for development were written in a positive way, usually as a target, and noticeably improved over the subsequent additions. (as exemplified in *Fig. 4.39*). Another interesting fact that emerged from the work sampling was the different demands or challenge made of pupils of different levels of ability in the comments written on their work, (see *Fig.4.38*), thus demonstrating the real benefit of teachers knowing their pupils well. Comments were also frequently focused on the assessment criteria linked to the level descriptions and these had a clear benefit on the way pupils moved forward with their work. Another factor that motivated pupils to address the tasks identified in comments was the teachers' regular review of previous comments.

It is evident from the detailed assessment information built into the units of work (*Fig. 4.30*) that School H had addressed the very complex issue of assessing D&T

capability successfully. The assessment of capability had been raised as an issue of concern by Black (1991) and Farrell (1992). Farrell stressed that unless teachers understood how pupils developed capability through the application of knowledge, understanding and skills they would not be able to devise appropriate assessment criteria for pupils. Here, in School H is clear evidence of this understanding of the assessment of capability.

The school tracking and target setting system was seen by the Department Head H and Teacher H as the key strategy for monitoring progress, setting appropriately challenging targets and thus to the raising of achievement. This view is also encapsulated in the LEA guidance to schools on target setting (Buckinghamshire Advisory Service 1998) and adhered to by many other national bodies (QCA 1998, DFE 1996, DfEE 1997 and 1998, OFSTED/DfEE 1996). The *Student Tracking Sheet* enables staff to enter assessment data and as soon as a baseline had been established, predictions were made with regard to future performance. The importance of regular review as the predictions are made on the basis of present capability was recognized and has been built into the pro-forma (see *Fig. 4.31*).

The work sampling gave an insight into the assessments made by all teachers in the D&T team. This confirmed the consistency indicated in the interviews with the Department Head H and Teacher H, and expressed by pupils in discussion. The work sampling also produced evidence of the regular monitoring and tracking of pupil progress through the use of the *Student Tracking Sheet.*

The analysis of the end of KS3 levels of attainment data demonstrates that in D&T pupils of all abilities make at least appropriate progress in comparison with their attainment in other subjects. Higher attaining pupils make the best progress, evidenced by significantly more pupils attaining Level 6 in D&T than in other subjects. Such analysis indicates that the work planned is well matched to the ability range of the pupils and that the two levels of task (basic and extension) and that the assessment procedures enable all pupils to make the best possible progress. All the assessment procedures in practice have their origins in the departmental policies and documentation, are referred to by teachers as effective in the quest to raise achievement and their use confirmed by pupils.

The Department Head H referred to the following assessment strategies and procedures as contributors to the raising of achievement. Firstly, he referred to the consistency of approach that standardisation of pupil tracking and target setting across the school brought, and that this was a fundamental pre-requisite to raising achievement within individual departments. Secondly, he posed a range of assessment strategies during the interview, all of which he believed play a significant role in raising achievement:

- good communication through the use of assessment procedures and pro-formas, at all levels, from whole school to individual pupil;
- consistent application of assessment procedures;
- emphasis on formative procedures;

- diagnostic marking, using comments only;
- carefully constructed assessment criteria derived from the NC levels, personalised to individual units of work and the development of the units of work at two levels (basic and extension);
- the involvement of pupils in their learning and the collaborative process of target setting;
- using assessment data analysis to identify potential pupil achievement and aiming targets to exceed this.

Teacher H presented an almost identical view of the strategies and processes essential to the raising of achievement. This similarity supports the evidence acquired from this study that the school has very good lines of communication that are well established and also an ethos that encourages staff to be very much involved in school improvement initiatives and thus have a sense of ownership.

Case Study 3 – School T

School T is situated in the residential outskirts of a town. The majority of pupils live within the 'reserved area' around the school. The school has a six form intake and a total of 725 pupils on roll. The school was built to take an eight form entry and is thus considerably undersubscribed.

D&T accommodation, consisting of eight specialist rooms is housed in a single storey block close to the main building. The two food technology rooms and the textile studio were refurbished in 1996 and equipped to deliver the industrial applications and ICT requirements of the NC. One of the three workshops was upgraded in 1997 to create a multi-materials room and in 1999 a graphics room was refurbished to provide a networked ICT suite for departmental use. The remaining rooms are traditional work areas with a few additional tools and bench mounted machines to create multi-materials environments.

The D&T team is made up of five full-time and three part-time teachers and three part-time technicians. Several of the teaching team also work in other departments and therefore have a more limited role in D&T. Those full-time in D&T have management responsibilities, Department Head T is responsible for monitoring and evaluation across the department, quality of teaching and learning, standards of pupil attainment, assessment, SEN and staff appraisal (performance management). The second in charge is responsible for primary liaison, ICT and health and safety and has responsibility for the deployment of technical staff. All those teaching KS3 are able to deliver all aspects of D&T. With the exception of one long serving part-timer all have been recruited since 1997.

At KS3, D&T is delivered to half year cohorts KS3, each divided into four, mixed ability teaching groups of approximately twenty two pupils. The subject is allocated two single sixty minute lessons per week. The first unit for Year 7 is a short five

week unit designed to provide a baseline assessment for each pupil. This is followed by four further units. In years 8 and 9 four more units are covered in each year. The penultimate unit in Year 9 is used as an end of KS assessment. Teaching groups are allocated two teachers each, although these may change year on year. Units are designed to cover the NC PoS and are delivered through food, graphics, resistant materials and textiles.

Department Head T was appointed in April 1997 to an understaffed department deemed unsatisfactory by OFSTED in 1995, D&T GCSE standards were low in comparison with similar schools, and in comparison with their attainment in other subjects within the school most pupils did less well in D&T. Significant issues about assessment across the whole school were also raised in the OFSTED report. The newly appointed Department Head T used the OFSTED subject report as a starting point and carried out a departmental audit assisted by the existing staff. A *Departmental Development Plan* (School T. Document 9) was produced to address the issues raised and this had a focus on teaching and learning and raising standards of pupil performance. Assessment strategies became the focus of many of the 'actions' listed under the key issue 'raising standards of pupil performance', those included are listed in *Fig. 4.40.*

- Baseline assessment at the start of Year 7 using a short unit of work designed specifically for that purpose;
- Departmental staff training in managing and using assessment data;
- Review of the Marking section of the Assessment policy and develop marking techniques to support learning;
- Identify and address needs of more able pupils;
- Improve target setting procedures and the use of prior attainment data.

Figure 4.40 **Assessment strategies listed in the 'Actions' column of the Departmental Development Plan. (School T. Document 9)**

By the time the school was reinspected in 2000 the situation was very different. OFSTED judged that the school procedures for assessing pupils' academic progress were good, having been considerably strengthened since the last inspection. (see Appendix 22). At department level the report identified significant developments, that subject teachers now scrutinise assessment data on entry to assist their own assessment procedures, that pupils' work was regularly assessed in relation to NC levels at KS3, and that the information thus acquired provided them with data to complete the school *Progress Sheets* (School T. Document 3i). "An efficient central system of assessment comprehensively tracks pupils' progress and achievement...as they progress through the school." (School T. Document 8, para.100). The report stated that all teachers had a sound basis against which to judge attainment and progress, but that not all departments had consistent practice. The D&T department were commended along with mathematics and history departments "Teachers' assessments of what pupils had understood led to

modifications to the next stage of teaching. Pupils clearly benefit from teachers' close monitoring of what has been learned." (ibid. para.104). Further detail of the OFSTED judgements is given in Appendix 22. Evidence of the departments rapid improvement in standards achieved at GCSE is exemplified by the relative performance indicator for D&T in comparison with performance in other subjects, illustrated in *Fig. 4.41.* Similar improvement was evident in end of KS3 teacher assessment data.

TABLE S6: GCSE SUBJECT PERFORMANCE INDICATOR – ALL PUPILS 1999

SUBJECT AREA	SCHOOL AVERAGE	AVERAGE IN ALL OTHER SUBJECTS	SCHOOL DIFFERENCE	NATIONAL DIFFERENCE	RELATIVE PERFORMANCE INDICATOR	SIGNIFICANCE
ART& DESIGN	4.77	4.14	0.63	0.47	0.16	
SCIENCE- DOUBLE	4.18	4.21	-0.03	-0.18	0.15	SIG
SCIENCE- SINGLE	4.03	3.97	0.06	-0.55	0.61	SIG
DESIGN & TECHNOLOGY	**4.69**	**4.35**	**0.26**	**-0.18**	**0.44**	**SIG**
ENGLISH	4.33	4.08	0.24	0.13	0.11	SIG
FRENCH	4.14	4.67	-0.53	-0.43	-0.10	
GEOGRAPHY	2.66	3.78	-1.12	-0.24	-0.88	SIG
GERMAN	3.48	4.44	-0.95	-0.47	-0.48	SIG
HISTORY	4.83	4.76	0.07	-0.32	0.39	SIG
IT	3.99	4.26	-0.27	-0.21	-0.61	
MATHEMATICS	4.46	4.06	0.40	-0.45	0.85	SIG
PE	4.00	3.71	0.29	0.33	-0.04	

Figure 4.41 **Extract from school PANDA Report (School T. Document 10)**

The school sets a baseline level for each pupil on entry, based on KS2 SAT results and VRQ scores. These are revised at the end of the first half term, after the internal subject specific assessment tasks have been completed, for D&T this is Unit 1, a short design and make modelling task. Data is entered onto the *Progress Sheets* by administrative staff and returned to the department within a week.

Departmental Documentation

Department Head T recognised that there was a considerable amount of work to be done within the department on assessment issues, so for this reason, with the agreement of the team decided to investigate what resources were already available to meet their identified assessment needs. The department subsequently generated a significant amount of documentation to fulfil the actions identified in the *Departmental Development Plan* (School T. Document 9)

Policy Documents

Assessment and Marking Policy

The school adopted the principles and format of the LEA policy, modifying it where necessary and relating it to the school where relevant. All departments, involved in the formulation of the school policy either adopted it outright or devised their own based on the principles set down in the school policy. The D&T team elected to adopt the school policy as it provided a generic framework and included all aspects

the D&T team felt relevant to the subject, but added guidance to support the use of strategies within D&T. This was the starting point for the D&T team to develop strategies for practice to meet the needs of the subject and to devise pro-formas to record the information and to collect data. The policy sets out the principles underpinning assessment in School T. This is detailed in *Fig. 4.42.*

ASSESSMENT PRINCIPLES

- Assessment is an integral part of the teaching and learning process, a valuable formative and summative tool, and can provide essential information about the students' experiences, performances and progress. In turn, analysis of these outcomes can yield important evidence regarding the appropriateness of the learning involved, the suitability of the learning experiences provided, and the effectiveness of teaching. This information and analysis constitute a sound basis for making decisions about subsequent learning and teaching.
- The outcomes of assessment can modify teaching methods, provide feedback on the NC as well as indicate student progress.
- Assessment has the potential for developing positive self-image in the student from positive and constructive feedback. It is the feeling of success that can encourage further study.
- Results of the assessment should be reported in a way useful for the student, teacher, parent and other interested parties.

Common procedures will:

- Give teacher judgements which are as valid and reliable as possible;
- Promote a common interpretation of the NC grade descriptors;
- Give teachers confidence in their professional judgements;
- Be fair to students.

Assessment records will:

- Be based on an agreed set of principles and purposes;
- Assess student progress against NC criteria;
- Not be administratively burdensome.

Assessment records should provide confidence between teachers across phases and enhance progression for students.

Figure 4.42 **Extract from the Assessment and Marking Policy (School T. Document 1, p.2)**

The section on marking states the school aim. "To raise the self esteem of students by providing them with prompt, regular and diagnostic feedback about their work." (School T. Document 1, p.4). How this aim could be achieved through D&T is detailed within the policy and shows a strong bias towards assessment for learning, see *Fig. 4.43.*

The policy includes detailed guidance on giving positive, constructive feedback and identifies the importance of sharing this information with pupils in discussion to ensure that they understand what it is they need to do to improve their work. The policy also emphasises target setting, stating, firstly, that students should be

responsible for setting their own targets with teacher 'oversight' for current coursework and to record them in their folders on a pro-forma entitled *My Key Stage 3 Targets.* (School T. Document 3iii). Secondly, that teachers' will also set targets with students as an ongoing procedure and that this information will be passed on to the teacher for the next 'unit' via the *Record Profile* (School T. Document 3ii).

Strategies for marking:

- The most effective assessment of a students work takes place through discussion with the individual. To go around the class marking folders/classwork/homework will allow the student to ask questions and therefore fully understand how improvements can be made. This will be done wherever possible and the individuals personal target should be referred to. Once the target has been achieved, it will be signed and dated and the student will be involved in setting another.
- Merit awards may be used to encourage and motivate students;
- Comments written in folders should be developmental, for example:
  - Suggest alternative ways in which work can be improved;
  - Positively acknowledge correct work;
  - Make encouraging comments about areas of development;
  - Recognise effort as well as quality.

Figure 4.43 **Extract from the Assessment and Marking Policy (School T. Document 1, p.4)**

Pro-formas

The D&T team identified the different purposes of assessment and have devised a range of pro-formas to ensure that information is in the appropriate format and detail according to the different audiences that need to be kept informed. Copies of the school *Progress Sheets* (School T. Document 3i) that track and predict progress across KS3 are held centrally in the department, accessible to all members of the team. These are used to check progress against the more detailed individual pupil *Record Profile* sheets (School T. Document 3.ii). These sheets are also held centrally. The *Record Profile* (see *Fig. 4.44*) has been developed and revised by the team for recording achievement in each unit of work and to record the agreed target/s for the next unit. Several commercial resources were used as a starting point for this.[1]

[1] Compton, J,. and Farrell, A. (1997) DATA Assessment Handbook.
NAAIDT. (1997) Quality Through Progression.

D&T KEY STAGE 3 RECORD PROFILE				
NAME:			GROUP:	
	FOOD	GRAPHICS	RESISTANT MATERIALS	TEXTILES
ATTITUDE	EP A B C D E	EP A B C D E	EP A B C D E	EP A B C D E
ORGANISATION	EP A B C D E	EP A B C D E	EP A B C D E	EP A B C D E
HOMEWORK	EP A B C D E	EP A B C D E	EP A B C D E	EP A B C D E
EFFORT	EP A B C D E	EP A B C D E	EP A B C D E	EP A B C D E
AT 1 DESIGNING	2 3 4 5 6 7 8	2 3 4 5 6 7 8	2 3 4 5 6 7 8	2 3 4 5 6 7 8
AT 2 MAKING	2 3 4 5 6 7 8	2 3 4 5 6 7 8	2 3 4 5 6 7 8	2 3 4 5 6 7 8
AT1	TEACHER COMMENT			
Clarifying the task				
Generating ideas				
Developing ideas				
Communicating intentions				
AT2	TEACHER COMMENT			
Planning				
Working with materials				
Health and Safety				
Evaluating				
KEY: EP Exceptional performance A Excellent		B Good C Average		D Below Average E Poor
STUDENT TARGETS				
•				
•				
•				

Figure 4.44 **Example of D&T KS3 Record Profile (School T. Document 3.ii)**

Information Documents

To facilitate consistency of practice and application the D&T team produced a range of guidance documents to support staff in the assessment of pupils' work. The team also developed information resources to help pupils understand the purposes of assessment and how to use the assessment information to raise achievement. The D&T team identified target setting as a key action to help raise attainment levels in the subject, but before looking at the process of individual pupil targets they decided that their own appraisal (performance management) targets would focus on formative assessment strategies. All teachers are required to set three targets, one school based, one department based and one personal. Those agreed for school and department level for 1999 are detailed in *Fig.4.45.* Team members also agreed to have an assessment focus for their individual targets.

> **School target:**
> Plan each lesson to include a variety of questioning techniques, assessment of pupil understanding and to praise achievement.
> **Department target:**
> To use the KS3 *Record Profiles* to monitor individual performance and raise the level of achievement of the majority of students.

***Figure 4.45* Performance Management Targets for 1999 (School T. Document 4, p.1)**

One of the 'actions' in the *Departmental Development Plan* was to develop the role target setting has to play in the process of raising achievement through assessment. To facilitate this a short document entitled *Target Setting* was written, identifying the procedures and practices to be developed. (School T. Document 4).

To standardise marking across the department for KS3 a grading system was introduced, this was linked to NC levels with the grades on a sliding scale according to year group. (see *Fig. 4.46*). The criteria key is the same as for the *Record Profile.*

KEY STAGE 3 COURSEWORK GRADING CRITERIA

NC LEVEL	8 HIGH	8 LOW	7 HIGH	7 LOW	6 HIGH	6 LOW	5 HIGH	5 LOW	4 HIGH	4 LOW	3 HIGH	3 LOW	2 HIGH	2 LOW
YEAR 7					**A**		**B**		**C**		**D**		**E**	
YEAR 8				**A**		**B**		**C**		**D**		**E**		
YEAR 9			**A**		**B**		**C**		**D**		**E**			

KEY
A Excellent
B Good
C Average
D Below Average
E Poor

***Figure 4.46* Extract from Coursework Grading Guidance (School T. Document 6, p.4)**

To support teachers' in the assessment of capability the team adopted the guidance given by the NAAIDT[2] as this explained what to look for in pupils work to be typical of a particular level, exemplified for Level 5 in *Fig. 4.47.*

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[2] NAAIDT and Berkshire Education Department. (1997) *Assessment of Design and Technology at Key Stage 3.*

LEVEL DESCRIPTION	WHAT TO LOOK FOR
AT 1: DESIGNING	
LEVEL 5	
When designing and making, pupils generate ideas that draw upon external sources and their understanding of the characteristics of familiar products. They clarify their ideas through discussion, drawing and modelling, using their knowledge and understanding of the appropriate programme of study to help them. Pupils evaluate ideas, showing understanding of the situations in which their designs will have to function, and awareness of resources as a constraint.	• Draw up a list of design requirements which includes issues concerning the function and use of the product; • Able to gather/analyse information from a variety of sources and find out about preferences of other people; • Able to develop design ideas in detail using 2D/3D drawings and models; • Evaluate design ideas against design requirements and plan for making a final design within the constraints of the resources available.

Figure 4.47 **Extract from Guidance for Assessing Design and Technology Capability (School T. Document 5 p.2)**

To help members of the team making summative end of unit assessments a benchmark portfolio of assessed work has been established. This is a collection of pupils' work that has been chosen to exemplify D&T capability. It contains a wide range of exemplars, from whole projects to extracts chosen to exemplify key aspects of designing and making. These key aspects are listed in the guidance notes that accompany the portfolio (see Appendix 23). Before an exemplar can be included in the portfolio it must be annotated with the following information:

- The final product (brief description);
- The pupil's skills and knowledge;
- The teacher's observation and records;
- AT1 – Features of the level exemplified;
- AT2 – Features of the level exemplified.

Examples from NAAIDT[2] were included with the guidance notes to support team members annotating school exemplars.

Scheme of Work

A KS3 SoW (School T. Document 2) was developed using Nuffield[3] and RCA[4] resources, and the *Optional Tasks and Tests* produced by SCAA. With the exception of the Year 7 baseline unit, all other units were differentiated. A standard unit was produced for the majority of pupils, this was modified to include support materials for lower attaining pupils and challenge for higher attaining pupils. Each unit was presented in booklet format, firstly a pupil design folio, to be used instead of a design folder, and secondly, resource booklet (differentiated) to guide pupils through the unit. In addition, generic 'helpsheets' were provided to support the teaching of generic skills and knowledge, for example, research skills; writing a

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[3] Nuffield Design & Technology. (1995) Key Stage 3: *Teachers Guide., Resource Task File., Capability Task File., Study Guide and Student's Book.*

[4] RCA . (1996) *D&T Challenges:* Course Guide., *Teacher's Resource* (Books 1,2 and 3)., *D&T 11-14* (Students' Course Books 1,2 and 3).

questionnaire. All paperwork is stored in ring binders which are kept in school. A plastic zip wallet is issued to pupils for taking work home.

Assessment is clearly defined in the unit booklets so that pupils will know how their work will be assessed. Assessment criteria are written specifically for each unit and are linked to level descriptions, (see example in Appendix 24) these are shared with pupils and displayed in all teaching areas. Copies for teachers' have additional information to help them locate the evidence in pupil design folios. On-going assessment focuses on the learning objective/s for that particular aspect of the work. To support teachers' marking, each unit of work includes a section listing the learning opportunities in AT1 and AT2 (see Appendix 25)

Departmental Pupil Data and Records

The school provides the department with individual pupil data in the form of KS2 SAT results and VRQ scores, entered on *Progress Sheets.* (School T. Document 3i). The department then adds the result of the Year 7 baseline assessment unit before predicting an end of key stage level. This sheet is then used to track pupil progress through the key stage, measured against expected progress. The sheets are updated during the penultimate week of each unit by administrative staff and returned in time for the teacher of the next unit to use to inform planning. These sheets (one per group) are centrally filed in the department for all staff to have easy access.

The *Record Profile* (see *Fig.4.44*), one per pupil per unit is used to record summative attainment at the end of each unit and for teachers' to note and specific issues relating to aspects of the ATs. Student targets are identified and entered during the penultimate lesson of a unit.

The Head of Department's Perspective

Department Head T referred to the OFSTED report of 1995, that first raised concerns about assessment across the school and how this had led to a number of whole school initiatives to improve the situation. At whole school level she considered that this had been very successful but that there had been insufficient support for improvement at departmental level and requirement to standardise procedures across them. The *Progress Sheets* were now providing an efficient and reliable pupil tracking system and this enabled individual departments to identify expected levels of attainment at the end of each key stage. What she felt had been missing in the school initiatives was any real interest in the role of formative assessment in raising achievement. Department Head T felt that it was crucial to have effective systems that were straightforward to administer and understood by all team members to ensure consistency of application. Pupils, she said were very much involved in assessment, they knew and understood how their work would be assessed and that they took an active part in target setting.

The main purpose of assessment was perceived by Department Head T to be its role in raising achievement and ensuring that each pupil made the best possible progress.

> For us it is to help students raise achievement, to go beyond expected progress and reach their challenging target...we concentrate on formative, on-going procedures. Unless we know where students are at all times we cannot plan effectively to meet their learning needs...so good formative assessment is essential.
>
> (School T. Transcript 1, p.3)

She considered that assessment was a vital part of the department's work and played a significant part in many aspects, firstly she said it was important to understand the differences and between formative and summative procedures. The summative role was well established and there were clear guidelines for both teachers and pupils. For this all team members she said, assessed units of work against criteria related to NC level descriptions. The important issues here for Department Head T were that all teachers' had a shared understanding of NC levels and that they fully understood the "what and how" of assessing D&T capability.

> We have developed a comprehensive benchmark portfolio of assessed work to address this need and...it is used extensively, not only for standardising work but also with pupils to demonstrate expectation.
>
> (ibid. p.4)

With regard to other purposes of assessment, she considered that if assessment was used sensitively, through a target setting process it could be a real motivator for both pupils and teachers. Assessment was also used to provide information about gaps in pupils' learning and thus in the provision of the planned teaching programme of units of work. Units of work were adapted or modified to address these issues when necessary. As well as the role of assessment in raising achievement Department Head T also emphasised the fact that the procedures that they had in place also enabled them to pick up underachievement quickly.

Department Head T explained that in view of the poor state the department was in and the low standards that it achieved at GCSE when she was appointed, it was important to turn the situation around as quickly as possible. They started with a self evaluation audit[5], together with the OFSTED Report subject paragraph (School T. Document 8) to identify strengths and weaknesses. The focus identified by the Department Head T for raising achievement was assessment. She believed that firstly there must be effective systems in place for assessing pupils' attainment and secondly, that assessment information should be used to inform pupils' of their next stage of learning and thirdly, to inform curriculum planning.

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[5] NAAIDT (1997) Raising Standards in Design and Technology: Monitoring for Quality Assurance at KS3 and KS4.

Department Head T felt that it was important that there was a consistent application of procedures across the department and that all team members were assigned to the agreed strategies. To facilitate this she had ensured that pro-formas were "unambiguous and straightforward to complete" and that short guidance documents, interpreting policy into practice were readily available to support teachers. A benchmark portfolio was introduced and developed by the team and this has been seen by Department Head T as having a significant role to play within the department.

> Because we strongly believe that formative assessment is one of the most significant factors in raising achievement, it is important that everyone has a common understanding of how pupils' develop capability and one way of seeing this is to look at good examples.
> (School T. Transcript 1, p.4).

She outlined four purposes this portfolio served, "to contribute to consistency in teacher assessment, to support new staff, to provide information for curriculum evaluation and improvement and also to provide exemplar practice for students." (ibid. p.5).

The setting of individual pupil targets for each unit of work was considered to be a positive motivator for many pupils and had the added advantage that teachers and pupils had to decide them together. "Giving students the ownership and teachers a deeper understanding of the needs of individual pupils in order to support the raising of achievement." (ibid. p.5).

They had found that assessment was very much more focused on individual pupils specific needs when the teacher knew the pupil well, so to facilitate this at KS3 the method of delivery was changed reducing the number of teachers a pupil worked with during each cycle through the different aspects of the subject.

> As most of us can teach all aspects at KS3 we could have opted to take the same group throughout the year but we believe there are more advantages of having two [teachers]. These two then work closely together with the group and as all our systems and procedures are generic across the department there is no disruption at a changeover. A real benefit is continuity when one teacher leaves the other is still in place.
> (ibid, p.6)

The involvement of pupils in their assessment at all stages of their work was seen as fundamental and the reason for producing guidance at pupil level (School T Document 6) was to ensure that they played an active part, the shared target setting for the next unit of work being a typical example.

Marking, using diagnostic comments was viewed as an important dimension in the raising of achievement process to ensure that pupils remained on track to achieve their targets. "If a pupil knows exactly what they need to do to improve, they are

much more likely to target that goal in the next piece of work they do." (School T. Transcript 1 p.7). Some work is still marked with grades as this is expected by the school, but that there was no standardised whole school procedures. Department Head T explained that their grading system had been linked to NC levels (see *Fig. 4.47*) to support teachers in making judgements. She felt that the diversity of arrangements across the school were unhelpful to pupils, who in her mind were "confused". Pupils, she said tend to be more concerned with the grade than with the comment, so regular discussions with teaching groups and individuals becomes important to ensure that they do what has been identified as needing attention or development.

With regard to the question of whether the departmental assessment system provides teachers with a clear and accurate picture of pupils capability, Department Head T felt that the procedures that they had in place did assess capability and "not just knowledge and skills, with emphasis on the quality of the finished product, that we see colleagues in neighbouring school doing." (ibid. p.7).

She viewed the monitoring of standards of achievement as one of the most important strategies. She considered that the skills of analysis were needed by all members of the team to enable them to understand and interpret the assessment data available to them. She recognised that the use of such data required a great deal of sensitivity to ensure that teachers did not feel threatened by the issues that it might raise, for example, she explained that pupils did less well in resistant materials at KS4 than other pupils did in other aspects of D&T in comparison with all their other subjects. At this stage of the departments improvement plan the most likely cause was lack of specialist resistant materials teaching and low expectations for this group at KS3 and not the quality of teaching of the GCSE teacher.

The Teacher's Perspective

Teacher T had been in post for three years, appointed soon after Department Head T. She had previously taught in a number of other schools and was very impressed with the speed in which the *Departmental Development Plan* (School T. Document 9) initiatives had been accomplished and were embedded in practice. This she said was primarily due to the team ethos that had been established through the style of leadership of Department Head T. The strong focus for improvement was directed at the raising of achievement of all pupils and all the team were committed to this through developing assessment procedures. She considered that she had learned a great deal about assessment since joining the school. In previous posts there had been considerable curriculum development in D&T but no associated development of assessment. Marking took place at the end of a unit, the artefact assessed according to the quality of manufacture and aesthetic appearance irrespective of the purpose identified in the design specification.

> My eyes have been opened here and I can now see further improvements we could make to what we do. I think we need to look at the National Curriculum levels and sub-divide them like the

> primary schools do with the a,b and c divisions...students would then be able to see progress.
>
> (School T. Transcript 2, p.1)

In response to the question relating to the purposes of assessment, Teacher T held similar views to those of Department Head T, seeing assessment principally as a tool for raising achievement and a mechanism to find out what knowledge, understanding and skills pupils already have, what their strengths are and what they need to develop further or move on to.

> When we have a clear picture of a pupil's learning through assessment we can then really challenge at an appropriate level to ensure that the student can make the best possible progress, equally by tracking progress we can see very quickly when a student is underachieving.
>
> (ibid. p.3)

She went on to describe how learning difficulties could also be identified through assessment procedures. Another purpose that could now be realised was the identification of aspects of knowledge, understanding and skills that were not sufficiently well covered in the teaching programme to enable pupils to accomplish a learning objective. "We can now review a scheme of work to identify missing elements that need to be taught through FPTs and product analysis." (ibid.p3)

Teacher T talked about the procedures and pro-formas developed and in place, these she said ensured a consistent approach across the whole department. The reduction in the number of teachers delivering D&T to one group of pupils to a pair of teachers working closely together greatly improved consistency and also enabled teachers' to develop shared understanding. One of the most useful strategies to support her and other teachers' was the development of a benchmark portfolio.

> The way it has been constructed and the information provided with each exemplar makes it very useable, not only for checking ones own judgements on standards but also to share with students to demonstrate potential expectation.
>
> (School T. Transcript 2, p.4)

She went on to explain that the requirement to mark diagnostically by writing comments to direct pupils to aspects to strengthen or move on to was, at first, quite hard to do and time consuming but persevered because it was "helpful to students, it gives them greater independence and responsibility for their own learning." (ibid. p2). She carried on to say that the comment writing had led to a much greater understanding of pupils learning needs and was really worth the extra effort. "It really makes you think if you have to write a comment rather than just a 'good' and a grade." (ibid. p.2).

Setting targets was another strategy that she felt helped pupils to become independent learners and also motivated them in wanting to improve their achievement and surpass their expected progress.

The Pupils' Views

Pupils responses to "Do you know how well you are doing?" with similar replies and all referred to the *Record Profile* (*Fig.4.44*) and the targets they had to write. They did not recognise progress unit by unit through the levels but were aware that they had a predicted end of KS level and knew if they were on track to achieve it or improve on it. Most described the system of grading and the key to what the grades meant. They all made some reference to written comments on their on-going work and how this gave them information about what they needed to do to improve their work. All pupils interviewed were able to explain what they were intended to learn during the unit of work, referring to the learning objectives written on the board for the current lesson and also for the whole unit of work outlined in the pupil resource booklet (School T. Document 2). Pupils also referred to exemplar units of work [from the Benchmark Portfolio] that teachers used to explain what was expected, they found this extremely useful and often requested to see them during the unit as well as at the beginning.

Do you know how well you are doing?

Our profiles[Record Profile] shows our levels for each unit we do. They are there right from the first one we ever did in Year 7 but it takes a long time to move up to the next level so I look at the grades I get on my work and what the teacher writes. (Pupil T01)

The resource booklet tell us what to do and how it will be assessed and the teacher writes on the board for the lesson, we get comments written on our work and sometimes a grade. At the end [of a unit] we get a Profile. (Pupil T02)

The work that the teacher shows us at the beginning [Benchmark Portfolio] gives something to aim for and also later on to see how we compare with it. (Pupil T04)

Figure 4.48 **Extracts from Pupil Discussions (School T)**

A variety of reasons were suggested in response to the question "Why do teachers mark/assess your work?" Three of the pupils saw assessment as a strategy to help them to do better work in future, referring to the diagnostic marking and the target setting on the *Record Profiles* Other views included that it was for the teachers benefit, to identify where work had been missed, and to make sure pupils are on track to make expected progress and to identify aspects that pupils have not understood.

Why do teachers mark/assess your work?

So they know what we have done and to make sure we have got it right. (Pupil T01)

To help me do better. (Pupil T02)

To see how we are doing...and to make sure we do not get behind or have not done something properly...its too late by the time we start making if there is a problem with the design. (Pupil T05)

Figure 4.49 **Extract from Pupil Discussions (School T)**

The pupils suggested a number of strategies used by their D&T teachers to assess their work. They all referred to the *Record Profile* used at the end of a unit, the criteria written in the unit *Resource Booklet* so that they were assessed against the criteria that they knew in advance and also the comments that were written on their work during the unit and at the end of the unit of work. Three pupils referred to the teacher discussing work on a one-to-one basis during the lesson and sometimes also writing notes in their design folios.

How is your work assessed?

We get a level at the end of a unit on our profiles, but these don't mean that much, unless it is lower than the one before, it takes too long to move up a level. [reference to the Record Profile] (Pupil T03)

At the end the teacher talks to us about how we have done, we look at our design folios and what we have made with the assessment list in the resource booklet and what targets to set for the next unit level. (Pupil T02)

Comments written on our work. (Pupil T04)

She looks at our work in the lesson and usually says something about it, usually that something needs to be thought about and sometimes she writes some reminders for me. (Pupil T05)

Figure 4.50 **Extracts from Pupil Discussions (School T)**

This question was followed up with "Does this assessment help you to do better?" Pupils all responded positively to the target setting which they said were useful to keep them focused on what they needed to improve. They were very positive about the diagnostic marking comments on their work and to the one to one discussions during lessons. None found the end of unit levels useful in this respect.

Does this assessment help you to do better?

Targets don't make me better but they make me try to get better. (Pupil T02)

Figure 4.51 **Extracts from Pupil Discussions (School T)**

In response to Question 8 "What assessment information do you find the most useful?", pupils said that the comments written in their design folios were the most useful and helpful. Targets were also suggested as they identified what aspect needed to be focused on in the next unit and that teachers also made frequent references back to the targets set.

What assessment information do you find the most useful?

The written comments telling me what to do to do better in my design folio. (Pupil T01)

I like to get good grades, they make me feel good but they are not really helpful. The written comments on my work are useful and so are the targets we set for each unit . (Pupil T03)

I like looking at my targets in my design folio, they make me remember what I have to do. (Pupil T04)

Figure 4.52 **Extracts from Pupil Discussions (School T)**

Pupils were unclear about how well they were doing in comparison with their other subjects, as each subject had its own way of assessing work. The one consistent system was the *Progress Sheet* (School T Document 3.i) as this tracked all subjects using the National Curriculum levels, however it was impossible to identify individual strengths as for many pupils they were on the same level for most subjects. Pupils were only able to identify which their strongest and weakest subjects were through their own assumptions as all departments used different systems and grading/level scales to assess work. All of the pupils expressed concern at the slow progress through the levels before achieving the next.

Pupils refer to a range of methods of feedback used by their teachers. They refer to teachers discussing work with individuals during lessons and discussing the summative 'end of unit' NC assessment level attained. Frequent reference is made to notes and comments written on their work and how they use this information. One pupil explained that it was not until the teacher discussed what she had written on his work that he really understood what to do.

Do you know how you could improve/do better?

She writes in my design folio to say what I need to concentrate on. I look at the assessment information in the Resource booklet as this helps to see what I have to do to. (Pupil T03)

The notes written on my design folio and what the teacher says when she comes round in the lesson to help us. (Pupil T05)

Figure 4.53 **Extract from Pupil Discussions (School T)**

The Lessons

The two Year 9 lessons were observed towards the end of a food technology unit of work. The focus for this was the development of a fruit dessert for a supermarket chain, suitable to include in a packed lunch and was also appealing to teenagers. Pupils had previously investigated the context, they had researched the dessert preferences of teenagers through the use of questionnaires. They had also investigated the range of individually packaged desserts available. In addition to the normal range of equipment pupils had the use of a vacuum former for the packaging and a pasteuriser to extend the life of the dessert.

The teacher had used a number of FPTs to teach the knowledge and understanding of thickening and setting agents and the use of the pasteuriser and to consolidate the skills of fruit preparation. All pupils had previously developed the skills and knowledge to carry out sensory analysis tests with potential consumers in order to refine their design ideas. Guidance sheets were available to support this and other activities and tasks needed for the unit. The unit of work and the lesson planning were consistent with the requirements of the departmental documentation and thus could be accessed at three levels. All pupils had a design folio booklet, a resource booklet and a bank of guidance sheets in their folders.

Both lessons followed the same three part format, an introduction followed by group and individual work and concluded with a plenary session. In the first lesson, the introductory session started with reference to the learning objective and expectations for the current lesson. This was promptly followed by a brisk question and answer session to consolidate recent work and to revise previously taught aspects. Pupils were referred to their resource booklets to review the tasks for the lesson. The teacher posed thought-provoking questions that led the pupils to the point where they were ready to start evaluating the results of their research to date in order to plan their final dessert recipe and choice of container.

All design folios had been marked since the previous lesson providing all pupils with actions to be taken or aspects to be developed. It became apparent that the question and answer session had introduced and skilfully dealt with a number of these, especially those raised for some of the lower attaining pupils. This strategy enabled these pupils to move on rapidly to address the issues. (see *Fig. 4.54*) For higher attaining pupils the question and answer session had raised issues for them but did not provide solutions, these pupils had to think for themselves.

Having clarified the tasks and expectations for the lesson the teacher circulated the groups systematically, visiting groups of pupils with different learning needs. The higher attaining pupils were working together on an extended task whilst the lower attaining pupils worked together supported by additional resources to help them with the tasks for the lesson. The rest of the pupils worked in two groups (on the standard task). The teacher continued to ask thought-provoking questions, never giving the answer but leading pupils on to find the answer. Occasionally she wrote

notes in a design folio to guide a pupil through the next aspect of their work. The lesson ended with a plenary session where the problems encountered were discussed and solutions sought. Homework, detailed in the *Resource booklet* was referred to and pupils reminded of what they would need for the next lesson.

T	Melanie, tell us what problem you had last week with the pineapple and the jelly.
P1	The jelly would not set.
T	Right, now who can help Melanie out with this, why did this happen and what could she do?
P2	Isn't pineapple one of the fruits that reacts against the jelly and stops it setting?
T	So what could Melanie do?
P3	She could...

Figure 4.54 **Example of Teacher T exploring problems that a pupil had encountered during the previous lesson, using the open questioning technique involving several pupils.[6] (School T)**

The second lesson followed the same format as the first and no additional information came to light with regard to assessment strategies used.

Work Sampling

A review of the assessment of pupils' work was carried out on a selection of Year 9 design folios together with the finished products (or photographs if it was a food product). All had previously been assessed and many had been moderated within the department. A copy of the relevant *Record Profile* was attached to each unit of work. For each year group, the work of three pupils had been provided, one from each task level (basic, standard and extension) so that progress through the year and the use of individual targets could also be reviewed.

It was evident that the folios had been marked on a very regular basis throughout a unit of work and that the comments written on the work related specifically to the next stage of learning in the process and thus had been responded to by the pupil. In some instances there were also comments about aspects that needed to be strengthened or improved, most pupils with these additional comments had made some attempt to address the issue but they were not as rigorous in response as they were to comments moving them on to new work.

The differentiated tasks meant that there was always challenge to extend all pupils whatever their starting point. Comments written at the same stage within a unit made very different demands on individual pupils according to the task level. Grades were awarded for some pieces of work and as these were level related it was possible to see that the ongoing judgement was of the same level as the summative

[6] T = Teacher, P1 = pupil (Melanie), P2 = pupil (Darren), P3 = pupil (Nita)

one. For teachers these grades appeared to be useful as they focused their comments on how to move on within that level or how to achieve the next level.

Quality of comment writing was inevitably varied but all did provide pupils with positive, helpful information usually written in the form of a short term target. Teacher T had reflected in the interview that the writing of comments initially was difficult to do well and time consuming but when she saw the positive progress and achievement that resulted from it then it was then worth it.

Some units had been moderated and these were annotated by the submitting teacher to indicate the evidence of capability and the features of the level awarded.(see *Fig. 4.55* The level of detail provided follows the *Benchmark Portfolio Guidance* (see Appendix 23) and the resultant information makes for a useful exemplar for supporting the judgement of levels as well as guiding pupils with regard to expectation.

Unit of Work: Design and make a novelty clock

Evidence of capability of Level 5

The pupil's skills and knowledge:

- Ideas reflect taught techniques and materials available;
- Justified choices and preferences of form and function;
- Product clearly developed from the brief using appropriate research;
- Construction planned in detail and sequence;
- Modifications planned and justified to improve outcomes;
- Good use of tools, equipment and materials to achieve accuracy and a quality finish.

The teacher's observations:

- Considered majority of key issues;
- Handled materials and components with care;
- Planned production with attention to detail;
- Worked through task independently
- Learnt also through observation of others in group.

Figure 4.55 **Extract from a moderated Year 9 Unit of Work illustrating teacher annotation of evidence for Level 5 (School T)**

Discussion

The analysis of data from School T has identified a number of significant features of practice in relation to assessment. The whole school initiative to develop assessment procedures following their first OFSTED inspection in 1995 which criticised assessment strategies and inconsistent practice has evidently been successful in terms of summative assessment procedures and the tracking of pupils achievement, from baseline in Year 7 through to GCSE. The department has integrated the school's summative assessment requirements and systems into its own procedures. In terms of formative, assessment for learning, departments were left to select strategies and devise their own procedures, resulting in a plethora of different practice across the school. Within the D&T department the case study data has demonstrated that the procedures put in place and the strategies used have

ensured a shared understanding and consistent practice. The departmental documentation indicated an emphasis on the use of formative strategies and a high level of pupil involvement. The pro-active and strategic role taken by Department Head T has had a considerable impact on the development and subsequent implementation of assessment procedures. The statistical data available in the school illustrates the rapid improvement in the standards of GCSE D&T from one of the lowest performing departments to one of the highest. It is also interesting to note that the subjects highlighted by OFSTED in their report (see Appendix 22) as using assessment data to plan the next stages of learning by modifying teaching plans, are those that pupils made the best progress in, according to the relative performance indicators at GCSE in 1999 (see *Fig. 4.41*) published shortly after the inspection.

The D&T department relied heavily on existing LEA and commercial resources as starting points for the development of their own policies and procedures. This enabled them to make rapid progress with documentation and to concentrate their effort into the implementation. Department Head T brought to the school management and leadership skills learned elsewhere and used them to advantage to bring about change, most significantly the development of a strong team ethos and collaborative approaches to working within the department. The *Departmental Development Plan* (School T. Document 9) was the initial driving force to effect the changes and developments needed to raise achievement principally through the use of assessment strategies.

Department Head T viewed effective communication as vital to the success of implementing policy into consistently applied practice. The case study data shows that at all levels from the *Assessment and Marking Policy* (School T. Document 1) through to practice in the classroom there were procedures in place supported by guidance documents. Within Units of Work the purposes of assessment were clearly identified and referred to by the teacher in lessons when outlining the learning objective/s for the session. Pupils responded knowledgeably about the purpose of assessment, they understood and saw the benefit of written comments and were aware of what the focus for assessment was in their current work. (see *Fig. 4.48 and Fig. 4.49*). To facilitate the communication of assessment information in consistent formats, pro-formas such as the *Record Profile* (see *Fig. 4.44*) were developed.

Where communication was not good it was at whole school level and thus beyond the remit of Department Head T, due to the plethora of formative assessment procedures and practices in other departments. In this respect pupils had no clear idea of their how well they were doing in other subjects, grades and marks meant little on a comparative basis. All the D&T documentation and the pro-formas, for example *Guidance for Assessing Design and Technology Capability* (School T. Document 5), were designed to ensure that all members of the department and pupils were kept fully informed about assessment.

The principles and purposes of assessment outlined in the *Assessment and Marking Policy* (see *Fig 4.42*) were derived from the principles recommended as exemplary practice by the LEA and are evident in the work of Black and Wiliam (1998b), The Assessment Reform Group (1999), and Weeden and Winter (1999). All four principles outlined in the departmental policy were evident in support and guidance resources and in practice as seen in lesson observations and in pupils' work. Responses from teachers and discussion with pupils' also reinforced the application of these principles. Department Head T put the greatest emphasis on formative strategies, especially feedback on work in progress and ensuring that each pupil made the best possible progress, to fulfil what she viewed as the main function of assessment which was to raise achievement.

Having identified Department Head T's view, that formative assessment strategies are the most influential in raising achievement, the next consideration was the purposes that formative assessment serves within this role. She considered that there were a number of purposes, firstly was the use of assessment to identify gaps in the teaching programme so that the missing aspects, where considered essential building blocks for future learning, could be planned in as additional FPTs' and product analysis activities, and for future groups the original unit would be modified. Thus clearly taking on one of the basic principles outlined by HMI in the mid 1980s' that assessment should also be a diagnostic tool to identify gaps in provision. (DES 1985a). Secondly, was the assessment of capability, here the study has produced a considerable quantity of data demonstrating the attempts the team have made to understand the nature of capability and how to assess it rather than the skills and knowledge taught as a precursor to their application in a DMA. This was evidenced by the team's focus on identifying the purpose of the planned activity and the setting of appropriate learning objectives together with the assessment information written into each unit of work (see Appendices 24 and 25) and the assessment guidance documents (School T. Document 5) produced by the team. In this aspect of the departments work the outcome of the APU's (1991) work in developing a conceptual understanding of capability becomes evident, along with the views of Black (1991) and Farrell (1992) relating to the assessment of capability. Department Head T put in place support for assessing capability in the form of guidance documentation that led from policy into practice, for example *Guidance for Assessing Design and Technology Capability.* (see *Fig. 4.47*). This ensured that teachers focused on assessing the outcomes of the learning objectives, hence the assessment of real D&T capability rather than looking just at the quality of the finished product.

Formative assessment also played a significant role in the target setting process undertaken jointly by pupils and teachers at the end of each unit of work to provide challenge in the next unit. To ensure consistency of approach a departmental document *Target Setting* (School T. Document 4) was produced, the procedures and practices to be followed were in evidence on the completed pupil *Record Profile* sheets (*Fig. 4.44*) attached to completed assessed work, available for the work

sampling. All pupils responded positively to the use of targets to help them improve their work (see *Fig. 4.51*). This approach to raising achievement has been recognised as being valuable (DfEE 1997, Chidgey 1998, NAAIDT 1999 and DfEE 2000a). The D&T department's approach to assessment was pupil centred, believing that this involvement ensured that pupils understood the purpose of their work, how and what was being assessed and what they needed to do to improve. This was seen as a motivator by staff, a view supported by pupils. (see *Fig. 4.51*).

One of the first strategies implemented by the team to support procedures to be implemented to raise achievement was to change the method of delivery at KS3. Department Head T realised that if formative assessment was going to be successful in raising achievement then teachers' needed to know their pupils' well and the traditional carousel style delivery was not going to do this. To facilitate this, the delivery was reorganised to reduce the number of teachers each group would meet during a one year cycle and secondly staff agreed to increase their repertoire of specialist subject skills to teach all, or most aspects at KS3. It was then possible for all aspects of KS3 to be taught by one teacher per group, however, the team elected to use two per group as they saw this as a more powerful structure, enabling teachers to work more closely together and thus have a greater shared understanding. It also benefited continuity, when one teacher left and was replaced by a new member of the team. This realisation was consistent with the view of HMI (OFSTED/HMCI 1997 and 1998) who had serious concerns about the lack of continuity and progression offered by carousel delivery. In School T evidence of progression could be seen in the increasing numbers of pupils in each group attempting standard and extension level work as units progress through the year. This did however raise the issue of progression for those pupils who commenced the year at extension level and were they adequately challenged later in the year. A return to closer scrutiny of high attainers work indicates that yes, they were sufficiently challenged, firstly, there were very few who started at extension level and secondly, it was evident through the assessment comments on their work that their teachers knew them and their abilities well and ensured that challenging targets were set.

The strategy to differentiate units of work at three levels was originally planned to ensure that there was sufficient challenge and opportunity to raise achievement for all pupils, and this in itself was successful as evidenced by the comments written on work scrutinised during the work sampling. However, it had an additional and unexpected benefit as described above with regard to progression throughout the year as greater numbers of pupils were able to access the higher levels.

The *Assessment and Marking Policy* (School T. Document 1) put emphasis on constructive feedback to pupils and for this purpose provided detailed strategies for marking and also stressed the importance of involving pupils at all stages of the process. Four criteria for marking work using written comments were included in the

policy. (see *Fig 4.43*). All four feature regularly on pupils work as evidenced during the work sampling and through the responses made by pupils. (see *Fig. 4.52* and *Fig. 4.53*). The marking strategies emphasise the involvement of pupils' in the assessment of their work through discussion between pupil and teacher. Marking is viewed very much as a diagnostic tool, by Department Head T, to help pupils improve their work and thereby raise achievement through the use of carefully worded comments. In discussion with pupils it was evident that they were well informed about their work in progress, most knew what they needed to do next. They were also able to describe their own strengths and weaknesses. Teacher T viewed this strategy of diagnostic marking, when first introduced, as difficult and time consuming but having observed the evidence of improved performance and motivation of pupils, conceded that it was well worth the effort. She added that the guidance information produced by the team to support assessment had made the writing of comments much easier to do. Work sampling provided evidence of the effort put in by teachers to write effective diagnostic comments that pupils could act upon and also demonstrated that there was consistency across the department. It was evident in the way that many comments were written that teachers were relying heavily on the guidance documents provided to support this.

Another strategy that had prominence in School T was the use of a benchmark portfolio of assessed work. This was used on a regular basis by teachers, firstly, to check their own judgements when awarding level to ensure consistent practice across the department and secondly as a stimulus to promote pupil motivation to higher achievement by providing them with exemplification of quality work that they could aspire to and achieve.

An overarching strategy, stressed by Department Head T was the use of unambiguous and straightforward guidance documents and pupil resources. These ensured that there was consistent application of procedures across the department. Teacher T echoed this view and confirmed the use of such documentation. Pupils considered that the *Resource Booklet* was influential in the development of their work, together with the written comments on their work in progress and their regular discussions during lessons with their teacher.

The lesson observations presented a strategy not included in the documentation or recognised by the teachers', yet nevertheless very relevant as part of on-going assessment, and that was the use of question and answer techniques, especially that of open questioning. Here the teacher appeared to evaluate pupil understanding as she went and used it to support lower attaining pupils and also for the introduction of additional challenge for high attainers. (see *Fig. 4.54*).

The weakness identified by Department Head T was the lack of sub-levels in the school pupil tracking system. The system provided expected levels at the end of KS3 and GCSE information at the end of KS4, but progress within the key stage

was difficult to see. Pupils and members of the department wanted to be able to see progress within the levels, to enhance their own departmental system as well as being able to see levels of achievement in other subjects.

The department, in line with school expectation awarded grades for some aspects of work and for this purpose they devised an A-E sliding scale system linked to NC levels (see *Fig. 4.46*). This scale had in actual fact sub-divided NC levels into two, high or low, but this was only used as a guide for teachers to use to award grades and thus not generally shared with pupils, so they did not see this interpretation of where they were within a NC level. The use of grades and comments on the same piece of work has been proven to reduce the effectiveness of the comment and thus constrain potential achievement according to the research of Butler (1988) and the more recent replication of this research carried out by Wiliam (1996 and 1999). In School T it was not possible to detect any reduction in response to the comment alongside a grade, in comparison with the response to the same pupil's work where there was just a comment. Two possible explanations were provided by Department Head T, firstly that grades were rarely used and pupils are well used to responding to the comments on their work and might even question the grade given in the light of the comment made. Secondly that the teachers' regularly backed up their written comments through group question and answer sessions and individual one to one discussion about their work.

The different data sources confirm that there is consistency of application of procedures throughout the department. Throughout the interview with Department Head T the following assessment strategies and procedures were referred to as having, in her view, a significant role to play in raising achievement. Firstly, and most significantly, as these arose several times throughout the interview in different contexts, were the importance of the collegiate approach, of team work and team ownership in bringing about change and the successful implementation of new procedures. Secondly was the importance of effective communication at all levels through from policy to practice and thus the need for clear, concise unambiguous guidance documentation and pro-formas.

Strategies Contributing to the Raising of Achievement

It was evident from the data that there were a number of strategies that appear to be fundamental in contributing to the raising of achievement in each of the schools. *Fig. 4.56* lists those implemented by each school, all of which are represented in the literature, exemplified as good practice by nationally recognised assessment bodies and associations or proven through research to make a difference in other contexts.

STRATEGIES USED BY SCHOOLS TO RAISE ACHIEVEMENT

SCHOOL C:

- consistent approach throughout the school using NC levels for all summative assessments;
- departmental Assessment and Recording Policy developed from the whole school policy and consistently applied by all members of the team;
- clear and concise departmental documentation produced in a handbook for all members of the department;
- KS3 delivery/organisation arranged to address the criticism of rotational courses made by OFSTED/HMCI, features that hamper progression thus minimised:
  - two instead of four teachers per group per year;
  - units of work have an emphasis on generic skills knowledge and understanding;
  - assessment is an integral part of unit of work planning;
- one member of the department responsible for assessment – provides specific expertise;
- assessment procedures straightforward ensuring that the process is manageable and effective:
- *Student Record Card* used successfully to fulfil both summative and formative purposes;
- *Student Record Card* used to map progression over the whole KS;
- *Student Record Card* informs teachers about levels achieved PRIOR to receiving their new group in the carousel;
- on-going work assessed using diagnostic comments (most effective when written as targets);
- adoption of the SCAA *Optional Task* for end of KS3 assessment;
- emphasis on formative assessment strategies (assessment for learning);
- assessment data used to modify work for individual pupils;
- involvement of pupils in the process of assessment;
- shared learning objectives and assessment criteria;
- *Key Stage 3 Attainment Targets for Design and Technology* (School C. Document 6) available in all workshops and used by pupils to identify what they need to do to get to the next (sub) level;
- planned and constructive verbal feedback to pupils in lessons;
- one to one discussions with pupils to decide summative levels for units of work;
- shared understanding of levels through regular moderation of assessed work and standardisation sessions;
- use of portfolio to maintain standards and to develop shared understanding of levels;
- trialling of new and modified procedures by the teacher responsible for assessment prior to adoption throughout the department;
- understanding of the assessment of design and technological capability.

SCHOOL H:

- consistent use of the school tracking and target setting system;
- consistent use of the NC levels and school devised sub-levels for all summative assessments;
- clear concise departmental documentation readily accessible to all team members;
- reduction in the number of teacher changes each pupil experiences in the delivery carousel;
- emphasis on formative assessment strategies;
- assessment procedures are straightforward ensuring that the process is manageable and effective:
  - *Design and Technology Assessment Sheet* (see *Fig. 5.29*) used successfully to record both formative [targets for future work] and summative [level achieved] assessment;
  - *Student Tracking Sheet* (see *Fig. 5.33*) used to identify minimum target levels and to track and monitor progress through KS3;
- active involvement of pupils in the process of assessment:
  - shared learning objectives and assessment criteria;
  - *Key Stage 3 Designing and Making Skills* (*see Fig. 5.30*) and *Key Stage 3 Knowledge and Understanding* level expectation grids displayed in all teaching areas for reference;
  - expectation of pupils to respond to comments written on their on-going coursework;
  - planned and constructive verbal feedback to pupils in lessons;
  - one to one pupil/teacher discussions to set targets for next unit of work;
- comments only, to assess on-going coursework in response to research findings identifying that pupils would make better progress if not given marks and grades (see the research of Butler (1988) and Black and Wiliam (1998a);
- assessing design and technological capability, the teaching team has a clear understanding of how to develop real design and technological capability through the application of knowledge, understanding and skills and has integrated assessment criteria into units of work to ensure that the assessment is focused on the raising of achievement;
- inputting data and other time consuming administrative tasks carried out by central non-teaching staff, thus freeing up this time for teachers to use more productively, this also ensures that the data is processed punctually for staff to make use of as soon as possible;
- units of work written at two levels to ensure all pupils can access the tasks at the appropriate level;
- detailed assessment criteria built into units of work to ensure that all staff are making similar judgments against shared criteria;
- assessment data used to modify and extend work for individual pupils to ensure sufficient support for lower attaining pupils and sufficient challenge for high attainers;
- use of portfolio and regular moderation of assessed work to maintain standards and to develop a shared understanding of level.

SCHOOL T:

- departmental Assessment and Marking Policy developed from the whole school policy and consistently applied by all members of the team;
- policy focus on formative assessment;
- pro-formas to support teacher assessment and to ensure consistency of application;
- guidance documents back up the use of pro-formas and exemplify the underpinning rationale, especially the assessment of capability;
- use of the whole school tracking system, *Progress Sheet* to predict progress across KS3;
- *Record Profile* used to record achievement and record agreed pupil targets for each Unit of Work;
- Departmental Development Plan focus on assessment and detailed Action Plans including success criteria produced;
- KS3 SoW differentiated at three levels to meet the needs of all pupils and to provide challenge for the higher attainers;
- assessment information included in SoW
- use of assessment to inform planning:
  to identify gaps in provision;
  to modify plans to meet the current needs of learners;
- assessment used to identify underachievement;
- independent learning encouraged:
  - assessment criteria and expectation clearly defined in Unit resource booklets;
  - pupil helpsheets provided;
  - target setting is carried out collaboratively;
- reduction of the number of teachers delivering units on the carousel to two per group per year, and where possible to maintain continuity from year to year;
- use of an introductory assessment unit of work at the start of Year 7 to contribute to a D&T baseline assessment for each pupil (SAT and VRQ scores also used);
- use of assessment data to identify baseline and thus potential expected attainment at the end of KS3;
- staff training in managing and using assessment data;
- adaptation and adoption of LEA and commercial materials to build on recognised good practice and the expertise of others;
- marking through the use of diagnostic comments identifying ways forward;
- target setting for the forthcoming unit of work to ensure all pupils are given realistic and achievable challenge;
- use of one-to-one and group discussion to reinforce diagnostic comments written on pupils work;
- frequent assessment of on-going coursework - aspects for development noted by teacher and subsequently explored during a question and answer session to support low attainers and to challenge high attainers;
- use of the benchmark portfolio to exemplify levels to maintain standards and to develop a shared understanding of levels.

CHAPTER 5

CONCLUSIONS & IMPLICATIONS

The three case studies provided detailed insights into assessment policy and practice in each school. Having looked firstly at the schools on an individual basis, this final chapter provides a comparison of policy and practice and identifies the aspects commonly used by all three schools and those used exclusively by one school. Whilst the cross-case analysis was of interest it was important that conclusions were not drawn from this evidence alone, as validity would be seriously questioned. Each procedure or strategy where there appeared to be strong evidence that it contributed to the raising of achievement, whether used by all three schools or by just one, has been reviewed in the context of the findings of other research and exemplary practice identified in the literature.

It was interesting to find that strategies made explicit in one school as contributors to raising achievement through assessment, for example, the importance stressed by School T on communication, were frequently implicit in the other two. In each of the schools there were some features not replicated in the others and some that seemed fundamental in contributing to the raising of achievement in that particular school. In addition to these individual features it was evident from the data that a number of procedures and strategies used by the teams contributed to the raising of achievement.

Conclusions: Individual Schools

School C

This case study provided an in-depth view of the current assessment practice within the D&T department and the whole school procedures that had been adopted by all departments. A shared understanding of the purposes of assessment and the strategies used was evident in the data from interviews, lesson observations and work sampling.

The analysis of the numbers of pupils achieving Levels 5 and 6 in the end of KS3 teacher assessments indicated that most progress is made by lower middle attainers gaining Level 5 instead of Level 4 when compared with other subjects (see see page 77). The case data was re-explored to look for differences in approach and application according to the ability of the pupil. A number of differences were found:

- differentiation by outcome was the most common strategy; rarely did differentiation by task feature in the *Key Stage 3 Scheme of Work;*
- differentiation strategies listed in the *Key Stage 3 Scheme of Work* were focused on the support of lower attaining pupils;
- extension activities suggested in the *Key Stage 3 Scheme of Work* tended to provide more work at the same level;

- comments written on the work of higher attaining pupils were of a congratulatory style with little or no reference to the next stages of learning or challenge to inspire higher achievement. (see *Fig.4.16).* For lower attaining pupils' work the comments were more constructive and helpful in identifying aspects to be strengthened and how to go about it.

Thus for the higher attaining pupils, the work provided was not sufficiently well matched to their levels of attainment and where the comments written on pupils' work did not address their needs and thus provide challege, progress was less marked.

Overall there would appear to be no single assessment procedure or strategy that contributed significantly to the raising of achievement. Instead a number of strategies contribute to the overall attainment achieved at the end of KS3 by the D&T department which is higher than other departments within the school with the exception of Art and English. The procedures and strategies implemented by the D&T team are detailed in *Fig. 4.56.*

School H

This case study provided a picture, of the current assessment practice within the D&T department and across the whole school. The whole school focus had a considerable impact on consistency within the school. The awareness raising of the purposes of assessment through staff development and training was of benefit to the D&T department who have investigated how to assess capability rather than knowledge and understanding (see pages 19, 89, 91 and 101) and have also put in place pro-formas to record appropriate assessment information (see *Fig. 4.27*). The decision to spend time developing assessment criteria specifically related to each unit of work and to provide a range of expectations linked to the NC levels was very successful in focusing teachers on assessing design and technological capability. This also helped teachers to structure relevant and helpful comments to guide pupils to the next stage of learning (or consolidation) when assessing work. The outcome of these developments was of real benefit to the pupils who clearly understood how and why their work was assessed and took an active part in the process. They were enabled to identify strengths and weaknesses and to know how to improve their work in order to raise their achievement.

Overall, the most important factor contributing to the raising of achievement through assessment in School H was the whole school policy and procedures adopted and consistently used by all departments. The development of a whole school tracking and target setting system caused the D&T team to change their method of delivery at KS3 and to develop assessment criteria within the units of work. This not only enhanced the quality of assessment procedures within the department but also led the team to a greater understanding of design and technological capability and thus enabled teachers to use formative assessment strategies more effectively to help pupils raise their levels of achievement. The data shows that a number of strategies used by the team contribute to the raising of achievement in D&T. These are detailed in *Fig.4.56.*

School T

In School T the focus on assessment practice was within the D&T department. Whole school procedures were strong and consistently applied with regard to summative assessment and this provided sufficient information for departments to use the value added data to set end of key stage target levels from baseline assessments. With regard to formative assessment the school had not developed a common approach to raise attainment through the assessment of ongoing work within departments. Previous experience provided Department Head T with expertise on raising standards through the use of formative assessment and the leadership skills both to manage a team of teachers, and to develop a team ethos and climate in which change could take place.

Summative assessment data indicated that by the end of KS3 pupils at all levels of ability were generally making better progress in D&T than they did in other subjects, with the exception of mathematics. At level 5 and above attainment is not significantly higher than the better performing subjects in the school but significantly more achieve Level 6 in D&T than in their other subjects. (see page 126). When the case data was reviewed with this in mind it became evident that the unit planning at three levels played a significant part here, as all pupils, whatever their starting point, were challenged by the work set, especially the higher attaining pupils.

A number of strategies have contributed to the raising of achievement through assessment in School T, but the main contributory factor appears to have been the appointment of a strong, experienced head of department whose leadership has enabled the team to make considerable progress in the area of formative assessment. The features of this situation that have had an impact on raising achievement through assessment are:

- development of staff understanding of the assessment of D&T capability;
- team ethos, common approach and shared understanding;
- effective communication to ensure consistent practice supported by a considerable range of guidance documentation for team members to use when assessing pupils' work.

In addition to these specific features the team also used a number of other strategies, these are detailed in *Fig.4.56.*

Conclusions: Across the Schools

In all three schools there has been some sort of whole school assessment initiative and policies have been developed within D&T departments to reflect a whole school approach. In School C the whole school links were strong due to the continuance of a school working group maintaining an overview, whereas in School T the whole school focus had been limited to summative procedures with little attention paid to consistency and a shared understanding of formative assessment procedures. In School H the whole school focus has had a considerable impact on consistency across the school, due principally to the tracking and target setting procedures

adopted by all departments. A consistent approach to summative assessment was evident in all three schools, however, only School H used this data to set targets across and within the key stage and thus make maximum use of the value-added analysis available to them. A consistent feature in all three schools, and exemplified by OFSTED was the quality and clarity of policy documentation and how it had been used to inform and develop practice.

> The best school assessment policies are not only helpful in explaining the aims and purposes of assessment, they also give sound advice to departments to enable them to develop their own assessment procedures and to make constructive use of the data available on pupils' attainments.
>
> (OFSTED/OHMCI. 1997, p.15)

It was evident that where there was an external, whole school influence there was a greater consistency across departments in the application of procedures and strategies. Where this was successfully implemented, as, for example in School C, pupils were able to compare their performance in one subject against another based on reliable comparative data rather than on intuition and thus identify their strengths and areas for development. (see *Fig 4.11*). School H had the most detailed summative assessment data and used it effectively to identify any underachievement as soon as it occurred, and to ensure pupils were on track to achieve at least their minimum expected level.

All department heads and teachers saw communication as an important prerequisite to the successful implementation and consistent application of assessment procedures and strategies; policy, guidance documents and pro-formas were all essential elements. School C took a minimalist approach, the department head, concerned for the workload of his team, ensured that documentation was succinct and that pro-formas provided the maximum information with the minimum of teacher input. At the other end of the spectrum, School T provided a considerable amount of guidance documentation to ensure staff understood the requirements, had a shared understanding and a consistent approach. This is exemplified by OFSTED who identified a correlation between policy and assessment documentation. "Where whole-school policy is good, the better departmental assessment policies almost always reflect it and provide subject detail about assessment and marking." (ibid. p.15).

The purposes of assessment set out by all three schools were very similar. This was not unexpected given that nationally recognised sources of guidance, for example AAIA (1996), DATA (1997), NAAIDT and Berkshire Education Department (1997) and Buckinghamshire Advisory Service (1998a), had been used by the schools and the D&T departments in developing assessment policy documents. All identified the four broad categories, formative, diagnostic, summative and evaluative, advocated by TGAT (1988a). All emphasised the use of formative procedures as being of greater importance in the quest to raise achievement. All three schools judged their effectiveness in comparison with similar schools and all schools nationally by using

assessment data as performance indicators and to some extent all evaluated schemes of work against assessment outcomes of pupils. Only School H, however, had strategies and procedures in place, and used them, to judge the effectiveness of teachers. All schools made reference in their assessment policies, either directly or indirectly to seven purposes of assessment, six identified back in 1976 by Macintosh and Hale (diagnosis, evaluation, guidance, grading, selection and prediction) and the seventh (motivation) by Brown (1990) and Harris and Bell (1990).

The review in Chapter 2 of the development of D&T from its craft based origins clearly indicated the need for a reappraisal of how the subject was assessed. The need for a move away from a focus on rewarding the acquisition of specific skills and knowledge to the assessment of capability was evident. Thus a prerequisite for the assessment of D&T is an understanding of design and technological capability and how it can be developed through the teaching of the subject. In line with the view held by Kimbell et al (1991), all three schools had a clear rationale for design and technological capability that provided teachers with a framework within which to plan, teach and assess D&T effectively. School T used the guidance provided by NAAIDT and Berkshire Education Department (1997). (see *Fig 4.47*) and, with one exception, a teacher in School C, had focused on the development of Units of Work to address the capability statement given as a precursor to each key stage in the NC Order for D&T (DFE, 1995). In School H the assessment of capability was not made explicit in a specific document but was implicit in the support resources available for teachers and pupils (see *Fig. 4.28*) and in the guidance provided for assessing Units of Work (see *Fig. 4.30*).

A number of procedural strategies impacted on achievement and the levels attained at the end of KS3. First, the requirements of formative assessment caused all three D&T teams to review the carousel delivery system for KS3 as they saw that frequent rotation of groups to different teachers was a major impediment to continuity and progression; teachers would need to know their pupils' strengths and weaknesses well on order to use assessment for learning strategies effectively. All chose to reduce the number of teachers to two per group per year and to encourage close collaboration between them (OFSTED/HMCI 1997 and 1998, OFSTED 1999c). Second, department heads and teachers stressed the importance of accessible, readily useable documentation to ensure that rigorous, straightforward procedures were in place and used consistently by staff (and understood by pupils, where relevant). The data exemplifies the use of specific pro-formas (School C. Document 4, School H. Documents 9a and 9b and School T. Document 3ii) and a range of support and guidance materials. Interestingly, each school had a different rationale for documentation, ranging from Department Head C's strongly held belief in a minimalist approach to School T where prolific, albeit purposeful and succinct documentation was considered essential to give teachers maximum support and to increase levels of consistency across the department. The evidence suggests that these different approaches, together with the approach taken by School H were successful in achieving what they set out to do. Third, the structure of the Units of

Work also had a marked effect on the numbers achieving at different levels. Where differentiation was built into the unit to ensure appropriate challenge and support for pupils of all abilities and was well matched to expectations, there was a correlation between the unit structure and the levels attained at the end of KS3 (see pages 104, and 126). Finally, moderation of pupils' work across the department and the development of a portfolio of assessed work were seen as important ways of helping team members gain a shared understanding of standards in the different aspects and material areas and to foster a consistent approach to assessment.

In all three schools, the D&T departments were provided with pupil level data that could be used to set a baseline level and to forecast end of KS3 and KS4 attainment. However, this was only used effectively in School H, where pupil progress was monitored regularly and individual targets set. School C used this information retrospectively if needed, although its potential had been recognised by Teacher C and plans were underway to use the data in future. School T found tracking using 'whole' NC levels [imposed by the school] unsatisfactory in terms of progress within a key stage as the levels were too broad to identify short-term progress. They used *Progress Sheets* (School T. Document 3) to record baseline to KS3 and KS3 to KS4, levels attained and levels expected and found that these were useful to identify expected progress across a key stage. All schools had systems in place for target setting and tracking. These worked most effectively in School H, where they were linked, individual pupil targets were mapped on tracking pro-formas to ensure that both teachers and pupils had a clear idea of potential outcomes and appropriate challenge. With this procedure it was also quick to recognise underachievement in School H.

All schools viewed the active involvement of pupils in the assessment process as a fundamental prerequisite to raising achievement. For Department Head C one of the most significant strategies to help pupils improve the quality of their work was the sharing of learning objectives and assessment criteria at the beginning of lessons. Individual target setting was a shared experience in all of the schools, but most rigorously implemented in School H.

The detailed medium term plans of School H and School T that included 'unit' specific assessment criteria linked to the level descriptions (see *Fig 4.32*) guided teachers in the writing of constructive comments to focus pupils on exactly the right tasks to accomplish in order to achieve an appropriate level of challenge. Thus comments for the higher and lower attaining pupils were equally constructive. In School C, however they tended to be congratulatory with limited guidance or challenge for the higher attaining pupils.

In all three schools there was variation in the ability of teachers to write constructive and helpful comments. Work sampling and pupils' views indicated that School H had least variation. The unit specific assessment criteria, developed by School H played a key role in this as teachers used these extensively to frame their comments. In addition, the two levels given also helped teachers to write realistic and challenging

comments to meet the needs of the full ability range, and especially the high attainers. (see *Fig.4.38*). For pupils', regular constructive feedback was the most important strategy used to help them raise achievement. (see *Figs. 4.10* and *4.34*). This view reflects the research findings of Butler (1988) (see page 14). Carefully written comments, identifying what pupils had done well, with aspects to improve or consolidate written in the form of targets were most popular with pupils. Most pupils valued verbal feedback where confusions or misunderstandings could be clarified. There was however, evidence that pupils perceived some feedback as either unfocused or of little use in improving work. Verbal follow up to written feedback was also viewed as beneficial, especially for lower attaining pupils who were not always sure exactly what to do in response to a written comment. (see *Fig. 4.53*). The findings here are consistent with those of Boulet et al (1990), see page 14 and Ronayne (1999) detailed on page 16. Pupils' confidence and motivation were often boosted by positive feedback and they saw the value of critical feedback if it gave pointers for improvement. Pupils did not like comments that were critical of their effort and achievement. The variations in the feedback reported by pupils and their sometimes confused perceptions of its intentions supports the findings of Ronayne (1999), Weeden and Winter (1999) and Sadler (1999).

When the views of the department heads and teachers were compared, on which procedures and strategies played a significant role in raising achievement there was considerable similarity as summarised in *Fig. 5.1*

- Emphasis on formative procedures
- Effective policy to inform practice
- Good communication
- Consistent application of assessment procedures
- Continuity of teacher with group
- Assessment planned into Units of Work
- Differentiated Units of Work
- Assessment criteria derived from NC levels
- Regular use of written and verbal feedback
- Diagnostic marking, to inform the next stage of learning
- Active pupil involvement in the assessment of their work and target setting
- Simple, straightforward systems for collecting and recording assessment data
- Understanding of D&T capability and how to develop it through Units of Work

Figure 5.1 **Summary of the shared views of department heads and teachers in the case study schools.**

The findings from the three case study schools largely concurred with the main findings of the review of research carried out by Black and Wiliam (1998a). First, that the data provided sufficient evidence in all three schools that formative assessment does raise standards and thus achievement. Second, that there is also

room for improvement in the way teachers use formative assessment. Third, that there is evidence from these studies about how to improve formative assessment that would help other teachers develop this as a tool for learning.

Summative assessment in all three schools has been used positively to enhance the effectiveness of formative strategies. This has been successfully implemented due primarily to teachers having a clear understanding of the different purposes of assessment and the support and guidance materials used within the schools. This finding differed from those of Black and Wiliam (1998a) who found evidence that there was often confusion in teachers' minds between formative and summative roles and this impeded pupil progress. The findings of Black and Wiliam reflect those found nationally by OFSTED/HMCI (1998), however the difference in my study can be explained, firstly, the study was carried out two years later and secondly the schools were selected specifically for their focus on assessment. The case studies also exemplify the use of summative assessment data for 'value added' predictions of pupil potential. This makes possible the identification of baseline to end of key stage progress and with this information teachers can pinpoint where pupils should be on this continuum at any one time, based on expected progress. The rapid identification of underachievement also becomes possible.

Summative procedures are essential to establish a baseline and from this, to identify minimum expected progress by using national data. Thus realistic and challenging targets can be established. This also acts as a check to ensure that a pupil remains on track and that any underachievement can be quickly picked up and addressed. The parameters having been set through summative procedures the active process of raising achievement can now be accomplished through formative strategies. Within the bounds of assessment for learning it is important to use diagnostic strategies to identify learning difficulties and also to use ipsative assessments to measure a pupil's progress against his or her own previous performance.

Conclusions: Key Features of Raising Achievement Through Assessment

The analysis of the case study data has highlighted key features, to which the raising of achievement through assessment in the three schools can be attributed.

General Characteristics

From the conclusions drawn across the three case study schools a number of characteristics, also present in the literature exemplifying good practice, have been identified. Firstly, there was a whole school approach to assessment, an awareness and understanding of the purposes of summative and formative assessment and the potential for the latter in raising achievement. In addition at D&T department level there was an understanding of what design and technological capability was.

Secondly, the schools had good quality documentation that was used consistently across the department. A third dimension is that of curriculum planning, where assessment was an integral part of the KS3 Units of Work and individual pupil needs were addressed to ensure all pupils made the best possible progress. The way Units of Work were differentiated appeared to have an impact on the levels attained at the end of KS3. The fourth dimension was the involvement of pupils in the process through the use of feedback, the use of self-assessment strategies and joint teacher pupil discussions and target setting. The final characteristic is a commitment to the process, where all ascribe to the procedures and strategies, and formative assessment becomes embedded in the working practices of the department. The following are strategies that contributed to the raising of achievement in the case study schools.

Assessment Documentation

The quantity of guidance documents varied considerably between the schools; School C had a minimalist approach to documentation and ensured that procedures were as streamlined as possible in contrast to School T where there was a plethora of support and guidance materials. Irrespective of this variation there were a number of key features that applied in all three schools and others that were evident in one or two of the schools. The following are the key features relating to assessment documentation that supports raising achievement:

Policy Documents:

- departmental policy reflects whole school policy and describes the culture expected for assessment;
- the policy statement is succinct and sets the parameters for work within the department.

Guidance Materials:

- support and exemplify policy for teachers;
- help pupils identify what they need to do next in order to make progress and to set targets for themselves;
- clarify expectations for both teachers and pupils;
- use examples of pupils' work to help them understand what they are capable of and want to aspire to and also to help them identify their strengths and aspects for development.

Recording Pro-formas:

- record useful data that is used to:
  - map progress across the key stage;
  - identify potential achievement on an annual and end of key stage basis;
  - identify value-added progress;
  - provide information for individual pupil target setting;
  - provide teachers with information about pupil's prior performance.

Planning

The SoW in each school had a key role to play with regard to raising achievement. The following strategies were used in all the schools and again were evident in the literature:

Long-term Planning:

- involves the whole D&T team;
- maps progression through the key stage;
- enables review to consider how well pupils are performing against the learning intentions and to modify activities where necessary.

Medium-term Planning (Units of Work):

- ensures learning intentions are clearly linked to tasks and provide the knowledge, understanding and skills to accomplish design and make assignments thereby developing design and technological capability;
- outlines assessment methods appropriate to learning objectives and planned activities and indicates how design and technological capability is assessed;
- identifies what will be assessed in depth;
- linked to levels of attainment;
- ensures units of work are differentiated to meet the learning needs of all pupils.

Short-term Planning:

- ensures each lesson has a clear learning objective;
- takes account of pupils' prior learning;
- outlines assessment methods to be used;
- includes strategies for sharing the learning objectives, individual targets and assessment criteria with pupils.

Assessment as an On-going Process

Assessment and marking policies in all three schools provided clear guidance on the assessment process and strategies to be employed. The following were exemplified in practice and through classroom observation, work sampling, interviews and discussions:

- teachers know what knowledge, understanding and skills pupils have;
- teachers ensure that pupils know what they are supposed to be learning, that they know what they have achieved and how they can improve;
- regular opportunities for pupils to reflect and talk about their learning and progress against targets with their teachers;
- teachers use a range of assessment strategies and apply them consistently across the department;
- strategies to identify when pupils are not making progress are in place;
- assessment information is used to plan the next stages of learning.

Feedback

The literature suggests that feedback is most effective when it confirms that pupils are on the right track and when it stimulates improvement in a piece of work. To be effective feedback comprises of three elements:

- what the pupil has done well;
- what they have been less successful in doing;
- an indication of how improvement can be made.

Feedback strategies observed in the case study schools:

- responses focused on the learning objective and the assessment criteria, given regularly and whilst still relevant;
- teachers ensure that pupils understand what they have achieved and that they know what they need to do next to make progress;
- feedback informs teachers about how they need to adapt future plans to address the learning needs of all pupils;
- feedback helps pupils find alternative solutions to problems when necessary;
- feedback highlighted the strengths and provided the strategies for improving work (usually in the form of targets);
- feedback made understandable to the pupil, through written comments and discussion;
- lesson time allocated for verbal feedback and for pupils to read written comments;
- feedback linked to longer time target setting.

Individual Target Setting

Where individual target setting was carried out the following strategies were employed:

- the process was shared between teacher and pupil;
- the targets set were achievable and quantified clearly.

Using Assessment Information to Monitor Progress

Where progress was monitored through the use of assessment information it was evident that:

- expectations were appropriate for pupils of differing abilities;
- individual pupil targets were set in relation to expected progress from baseline to end of key stage data.

End of Key Stage Assessment

It was evident that teachers knowledgeable about formative assessment strategies were able to make good use of their expertise with regard to summative procedures:

- teachers drew on the full range of ongoing assessment information and records when making teacher assessments;

- teachers had a clear understanding of the level descriptions and how to apply them holistically;
- teachers made summative judgements which were consistent with a shared understanding of standards developed through agreement trials and moderation sessions within the department;
- teachers used the information formatively to monitor progress towards targets set.

Implications for Developing Practice

The detailed insights into assessment policy, documentation and practice in each of the three case study schools has provided a rationale for supporting other schools in developing their own formative assessment practice. D&T departments will need to consider the fundamental issue of the curriculum delivery model for KS3 as the traditional carousel with frequent rotations to different teachers will not work. This has been exemplified in all three case study schools, where it has been established that formative assessment is most successful in raising achievement when teachers know their pupils well. Once an appropriate curriculum model has been established then the assessment procedures and strategies can be put in place and supported by clear and concise documentation.

The study has also identified aspects relating either directly or indirectly to formative assessment, that need to be developed further in order that maximum benefit of raising achievement can be achieved. Firstly is the need to introduce strategies to ensure that pupils become more involved in the assessment process by developing more opportunities for self-assessment. To ensure that the process helps pupils to engage more effectively with "bridging the gap between present and future performance." (Sadler 1998, p.79). If pupils are to learn, research carried out by Weedon and Winter (1999) found that pupils need to be able to work out why these gaps occur and they need to identify strategies that they might use to close the gaps. The teacher's interchange was found to be crucial to the pupil's understanding of what needs to be done next. The involvement in self-assessment will help pupils to understand what is expected and what they are required to learn. "The dependency of students on their teachers means that teachers should be aware of the need to signpost the journey and share the criteria for assessment." (Weeden and Winter 1999, p.15). Thus the sharing of the capability requirements of the whole Unit of Work through the DMA and also the requirements in terms of knowledge, understanding and skills required for the FPT and Product Analysis activities.

Discussions with pupils and work sampling identified that not all written feedback was useful or that pupils understood it, highlighting the need for further development in this aspect. School H provides clear evidence of the improvement in the quality of written feedback following a training day led by Paul Black (see page 93). Another related aspect would be to introduce strategies to support the development of pupils' self esteem to support them in the process of self-assessment. For many teachers,

written feedback to pupils still needs to be developed to ensure that marking is constructive and also that comments alone are used. Black and Wiliam (1998a) cite research evidence that comments without grades were more helpful and useful, particularly for lower attaining pupils. Another aspect that requires consideration is that of the development of the 'question and answer' technique, this would enable pupils to explain themselves and share their thinking with others.

Another important area for development is the use of summative assessment data to support formative assessment. Thus assessment information could be used to monitor specific aspects within the department:

- performance of different groups of pupils, e.g. boys and girls, ethnic groups, those with special needs, high attainers, additional language learners;
- performance of different teaching groups;
- performance in the different aspects of D&T, e.g. resistant materials, food, textiles, control;
- department performance considered alongside national and local benchmark data;
- year on year trends.

Since there are no statutory tests at the end of KS3 in D&T, it is particularly important that departments have procedures to promote consistent, high-quality assessment to ensure the accuracy of end-of-key-stage assessment against NC level descriptions. This is exemplified by the case study schools where there are systematic procedures in place. Here the teachers operate in the same way and share the same standards.

Outcomes of the Study

The analysis of the data collected has been used extensively to meet the aim of the study. The evidence gathered has provided factual information regarding successful assessment procedures and the evaluation of the assessment procedures has enabled the identification of key features that contribute to raising achievement. The EDP (Buckinghamshire County Council 1999) linking theme of 'recognising and disseminating best practice' also has associated activities, and it is here where the outcome of this research will make a contribution to all the activities identified:

- creating a data base of effective practice in County schools;
- supporting teachers in identifying best practice to aid professional development;
- ensuring that the identification of best practice becomes a key feature of LEA publications;
- teaching master classes;
- extension and development of the County research base on best practice in classroom teaching.

(Buckinghamshire County Council 1999, p.5)

A report, based on the findings will be produced to provide guidance for heads of department and teachers relating to effective assessment procedures and the key features which contribute to raising achievement. This will be illustrated by:

- an appraisal of departmental assessment documentation and pro-formas;
- a description of assessment practice (organisation and approaches);
- an account of teacher understanding;
- pupils' views of assessment.

Impact on Policy and Practice

The outcome of this study would be of interest to all involved in the teaching and assessment of D&T in secondary schools, general advisers linked to secondary schools, specialist design and technology advisers and consultants. Mindful of the apparent lack of impact of research on practice in schools (Hargreaves 1996, Hillage 1998, Tooley and Darby 1998) the findings of this research will be disseminated in a variety of different ways and in different formats:

- Aspects of this research will make a valuable contribution to the D&T CPD programme provided for County schools;
- Use of exemplar materials for supporting local network groups of D&T teachers;
- Individual case studies posted on the D&T pages of the LEA website;
- Complete research study available to members of NAAIDT on the NAAIDT members section of the website;
- Selected aspects (relevant to teachers) available on the NAAIDT website.

Reflections

The opportunity to explore ways of raising achievement through assessment in depth in the three case study schools has been a fascinating and rewarding experience. The use of case study as a research strategy has enabled me to focus on the original purpose, to explore the use of assessment procedures within D&T to identify current practice and the key features that contribute to the raising of achievement. The recommendation of Yin (1994) for the meticulous planning and the testing of all proposed research instruments through a pilot study was, in hindsight, very sound advice, as can be seen from the improvements and refinements made to the original schedules for data gathering, interviews and discussions. Grounded theory, although at first somewhat daunting in its requirement for 'line-by-line' analysis to generate initial coding categories and to find the relationships among concepts, proved to be a rigorous but very satisfying method of analysing the data. The theory derived from the data through such close scrutiny has given me an insight into the case study schools, it has resulted in a realistic view of current practice and provided a meaningful view of assessment within the context of D&T guide to future developments and actions.

Future Research

This study has taken forward the work of Black and Wiliam (1998a), and whilst identifying successful strategies for raising achievement through assessment it has also raised questions that demand focused investigation. Firstly was the issue of a curriculum model of delivery, the case study schools having established that the traditional 'carousel' was not compatible with the prerequisites of formative assessment. This aspect is worthy of further investigation to identify the most appropriate model/s for D&T curriculum delivery to accommodate formative assessment procedures. Secondly, medium term planning of the Units of Work raised some interesting questions. Each school had differentiated their units in different ways, School T appeared to be the most successful in meeting the needs of the full ability range as they had three levels for each unit. This aspect would certainly benefit from research focused directly on differentiation. A third area that most certainly needs detailed investigation within D&T is that of written and verbal feedback, building on the generic work of Butler (1988) in this field. The next stage might be to look closely at the relationship between written and verbal feedback and the balance between the two. The final aspect that arose from this study was that of target setting and the use of value added data in the context of raising the achievement of individual pupils, not whole cohorts.

> It is time to get research reports off the shelf and into the hands of those responsible for education who can apply them. Until we do, educational research too often will remain an exercise in futility.
>
> (Burdin in Bennett and Desforges 1985, p.110)

THE ORIGINS OF DESIGN AND TECHNOLOGY

Practical subjects, the precursor of today's D&T, were first introduced into the elementary school curriculum in the 1880s following a recommendation by the Royal Commission on Technical Instruction (Samuelson 1882). Known then as manual training, the emphasis was on the development of motor skills; boys were instructed in woodwork and metalwork (handicrafts), and girls were similarly instructed in domestic science (housecraft) and needlework. These 'craft' subjects were the province of the less able and were firmly sited at the bottom of the academic hierarchy, as the views expressed at the end of 19th Century exemplify (Sommerhoff quoted in Penfold 1988). The view held by Sommerhoff that the traditional metalworkshop could do more harm than good to the engineering profession, was echoed in the 1956 White Paper on Technical Education, and again nearly one hundred years later, by the Engineering Council (1992) announced that "there now needed to be a radical rethink on the subject so that it could become a valuable experience for all students and a subject which would be respected by higher education and by industry." (p.2).

Almost as soon as manual training had been introduced into the curriculum there were those who held a very different view, a belief that this subject should extend beyond the confines of 'rote' acquisition of practical skills to make an artefact. In 1884, John Moss, Clerk to the Sheffield School Board, outlined a framework from a very different perspective:

> To be of fullest value...It should supply a connecting link - practical in its bearing, and thoroughly educational in its character - between theoretical knowledge...and the industrial pursuits in which such knowledge may be applied...It should be a means of illustrating scientific principles and of applying in practice theories...The training of the hand and eye should be immediately associated with the development of mental faculties.
>
> (Moss quoted in Penfold 1988, pp.9-10).

Professor Guthrie FRRS, who was closely involved with the work of the Science Schools in South Kensington, held similar views to Moss, declaring that the true basis of technical education was bringing hand and mind together. In the late 1880s Guthrie argued that where the mind alone was employed, knowledge quickly passed away, but when the mind and hand worked in unison it was never forgotten. (Penfold 1988). The vision of bringing 'hand and mind together' was exemplified by the APU in their research carried out in the 1980s, nearly one hundred years later. This traditional craft curriculum taught to boys in schools is epitomised by Eggleston in the following description:

> The woodwork teacher prescribed exercises in planing and sawing and rewarded their successful performance with the opportunity to produce pipe racks and egg stands. Diligent application to the production of such objects was the way to the promised land of bookracks, coffee tables and standard lamps.
>
> (Eggleston 1996, p.12).

The craft curriculum for girls, taught in the same manner but using different materials; with food in domestic science it was 'look and cook', one week a demonstration by the

teacher, replicated as closely as possible the next week by the whole class, thus they learned the skills of home cooking. Needlework teaching replicated very closely the method used for wood and metal. Here girls were instructed in the intricacies of garment construction and the traditional range of embroidery techniques. Those exposed to the delights of housecraft gained such skills as how to wash, starch (collar and cuffs) and iron a man's shirt.

Government reports such as the Hadow Report (1926), Spens Report (1938), Crowther Report (1959) and the Newsom Report (1963) and the White Paper on Technical Education (1956) all promoted the cause of practical education. Respectability was acquired through the 'intellectualisation' of the subject at examination level, initially School Certificate followed by GCE 'O' and 'A' levels in the late 1940s. In becoming 'respectable' the craft based subjects were effectively put in a strait-jacket and the evident, albeit, slow departure from the formalisation of the 19th Century came to a halt. "...Examination syllabuses in the craft subjects called for regurgitated pieces of memorised knowledge and skill from which almost all creative performance was eliminated." (Eggleston 1996, p.15). The Crowther Report committee was asked to look at the issue of why pupils lost their intellectual curiosity before they exhausted their capacity to learn. *Chapter 35 'The Alternative Road'* can be seen as the starting point for the subsequent emergence of D&T. (Hicks 2000a). It was instrumental in encouraging the first serious look at technology in the school curriculum and led to the publication of the Schools' Council (1967) *Bulletin Number 2, 'A School Approach to Technology'.*

Developments in schools were evident by the mid 1960s and this progress encouraged the Schools' Council to launch two national research projects. The first under the leadership of Eggleston, entitled *Education through Craft and Design*, aimed to transform the handcraft area of the curriculum to deliver a coherent design-based technological approach. Thus problem solving strategies became the order of the day and in order to deliver D&T through a technological approach teachers acquired a new vocabulary. Design methodologies using analytical and synthetical criteria moved logically from need identification to optimised solutions and their evaluation. The second project, directed by Harrison was entitled *Technology in Schools*, and referred to as *Project Technology*, it was through this initiative that Harrison managed to establish craft as the route to technology in schools, fending off the strong science lobby led by the Association of Science Education and the Council of Engineering Institutions. (McCulloch, Jenkins and Layton 1985). Both projects supported teachers in schools by providing INSET, produced journals, and published many widely used books on ways in which these new approaches could be put into practice in school.

The 1970s were a period of dramatic change and by the end of the decade the accepted names of the curriculum aspects to be the major contributors to D&T were CDT and Home Economics. In 1975 the DES set up the APU to attempt to assess the performance of pupils. A new and diversified curriculum had developed in the 1960s and 1970s, not just in the D&T area but across the whole curriculum and there was now an urgent need to record what pupils were actually achieving. The work of the APU in respect of the assessment of D&T is explored and discussed on page... Other initiatives that have had an impact on individual schools have tended to be those that have brought additional funding into schools, such as the Technical and Vocational Educational Initiative (TVEI) introduced by the Manpower Services Commission in

1982; the introduction of the City Technical Colleges (CTCs) in 1985 and the Technology Schools Initiative (TSI) launched by government in 1993, followed by the creation of 'Technology College' status in 1995.

The Curriculum from 5-16, (DES 1985b) written by HMI, set out to stimulate professional debate regarding the whole school curriculum to provide a basis for the Education Reform Act of 1988. They outlined nine areas of learning and experience of which the 'technological' set out to define their understanding of technology in an educational context. "The essence of technology lies in the process of bringing about change or exercising control over the environment. This process is a particular form of problem solving: of designing in order to effect control." (DES 1985b, p.34).

Thus, very clearly emphasising the shift from craft based practical skills courses to something far more radical and useful - the application of knowledge, understanding and skills to a specific situation and this in turn requires the development of capability. HMI had a clear vision of the traditional subjects which should be brought together to create this exciting new curriculum area; the main contributors perceived as craft, D&T and home economics together with aspects of information technology. They stated that all pupils throughout the 5-16 age range should experience technology and stressed that however interesting learning about technology may be it was not a substitute for active involvement in the process itself. It was this involvement HMI and others, Down (1977), APU (1981), Hicks (1983a), Hicks (1983b), Black and Harrison (1985) were keen to promote.

HMI reports on Home Economics (DES 1985a) and Craft Design and Technology (DES 1987), both to become major contributory curriculum areas of D&T were indicating that change was necessary. Teaching methods recommended by HMI in *Home Economics from 5-16* promoted active learning and a problem-solving approach, they argued that the learning of practical skills and the development of manual dexterity should not be ends in themselves. In *Craft Design and Technology from 5-16*, HMI discussed the importance of craft skills as part of a process and not as ends in themselves. They recognised that craft skills needed to be acquired to enable pupils to produce finished products which to them were satisfying rather than to be frustrated and demotivated by lack of ability to complete a task to the standard they felt was appropriate. They recommended that the craft skills should be set more firmly within the context of designing.

There was, therefore, a growing dissatisfaction with 'craft' work in schools from a number of different individuals and groups. Hicks reported that "traditional handicraft teaching, with its emphasis on the group acquisition of specific craft skills was being transformed to CDT, with its broader concern for individual problem-solving." (Hicks 1983b, p.35). A meticulous and detailed account of the evolution of D&T, from its earliest origins up to the late 1980s can be found in Penfold (1988). His account clearly demonstrates that throughout the subject's history there have been those who have always perceived the subject as being essentially about the application of skills, knowledge and understanding and not just the rote application of practical craft techniques to make an artefact, determined and pre-planned by the teacher. Others, Harrison (1992), Eggleston (1996), Kimbell (1997) and Hicks (2000a, 2000b) augment this account and provide detail of the more recent history, demonstrating how the frequency of change has escalated with the advent of the statutory requirements of the National Curriculum.

NATIONAL CURRICULUM STATUTORY ORDER FOR DESIGN AND TECHNOLOGY

In April 1988 a working group was appointed by the DES to advise on attainment targets and programmes of study for technology. The terms of reference outlined the approach that the working group was to follow:

> Design and make useful objects or systems, thus developing their ability to solve practical problems...They should be taught the principles and practice of good design, the application of theoretical knowledge, and within that context the practical craft skills needed for their designs...
>
> (DES/WO 1988, p.86).

Although the intellectual ideas behind the approach to D&T education were by no means new as the thinking of the APU (1981, 1987),Eggleston (1985), Black and Harrison (1985), Kimbell (1988), and both specialist DES (1985a, 1987) and general DES (1985b) reporting groups of HMI demonstrated, it was one of the most fundamental changes required by the NC. At its heart lay the need to adopt new approaches to the process of teaching and learning, the working group noted that this approach for some schools would mean a considerable change, especially those who had continued to teach traditional subjects with a strong craft bias. The Interim Report (DES/WO 1988) contained far more detail than the Final Proposals (DES/WO 1989) and the National Curriculum Statutory Order (DES/WO 1990) itself. The first chapter consisted of a reflective discussion of the nature of D&T and, most significantly stated their definition of capability:

> pupils are able to use existing artefacts and systems effectively;
>
> pupils are able to make critical appraisals of personal, social, economic and environmental implications of artefacts and systems;
>
> pupils are able to improve, and extend the uses of, existing artefacts and systems;
>
> pupils are able to design, make and appraise new artefacts and systems;
>
> pupils are able to diagnose and rectify faults in artefacts and systems.
>
> (DES/WO 1988, pp.17-18).

This view did not just appear 'out of the blue', its content is eminently distinguishable as the latest stage in the evolution of the subject. (Penfold 1988, Kimbell et al. 1991, McCormick 1992). Central to this development was the fundamental shift of emphasis from the practical skills/product outcomes to the holistic exercise of a technological process (of design, development, manufacture and testing) that generates outcomes. "The pupil is transformed from a passive recipient into active participant. Not so much studying technology as *being* a technologist." (Kimbell, Stables and Green 1996, p.28). Thus, a new vision was needed. Black (1991) argued that the subject was radically new and unless those involved saw it as radically new, they would be missing the point.

The DES/WO published the Final Report (1989) setting out proposals for the Order: four ATs, each with ten defined levels of Statements of Attainment. In addition the PoS were defined for each KS under sixteen headings and at ten levels. Not surprisingly there was a significant concern expressed about the complexity of the PoS during the consultation period. This resulted in the reduction of the PoS headings to four, however all the original statements were then redistributed to these new headings!

Too often in the past, academic knowledge, 'knowing that', has remained disconnected from practical action 'knowing how". Ability to solve theoretical problems on paper does not ensure that competence could be extended into the realms of real life situations.

> Design and technology capability empowers people to operate effectively, creatively and confidently in the made world and the Order for technology assumes that practical engagement by pupils in the process of design and technology is fundamental to an education with this aim.
>
> (Layton 1991, p.3).

Denis Filer, Director General of the Engineering Council and a member of the working group highlighted a concern of a growing number of individuals and groups that there was a need for the education system to produce young people who could use their knowledge and skills to make decisions which lead to actions. He endorsed the inclusion of D&T in the NC as being able to address this need. (Filer in Murray 1990).

The first statutory Order for Design and Technology (DES/WO 1990) was issued and although there was Non-Statutory Guidance (NCC 1990) and in-service material to support the implementation of the Order, they were not adequate (McCormick 1992) to cope with the considerable task of getting teachers to take on the issues required. The Order made no reference to a number of issues, leaving teachers to address them in school. Issues to do with capability raised questions such as, 'What, for instance, does capability look like in design and technology, and how does it develop?' and most significantly, for this study, 'How can a pupil's capability be assessed?' From the outset teachers experienced difficulty in interpreting the detailed statutory requirements. The problems with the Order were highlighted by the research of Smithers and Robinson (1992), commissioned by the Engineering Council; this highly critical paper opened by stating "Technology in the national curriculum is a mess." (p.5). The difficulties in implementation were identified in the HMI Report (DES 1992) on the first year of implementation and also in the NCC report '*National Curriculum Technology: The Case for Revising the Order*' (1992). The breadth and depth demanded within the 1990 Order were clearly impossible to achieve, especially with D&T embracing so many contributory subjects. In 1992 the Secretary of State announced a major review of D&T in the National Curriculum. This review (SCAA 1994a and SCAA 1994b) took three years and the revised Order for D&T was published in January 1995 by the DFE for implementation in August 1995.

THE 1995 REVISED ORDER

In the revised Orders, D&T remains a foundation subject within the NC and continues to be a statutory requirement for all pupils aged five to sixteen.

Redefining Design and Technology

By the end of 1992 the proposed revision of the Order (DFE 1992) had consolidated the Attainment Targets from four into two, 'Designing' and 'Making; and had also put forward a simplified definition of D&T: "Design and Technology involves applying knowledge and skills when designing and making good quality products fit for their purpose." (p.13). The NCC (1993) recommendations simplified this to read "Technology is the creative application of knowledge, skills and understanding, to design and make good quality products." (p.5). This was further modified by the removal of 'creative' and 'good quality' but now included 'capability', the definition published in the 1995 Order: "Design and Technology capability requires pupils to combine their designing and making skills with knowledge and understanding in order to design and make products." (DFE 1995, p.2). The importance placed upon this definition was evident by the fact that it featured as the opening statement to each key stage. This statement shows how the 'Designing' and 'Making' sections are related to the 'Knowledge and Understanding' section.

Structure of the Order

Design and Technology Activities

The Order sets out three types of activity for pupils:

- Investigative, disassembly and evaluative activities - related to familiar products and applications.
- Focused practical tasks - in which pupils learn, develop and practise particular skills
- Designing and making assignments - in which pupils design and make products, focusing on different contexts and materials. These assignments provide the opportunity for them to put their capability to work to develop products that meet real needs; requiring the pupils to draw on their repertoire of designing and making skills together with their knowledge and understanding.

Materials

- Resistant materials
- Compliant materials and/or food
  Assignments should include work with control systems (electrical, electronic, mechanical, pneumatic) and structures

Designing Skills

The generic skills required to design products

Making Skills

The generic skills required to make products

Knowledge and Understanding

The knowledge that underpins the application of the designing and making skills.

Assessment Requirements

The cumbersome assessment requirements of the 1990 Order were replaced by 'Level Descriptions' which describe the types and range of performance that pupils working at a particular level should characteristically demonstrate. “In deciding on a pupil's level of attainment at the end of a key stage, teachers should judge which description best fits the pupil's performance. Each description should be considered in conjunction with the descriptions for adjacent levels.” (DFE 1995, p.13).

These 'Descriptions' range from Level 1 to Level 8 and to help teachers differentiate exceptional performance at Key Stage 3, a description above Level 8 is provided. By the end of Key Stage 3 pupils should be within the range of Level 3 to 7.

THE CONTEXT OF DESIGN AND TECHNOLOGY EDUCATION AS DEFINED BY THE APU

2.1 INTRODUCTION

We recognise that it would be inappropriate, if not impossible, to embark on a monitoring exercise of capability in design and technology without first spelling out clearly what we understood this capability to consist of.

From the earliest work in this field, there has been general agreement on certain basic tenets of Design and Technology. It is an **active** study, involving the **purposeful** pursuit of a **task** to some form of **resolution** that results in **improvement** (for someone) in the made world. It is a study that is essentially procedural (i.e. deploying processes/activities in pursuit of a task) and which uses knowledge and skills as a resource for action rather than regarding them as ends in themselves. The underlying drive behind the activity is one of improving some aspects of the made world, which starts when we see an opportunity to intervene and create something new or something better.

2.2 'OPPORTUNITIES', 'NEEDS' AND 'IMPROVEMENTS'

All Design and Technology is essentially opportunistic in the sense that if we cannot see the opportunity, for example, to exploit or create a new market need, or recognise the opportunities inherent in this or that material or production technique, then the activity would never get underway - because we **do** see the opportunity to create something new or better - we have to recognise that the concept of 'better' is a problematic one.

Whether you see something as being 'better' will depend entirely on your value position. Is it 'better' to burn cheap fuels (based on hydrocarbons) or renewable fuels? Is it better to have whiter than white (i.e. chlorine bleached) nappies or duller ones? Is it better to have motorways, or the acres of open country that they use up? Inevitably Design and Technology impacts upon, and is influenced by the political, economic, physical and social world in which we live and these influences create the climate in which some outcomes are seen as more desirable than others. What is possible is not necessarily desirable - or at least it is not seen as desirable by all. Design and technology is therefore at the cutting edge of social conscience where the concepts of 'need' and 'improvement' are far from clear and are often contentious.

Once inside a design task, value issues continue to be all pervasive, leading the designer to optimise one quality against another, prioritising one set of values against another, e.g. durability against cost, or visual styling against a particular material or production process. Design and Technology is unavoidably and continually concerned with identifying and reconciling conflicting human values. (p17)

2.4 INSTRUMENTAL AND EDUCATIONAL PERSPECTIVES

In defining design and technology as being concerned with concrete realities, we must be careful to maintain the distinction between the instrumental and educational uses of design and technology. We are aware that there has for many years been disagreement about the **motives** underlying design and technology. Some would see the curriculum as a means to helping pupils into industrially related employment and thereby increasing the nation's productivity. Others would argue that its purpose is to enhance the education of all pupils as autonomous, capable individuals.

Increasingly, the debate is being resolved in favour of a broad educational interpretation of design and technology... (p18)

2.6 THE INTERACTION OF HAND AND MIND

For APU we attempted to create a different way of looking at design and technology; a way that placed the interactive process at the heart of our work and the products as subservient to that process. to do this, we rejected the idea of describing the activity in terms of the products that result from it, and instead concentrated on the thinking and decision-making processes that result in these products. We were more interested in **why** and **how** pupils chose to do things than in **what** it was they chose to do. The pupil's thoughts and intentions were as important to us as were the products that resulted from them.

We gradually came to see the essence of design and technology as being the interaction of mind and hand - inside and outside the head. It involves **more** than conceptual understanding - but is dependent upon it, and it involves **more** than practical skill - but again is dependent upon it. In design and technology, ideas conceived in the mind need to be expressed in concrete form before they can be examined to see how useful they are. (pp9-10)

Extracts from 'The Assessment of Performance in Design and Technology: The final report of the APU design and technology project 1985-1991' (Kimbell et al 1991)

NATIONAL CURRICULUM

DESIGN & TECHNOLOGY - LEVEL DESCRIPTIONS

AT1 DESIGNING	AT2 MAKING
Level 1 When designing and making, pupils generate ideas through shaping, assembling and rearranging materials and components. They recognise the simple features of familiar products and when prompted, relate them to their own ideas. They use pictures and words to convey what they want to do.	**Level 1** When designing and making, pupils explain what they are making and which materials they are using. They select from a narrow range of materials and use given techniques and tools to shape, assemble and join them.
Level 2 When designing and making, pupils use their experiences of using materials, techniques and products to help generate ideas. They use models and pictures to develop and communicate their designs. They reflect on their ideas and suggest improvements.	**Level 2** When designing and making, pupils select from a range of materials, tools and techniques, explaining their choices. They manipulate tools safely and assemble and join in a variety of ways. They make judgements about the outcomes of their work.
Level 3 When designing and making, pupils generate ideas, recognising that their designs will have to satisfy conflicting requirements. They make realistic suggestions about how they can achieve their intentions and suggest more ideas when asked. They draw on their knowledge and understanding of the appropriate programme of study to help them generate ideas. Labelled sketches are used to show the details of their designs.	**Level 3** When designing and making, pupils think ahead about the order of their work, choosing tools, materials and techniques more purposefully. They use tools with some accuracy and use simple finishing techniques to improve their products. They cut and shape materials and components with some precision to help assembly. Their products are similar to their original intentions and where changes have been made, they are identified.
Level 4 When designing and making, pupils gather information independently, and use it to generate a number of ideas. They recognise that users have views and preferences, and are beginning to take them into account. They evaluate their work as it develop, bearing in mind the purpose for which it is intended. They illustrate alternatives using sketches and models and make choices between them showing an awareness of constraints.	**Level 4** When designing and making, pupils produce step-by-step plans that identify the main stages in making, and list the tools, materials and processes needed. They measure, mark out and simple forms in a variety of materials and join them using a range of techniques. They show increasing accuracy, paying attention to quality of finish and function. They identify what is and what is not working well in their products.
Level 5 When designing and making, pupils generate ideas that draw upon external sources and their understanding of the characteristics of familiar products. They clarify their ideas through discussion, drawing and modelling, using their knowledge and understanding of the appropriate programme of study to help them. Pupils evaluate ideas, showing understanding of the situations in which their designs will have to function, and awareness of resources as a constraint.	**Level 5** When designing and making, pupils work from plans they have produced, modifying them in the light of difficulties. They use a range of tools, materials and processes safely with increasing precision and control. They use measuring and checking procedures as their work develops, and modify their approach if first attempts fail. They evaluate their products by comparing them with their design intentions and suggest ways of improving them.

AT1 DESIGNING	AT2 MAKING
Level 6 When designing and making, pupils generate ideas that draw on a wider range of sources of information, including those not immediately related to the task, and an understanding of the form and function of familiar products. They develop criteria for their designs, which take into account appearance, function, safety, reliability and the users and purposes for which they are intended, and use these to formulate a design proposal. They make preliminary models to explore and test their design thinking, and use formal drawing methods to communicate their intentions.	**Level 6** When designing and making, pupils produce plans that outline the implications of their design decisions, and suggest alternative methods of proceeding if first attempts should fail. They are becoming increasingly skilful in the use of the techniques and processes identified in the Key Stage 3 Programme of Study, and use tools and equipment to work materials precisely. They evaluate their products in use and identify ways of improving them.
Level 7 When designing and making, pupils identify the appropriate sources of information and use them to help generate ideas. They investigate the characteristics of familiar products, including form, function and production processes, in order to develop their ideas. The working characteristics of materials and components are taken into account. They recognise the different needs of a variety of users, and use appropriate evaluation techniques to identify ways forward. They use their knowledge and understanding of the Key Stage 3 Programme of Study to develop realistic intentions, which they communicate to others through a variety of media, showing how their designs will function in use.	**Level 7** When designing and making, pupils produce plans that predict the time needed to carry out the main stages in making, and match their choice of materials and components with tools, equipment and processes. They adapt their methods of manufacture to changing circumstances, providing a sound rationale for any deviations from the design proposal. They select appropriate techniques to evaluate how their products would perform in use and modify them to improve their performance.
Level 8 When designing and making, pupils use a range of strategies to help them generate appropriate ideas. They identify how the needs and preferences of users are reflected in existing products, and relate these ideas to their own work. They make decisions on materials and techniques, based on an understanding of their physical and working characteristics. They identify the conflicting demands on their designs, identify and communicate how design ideas address these demands, and use this analysis to produce a design proposal.	**Level 8** When designing and making, pupils produce plans that identify where decisions have to be made. Their plans allow for alternative methods of manufacture. They organise their work to ensure that processes can be carried out accurately and consistently, and use tools and techniques with the degree of precision required by their plans. When evaluating their products, they identify a range of criteria that address issues beyond the purpose for which the product was designed.
Exceptional Performance When designing and making, pupils systematically seek out information to aid their design thinking, recognising the needs of a variety of client groups. They draw on their knowledge and understanding of the Key Stage 3 Programme of Study to arrive at a justifiable optimum solution through modelling and communicate to others the key features of their designs, together with details that will aid manufacture.	**Exceptional Performance** When designing and making, pupils produce and work from plans that specify how each stage in the making is to be achieved and they make best use of the time and resources available. They work to a high degree of precision to make products that are reliable and robust and that fully reflect the quality requirements and detail given in the design proposal. They devise evaluation procedures, use these to indicate ways of improving their products, and implement these improvements.

PILOT CASE STUDY – SCHOOL A

Data Collection

Preparation

The first contact with the pilot school was made by telephone and followed up with an initial visit to the head of department to introduce the study and its implications for the department and to establish, in principle, a willingness to be involved in the study. The headteacher's agreement was then sought prior to confirmation back to the head of department. A letter confirming the agreed dates and outlining the involvement of the department and the documentation required was sent to the head of department. The documentation was collected from the school and reviewed prior to the first visit to identify aspects for clarification or to raise additional questions. For example the school assessment and marking policies adopted by the department emphasised the value they put on diagnostic marking, the marking policy exemplifies this and states:

> Clear and concise comments which explain what is good, what has to be improved and how this can be achieved are important to enable pupils to improve their performance. It may not be necessary to provide any other form of 'mark', although departments may wish to have some method of recording information about that work.
>
> (School A. Document 2, p.1)

The department assessment pro-formas indicated an emphasis on the use of NC Levels of Attainment for the summative assessment of units of work, as a means of tracking pupils' progress throughout the key stage.

DOCUMENT	RECEIVED	COMMENT
Assessment Policy	✔	Whole school policy adopted by department
Marking Policy	✔	As above
Scheme of Work (Year 9 Unit of Work)	✔	
Any other planning documents relevant to KS3 assessment		
Key Stage 3 assessment pro-formas	✔	
Information given to KS3 pupils about assessment		Included in pupil project guidance
Pupil tracking	✔	Levels pro forma
Target setting		

Using the Pro-formas

The pro-formas devised for the collection of data and those developed as checklists were reviewed after they had been used, to identify any shortcomings and where they might need to be refined. These issues were noted but not acted upon until

after the data analysis had been carried out as further modification might be necessary after this stage.

Document Evaluation Checklist

The documents were reviewed and the draft 'Document Evaluation Checklist' was completed. (see page171 for a completed example). This process was relatively straightforward, but raised issues for consideration as it became evident that the document columns would need to be more flexible to accommodate the differing range and combination of documents that might be produced by schools. The draft pro-forma had only one column for 'policies', the pilot school had two separate policies. To address the problem of 'unlisted' documents, two additional columns were added to accommodate other documentation. (see Appendix 15). Having completed the evaluation questions for each document the next stage was to ensure that by asking the evaluation questions, had they established the authenticity, the accuracy and the worth of each document. The information assimilated in response to the evaluation questions provided clear evidence of authenticity and indicated that they were at first sight accurate and of worth. The latter two aspects were further tested during the analysis process.

Document Summary Form

The document summary form was tested on all the documents provided by the pilot school. This pro-forma provided all that was required of it and culminated in a useful summary of the document. The section allocated to the 'significance of the document' as well as identifying the significance, also further clarified the context and the purpose. (see page 172 for a completed example). Another section was added, following on from the 'Summary of Contents' and entitled 'Questions Raised'. By highlighting these in this way acted as a reminder prior to a subsequent visit or telephone call to the school.

Archival Evaluation Checklist

This pro-forma was produced in the same format as the 'Document Evaluation Checklist' pro-forma. The column headings for the 'archival sources' worked effectively for the range of sources available in the pilot school, however, mindful of the shortcomings of the 'document' column headings it was decided to allocated a further two columns with blank headings to accommodate anything unforeseen. (see Appendix 16).

Contact Summary Form

As soon as an interview had been transcribed, a Contact Summary Form was completed, generally this was accomplished within a week, mindful of Lofland and Lofland (1984), Miles and Huberman (1994) who advocate that these should be written up no later than the day after a field visit. "At that point you have a perspective that combines immediacy with a reflective overview of what went on in the contact." (Miles and Huberman 1994, p.52) (see page 173 for a completed example)

Using the Results

Miles and Huberman (1994) suggest a number of ways that these sheets can be used for the early steps in analysis. The following suggestions were used:

- to guide planning for the next contact
- to suggest new or revised codes
- to re-orientate, when returning to the write-up or transcription
- to aid further data analysis

A completed copy of the pro-forma was attached to the top sheet of the transcription or write-up. In use it was found to be a quick and practical way of doing the early analysis and the first data reduction. "It captures thoughtful impressions and reflections. It pulls together the data in the 'soft computer' - the field worker's mind - and makes them available for further reflection and analysis." (Miles and Huberman 1994, p.52). The layout of this pro-forma provided a useful summary through the 'salient point' column. The 'page/line' column was systematically completed in the anticipation that it would be a worthwhile time-saving mechanism in the later stages of data analysis and conclusion drawing.

Observation Pro-formas

Observation Checklist – Pupil Observation

The checklist was an extremely useful tool, acting as an aide mémoire and it also ensured that the observation focused on the factors and strategies related to assessment. The format and the range of prompt features have provided sufficient flexibility to accommodate any variations, which could be found in other schools. (see page 174 for a completed example).

Lesson Observation

This pro-forma sought firstly to provide basis contextual data relating to the teaching group and the lesson. Factors such as lesson length and group size that would affect the planned content were noted. Reference to long and medium term planning was included to enable quick referencing back to the scheme of work or unit of work. The NC levels of attainment addressed by the Unit and/or lesson were important to establish; to ensure that there was potential within the lesson to appropriately challenge pupils of all abilities within the group. 'Learning Objectives' and 'Assessment Foci' were copied from the lesson/unit plan, to identify the teacher's aims and objectives for the lesson. The second function of the pro-forma was to provide space to record a narrative account of the lesson. This was accomplished under three main headings:

- Teaching: specific references to assessment
  - introduction to lesson
  - main part of lesson
  - plenary
- Pupil Response and Progress: assessment related aspects
- Other Significant Evidence: assessment information used/pro-formas/marking

The observation narratives illustrated that the researcher has been able to maintain a focus on assessment and has observed the teacher in action, identifying strategies used. As far as the collection of data is concerned, this layout and the content requirements of the pro-forma worked well. No modifications were planned at this stage. (see page 175 for a completed lesson observation pro-forma).

Interview Schedules

The draft interview schedules were initially reviewed with regard to the order and range of questions to identify any immediate shortcomings related to the process of the interview rather than the content. Further review would be carried out at the analysis stage where the focus would be on whether or not the questions illicited the data required.

The Head of Department Interview

The first question relating to contextual data worked well as the 'warm-up', however, the next question, the first of the 'main focus', required the head of department to describe their perceptions of assessment; this provided too sharp a contrast, both in subject and complexity. The interviewee had some difficulty in responding, evidenced by the "Well...um I think...no firstly..." at the start of the response. There was markedly more hesitation throughout the answer than had been apparent in the first answer. On reflection, it was decided that a re-ordering of the 'main focus' questions was necessary; but that this would best be done at the redrafting stage, after the analysis of the interview data.

The Teacher Interview

The first question provided an ideal 'warm-up' as it gave the teacher the opportunity to provide factual information about the context (the unit of work currently being undertaken) that she was very familiar and thus confident with. The next question, the first of the 'main focus' was identical to that asked of the head of department. Likewise it was decided to move it down the order, as potentially it was the most difficult to be attempted. This teacher did attempt the question, without the hesitation of the head of department, but the response outlined factual information rather than a philosophical view. By locating it further into the interview it was more likely to illicit a richer response. The order of the questions was to be addressed after the analysis of data had been accomplished.

The Pupil Interviews

The range of questions address the aspects raised through the research aims and objectives and focus very specifically on the 'what' and 'how' of achievement raising. With most pupils, unless frequent prompts and follow-ups were used, the answers tended to be very short and little data of any real significance was produced. These interviews were not taped, as in the case of the teachers, instead notes were taken throughout. This meant that the information given had to be assimilated very quickly and summarised accurately. The outcome of this was that more thought was being put into the summarising of the data rather than thinking ahead and probing lines of interest or encouraging the pupil to talk more freely and to expand on what they were saying. A decision as to whether to continue to 'note' or change to tape recording responses would need to be taken at the end of the analysis stage. Question 7, "In comparison with other subjects, how well do you think you are doing in D&T?" was the only one that did not fit in with the sequence. By asking about other subjects it took the focus off design and technology and on to other subjects, which then needed to be refocused for the next question.

Analysis

"No matter what specific analytic strategy is chosen, you must do everything to make sure that your analysis is of the highest quality." (Yin 1994, p.123). To this end Yin identifies four underlying principles to be adhered to:

- the analysis should show that it relied on all the relevant evidence
- the analysis should include all major rival interpretations
- the analysis should address the most significant aspects of the case study
- the researcher should bring prior expert knowledge to the case study

These four principles have underpinned the process of analysis as it evolved.

Drawing and Verifying Conclusions

At this stage of the analysis it is important to be able, firstly to see "added evidence of the same pattern" and secondly, remain open "to disconfirming evidence when it appears". (Miles and Huberman 1994, p.246).

Drawing Conclusions from the Matrix Data

The test of any matrix is what it helps you understand and how valid that understanding is. "The conclusions drawn from the matrix can never be better than the quality of the data entered." (Miles and Huberman 1994, p.241). The table below exemplifies the completed 'Feedback' section of the matrix.

	DEPARTMENT HEAD	TEACHER	PUPILS	DOCUMENTS	ARCHIVAL SOURCES
FEEDBACK	Units assessed using Levels >pupils >to other teachers Diagnostic marking .next stage of learning 'Coursework Assessment' pro-forma (future potential)	Level tracking sheet >pupil access Summative end of unit comment discussed Diagnostic marking >discussed Regular marking	Know strengths and weaknesses >know what to do next Diagnostic marking- the most useful/helpful Level tracking – can see progress albeit very slow as Levels are very broad	Policy identifies range of feedback procedures + emphasis on diagnostic marking Range of pro-formas designed to provide feedback to pupils and teachers.	Pro-formas identified in policy evident in filing system and in classrooms Pro-formas accessible to pupils to see progress (or lack of it) and what to do next

The conclusions drawn were written up in the form of analytic text, enabling the researcher to add interpretations. The conclusions were arrived at by noting patterns and themes together with the building of a 'logical chain of evidence' (achieved by tracking from the documents to the teachers and through to the pupils. This process stimulated further analysis and encouraged a return to the field notes to find the detail not summarised in the data display.

> It seems, in fact, that you do not truly begin to think until you attempt to lay out your ideas and information into successive sentences...For better or for worse, when you actually start writing you begin to get new ideas, to see new connections, to remember material you had forgotten...You are never truly inside a topic – or on top of it – until you face the hard task of explaining it to someone else.
>
> (Lofland and Lofland 1984, p.142-143)

As the writing of the analytic text progressed, it clarified the initial findings and out of this additional comparisons evolved, for example the weaknesses and shortcomings identified by the school and how they impinged upon the strategies in place.

The Pilot School

School A is a four-form entry, non-selective, 11-18 upper school situated in the residential outskirts of one of the larger towns in the county. Pupils are drawn from surrounding villages as well as from the town. The majority of pupils come from the five main feeder schools, however the total number often exceeds fifteen as many of the outlying villages have their own primary schools.

The D&T accommodation is located, with art, in the Design Centre, a self-contained block set slightly apart from the main buildings. All the specialist rooms were of a good size and were well maintained. The food technology room had recently been refurbished, creating an environment with a distinct technological 'feel' to it. All areas were well resourced with large plant and equipment, including some CNC provision. ICT provision, however, was inadequate; the department improvement plan indicated a focus for this aspect the following year.

The D&T team consisted of a head of department and three other full time specialists, whose expertise covered the range of aspects outlined in the NC Order for D&T. The team was line managed by one of the deputy headteachers and was supported by two part time technicians. Learning assistants supported individual pupils identified through the special educational needs (SEN) department in liaison with the department's SEN representative.

Each year group was divided into two cohorts; the two forms in a cohort were then divided into three mixed ability D&T teaching groups of about twenty pupils. The school operated a ten-day timetable with a five period day. D&T was allocated three periods per ten day cycle, thus 6% of curriculum time for KS3, this increased to five periods (10% of curriculum time) in Key Stage 4. KS 3 (Years 7,8 and 9) was delivered using a 'carousel', each unit lasting approximately nine weeks. Specific generic skills were identified and taught to all pupils across the whole year group at the same time by all staff. At KS4 all pupils took a full D&T GCSE course, specialising in resistant materials, graphics, food technology or textiles. A Certificate of Achievement was available for those for whom GCSE is unsuitable.

The percentage of pupils gaining A*-C grades in GCSE D&T was higher in comparison with similar schools nationally. GCSE point score data analysis demonstrates that pupil performance was at a higher level in D&T than in other subjects within the school. Teacher assessment at the end of KS3, painted a similar picture, with significantly more pupils achieving levels 5 and 6 than in other subjects. The school used national performance data, 'The Autumn Package' compiled annually by the DfEE and their individual school 'PANDA' produced by Ofsted to produce KS3 to KS4 value added data for all departments. The department used this information to predict individual pupil grades at GCSE. This value added process had yet to be introduced for KS2 (or early Year 7) to KS3; plans to provide a reliable benchmark for this were underway.

The headteacher and the head of department were keen to participate; they felt that although they had put many systems and strategies in place to monitor progress and individual achievement they wanted to make further improvements and replicate successful procedures across the school. The headteacher was very much aware that despite whole school policies on assessment and marking, practice was not consistent across the school.

Findings and Discussion

Throughout the study of the pilot school a great deal of consistency was evident, starting with the documentation (an aspect of policy for example) which was evident in practice, exemplified by the department head, used by the class teacher and understood by the pupil and filed in archival records for retrieval. The matrix facilitated this process by mapping across the horizontal axis. For example, the pupil tracking pro-forma; (This pro-forma was untitled and thus variously referred to throughout by different interviewees. Confirmation was sought where necessary to ensure that this was the pro-forma being referred to.) The starting point was the assessment policy that requires "teachers to keep records of pupils' progress, which enable them to identify the level of achievement for each pupil." (School A. Document 1, p.2) The D&T departmental handbook had takeen this on board and described how this would be carried out through the use of pro-formas. It stipulated that the purpose of assessment pro-formas was to "standardise information" and to "inform teachers and pupils of progress and stage of learning". (School A. Document 3) To record pupils' progress the department had developed two pro-formas specifically for this purpose. The first was the untitled tracking sheet on which teachers record a NC Level of Attainment at the end of a unit of work, for each pupil in their teaching group. Thus recording summative achievement across the three years of KS3 on one sheet of paper. These sheets were centrally stored within the department, readily accessible to the staff. Additionally, copies were passed on to 'receiving' teachers on the 'carousel' to provide an overview of their new group with regard to past achievement. A second pro-forma, this time, one for each individual pupil, entitled 'Year 7,8 & 9 Coursework Assessment' provided the same 'Level' information but also had space for a target to be included on the summation of a unit of work. The department head stressed the importance of providing assessment information to teachers ahead of receiving a new group rotating through the different materials areas required by the carousel delivery system.

> It's very important for the carousel so that teachers get information about new groups...to tell us what level we need to set work at and which pupils need higher level work and which need more support...We assess units of work at the end of the project and give level, these are recorded on the sheets in the filing cabinet and given to the next teacher.
>
> (School A. Transcript 1, p.2)

The class teacher confirmed the use of these sheets during her interview "We use the levels recording sheet to see what they did previously. We get a copy and the master goes into the filing cabinet." (School A. Transcript 2, p.2-3). Thus evidence so far that the policy had been implemented in practice, the department head's expectations were confirmed by the class teacher's response. The next question was then focused on the pupils to see if they were aware of the tracking system and their understanding of it. None of the pupil interview questions make direct reference to specific strategies, instead they provide opportunity for pupils to refer to pro-

formas and strategies they know of. Question 3 asks "Do you know how well you are doing?" Pupil A04 responds "Yes, at the end of each project we get a mark for the whole project, it's called a level, mine are mostly fives, last year I got fours and the ones I did not like as much this year, some were boring I got fours again." Later in the interview, in response to Question 10, the same pupil refered to the tracking pro-forma that the teacher "keeps in her folder" detailing these levels. Pupils were aware of the level tracking sheets and their purpose and how they were used in the classroom situation. Pupil A05 explains that at the end of each unit of work a level was awarded. "These are National Curriculum levels", that the tracking sheet was kept in the teacher's file and that they had copies of their own levels on the Coursework Assessment Sheet. (a copy of which was kept by the pupil in his coursework folder). However, the transfer of information, on occasion, was not always sufficiently speedy to provide the receiving teacher with previous attainment details right at the beginning of the unit that could then be used for planning at the appropriate level. Pupil A01 exemplifies this when asked Question 8 "When do you get assessment information about your previous unit of work?" The reply enlightens us with "Depends on the previous teacher, some are very quick, others take a long time." Indicating here that the system did not always work to inform the 'next' teacher on the carousel about recent attainment but did, never-the-less, indicate that completion was achieved at some stage, thus making a complete picture of progression. Classroom observation and work sampling exemplify that differentiated work was targeted at specific pupils or groups of pupils. The teacher emphasizing that "unless we assess pupils we don't know where they are, and therefore cannot give them work at an appropriate level or be able to challenge them." (School A. Transcript 2, p.1)

The consistency of evidence from all the data sources, with regard to this assessment strategy, clearly met the first part of the aim of the study 'to identify current practice'. However, did it fulfil the second part of the aim, 'to identify key features that contributes to the raising of achievement'? To establish whether or not this is so, required a return to the data. The class teacher explained how she uses the level tracking sheet as a strategy to raise achievement at KS3. "I look at the level they have attained in previous units, this tells me who needs to be challenged with something more complex and those who need support, or possibly motivation to do better". (School A. Transcript 2, p.3). This view indicated that the tracking of levels was used positively to match work to the individual pupil and an intention to provide sufficient challenge to raise attainment. However, when asked about what other assessment strategies she would like to introduce she immediately responded by returning to the use of the level descriptions and criticised their 'broadness' and that they needed to be divided into three sub-levels, so that progress could be tracked within a level more easily. This view was also corroborated by the department head who talked of further refinement to the system currently in place and outlined plans to put in place "something like the subdivisions in the levels like the primary schools have ABC[1]." (School A. Transcript 1, p.5) Pupils likewise complained of the length of time spent on one level and would prefer to see progression within the levels more easily.

The most frequently referred to assessment strategy identified as being beneficial in the quest to raise achievement was diagnostic marking. This again, could be

[1] Key Stage 1 and 2 SAT levels are subdivided into A,B and C.

mapped through from policy to practice. Starting with policy, the assessment policy requires that evidence of pupil achievement should be recorded; it suggested various forms (several of which the department use), one being annotated notes on work. The policy stressed that the importance was not the recording itself but that of how the judgement was shared with the pupil. Thus requiring "teachers to provide feedback to pupils in a variety of ways so that individuals understand what it is they must do to improve and develop their work." (School A. Document 1, p.2) The marking policy exemplified this with a clear rationale for the purpose of marking and states:

> In order that these objectives may be achieved it is important that teachers are clear about the purpose of the work being marked as this will determine how marking will be done. Clear and concise comments which explain what is good; what has to be improved to enable pupils to improve their performance.
>
> (School A. Document 2, p.2)

The department head explained that her comments on pupils work, and also agreed as a departmental commitment; inform pupils of what they have done well, what had been missed (if relevant) and how to do better next time. The written comments were followed up by a one to one or small group sessions ensuring that pupils understood and acted upon the comments. During lesson observations this was observed as a regular feature of the one to one activity; and when involved in a generic process or skill pupils were also encouraged to review their previous attempt. The most frequently referred to assessment strategy identified as being beneficial in the quest to raise achievement was diagnostic marking. This again, could be mapped through from policy to practice. Starting with policy, the assessment policy required that pupil achievement should be recorded, it suggested various forms (several of which the department used), one being annotated notes on work. The policy stressed that the importance was not the recording in itself but that of how the judgement was shared with the pupil. Thus requiring "teachers provide feedback to pupils in a variety of ways so that individuals understand what it is they must do to improve and develop their work." (School A. Document 1, p.3) The marking policy exemplified this with a clear rationale for the purpose of marking and stated:

> In order that these objectives may be achieved it is important that teachers are clear about the purpose of the work being marked as this will determine how marking will be done. Clear concise comments which explain what is good, what has to be improved and how this can be achieved are important to enable pupils to improve their performance.
>
> (School A. Document 2, p.1)

Work sampling, looking at pupils on-going folder work and completed projects demonstrated that pupils had heeded what had been written, acted upon the information and as a result, improved upon the current aspect of work. In addition to, and perhaps more importantly, when repeating a procedure, it could be seen to be addressed at a higher, or more complex level than previously. Pupils were evidently used to referring back and making use of the comments to improve future replications.

Pupils' views confirmed that comments were used regularly and were beneficial "because it tells me what I need to do to get better." (Pupil A01) There was a consensus view that the diagnostic comments were more helpful than marks or grades, that these comments enabled them to understand what they did well and what aspects they needed to work at. For example Pupil A01 recognised her strengths as "being organised and good at practical" and that she needed to concentrate on "designing things and having my own ideas." They had no difficulty in comparing their achievement across the different disciplines within D&T due to the consistent approach to assessment taken by their teachers. In sharp contrast to this, they were unable to compare their achievement in D&T with that in other subjects due to the plethora of different procedures and perceived standards of the different teachers. Pupil A04 exemplified this view when asked to compare performance in D&T with other subjects, responded by saying "Don't know, it's difficult other teachers mark in different ways and some always mark very hard." In response to a prompt in Question 7 asking if all teachers assessed work with written comments the pupil replies "No we get marks and grades as well, some write comments like Mrs X. This was followed up with "Are these more helpful?" The reply exemplified the view of most of the pupils "No, its confusing, they are all different."

Pupils agreed that the diagnostic comments were the most useful form of assessment in that they told them what they were good at, identified what they needed to concentrate on and how they could improve the current work and lastly how they might attempt to do better at the same thing next time. (at a higher level or with greater complexity). They found the plethora of systems used across the school confusing and would prefer all teachers to adopt a similar system but still retaining some numeric marks for marking of 'right or wrong' answers.

The department head spoke of the desirability of making the projects to be tackled in the units of work interesting and exciting, thus motivating and stimulating, encouraging pupils to want to do well and thus make greater progress. In discussion with pupils, a number indicated that their best results were for units that they found interesting. Pupil A04 admits that his last assessment level went down from a five to a four. "I don't like that very much even though I didn't make as much effort as it was boring"; a view echoed by the majority of pupils who discussed their work.

The department head viewed the tracking of progress and thus the ability to plan challenging work at different levels to meet the needs of all pupils to be of paramount importance. She emphasized that progress tracking would only be accurate when assessment procedures were rigorous, were implemented consistently across the department and understood by all. They believed that a very robust system was in place to do this through their diagnostic marking. However, they had identified that the levels were too broad to be used formatively and intended to subdivide within each level to address this problem.

Whether the diagnostic marking alone was to account for improved attainment, or whether the teachers' planning to address the task at a higher level also contributed cannot be separated. Quite clearly, it was only through the application of the assessment procedures that teachers have very detailed knowledge of the individual pupils' levels of attainment and thus plan appropriately challenging work; which in turn leads to achievement at a higher level.

The department have identified areas for further development, in the quest to further raise attainment recognising, for example, the importance of acquiring and using value added information at KS3 (this was very effective in KS4). They were currently exploring how and what to use as a baseline benchmark.

Implications

Research Design

Proposed Methodology

The research questions for this study are essentially exploratory, to find out what schools were actually doing; a case study technique was selected as it is interested in discovering the dynamics of individual institutions, viewed from a variety of perspectives. The analysis of the data collected relied on the 'grounded theory' approach and an inductive coding system was used. The findings of the pilot study drawn from the data analysis have illustrated that the research aim could be achieved through the use of the research questions.

Initial Design

The components of the research design for the case study were planned as a sequence that connected the study through all the stages, from the initial research questions through to its conclusion. The aim of the study was operationalized through the outcome objectives, and these facilitated the development of the research questions. The data collection techniques; literature review, document and archival source reviews, interviews carried out with heads of departments, class teachers and pupils, classroom observation and work sampling, were planned to address the aim of the study. Having worked the pilot case study through the process laid out in the Chapter 3 without any problems relating to the design arising, the same process was replicated for the main study.

Data Collection Techniques

The data collection techniques were selected to ensure that data would be acquired from a range of different sources. Each having a slightly different perspective, thus providing opportunity for triangulation to be used as one of the methods to confirm the findings and also the validity of the conclusions drawn from the findings of the study. It was in this area that the most significant changes were made to the content of the planned techniques. Minor modifications were made to some of the pro-formas, as they came to be completed, during the early stages of data collection. These are detailed in the section 'Using the Pro-formas', pages 157-160. The most significant refinements were made to the interview schedules, considerable changes were made to the schedule for the head of department and also the schedule planned for the pupils. The order and range of questions for each interview were reviewed straight after the interview had taken place whilst the process was still very clear in the mind, a number of changes were made, these and the reasons for them are detailed page 160.

Interviews

After the analysis of the interview, the questions were reviewed again, this time focusing on whether or not the questions had illicited the information required and thus to identify where further refinement was necessary or more and/or different

information was required. It was evident that refinements to the wording of some questions was necessary and some additional questions were needed, in order to acquire the information sought.

Head of Department Interview

Question 6 "Tell me about any pupil tracking that is carried out by the department and how it is used?" had already been addressed through the responses to earlier questions, it was noted to be deleted when redrafting took place.

Question 7 "Do you use data from base-line (KS2) or your own early KS3 assessments to end of KS3 for value added?" had also been addressed in an earlier response. However, it was decided to keep this question here as, firstly, the answer would not necessarily arise out of any of the other questions and secondly, it also provided some contextual data.

Question 9 "What recording systems do you have in place? – and how are they used? The recording systems were already evident from the document review and evidenced in use through the archival source review, thus it appeared pointless to include this question. Instead a potentially more probing question was added about the views of the head of department on this particular aspect. Thus, "Does the assessment system provide teachers with a clear and accurate picture of pupils progress and design and technological capability?" was included.

The following questions were added:

- Are assessment criteria given to pupils before they start their work?
  followed up by
  Are they reminded of them as work proceeds?
  and
  Is there planned discussion and feedback as they work, to help them make good progress towards meeting the criteria?
- In what ways are formative assessments used to encourage the pupils and help them improve the quality of their work?
- How does the department identify pupil/groups of pupils who are underachieving?
  followed up by
  What strategies are used to address this?

The questions were then re-ordered based on the outcome of the pilot interview. The revised, final version of the 'Interview Focus for the Head of Department' is in Appendix 10.

Teacher Interview

Question 11 "How do you standardise assessments?" had already been addressed through the responses to question 8, thus it was noted to be deleted when redrafting took place but to be reinserted as a follow up prompt to Question 8. The questions, apart from Question 2, did not need reordering. The revised, final version of the 'Interview Focus for the Class Teacher' is in Appendix 11.

Pupil Interview

The five pupil interviews, demonstrated clearly that follow-up questions and probes were essential if the resultant data was to be meaningful and to be a rich source of

information. As described earlier pupils were not as forthcoming as teachers and therefore need a more focused approach with follow-up. For example, in response to Question 13:
"Does it (assessment) help you to understand what you are good at and what things you need to work at (strengths and weaknesses)?",
Pupil 001 responded with
"Yes, the comments help."
This was followed up to find out the detail
"What has it told you that you are good at?"
The pupil then provided the evidence that the assessment comments of the teachers diagnostic marking had identified her strengths,
"...being organised and good at practical work."
The researcher continued to prompt and this time follows up with
"What about the areas to be developed (weaknesses)?"
Again the pupil was aware of the areas for development
"Designing things and having my own ideas."
None of these points were given voluntarily through the asking of the original question, making it essential to keep following up.
At this point the researcher moved on to the next question, on reflection, further data would have been useful, for example, finding out if the pupil was able to work on areas of weakness and how the teacher facilitated this.

Question 15 asks of pupils "What assessment information do you find the most useful/helpful?" Here, having noted the initial response, it was again necessary to prompt as they did not always refer to all the strategies that were evidently in place. Once reminded of a pro-forma or strategy the pupil would then provide a view.

A number of the questions planned for the pupil interviews revisit the same aspect but in different contexts or from a different perspective. The aim of the study 'raising achievement' being the key focus for these repeats. For example, whilst talking about current work, Question 4 asks "Do you know how you could improve/do better?" This aspect was returned to later on when talking about the way in which work is assessed, firstly with regard to how the work was actually assessed (grades, numerical marks or alphabetical grades), Question 6 asks "Does this assessment help you to do better?" Secondly, when talking about assessment information from the previous unit or units of work, the pupil was asked in Question 11 "Does it help you with your current work?", and in Question 12 "Does it help you to do better?"

Having analysed these pupil interviews, the actual layout of the questions did not clearly demonstrate the relationships of the questions and thus which were follow on questions and those that were free standing and explored different aspects. To overcome this problem, it was decided to reorganise the questions into groups under the focus headings. The revised Pupil Interview Schedule is detailed in Appendix 12.

Analysis

Mindful of Yin's warning of not to start a case study without first thinking about how the data was to be analysed, the analytic strategy was developed alongside the case study protocol, thus the pro-formas designed to collect data were also constructed with a view to the analysis stage. The summary pro-formas were

likewise produced. The analytic techniques defined by Miles and Huberman (1994) provided a range of possibilities for use; the technique selected for data display, which worked effectively as a single case was the matrix. This will be replicated for the main study, firstly with single case matrices for all schools, and secondly, with a multi-case matrix combining all the schools. The findings of this pilot case study indicated that the process of analysis can be replicated in the main study.

Validity

The issue of validity came into play at this stage as a means of verifying that the interpretations made by the researcher of the data matched those of the case study site and informants. "Qualitative analyses can be evocative, illuminating, masterful – and wrong" (Miles and Huberman 1994, p.262). The data quality has been assessed through:

- Triangulating across the data sources and techniques used.
  This aspect is exemplified through evidence of the use of different techniques, together, with the data from a variety of sources.
- Checking for researcher effects on the case study and vice versa.
  Throughout the period of research, from the initial planning stage, throughout the data collection in the field and during the analysis the question of bias has been considered. For example, prior to classroom observation, the decision was made to wear a workshop coat or food technology overall, thus being far less conspicuous, raising at most, only mild curiosity amongst pupils. By positioning oneself at the back of the room, prior to the commencement of the lesson again minimalized disruption and intrusion. One advantage, accrued from Ofsted inspection was that teachers were very aware that there was no point in changing their normal routine or modus operandi for the benefit of an observer as it was very evident in the pupils' response when an unfamiliar routine was suddenly introduced. Thus through the observation of pupil reactions to the teacher and their responses in discussion it was evident that the situation observed was the norm rather than a staged performance.

For the main study an additional strategy was introduced to further test the findings; that of checking for representativeness across the cases.

Conclusion

Having carried out the pilot study, analysed the resultant data to generate meaning, produced and confirmed the findings, the final stage was to return to the rationale to discover whether or not its aims had been accomplished. The rationale for carrying out a pilot study was:

- to ensure that the aim of the research could be realised through the planned methodology;
- to identify any inadequacies in the initial design;
- to test the data collection techniques planned to gather the data;
- to ensure that the data collected is analysable;
- to ensure that the findings are valid.

Throughout the pilot study, conclusions have been drawn at every stage, addressing the five points identified in the rationale and thus ensuring that the aims had been accomplished.

DRAFT

DOCUMENT EVALUATION CHECKLIST

School: A **Date:** March 2000

EVALUATION QUESTIONS	POLICY : ASSESSMENT & MARKING	YEAR 9 UNIT of WORK	KEY STAGE 3 ASSESSMENT PRO-FORMAS	PUPIL TRACKING	TARGET SETTING
What kind of document is it?	Assessment – whole school, adopted by department Marking – as above	Guidance for teachers – based on Nuffield projects	Coursework Assessments Departmental Doc for internal use	NC Levels record Yr7-9 Departmental doc for internal use	X
What does it actually say?	Assessment – philosophy + framework Marking – specific requirements	How to deliver the unit	What the pupil produced Target for next unit Levels attained	Levels awarded for each unit One sheet for each group	X
Who produced it?	Assessment – SMT based on LEA guidance Marking – School working party	Material specialist	Developed by team members	Developed by team members	X
What was its purpose?	To standardise and encourage common practice	To standardise delivery, to ensure all pupils taught the same PoS	To standardise information To inform teachers and pupils of progress and stage of learning	To standardise information To inform teachers and pupils of progress and stage of learning	X
When and in what circumstances was it produced?	Following Ofsted Inspection Marking – in team meetings	1998 to cover PoS, following audit of KS3 curriculum	To meet requirements of school policy	To meet requirements of school policy	X
Is it typical or exceptional of its type?	Typical	Typical	Typical	Typical	X
Is it complete?	Assessment – Yes Marking – Yes	Yes	N/A	N/A	X
Has it been altered or edited?	No	Not since the 1998 review	No	No	X
NOTES			Limited number of pro formas- do not cover all aspects of assessment		Not yet in place at KS3. Targets set for KS4 based on outcome of end of KS3 assessment

DRAFT

DOCUMENT SUMMARY

SCHOOL	A	DATE RECEIVED	March 2000	ASPECT/CODE

NAME AND DESCRIPTION OF DOCUMENT	
Policy on Assessment , Recording and Reporting Achievement	
DOCUMENT ASSOCIATED WITH (Event or contact)	
Whole school + department head	
SIGNIFICANCE OF DOCUMENT	
• **In relation to the research questions:** Identifies school rationale – assessment strategies to be used to raise achievement	
• **In relation to Heads of Department/Teachers/Pupils:** Identifies department with a common approach and opportunity to develop own system within it	
SUMMARY OF CONTENTS	
• Focus on positive achievement • Purposes of assessment • Assessment of academic progress • Assessment of NC and beyond • Recording pupil achievement Evidence: Annotated notes on work Assessment sheet attached to work Photographic evidence Recorded evidence Notes in teacher's markbook Joint teacher + self-evaluation sheet Importance of: How judgement is shared with pupil How used to set new learning targets That it is fair and consistent Requires: Teachers to provide feedback to pupils ➔what it is they must do to improve and develop their work moderation and consistency • Pupil self-assessment (other information not relevant to research questions)	Philosophy Information System Diagnostic marking Recorded Discussion Diagnostic marking Self-assessment

CONTACT SUMMARY FORM

SCHOOL	Pilot – School A	NAME	Head of Department	DATE	March 2000
TYPE OF CONTACT	INTERVIEW – transcript				

PAGE/LINE	SALIENT POINT	ASPECT/CODE
	9 week units – 14 hours	
2.5	Purpose of assessment in policy "To improve learning by identifying strengths and weaknesses"	COM PHIL
2.9	Information re levels passed on to next teacher on carousel to inform planning	COM INF
2.24 4.8 5.15	Pupil tracking (see archival info for pro-forma)	MON TRA
2.30	Diagnostic marking	FEE DM
2.38	Monitoring teachers assessment procedures (checking up)	MON
3.4	HT keen on value-added – detailed analysis of GCSE grade data	STR VA
3.14	Benchmark KS3>KS4 used to predict potential grade (non KS2>KS3)	{STR BM {PUR UD
3.16	Intention of introducing a benchmark task early in Yr7 (plan to use a SCAA task adapted)	SPE
3.22	Intention to develop a grading system related directly to level	SPE
3.23	Work sampling to develop a shared understanding of levels	MON
3.30	Raising achievement measured by looking at GCSE output in comparison with pupil achievement in other subjects (pointscore)	PUR UD
4.23	Essential to make subject interesting and enjoyable so that pupils are motivated to learn and do better.	PUR MOT
5.10 6.13	Intention to introduce sub-divisions to levels (similar to KS!/2 SATs)	SPE
5.24	Shortfall in system when Ts don't keep to deadline dates	WEA
5.37	Target setting not yet in place	SPE

ANY NEW (OR REMAINING) QUESTIONS FOR NEXT VISIT	Look at current work – diagnostic marking, follow up with pupils during interviews Work sampling – diagnostic marking, look to see if pupil has acted upon the comment Pupil tracking - grade sheets, follow up with pupils during interviews Archive, review completed sheets in central filing

OBSERVATION CHECKLIST – PUPIL ASSESSMENT

School ...A... **Teacher ...RB...** **Date/s** 10+17 March 2000

	FEATURES		COMMENTS
	LESSON PLANNING		
1	**Planning includes assessment opportunities**	✔	Refers to the use of outcomes of sensory analysis – what is expected of pupils in terms of learning outcome. Learning objectives clearly linked to assessment criteria
2	**Work planned to specified range of levels**	✔	Levels 3-5 referred to + ref to 'Level Descriptions'
3	**Work planned is differentiated**	✔	Differentiation through ▪ Range of resources (recipe books + sheets, including pictorial instructions for those with language difficulties ▪ Direct T support for lower attainers
4	**Targets for lesson identified**	✔	Concise information given re tasks to be accomplished and expectation of depth Time allocations stated
5	**Other assessment features**		
	LESSON CHECKLIST		
6	**Marking consistent with policy**		No whole school policy. Departmental policy which emphasizes the use of diagnostic comments rather than marks is clearly in evidence
7	**Marking provides diagnostic information**	✔	Regular marking of pupils work is evident, comments help pupils to identify next stages of learning
8	**Pupils have details of their own progress**	✔	Detailed diagnostic coments
9	**Use of assessment pro formas**		Teacher keeps a record book of pupil progress
10	**Self-assessment pro formas**		
11	**Pupils aware of level they are working at**		Pupils are unaware of their level of attainment
12	**Pupils understand what they need to do to raise achievement**	✔	Teacher comments provide guidance for pupils to help them identify what to do next, or how to improve
13	**Pupils aware of assessment levels/grades of previous units**		
14	**Assessment information displayed in room**	✔	
15	**Evidence of planned assessments in practice**		

LESSON OBSERVATION

DATE: 10 March 2000

SCHOOL	A	YEAR	9	NOR	20
TEACHER	RB	GROUP Ref	9RB	PRESENT	18
	none	GROUPING	M/A	LESSON LENGTH	60mins

CONTEXT OF THE OBSERVATION – UNIT OF WORK:

NC POS/reference to LONG & MEDIUM TERM PLANS

Lesson plan is referenced to MTP Unit of Work

PoS identified in MTP

NC LEVELS

3-5

LEARNING OBJECTIVES FOR LESSON

- Sensory analysis - to analyse a 'pot meal', identifying good and not so good features
- Content analysis – what are the recognisable ingredients?
  - what else is used?
- To develop an appropriate technical vocabulary for sensory analysis

ASSESSMENT FOCI

- Use of technical vocabulary for sensory analysis
- Categorisation of good/poor features

(each piece to have a written diagnostic comment)

TEACHING: SPECIFIC REFERENCE TO ASSESSMENT

INTRODUCTION TO LESSON

Recap from previous work on sensory analysis – pupils have all completed a FPT to develop the skills needed for sensory analysis and to gain an understanding of its purpose in product development (LP indicates that this is to assess how much they have remembered and to reinforce the previous learning)

Context is established by ensuring that pupils are aware of the purpose of the task and why they will need the information for future work

Sensory analysis 'pot meal'. Discussion relates to the application of technical descriptive words for the analysis

Q&A used to develop ideas for the content analysis

Pupils encouraged to look back in their folders to find the relevant information from the FPT and also to look at the assessment comment – this may highlight a weakness that needs to be addressed this time.

T reminds pupils that she will also be looking back at their FPT work to find out how they have applied the skills and knowledge gained

(emphasis throughout is on the learning objectives and the aspects that will be assessed)
Target – expectation of progress (sensory and content analysis to be completed by the end of the lesson)

DURING LESSON

Most Ps refer back to their sensory analysis FPT work, some then summon the T before commencing on the current task

T circulates group to discuss ideas, frequently questions and challenges to promote further (and deeper) thought Frequently reinforces the use of the technical vocabulary (word banks are available for independent research)

PLENARY

P come together to discuss outcome of their work, emphasis is again on the use of the technical vocabulary

The content analysis task is also discussed – some Ps have used the guidance in the study booklets*, and have listed ingredients according to quantity and then checked back to the packaging –to see if it agrees with their analysis!

PUPIL RESPONSE & PROGRESS: ASSESSMENT RELATED ASPECTS

Ps clearly aware of expectation for this session and what and how the T will assess their work
Ps use written feedback constructively to support their current work and future ideas

OTHER SIGNIFICANT EVIDENCE: ASSESSMENT INFORMATION USED/PRO FORMAS/MARKING

*Study booklets – these have been produced to support independent learning and contain all the generic processes they need for their work e.g. 'word bank for sensory analysis' and the 'How to do a content analysis of a food product'– this is well established and pupils use the booklets in the first instance, before asking the T for help/guidance

OVERVIEW OF THE RESEARCH DESIGN

METHODOLOGY : CASE STUDY	
DATA COLLECTION METHOD	**RANGE AND SCOPE**
LITERATURE REVIEW	Books: D&T assessment of D&T (post 1990) generic assessment (post 1990) Journals (post 1990): Research based educational Specialist – D&T Specialist – assessment Official Reports (post 1990): DfEE (formerly DES) Ofsted QCA HMI
DOCUMENTATION	School/ departmental assessment policy Marking policy Planning documents relevant to assessment (KS3) Assessment pro-formas (KS3) Information issued to pupils relating to assessment Target setting/pupil tracking
ARCHIVAL RECORDS	National Curriculum KS2 level assessments (if available) National Curriculum KS3 level assessments On-going pupil assessment pro-formas Departmental assessment portfolio (if produced) Pupil portfolios (if produced)
INTERVIEWS	4 x head of D&T (includes 1 for pilot study) 4 x class teacher (includes 1 for pilot study) 20 x Year 9 pupils (includes 5 for pilot study)

APPENDIX 7

EVIDENCE SOURCES USED TO SET THE STUDY IN CONTEXT

Books

- D&T pre 1990, to provide the historical context
- D&T post 1990 (National Curriculum)
- specifically about the assessment of D&T, post 1990
- generic texts about assessment, post 1990

Journals (post 1990)

Journal articles provided the only reasonably up-to-date guide to thinking on assessment in general terms and also specifically related to D&T

- research based educational
- specialist associations - D&T
- specialist associations - assessment

Official Reports (post 1990, some pre 1990 to provide historical context)

Produced by institutions and organisations such as:

- DfEE (Department for Education and Employment)
  (formerly DES, Department for Education and Science)
- Ofsted (Office for Standards in Education)
- QCA (Qualifications and Curriculum Authority)
  (formerly SCAA, Schools Curriculum and Assessment Authority, and NCC, National Curriculum Council)
- HMI (Her Majesty's Inspectorate)

Documents

Any of the following documentation that has been produced would be useful:

- Assessment policy – departmental and/or school
- Marking policy -- departmental and/or school
- An example of a scheme of work for a Year 9 Unit of Work (ideally, the one that group to be observed will be undertaking)
- Any other planning documents relevant to Key Stage 3 assessment
- Key Stage 3 assessment proformas
- Information issued to Key Stage 3 pupils about assessment
- Pupil tracking
- Target setting

Archival Records (for review during visit)

Any of the following, that are available/produced would be useful:

- National Curriculum end of Key Stage 2 level assessments (information from primary feeder schools)
- National Curriculum end of Key Stage 3 level assessments
- On-going pupil assessment records
- Department assessment portfolio
- An example of assessed pupil work from Year 9

Please add any other documentation/information that you use for assessment.

TECHNIQUES FOR INTERVIEWING & OBSERVATION

Interview Techniques

Interview types and styles are variously described. Robson (1993) makes the distinction based on the degree of structure or formality and on this continuum identifies three categories, ranging from one extreme, the fully structured interview with predetermined questions to the unstructured or completely informal interview where the interviewer has a general area of interest but lets the conversation develop within the area. In the middle of this continuum but tending towards the structured is the semi-structured interview where the interviewer has prepared questions in advance but is free to modify their order based upon what seems most appropriate in the context of the interview as it progresses. Similarly, Yin (1994) identifies three types of interview used by the case study researcher; open-ended, in which interviewees are asked for basic facts as well as their opinions and in some situations they might also be asked to make their own propositions. Yin's second type of interview is defined as the focused interview, a short interview lasting perhaps one hour, still essentially open-ended and conversational in manner but tending to follow a set of predetermined questions. The third type entails more structured questions along the line of a formal survey. Direct comparisons can be made of the three types identified by Robson and Yin. Oppenheim (1992) divides interviews into two types: namely, the exploratory interview which is a free-style or depth interview and the standardised interview used to collect survey style data thus requiring interviewees to respond to predetermined questions. Powney and Watts (1987) similarly identify two groups but again a different typology; firstly the respondent interview where the interviewer remains in control throughout the whole process, the interviewer's agenda remains central; and secondly the informant interview which is concerned with perceptions within a particular situation. Again there are significant similarities between the groupings and all could be placed within the continuum defined. The fully and semi-structured types identified by Robson, for example, are essentially the respondent interview of Powney and Watts.

Observation Techniques

Techniques used for observation, like interview techniques also appear at opposite ends of a continuum, structured at one end, unstructured at the other; however, unlike interview techniques these approaches are fundamentally different. At the unstructured extreme is participant observation, which is an essentially qualitative style originally, rooted in the work of anthropologists. At the other extreme is structured observation; essentially a quantitative style entailing the use of pre-determined categories of specific observable behaviours which are recorded on a regular timed basis such as the Flanders Interaction Analysis Categories (Wilcox 1992). Several different styles of classroom observation have been developed over the years. The decision as to which style to use will depend on the needs of the enquiry. Elements of both could be utilized, or a hybrid which is both structured and also participatory. It is also possible to have non-participant observation, which is unstructured. The ethological approach, Tinbergen (in Robson 1993), for example, starts with careful, exploratory observation

seeking detailed and comprehensive description of the behaviour. As with many participant observers, their observation is concerned with hypothesis generation rather than the confirmation of pre-formed hypotheses.

The belief that the effectiveness of teachers can be enhanced if a body of knowledge is established which demonstrates that they should do more of this and less of that has led to the quantitative approach being used; however, according to Wragg (1994) there are relatively few things that can be said to be of wide general interest or concern:

> "The observation of individual teachers, therefore, can utilise some of the approaches of those who have devised good quantitative methods, albeit with caution, even if the eventual findings from them are not the same as those of the original investigator or category designer." (Wragg 1994 p8)

Whilst the counting of events may offer some interesting insights it by no means gives a full account of life in the classroom.

DRAFT
INTERVIEW FOCUS – Use of Assessment in Raising Achievement

HEAD OF DEPARTMENT

INTRODUCTION

Purpose

- part of a research study focusing on the use of assessment in raising achievement at KS3

Confidentiality

- you will remain completely anonymous and no records of the interview will be kept with your name on.

Tape/notes

- if you have no objection I would prefer to tape the interview rather than make detailed notes, I will make brief reference notes during the interview

INTERVIEW

1. Firstly, to help me to put the information you are going to give into context it would be helpful if you would outline the way you organise KS3?

   system - carousel/circus etc
   range of materials offered
   time allocation - per annum and per unit
   any other organisational issues

2. What do you perceive to be the purposes of assessment?

   role of assessment in raising achievement

   different purposes of assessment:
   summative
   formative
   diagnostic
   ipsative

3. Tell me about the assessment strategies you (as a department) use to raise achievement at key stage 3 and also those that you would introduce, if any?

4. How do you know if you are raising achievement?

5. How do you know if pupils are achieving to their full potential?

6. Tell me about any pupil tracking that is carried out by the department and how used?

7. Do you use data from base-line (KS2) or your own KS2 assessments to end of KS3 for value added?

8. What do you use to assess pupils at the end of KS3?

9. What recording systems do you have in place? How are these used?

10. Do you assessment information for target setting?

11. How do you standardise assessments

12. Do you find the Level Descriptions helpful? How do you use them?

13. What do pupils know about levels of attainment?

REVISED

INTERVIEW FOCUS – Use of Assessment in Raising Achievement

HEAD OF DEPARTMENT

INTRODUCTION

Purpose

- part of a research study focusing on the use of assessment in raising achievement at KS3

Confidentiality

- you will remain completely anonymous and no records of the interview will be kept with your name on.

Tape/notes

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2. Tell me about the assessment strategies you (as a department) use to raise achievement at key stage 3 and also those that you would introduce, if any?

3. What do you perceive to be the purposes of assessment?

   role of assessment in raising achievement

   different purposes of assessment:
   summative
   formative
   diagnostic
   ipsative

4. Do you find the Level Descriptions helpful? How do you use them?

5. What do you use to assess pupils at the end of KS3?

6. Do you use data from base-line (KS2) or your own KS2 assessments to end of KS3 for value added?

7. Do you assessment information for target setting?

8. How do you know if you are raising achievement?

9. Are assessment criteria given to the pupils before they start their work?

   Are they reminded of them as work proceeds?

   Is there planned discussion and feedback as they work to help them make good progress towards meeting the criteria?

10. In what ways are formative assessments used to encourage the pupils and help them improve the quality of their work?

11. What do pupils know about levels of attainment?

12. How do you know if pupils are achieving to their full potential?

13. How do you standardise assessments?

14. Does the assessment system provide teachers with a clear and accurate picture of pupils progress and D&T capability?

15. How does the department identify pupils/groups of pupils who are underachieving?

    What strategies are used to address this?

16. Is there a standardised portfolio of work to help teachers achieve consistency when moderating the pupils' work?

17. Do assessment records give an accurate account of the pupils, experiences and achievements to date?

    How are they used by teachers to plan future work?

18. When reviewed over the Key Stage, can assessment criteria be seen to be increasingly demanding in their expectations of the pupils, performance?

ADDITIONAL Questions not used in the pilot: 16,17 and 18.

QUESTIONS DELETED FROM PILOT:

Tell me about any pupil tracking that is carried out by the department and how used? (Qu.6)

What recording systems do you have in place? How are these used? (Qu.9)

DRAFT
INTERVIEW FOCUS – Use of Assessment in Raising Achievement

CLASS TEACHER

INTRODUCTION

Purpose

- part of a research study focusing on the use of assessment in raising achievement at KS3

Confidentiality

- you will remain completely anonymous and no records of the interview will be kept with your name on.

Tape/notes

- if you have no objection I would prefer to tape the interview rather than make detailed notes, I will make brief reference notes during the interview

INTERVIEW

1. Firstly, to help me to put the information you are going to give into context it would be helpful if you would tell me about the unit of work you are doing.

2. What do you perceive to be the purposes of assessment?

   role of assessment in raising achievement

   different purposes of assessment:
   - summative
   - formative
   - diagnostic
   - ipsative

3. Tell me about the assessment strategies you use to raise achievement at key stage 3 and also those that you would introduce, if any?

4. How do you know if you are raising achievement?

5. How do you know if pupils are achieving to their full potential (How do you monitor the achievement of pupils)?

6. How do you identify individuals or groups of pupils who are underachieving?

7. Do you have access to any data that is prepared for/or could be used for value added information about pupil potential?

8. What do you use to assess pupils at the end of KS3?

9. What recording systems do you have in place? How are these used?

10. Do you assessment information for target setting?

11. How do you standardise assessments?

12. Do you find the Level Descriptions helpful? How do you use them?

13. In your lessons, how do pupils know how well they are doing?

REVISED
INTERVIEW FOCUS – Use of Assessment in Raising Achievement

CLASS TEACHER

INTRODUCTION

Purpose

- part of a research study focusing on the use of assessment in raising achievement at KS3

Confidentiality

- you will remain completely anonymous and no records of the interview will be kept with your name on.

Tape/notes

- if you have no objection I would prefer to tape the interview rather than make detailed notes, I will make brief reference notes during the interview

INTERVIEW

1. Firstly, to help me to put the information you are going to give into context it would be helpful if you would tell me about the unit of work you are doing.

2. Tell me about the assessment strategies you use to raise achievement at key stage 3 and also those that you would introduce, if any?

3. What do you perceive to be the purposes of assessment?

   role of assessment in raising achievement

   different purposes of assessment:
   summative
   formative
   diagnostic
   ipsative

4. How do you know if you are raising achievement?

5. How do you know if pupils are achieving to their full potential (How do you monitor the achievement of pupils)?

6. How do you identify individuals or groups of pupils who are underachieving?

7. Do you have access to any data that is prepared for/or could be used for value added information about pupil potential?

8. What do you use to assess pupils at the end of KS3?
   How do you standardise assessments?

9. What recording systems do you have in place? How are these used?

10. Do you assessment information for target setting?

11. Do you find the Level Descriptions helpful? How do you use them?

12. In your lessons, how do pupils know how well they are doing?

DRAFT

INTERVIEW FOCUS – Understanding and Use of Assessment

PUPIL PERSPECTIVE

School: **Pupil:** **Date:** 2000

TELL ME ABOUT THE WORK YOU ARE DOING

1. Tell me about this project/unit , what have you done so far?

2. Do you know what your teacher hopes you are learning?

3. Do you know how well you are doing?

4. Do you know how you could improve/do better?

TELL ME ABOUT THE WAY YOUR WORK IS ASSESSED

4. How is your worked assessed (grades, marks, comments)?

5. Does this assessment help you to do better?

6. In comparison with other subjects, how well do you think you are doing in D&T?

7. When do you get assessment information about your previous unit/project?

8. What were you given last time?

8. How is this information used?

9. Does it help you with your current work?

10. Does it help you to do better?

11. Does it help you to understand what you are good at and what things you need to work at (strengths and weaknesses)?

12. Does assessment help you to get better?

13. What assessment information do you find the most useful/helpful?

14. Are you involved in any self-assessment?

15. Why do teachers mark/assess your work?

REVISED

INTERVIEW FOCUS – Understanding and Use of Assessment

PUPIL PERSPECTIVE

School: **Pupil:** **Date:** 2000

TELL ME ABOUT THE WORK YOU ARE DOING

1. Tell me about this project/unit , what have you done so far?
2. Do you know what your teacher hopes you are learning?
3. Do you know how well you are doing?
4. Do you know how you could improve/do better?

TELL ME ABOUT THE WAY YOUR WORK IS ASSESSED

5a. How is your worked assessed (grades, marks, comments)?

5b. Does this assessment help you to do better?

6a. When do you get assessment information about your previous unit/project?

6b. What were you given last time?

6c. How is this information used?

6d Does it help you with your current work?

6e. Does it help you to do better?

7a. Does assessment help you to understand what you are good at and what things you need to work at (strengths and weaknesses)?

7b. Does this assessment help you to get better?

8. What assessment information do you find the most useful/helpful?

9. Are you involved in any self-assessment?

10. In comparison with other subjects, how well do you think you are doing in D&T?

11. Why do teachers mark/assess your work?

OBSERVATION CHECKLIST – PUPIL ASSESSMENT

School ...H... **Teacher ...H...** **Date/s** 26 June + 3 July 2000

	FEATURES	OBS	COMMENTS
	LESSON PLANNING		
1	**Planning includes assessment opportunities**	✔	A.Objectives listed aspects that will contribute to the pupils assessment. A.Criteria listed L2-7, linked to LDs and subject specific
2	**Work planned to specified range of levels**	✔	Levels 3-7
3	**Work planned is differentiated**	✔	Basic and extended versions provided
4	**Targets for lesson identified**	✔	Overall + individual lesson targets 9pupils also have their own individual targets)
5	**Other assessment features**	✔	Prior K,U&S required are given to help teacher decide which level individuals work at – basic or extendedl
	LESSON CHECKLIST		
6	**Marking consistent with policy**	✔	All c/w assessed using comments. Summative Levels awarded but comments guide pupils to Levels
7	**Marking provides diagnostic information**	✔	See above
8	**Pupils have details of their own progress**	✔	Pupils know where they are and where they are going. Can identify what they need to do to improve. They can identify their strengths and the aspects they need to develop.
9	**Use of assessment pro formas**	✔	Evident that they are regularly updated. Pupils aware of their own progress
10	**Self-assessment pro formas**	✘	Pupils involved in contributing to their progress and write their own targets in collaboration with their teacher
11	**Pupils aware of level they are working at**	✔	Pupils totally involved in process and know what to do to achieve next 'sub' level
12	**Pupils understand what they need to do to raise achievement**	✔	As above
13	**Pupils aware of assessment levels/grades of previous units**	✔	Pupil tracking and target setting provide pupils with this information
14	**Assessment information displayed in room**	✔	Pupils refer to this information during lesson
15	**Evidence of planned assessments in practice**	✔	See observation pro-forma

LESSON OBSERVATION

DATE: 26 June 2000

SCHOOL	B	YEAR	9	NOR	18
TEACHER	PT	GROUP Ref		PRESENT	17
SUPPORT STAFF	none	GROUPING	M/A	LESSON LENGTH	50mins

CONTEXT OF THE OBSERVATION – UNIT OF WORK:

NC POS/reference to LONG & MEDIUM TERM PLANS

Lesson plan is referenced to MTP Unit of Work

PoS identified in MTP and translated into specific learning objectives for each lesson

NC LEVELS

3-7

LEARNING OBJECTIVES FOR LESSON

- To be able to evaluate a product in terms of form, function, appearance and novelty value
- To be able to construct a Design Specification based on the information and research carried out over the last two lessons (start in lesson and finish for homework)

ASSESSMENT FOCI

- Categorisation of good/poor features
- Design Specification

TEACHING: SPECIFIC REFERENCE TO ASSESSMENT

INTRODUCTION TO LESSON

Previous lesson: context set and they have identified what a product will need to be like if it is to be attractive to potential customers.

Product Analysis – recap on skills needed to evaluate an existing product – use of Q&A to facilitate

Context is established by ensuring that pupils are aware of the purpose of the task and why they will need the information for future work

Pupils encouraged to look back in their folders to find the relevant information on Product Analysis and also to look at the assessment comment – this may highlight a weakness that needs to be addressed this time.

(emphasis throughout is on the learning objective and the aspects that will be assessed later on)
Target – expectation of progress (Product Analysis to be completed by the end of the lesson)

DURING LESSON

Several Ps refer back to their previous product analysis work, and as this is a group activity sharing views they discuss with one another (T listens in to discussion and interjects where he feels they need more guidance)

T circulates group to discuss ideas, frequently questions and challenges to promote further (and deeper) thought Frequently reinforces the use of the technical vocabulary (word banks are available for independent research)

PLENARY

P come together to discuss outcome of their work, emphasis is again on the use of the technical vocabulary

The content analysis task is also discussed – some Ps have used the guidance in the study booklets*, and have listed ingredients according to quantity and then checked back to the packaging –to see if it agrees with their analysis!

PUPIL RESPONSE & PROGRESS: ASSESSMENT RELATED ASPECTS

Ps clearly aware of expectation for this session and what and how the T will assess their work
Ps use written feedback constructively to support their current work and future ideas

OTHER SIGNIFICANT EVIDENCE: ASSESSMENT INFORMATION USED/PRO FORMAS/MARKING

Pupils make use of comments written on their work and discuss with T as he circulates

Assessment information on noticeboard – pupils aware of it and use it to identify what they might need to do to work at a higher level.

OBSERVATION PROFORMA.001

CONTACT SUMMARY FORM

SCHOOL	C	NAME	Teacher C	DATE	June 2000
TYPE OF CONTACT	INTERVIEW TRANSCRIPT				

PAGE/LINE	SALIENT POINT	ASPECT/CODE
1.20	Q2:Student Record Card – main strategy	PUR-REC
1.22	Summative assessment with pupils present	FEE-TA
1.23	SRC informs T planning	PUR-AP
1.26	Sch uses CATs to identify potential progress, Dept does not make much use of them	PUR-UD
1.30	Comments written on pupils work	FEE-DM
1.36	Dept needs a more consistent approach for ongoing work Develop use of CATs Develop use of SCAA Opt task assessments	SPE-INO SPE-INO SPE-INO
2.3-10	Q3: Purposes To identify what pupils can do and know To identify next steps in learning Tells teachers where pupils are + extension and support needs identified Modification of SoW Reports to parents	PUR-AP FEE-DM FEE-DM FEE-IP PUR-AP
2.23	Types – formative and summative	
2.12	Fit for purpose, manageable Work as a team – shared understanding	MON-OV MON-OV
2.16	Q4: Consistency of procedures – across the sch	MON-CON
2.31	Level sub-divisions to dem progress	MON-TRA
2.35-41	Level scale and rationale	COM-INF
3.6	Q5: Use of CATs as design and technology predictor	PUR-UD
3.21	Q6: Underachievement identification strategies	PUR-AP
3.31	Q8 End of KS3 Assessment – SCAA Optional tasks – material specific level information	PUR-AP
3.38	Q9 Recording systems – use of mark book	PUR-REC
4.3	Q10: Target Setting. Teacher sets targets for individual pupils but system across dept is not yet in place	PRO-TS
4.12	Q11: Level descriptions – stranded and displayed in all teaching areas + further ref to SCAA Optional Task booklet assessment levels	PUR-AP + FEE-LEV
4.33	Pupils included in discussion re summative project assessment, they like the responsibility	PRO-SA
5.3	Monitoring progress via the SRC. Importance of extension work in raising achievement	MON-TRA

ANY NEW (OR REMAINING) QUESTIONS FOR NEXT VISIT	Look at current work and work sample for diagnostic marking and evidence of pupils acting upon comments. Archive – review the SRC in central filing system- are they complete and up to date? Archive – review CATs data Pupils – check for their understanding and use of SRC.

REVISED
DOCUMENT EVALUATION CHECKLIST

School .....C..... Date...June 2000

EVALUATION QUESTIONS	POLICY : ASSESSMENT	YEAR 9 UNIT of WORK	KEY STAGE 3 ASSESSMENT PRO-FORMAS	PUPIL TRACKING	TARGET SETTING	Marking Policy	KS3 ATs for DGT
What kind of document is it?	D&T Policy based on whole sch pol	Guidance for teachers. MTP + STP	C/W Sumative assessment	See DOCs 4&5	CAT Individual Pupil Profile with KS3 & GCSE indicators	Whole sch & subject specific info eg design folders	Dept information
What does it actually say?	Rationale Purposes Opportunities F+S How to self-assess	Wk by Wk delivery Identifies SK&U	Levels attained over the KS		How pupil is performing compared to nat average. Predicts KS3 & GCSE grades	Rationale Purpose How: grading comments corrections Standardization	Strands NC LDs
Who produced it?	Dept led by HoD	Specialist teachers	Developed by the D&T team		University	SMT Curric Management. Subject specific – D&T team	HoD
What was its purpose?	To ensure dept in line with sch. To standardise To raise achievement To measure achievement	To cover PoS To standardise delivery Consistency	To record progress over the KS. To ensure progress from unit to unit		To provide baseline benchmark & value added potential	To help understanding & coherence. Consistency	To clarify aspects for assessment
When and in what circumstances was it produced?	Dept mtgs Revision date inbuilt Currently 4	To deliver revised curriculum	To meet policy requirements		Sch decision to identify value added potential	SMT/Curric Management meetings	For assessing revised NC
Is it typical or exceptional of its type?	Exc- focus on formative strategies	Typical +++	Typical++		Typical +	Typical	Typical
Is it complete?	Yes	Yes	Yes		Yes	Yes	Yes
Has it been altered or edited?	Revised as stated – version 4	No	Reviewed annually and has been revised		N/A	Yes, HoD provided previous Policy for info	No
NOTES			Also used for tracking				Used with DOC 4
DOCUMENT NO	DOC 1	DOC 3	DOC 4		DOC 5	DOC 2	DOC 6

REVISED
ARCHIVAL SOURCE EVALUATION CHECKLIST

School ...C..... Date...June 2000

EVALUATION QUESTIONS	BASELINE ENTRY INFO	END OF KS3 LEVELS Teacher Assessment	ON-GOING PUPIL ASSESSMENT RECORDS	DEPARTMENT ASSESSMENT PORTFOLIO	PUPIL ASSESSMENT PORTFOLIOS	CAT Profile	
What kind of document is it?	SAT results Core LEA Primary transfer data	Student Record Card used	Student Record Card used	Collection of moderated and exemplar work	x	School commissioned	
What does it actually say?	Teacher assessment levels SAT results			These are the standards expected in this D&T dept			
Who produced it?	Feeder primary schools & LEA			D&T team members			
What was its purpose?	To provide standardised pupil data to derive base line standards			To maintain consistent standards. To support new & inexperienced staff		To augment KS2 SAT results.	
When and in what circumstances was it produced?	N/A			Initial start from a DDP focus. Ongoing update			
Is it typical or exceptional of its type?	Typical			Exceptional			
Is it complete?	No Not all primary schs provide foundation subject data	Completed cards stored in dept central file	Completed cards stored in dept central file	N/A			
Has it been altered or edited?	No			N/A			
NOTES	Information not used by D&T dept	See DOC 4	See DOC 4				

REVISED
DOCUMENT SUMMARY

SCHOOL	C	DATE RECEIVED	June 2000	ASPECT/CODE
NAME AND DESCRIPTION OF DOCUMENT				
Assessment and Recording Policy – Design and Technology				COM-PHI
DOCUMENT ASSOCIATED WITH (Event or contact)				
Whole school policy Head of Department				EXC
SIGNIFICANCE OF DOCUMENT				
• **In relation to the research questions:** Identifies school/department rationale Purposes of assessment and strategies to raise achievement				 COM-PHI PUR-RA
• **In relation to Heads of Department/Teachers/Pupils:** Provides common approach Pupils- familiarity of approach as used across the whole school				 COM-SYSI COM-INF
SUMMARY OF CONTENTS				
Purposes of assessment: • Summative progress → levels • Recording knowledge and understanding • Raises expectations • Individual targets → raises achievement • Diagnostic – to identify shortcomings Assessment integral to planning of work Assessment opportunities in D&T (formative and summative) - Involving pupils How to use the department system of Student Record Cards				PUR PUR-ID PUR-REC PUR-AP PUR-MOT FEE-DM FEE-IP PRO-SA COM-INF
QUESTIONS RAISED				
Is school policy used by other departments? Pupil understanding? Evidence of assessment planned into Units of Work?				

REVISED CODES and DEFINITIONS

LABEL	CODE	DEFINITION
EXTERNAL CONTEXT	**EXC**	**Whole school, other departments. Aspects beyond the control of the D&T department. External effects on organizational practice.**
Data	EXC-DA	Whole school data for target setting etc.
Other departments	EXC-OD	Different systems, processes used by other departments – not compatible with the D&T department.
Influence	EXC-INF	Systems, strategies etc imposed
INTERNAL CONTEXT	**INC**	**The D&T department. Those aspects of leadership, management and organisation that the department has responsibility for, and control over.**
Organisation	INC-ORG	How KS3 is timetabled and delivered
Course information	INC-COU	Planning, course content, areas of experience
INFORMANT PERSPECTIVE	**INP**	**How people construe their understanding of assessment, its purpose and related events**
Conditions	INP-CON	View of assessment procedures/conditions necessary for raising achievement
Department head	INP-DH	View
Teacher	INP-T	View
Pupil	INP-P	View
COMMUNICATION	**COM**	**How information is disseminated to facilitate a shared vision**
Philosophy	COM-PHI	Departments belief and underlying principles for assessment.
Information	COM-INF	Passing on assessment information to pupils/teachers/archive
Systems	COM-SYS	Procedures in place as a conduit for information transfer.
Work sampling	COM-WS	Shared understanding/expectation for assessments to agree consensus view
SPECULATION	**SPE**	**Intentions for the future including embryonic processes**
Innovation	SPE-INO	New assessment strategy or system or process to aid raising achievement through assessment
PURPOSE	**PUR**	**Rationale/reasons for strategies. Resultant outcome of strategy/process**
Application	PUR-AP	Outcome of an applied strategy
Using data	PUR-UD	Statistical information used for VA, TS, and BM
Recording	PUR-REC	Maintenance of summative records (for demonstrating progress over time)
Reporting	PUR-REP	Assessment information published for other audiences
Motivation	PUR-MOT	Creation of interest and enthusiasm
Raising achievement	PUR-RA	Outcome of a procedure
Identification	PUR-ID	Procedure used to identify achievement
PROCEDURES	**PRO**	**The range of processes in place to aid raising achievement through assessment**
Self assessment	PRO-SA	Process to involve pupils in own assessment
Target setting	PRO-TS	Predicting outcome grade/level based on previous achievement
Value added	PRO-VA	Predicting likely future performance based on prior attainment
Benchmarking	PRO-BM	Comparison with other subjects within the school and D&T with other similar schools, based on the pupils' prior attainment at the previous KS (2)
Challenge	PRO-CHA	Work set to extend pupils
Moderation	PRO-MOD	Teachers' standardising work a consensus view of level of attainment
Tracking	PRO-TRA	Keeping sight of pupil progress, achievement etc
Staff development	PRO-CPD	INSET and training
FEEDBACK	**FEE**	**Assessment details given to pupils and teachers to inform – progress, achievement, next stages of learning etc. Information also stored in archive for this purpose**
Teacher action	FEE-TA	Active participation in the feedback process
Levels	FEE-LEV	National Curriculum Levels of Attainment
Marking	FEE-MAR	Aspects of marking related to numeric marks or alphabetic grades. Non-diagnostic comments
Diagnostic marking	FEE-DM	Written comments, identifying – what next, how to improve, strengths/weaknesses etc
Informing planning	FEE-IP	Feedback information used to modify SoW etc
MONITORING	**MON**	**Systems to ensure that policy is realised in practice and that practice stipulated in documents does actually happen e.g. use of pro-forma**
Oversight	MON-OV	Checking procedures to find out if policy/practice is actually being carried out by teachers
Consensus	MON-CON	Shared understanding
WEAKNESSES	**WEA**	**Glitches in the processes etc provided for assessment purposes. Gaps in provision. Lack of/insufficient training**
System	WEA-SYS	A defined process not working as intended/not at all/missing
Training	WEA-TRA	Lack of staff expertise
THREATS	**THR**	**Inhibitors to raising achievement from external (school) or internal (within department) sources**
Potential shortcoming	THR-PS	Inadequacy or constraint of system or personnel
Blockage	THR-BLO	Intentional hampering/non-compliance

MATRIX FORMAT USED FOR THE MAIN STUDY

	DEPT HEAD	TEACHER	PUPILS	LESSON OBS & SAMPLING	DOCU-MENTS	ARCHIVAL SOURCES
EXTERNAL CONTEXT						
INTERNAL CONTEXT						
INFORMANT PERSPECTIVE						
COMMUNI-CATION						
SPECULATION						
PURPOSES						
PROCEDURES						
FEEDBACK						
MONITORING						
WEAKNESSES						
THREATS						

SCHOOL H
OVERVIEW OF PUPIL TRACKING & TARGET SETTING

BASELINE ASSESSMENT AND TARGET SETTING

At Baseline

Use VRQ's, KS2 Tests and Teacher Assessments to establish Minimum Target levels for the end of Year 7, Year 8 and Year 9. (CATs or MidYIS). All students also tested in spelling and reading with targets set for improvement in those areas.

At the end of Key Stage 3

Use VRQ's and KS3 tests and teacher assessments to establish Minimum Target Grades for GCSE.

At the end of Key Stage 4

Use VRQ's, GCSE average points score and individual subject grades to establish Minimum Target Grades for A level and Advanced GNVQ courses.

MONITORING

All year groups (Year 7 to Year 13) have two review meetings each year. Before each meeting subject teachers submit current attainment and effort grades. All students are discussed, emphasis on underachievers. Staff comments typed in at meeting. Data distributed to all staff next day.

ACADEMIC INTERVIEW

All students have an interview with a member of staff (all 3+ and 3- see Head, 2+ and 2- Head of Year, 1+ and 1- Form Tutor). Meeting reviews progress, sets SMART targets.

MENTORING

More frequent (weekly) reviews of progress and target setting for students who are seriously under performing.

TARGET SETTING

Whole School

Using benchmark information the school sets public targets at KS3, KS4 and Post 16. We also have internal expected targets and internal aspirational targets.

Departmental

These are set in discussion with Head, building upon previous years performance but, at GCSE and 'A' level, taking into account the quality of students opting for the subject.

Student

Minimum Target Grades are set at the average performance of all students with a given prior attainment. There is an expectation that all students will reach beyond this for their aspirational goal. No limit is set for any individual's aspirational goal and students are encouraged to include these in their personal target setting.

PARENTS/REPORTS

Reports inform parents of individual student targets. Three reports a year, two 'short' reports and one full traditional written report. One traditional parents evening, one with form tutors only. [This is an area we are conscious we need to develop].

SCHOOL H

MARKING AND FEEDBACK POLICY (Extract)

FEEDBACK

Characteristics of Effective Feedback:

- feedback is more effective if it focuses on the task, is given regularly and while still relevant;
- feedback is most effective when it confirms the pupils are on the right tracks and when it stimulates correction of errors or improvement of a piece of work;
- suggestions for improvement should act as 'scaffolding' i.e. pupils should be given as much help as they need to use their knowledge. They should not be given the complete solutions as soon as they get stuck so that they must think things through for themselves;
- pupils should be helped to find alternative solutions if simply repeating an explanation continues to lead to failure;
- feedback on progress over a number of attempts is more effective than feedback on performance treated in isolation;
- the quality of dialogue in feedback is important and most research indicates that oral feedback is more effective than written feedback;
- pupils need to have the skills to ask for help and the ethos of the school should encourage them to do so.

Feedback in Written Form – Guidance on Marking Work

- the purpose of individual pieces of work should be made clear;
- how the work is to be assessed should be made clear i.e. the success criteria should be made explicit;
- teachers should let pupils know when they can expect their work to be marked and returned;
- pupils should be quite clear what follow-up is expected to any piece of work; e.g. 'do corrections', 'complete', 'practise certain skills', ' develop the work in certain ways'.
- when targets are used, they should be referred to in the marking of subsequent pieces of work, until the targets are hit. Targets give the marking focus;
- use targets as a way of encouraging the pupils to take ownership of their learning. Lesson objectives are usually defined by the teacher, but the pupil should have a real investment in choosing targets for improving her/his work.

SCHOOL T

EXTRACTS FROM THE OFSTED INSPECTION REPORT RELATING TO ASSESSMENT

100. Procedures for assessing pupils' academic progress are good. They have been strengthened since the previous inspection in three particular ways. Firstly, an efficient central system of assessment comprehensively tracks pupils' progress and achievement. This records and makes available all the appropriate information about pupils' prior attainment, stage of language-acquisition and any particular learning needs. The record includes teachers' changing predictions of GCSE grades and, ultimately, the actual results. It gives all subject teachers, tutors, and others concerned with pastoral responsibilities, a clear picture of pupils' attainment and achievement as they progress through the school.

101. The school also makes effective use of commercially devised systems to predict realistic targets fro pupils, based on the levels they have reached already. These predictions are valuable in alerting teachers to signs of underachievement by pupils, particularly in the approach to external examinations taken at the ages of 14 and 16. The use of target grades derived from these systems and from teachers' predictions has a clear and positive effect in raising pupils' awareness of what is expected of them.

102. Subject teachers now scrutinise assessment data from the national tests taken by pupils at the age of 11, and from scores obtained from verbal reasoning tests carried out in school, to assist their own procedures of assessment. They make more regular assessments of pupils' work to keep a continuous record of attainment in relation to the levels of the National Curriculum in Years 7 to 9 and to GCSE grades in Years 10 and 11. This information provides teachers with the data necessary to complete the new progress sheets which are sent to parents three times each year. It helps also in the compilation of the recently revised, annual written reports to parents. All permanent teachers now have a sound basis against which to judge attainment and progress.

103. Procedures for assessment are satisfactory in most subjects. They are unsatisfactory in geography and German because they do not ensure that pupils of all levels of attainment receive appropriately difficult work. Within the larger departments, there are differences of practice among different teachers. In English, for example, in which pupils' National Curriculum levels are recorded each half term during years 7 to 9, some teachers assess all aspects in each completed piece of work as a continuous process whilst others make an overall judgement at the end of the half term. The method of continuous grading is much more helpful to pupils.

104. In subjects such as mathematics, design and technology, and history teachers' assessments of what pupils had understood led to modifications to the next stage of teaching. Pupils clearly benefit from teachers' close monitoring of what has been learned.

Extracts from OFSTED Inspection Report (October 2000) (School T. Document 8, pp.33-34)

SCHOOL T
BENCHMARK PORTFOLIO GUIDANCE

RANGE AND TYPE OF EXAMPLES

- Clear examples of complete design and make assignments;
  Key Stage 3 - for each level (3-7), for each focus area, including on-going feedback comments from the teacher; together with student *Record Profiles;*
  Key Stage 4 – graded final GCSE project work (A, C and E/F) in each focus area;
- A range of examples to illustrate key aspects of designing and making and also some to support teaching and learning;
- A range of examples of focused practical tasks and product analysis activities to support teaching and learning.

KEY ASPECTS OF DESIGNING SKILLS COULD INCLUDE:

- Researching (including information handling e.g. clarifying, investigating, interpreting, recording);
- Working with briefs (e.g. tacking account of constraints and limitations, addressing client and user needs, working with specifications);
- Generating ideas and approaches (e.g. for single products and batches);
- Selecting working methods (e.g. materials, tools and equipment, techniques and processes);
- Communicating (e.g. ideas about the way designs might look, thinking about what designs might do, presenting plans and ideas);
- Planning (e.g. short tasks, design and make assignments, out of school work);
- Modelling (e.g. developing ideas through trial/test runs, prototypes, samples, mock-ups);
- Evaluating (e.g. own work, others' work, existing products – their impact and applications)
- Decision-making (e.g. taking account of conflicting factors and complexities).

KEY ASPECTS OF MAKING SKILLS COULD INCLUDE:

- Work in progress (e.g. preparing materials, measuring and marking out, cutting, forming and joining, trying for fit);
- Applied knowledge and understanding (e.g. materials and components, systems and control, structures and forces, products and applications, quality, health and safety;
- Progress record (e.g. changes to plans, problems overcome, modifications, things realised/new ideas along the way;
- Finished work against the specification (e.g. appropriate quality, satisfactory standard, borderline, unacceptable).

These key aspects of capability are an important focus not only for teachers, to help them make more consistent judgements, but also for students. Students need to know what 'getting better' at design and technology means in real terms.

EXEMPLARS

UNIT INFORMATION

Include:

- The project brief and some background commentary on the way the work was approached (e.g. timing, taught inputs, points specific to the student, differentiated targets and resources.)

- Annotation to indicate the agreed features of capability evidenced in the work;
- A brief explanation of the judgements made, and how the work justifies the decisions.

ANNOTATION

All exemplars must be annotated under the following headings:

- **The final product – brief description;**
- **The pupil's skills and knowledge;**
- **The teacher's observations;**
- **AT1 Designing – features of (exemplified level)**
- **AT2 Making – features of (exemplified level)**

Examples of these have been taken from *Assessment of Design and Technology at Key Stage 3* (NAAIDT/Berkshire) for guidance.

Extracts from Benchmark Portfolio Guidance (School T. Document 11)

SCHOOL T

ASSESSMENT GUIDANCE FOR A UNIT OF WORK

DMA: PACKAGED FRIUT DESSERT (food + plastics)

To be successful (from resource booklet)

- Your research into existing products, your ideas and experiments with ingredients will result in a dessert which contains fruit, combines different layers, colours and textures, looks appetising and tastes good;
- You will apply your understanding of how different ingredients may be used to set and thicken food products to create desserts;
- Your packaging will be functional, keeping the dessert free from contamination and will indicate the contents;
- You will evaluate your product and consult other people appropriately.

Teaching Focus	Assessment Focus
• To develop planning and organisational skills; • To help students develop a specification and design ideas in response to a customer's requirements; • To introduce some scientific principles into food product development.	• Researching a range of products; • Developing a specification to meet the identified need; • Using drawings and models to communicate design ideas; • Designing a food product and appropriate packaging; • Making a product to meet a specification; • *Evaluation against the specification and the client's needs.*
Designing Statements	**Making Statements**

Extension Level

The design folio: • Shows evidence of research into a range of products and the research is analysed to develop a specification;* • Makes good use of drawings and models to communicate design ideas; • Shows how an understanding of thickening and setting was used when developing design ideas;* • Shows how the design of the product and the packaging developed together.	The finished dessert: • Meets in full the requirements of the specification;* • Is visually attractive; • Shows effective use of thickening and setting techniques;* • Is packaged effectively and attractively • Shows detailed evidence of evaluation against the customer's requirements and suggestions for modifications and improvements.

Standard Level

The design folio: • Includes some evidence of research into products and analysis of the research to develop a specification;* • Makes use of drawings and models to communicate design ideas; • Shows how some understanding of thickening and setting was used when *developing design ideas*;* • Includes some evidence that the design of the product and the packaging developed together.	The finished dessert: • Meets most of the requirements of the specification;* • Is visually attractive; • Shows use of thickening and setting techniques;* • Is packaged effectively and appropriately; • Shows evidence of evaluation against the customer's requirements with some ideas for improvements.

Basic Level

The design folio: • Includes some limited evidence that research was used to develop a specification;* • Makes limited use of drawings and models; • Shows some evidence of an understanding of thickening and setting;*	The finished dessert: • Meets some of the requirements of the specification;* • Is visually acceptable; • Shows use of a limited range of thickening and setting techniques; • Is packaged; • Shows some limited evidence of evaluation.

Key statements *

Extract from Document 2.

SCHOOL T

UNIT OF WORK: RESISTANT MATERIALS – NOVELTY CLOCK

LEARNING OPPORTUNITIES

Brief: Design and make a novelty clock.

Task: Decide upon a club, local company or place. Design and make a clock for a wall, desk or shelf. The clock should show what the place is about.

LEARNING OPPORTUNITIES	
AT1: LEARNING	**AT2: MAKING**
• **To collect information to help with designing:** Which materials? Working properties? How does the clock movement work? How do products convey images? Critical dimensions?	• **To plan the use of materials and mark them out prior to manufacture:** Reduce wastage. Use of templates. Temporary marking out. Awareness of critical dimensions. Protection of surface finish.
• **To develop a detailed specification by analysing and interpreting the brief:** Which club, company or place? Wall, desk or shelf mounted? Realistic dimensions?	• **To develop knowledge and skills in cutting, shaping, joining and finishing of materials:** Experimenting with different adhesives and tapes. Testing for drilling. Trial for edge finishing. Actual manufacture. Quality control.
• **To consider the use of the clock to promote the club, company or place:** How do images, shapes and symbols become 'trade marks'? What relates to the chosen idea?	• **To organise the workplace, select tools and equipment appropriate for the construction technique:** Personal organisation. Appropriate practices. Care of emerging product and components.
• **To consider how the functional and aesthetic aspects influence design decisions:** Can a shape be manufactured? Does colour make a difference? How can the material be finished? Will the idea actually work?	• **To understand and demonstrate safe working practice when working with materials:** Safe practices. Awareness of others. Risk assessment and control. Awareness of the requirements of the end user.
• **To use templates/models to plan and test shapes:** Working to scale. Simple nets. 3D stability. Forming materials. Experimentation, development and evaluation.	• **To examine the process of production and modify intentions in the light of experience:** Processes used in sequence to ensure quality of product. Modifications planned and justified.
• **To consider material costs and wastage, economies of batch production, use of time:** Cutting/component lists. Use of jigs or moulds.	• **To assemble the product and test against the brief and specification:** Careful assembly. Test for stability. Test operational and visual qualities and impact on end user. Quality control. Record of issues and personal commentary on success.
• **To communicate design ideas, plan for making and record modifications:** Design sketches. Annotated development drawings. Selection of techniques. Justification of selections made. Record of development.	

Extract from KS3 Scheme of Work (School T. Document 2)

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