Refocusing Assessment - Design & Technology

We have produced this resource following the publication by Schools, Students and Teachers network (SSAT), the Association of School and College Leaders (ASCL) and the National Foundation for Educational Research (NFER) of a series of *Refocusing Assessment* documents concerning English, geography, history, mathematics, modern foreign languages and science[1].

This document has been informed by these publications and follows a similar structure. We believe that such a document is particularly necessary for design & technology (d&t) because the introduction of a new single title GCSE to be taught from September 2017 has provided the opportunity for secondary schools to develop a coherent five-year teaching programme beginning in Year 7. Understanding what it means to be successful in d&t, how pupils might make progress and what it means to get better, are essential for such an approach.

We believe that it is essential that d&t departments have the same opportunities and support as those subjects within the EBacc to develop a well informed and robust approach to assessment (as well as other aspects of teaching and learning). This will help them keep their pedagogies under review and enable them to contribute to teaching and learning debates taking place in their schools, including those about assessment.

We see the move away from a single national assessment system (levels) to a more flexible, school-determined approach as providing interesting opportunities for schools to develop curricula that are appropriate for their pupils. However, we are aware that uncertainty about the nature of progress and how to assess it is likely to reduce the confidence with which d&t teachers are able to tackle the curriculum reform that is necessary both for their own situation and for the subject nationally.

We have a deep interest in the both the curricula and associated assessment that schools develop for d&t and invite teachers to tell us about their work by contacting us via https://dandtfordandt.wordpress.com/contact/.

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[1] https://www.nfer.ac.uk/schools/refocusing-assessment/

Introduction

Taking the work of SSAT, ASCL and NFER on Refocusing Assessment as a model for this resource we have identified five key questions for all departments, which you will find on page 3.

In the pages following these questions you will also find some possible responses to each question. These have been developed for design & technology in the light of
1   the responses of the other subjects in the original Refocusing Assessment documents,
2   the description of the nature, purpose and pedagogy of d&t as outlined in *Re-Building Design & Technology in the Secondary School Curriculum*[2].

These responses are not intended to offer definitive answers to the key questions, but may help to support, challenge or structure your own discussions as you develop the structure of assessment in d&t in your school.

References are listed on page 10, web addresses are provided as footnotes.

How to use this resource

1   Spend time with your department discussing each of the five questions.
2   Record a summary of your discussions.
3   Look at the commentary and elaborations for each key question. How far do they reflect the thoughts of your team?
4   See if you can summarise the 'assessment requirements' for your subject using the *Refocusing Assessment template*[3].
5   You may be asked to share your responses with other departments to help identify the commonalities and differences between subjects in order to help establish a whole school approach that respects individual subject differences. You may wish to consider the following questions:
   o   How do the needs of different subject areas vary?
   o   How can you apply best practice in different subject areas whilst also maintaining consistency across the whole school?
6   You may wish to produce an action plan to modify and shape your assessment policy and practice.
7   Set a time to review and evaluate the impact of the action plan on assessment.

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[2] https://dandtfordandt.wordpress.com/2017/05/05/re-building-dt-v2/

[3] https://www.nfer.ac.uk/publications/GTGA01/refocusingassessmenttemplate.pdf

Five key questions

1: What does it mean to be a successful student in d&t?	2: What is the purpose of assessment in d&t?	3: What does progress look like in d&t?	4: How can progress be assessed most effectively in d&t?	5: How do the assessment practices in our department contribute to/work with whole school policy?
Why do we teach d&t?

What 'big ideas' underpin d&t?

How are these ideas used in achieving technological capability and technological perspective? | Why do we assess?

Who is assessment for? | How do we know when a student is making progress?

How might progress vary over time? | Which assessment techniques work best in d&t?

How successfully do we use formative assessment approaches?

How can formative and summative assessment work together to ensure effective assessment for learning?

How do we benchmark/ quality assure our assessment practices? | |

Question 1: What does it mean to be a successful student in d&t?

The broad aims of d&t education are for students to be able to understand and intervene in the made and natural worlds around them.

These aims are realised by teaching children to achieve a combination of technological capability and technological perspective.
Technological capability is designer-maker capability, capturing the essence of technological activity as intervention in the made and natural worlds.
Technological perspective provides insight into "how technology works", which informs a constructively critical view of technology, avoids alienation from our technologically-based society and enables consideration of how technology might be used to provide products and systems that help create the sort of society in which pupils wish to live.

This requires a firm grounding in the *Big Ideas for Design & Technology*[4].
These include:

- big ideas *about* d&t which describe its fundamental nature; for example, that there are always many possible and valid solutions to technological and product development challenges, some of which will meet these challenges better than others.
- big ideas *of* d&t which describe the conceptual knowledge; for example, knowledge of materials.

These big ideas represent the core of d&t knowledge.

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[4] https://dandtfordandt.wordpress.com/working-papers/big-ideas-for-dt/

Question 1 (cont): What does it mean to be a successful student in d&t?

A successful student…	Elaboration
… appreciates and understands the grand narratives of technologies and the design thinking behind them as major achievements of our culture.	The outcomes of d&t doing and thinking have had a profound effect on human history. These have been enabled by humanity's ability to envisage what might be and act to realise these unreached visions. This can be explored through the history of specific technologies, the lives of individual designers, engineers, and architects, the development of different civilisations, through investigating products as well as through the designing and making that young people engage in.
… reaches informed views on questions and disputes that have matters of design and/or technology at their core.	A role of d&t education is to produce informed citizens able to take an active role at various 'levels' in their community and able to engage in informed and rational debate about the development and deployment of technologies and their impact on society. In short to engage in the "we can, but should we?" debate.
… deploys design skills and technical problem solving to address and solve practical problems at both the personal and community levels.	The personal qualities developed by being able to deploy design and technical problem-solving skills give not only immense personal satisfaction but, importantly, a sense of self-efficacy which provides young people with a positive self-image about their ability to be successful in the face of practical difficulties.
… is more inclined to consider careers in the STEM industries This is important as our country faces a "STEM skills" gap (Institute of Engineering and Technology, 2016).	Ensuring that a high percentage of the school population is exposed to design & technology will increase the pool of young people across a range of attainments who become interested in following a technical career.

Question 2: What is the purpose of assessment in d&t?

Assessment in d&t will need to cover a broad range of knowledge, understanding, skills and values and will need to call on a variety of observations on different sorts of activity over different periods of time. It can be used for both formative and summative purposes.

General Features of assessment	Elaboration
For the student The key purpose of assessment should be to help students understand where they are in their learning - supporting them to know what they are secure with in terms of their knowledge, understanding, skills and values and helping them identify areas to develop.	Assessment can: • allow learners to reflect on learning over time • be used to find out where students are before they start something new • help teachers reflect on their pedagogy • help teachers to develop a better understanding of the student as a learner • help to identify learning issues to support the planning of strategic interventions • provide a basis for a meaningful dialogue with students, about students' progress.
Formative assessment This identifies what a learner needs to do to progress and helps the teacher and learner understand the next learning steps.	It takes a range of forms, for example: from informal discussions, to the use of 'hinge questions' in lessons, to the observation of making and the inspection of made items, to assessing extended designing and making tasks that can be used to tease out more complex and deeper levels of understanding and skill. Formative assessment should address the totality of a student's performance, not just the easily measurable. In developing formative assessment, it is vital to consider what information the assessment is aiming to collect. Effective formative assessment helps to identify strengths and areas for development and can also help to demonstrate progress over time.
Summative assessment This provides feedback to indicate a learner's level of achievement at a particular time and also provides formative information that can be used to inform future teaching and learning.	This includes performance in: • d&t related activities such as making from given plans, designing without making, designing and making and considering the consequences of technology • end of topic tests • in-school examinations • public examinations
Various stakeholders Assessment should be focused **on** the student and **for** the student. But it also provides useful information for a variety of stakeholders including teachers, parents/carers and others such as school leaders, governors and Ofsted.	This includes the use of assessment data to inform option choices and make predictions about attainment in the future, such as in public examinations, inform target setting, enable curriculum development, and improve effectiveness.

Question 3: What does progress look like in d&t?

Features of Progress	Elaboration
Because d&t is a **broad and complex subject** encompassing a wide range of knowledge, understanding skills and values it is taught by at least four different teaching methods	D&T is taught through activities that involve: • Making at item that someone else has designed where a key feature of progress is the widening range of tools, materials and equipment used • Designing but not making an item that uses a new or emerging technology as a starting point where a key feature of progress is the sophistication with which the design is justified • Designing and making an item of use to a person (or persons) in a particular situation where a key feature of progress is the openness of the task and the resultant complexity and range of design decisions made (see technological capability below) • Considering the consequences of utilising a particular technology or artefact where a key feature of progress is a consideration of the widening range of impacts both intended and unintended
Progress in learning for an individual pupil, by means of a particular method of teaching, is **likely to be uneven**	A learner may, for example, excel at using a sewing machine whilst at the same time experience considerable difficult in becoming competent at using a vibro saw. A learner may, for example, tackle one 'designing without making' activity well whilst a later similar activity less well. This often depends on how compelling the context of the activity is to a particular learner
Progress in learning for an individual pupil, by means of different methods of teaching, is **likely to be uneven**	A learner may, for example, make steady progress in developing making skills but find designing in both design without making and designing and making challenging whilst at the same time excel at considering the consequences of utilising particular technologies or artefacts
Progress in **technological capability** will require learners to use their knowledge, understanding skills and values in increasingly complex ways. They become more creative as their confidence in dealing with uncertainty and taking intellectual risks increases.	Technological capability can be described in terms of the number and type of design decisions that a learner makes in a designing and making task (Barlex (2007). These design decisions can include the following, which are interdependent: • Conceptual (overall purpose of the design, the sort of product that it will be), • Technical (how the design will work), • Aesthetic (what the design will look like), • Constructional (how the design will be put together) • Marketing (who the design is for, where it will be used, how it will be sold). In developing progression, the teacher should increase the opportunities for learners to make more, harder and different design decisions across time by providing more open design briefs and allowing the pupil to devise their own design briefs from given contexts.

Features of Progress	Elaboration
Progress in **technological perspective** will require learners to develop an understanding of unfamiliar technologies and to develop critical skills in challenging value positions.	Learners develop technological perspective by considering the economic and social impact of particular technologies and artefacts on both groups and individuals and their environmental impact on both the made and natural worlds. In developing progression, the teacher should begin with relatively simple artefacts used by learners and their families and move to considering more complex technologies and artefacts that will require systems thinking for their critical evaluation.
As learners progress they tend to show **greater independence** and **better time management**	If learners are to show greater independence and better time management it is important that the teacher devises activities where there are opportunities for learners to demonstrate such qualities whilst at the same time providing 'safety nets' for those learners for whom this is too great a challenge.

Question 4: How can progress be assessed most effectively in d&t?

Features of Assessment	Elaboration
Integration of assessment into curriculum planning	It is essential that the range of learning activities and how they might be assessed are considered so that all students have the opportunity to show what they have learned and can demonstrate fully the extent to which their knowledge, understanding, skills and values have grown.
Talking and listening to students while they are actively engaged in the task at hand	This enables teachers to fully grasp the students' thought processes. Such 'assessment conversations' will only be open and honest if the teacher has established a trusting relationship with the students so that they are prepared to be open and reveal their thinking in the certain knowledge that the teacher's response will be both respectful and useful.
Feedback to students (But not all forms of feedback are effective)	Paul Black has often made the following perceptive comments (See Black and William, 1998). • Marks alone are counterproductive • Marks plus comments aren't much better • Written comments can be useful • Verbal comments can be very useful It is essential that any comments provoke a useful response from the student.
Student response to feedback needs to be useful	Kluger and DeNisi (1996) have noted that if a student falls short of a goal then the teacher wants the student to increase effort. If a student exceeds a goal the teacher wants the student to increase aspiration. But students do not always respond in this way. Sometimes they reduce aspiration and effort or even ignore the feedback completely.
Feedback can be 'in the moment' of a learning activity; such feedback is often more valuable than delayed feedback	It is important that teachers use their conversations with students to uncover any difficulties with the learning; in the case of such difficulties, the conversation should focus on helping the student to make more effort. If the student has mastered the required learning then the conversation should focus on helping the student go further with their learning. Examples of this can be found in the paper *Assessment in D&T, Part 1: 'In the moment' feedback for design & technology tasks*[5]. This kind of feedback generally does not need recording. The learners themselves may find it helpful to record their response to such conversations, but an all-embracing, onerous system of centralised recording may be counter-productive to the effectiveness of such 'in the moment' feedback.

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[5] https://dandtfordandt.wordpress.com/assessment-in-dt/

Features of Assessment	Elaboration
Feedback can be at the end of a learning activity	To provide useful feedback to a student it is essential that the teacher: • Is clear about the learning intentions of the activity, • has made observations and other evidence that indicates the extent to which the student has achieved the required learning, • can communicate this quickly to the student with specific guidance as to how any shortcomings may be overcome. Note that without the initial clarity of learning intentions useful feedback cannot take place. Examples of this approach can be found in the paper **Assessment in D&T, Part 2: Approaches to feedback at the end of design & technology tasks**[6].
Progress should be reviewed at the end of a long learning activity	It is important that students have regular opportunities to think about how they might get better at d&t. They can do this by discussing the following questions: • What did you enjoy most? • What did you find easy? • What did you find difficult? • What did you get better at? • Did you help each other? • What could have been done better and how? After such a discussion, the class can agree a statement for improvement for their next design & technology unit of work. Individual students can set their own priorities. And teachers can moderate students' perceptions.
Assessment should also be used by teachers to assess the impact that have had on student learning	One way to gather impact evidence is to use pre- and post- activity questions related to the learning that is expected to take place through the activity. Such an approach may reveal that whilst some students have made learning gains others, whilst successful in the activity, may have not learned anything new, and yet others might even have regressed. Such information is important if we are to ensure that d&t involves learning as well as doing. Examples of this approach can be found in the paper **Assessment in D&T, Part 1: Knowing thy impact in design & technology**[7].
Predicting public examination performance	Parents are understandably concerned about public examination success. Presenting an overview of a student's achievement in terms of whether their progress indicates that he or she is on track to achieve a predicted public examination grade, exceeding that expectation or giving cause for concern is very useful. Teachers need to be clear about the public examination requirements and how the curriculum is moving students towards meeting these requirements.

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[6], [7] https://dandtfordandt.wordpress.com/assessment-in-dt/

Acknowledgements

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[8] https://www.nfer.ac.uk/schools/refocusing-assessment/