Defining Design and Technology in an age of Uncertainty

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Context

Within the English and Welsh National Curriculum, Design and Technology has fought a relentless battle to justify its worth and existence. Policy changes and directional shift by policy makers have only added further doubt and confusion. Within the subject itself, heated debate often surrounds elements of its core being including; its place in STEM, is vocational nature, its academic worth and its part in creativity. This work seeks to help Design and Technology define its identity, and subsequently allow it to justify its place in the school curriculum.

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School Types

Secondary Comprehensive

Academy (pre 2010)

Academy (post 2010)

Free School

University Technical College (UTC)

Private (fee paying schools)

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Education in England and Wales differs from that in Scotland.

Design and Technology forms a compulsory element in KS1, KS2 and KS3.

(For in-excess of twenty years, Design and Technology was compulsory at KS4).

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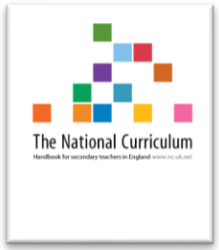
UK School System in Year Groupings

Age	England & Wales	Northern Ireland	Scotland
3	Nursery (non-compulsory)	Nursery (non-compulsory)	Nursery (non-compulsory)
4-5	Reception / Primary Key Stage 1	Year 1 / Primary Key Stage 1	Nursery (non-compulsory)
5-6	Year 1	Year 2	P1 / Primary
6-7	Year 2	Year 3	P2
7-8	Year 3 / Key Stage 2	Year 4 / Key Stage 2	P3
8-9	Year 4	Year 5	P4
9-10	Year 5	Year 6	P5
10-11	Year 6	Year 7	P6
11-12	Year 7 / Secondary Key Stage 3	Year 8 / Secondary Key Stage 3	P7
12-13	Year 8	Year 9	S1 / Secondary
13-14	Year 9	Year 10	S2
14-15	Year 10 / Key Stage 4	Year 11 / Key Stage 4	S3
15-16	Year 11	Year 12	S4
End Of Compulsory Schooling			
16-17	Year 12 (Lower Sixth)	Year 13	S5
17-18	Year 13 (Upper Sixth)	Year 14	S6

- New Curriculum for All
- Rearranging School Structure
- Introduction of GCSE's

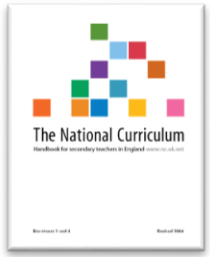
- Revised Programme's of Study
- Attainment Targets (5 in total)
- Illustrative Materials
- Explicit use of IT
- D&T in Years 1, 3 and 7

- Review of Content
- Review of Pedagogy



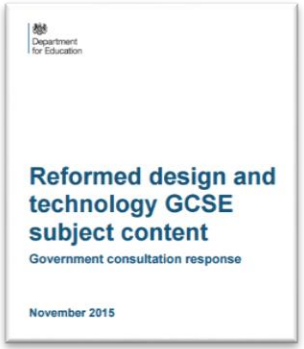
- 1st Edition
- Revised Assessment Criterion

- Revised Programme's of Study
- Revised Attainment Targets (Reduced to 2)



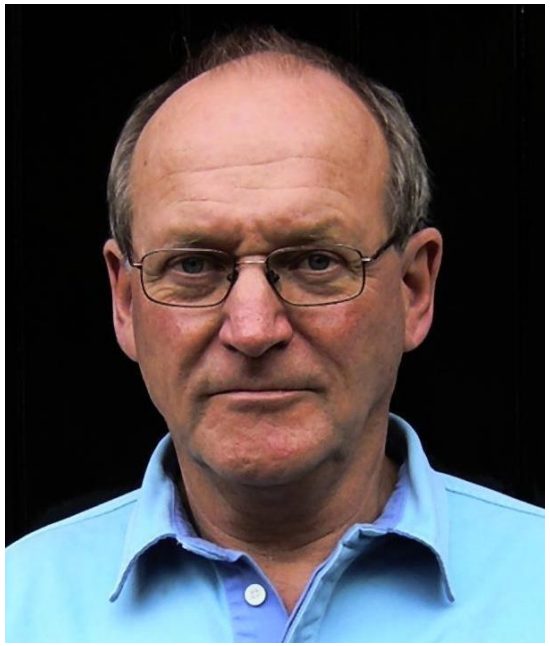
- 2nd Edition
- Revised Content to reflect GCSE's

- Totally Revised Content



1988
1989
1995
1999
2004
2007
2013
2017

Background



Never before had it been an entitlement for all children to study technology; now it was … Never before had it been the least bit significant in the primary curriculum; now it was. Never before had the specialist subjects in the secondary school technology domain (craft, design and technology; home economics, art and design) been grouped and expected to provide a single coherent technology experience; now they were…It was a great moment.

Kimbell (1997)

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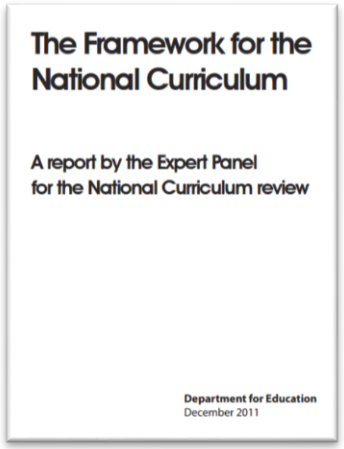

Despite their importance in balanced educational provision, we are not entirely persuaded of claims that design and technology, information and communication technology and citizenship have sufficient disciplinary coherence, as such we recommend that;

Design and technology is reclassified as part of the Basic Curriculum. We recommend that design and technology programmes should be developed by schools in response to local needs and interests, which is why we take the view that a reclassification to the Basic Curriculum is desirable.

A report by the Expert Panel for the National Curriculum review
December 2011

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….downgrading the subject of Design and Technology would be extremely detrimental for manufacturers in various sectors.

Christian Horner (2012)

Principal of the Red Bull Formula 1 Racing Team

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What do Pupils Think?

Wooff et al (2015) investigated pupils' perceptions of Design and Technology using a modified PATT tool devised by Ardies et al. (2012, 2013) from the original PATT survey developed by de Vries (1988).

During this work, the question of what actually is Design and Technology arose.

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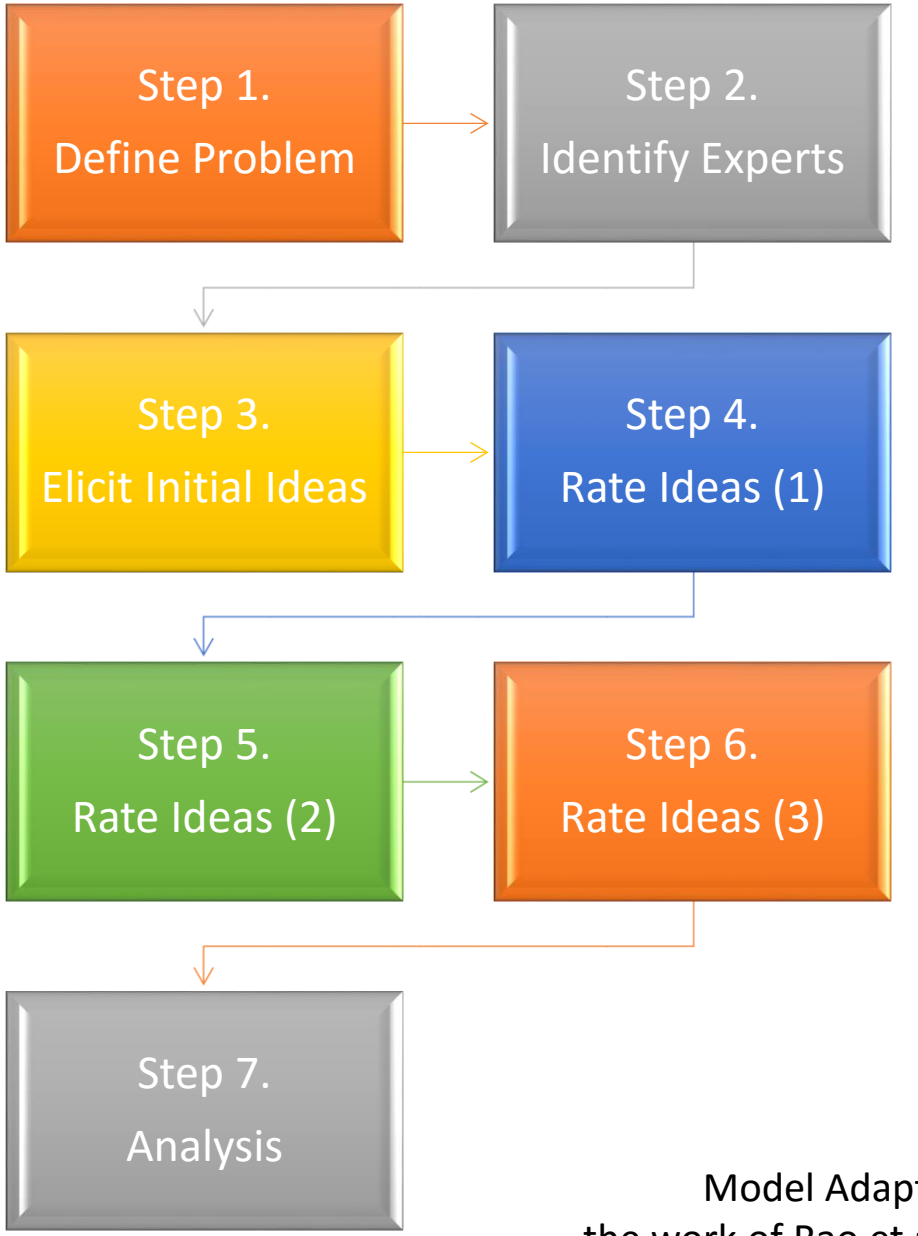
Research Design

This study used the Delphi Technique (Helmer 1967) to determine key phrases, qualities and features which could be used to define; *what is Design and Technology?*



Model Adapted from the work of Rao et al (2010)

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Why the Delphi Technique?

- Anonymity and confidentiality of participants (experts)
- No need to gather participants in one place geographically – can be done at a distance
- Elimination of bias
- Cost effective
- Can be done at convenience of participant (within boundaries)

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Problems Encountered

- Selection of experts – and determination of criteria for selection
- Pursuit(?) of all experts to make sure they responded in a timely fashion
- Keeping track of responses
- Time consuming to collate and analyse
- Coding of initial responses to provide step 2
- Terminology – many respondents did not like the idea of being identified as ‘experts’

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Research Sample

Participants (Experts) were drawn from a convenience sample (Cohen et al 2007) selected through an open invitation on a national education forum. Participants claims to excellence were assessed using:

- Academic Qualifications
- Performance Review Outcomes
- Lesson Observation Grade Data
- Pupil /Class Attainment Data
- Length of service in post (>5 Years)

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Data Gathering

Two research questions were asked in the first stage of the process, and respondents were asked to provide as many options /comments /outcomes for each of these two questions:

1. How would you define Design and Technology?

2. What do you see as being the principals that underpin Design and Technology?

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Research Question 1 - Initial Responses

There were a vast range of responses to the first research question, exemplified by:

"Design and technology is a subject that applies knowledge and skills in the pursuit of realising a solution to a problem"

Participant 11

"Fun, Dynamic, Active, Creative and Engaging"

Participant 17

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Research Question 1 - Summary of Findings

“Design and Technology is a subject which uses knowledge and skill to help pupils make decisions to arrive at an outcome to a problem”.

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Research Question 1 - Summary of Findings

"Design and Technology is a subject which uses knowledge and skill to help pupils make decisions to arrive at an outcome to a problem".

Design and Technology Association
February 2016

Design and Technology (D&T) is the inspiring, rigorous and practical subject which prepares all young people to live and work in the designed and made world.

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Research Question 2 - Initial Responses

There were a vast range of responses to the second research question, exemplified some of these part responses:

“There are many, but I would say; creativity, practical application of knowledge and skills, designing and making”

Participant 04

“Being challenged to solve problems”

Participant 17

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Research Question 2 - Summary of Findings

The top responses to defining the principals that underpin Design and Technology were determined to be:

- Problem Solving
- Meeting the needs of others /a client
- Learning by application (doing)
- Decision making
- Freedom to arrive at your own solution

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1. Meaningful activity of solving real problems with real solutions
2. Learning happens through using brains and hands together
3. Empowers society to act to improve the world
4. Personal ownership of decisions and actions
5. Learning of vocational skills and techniques that open doors to a range of careers

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Hardy (2014)
Values Framework for Design and Technology

Why the difference?

Some possible reasons:

- One study used the term “Values” the other “Principals”,
- One used a sample group of teachers in training and Design and Technology academics from the same institution, the other, a geographically diverse range of successful established teachers,
- One used a sample where participants knew each other, the other used an anonymous sample where participants had no idea who the other expert panel members were.

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Validity?

It is clear that there is definitely a conscious in the group of experts in the findings derived in this study.

However, as a process the Delphi Technique has no determined optimum sample size – indeed researchers employing this approach have used variable sample sizes. Witkin and Altschuld (1995) note that sample sizes tend to be under 50 participants and often in the 15 – 20 range.

Doubters?

There are many that cast doubt on the reliability and credibility of using the Delphi Technique. Gordon and Helmer (1966), Welty (1971), Linstone (1975), Fink, Kosecoff, Chassin, and Brook (1984), Rennie (1981), Witkin and Altschuld (1995), Green (2014) all highlight potential issues with it as an approach, in summary these are;

- Over simplification through coding
- Illusory expertise (of the 'expert')
- Poor execution
- Overselling (doing the same study with different groups of anonymous experts)
- Deception (by the anonymous experts to manipulate the outcomes)

Next Steps / Recommendations

Recommendation 1. Repeat this study with a wider set of experts. This will further determine the validity of the outcomes from this initial piece of work.

Recommendation 2. Undertake the same process with different identified groups (eg: Primary School Teachers).

Recommendation 3. Follow up this study with another one after the embedding of the new curriculum (Sept 2017 onwards).

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