



Consultation Response Form

Consultation closing date: 20 November 2014

Your comments must reach us by that date

GCSE and A level reform

If you would prefer to respond online to this consultation please use the following link: <https://www.education.gov.uk/consultations>

Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information regimes, primarily the Freedom of Information Act 2000 and the Data Protection Act 1998.

If you want all, or any part, of your response to be treated as confidential, please explain why you consider it to be confidential.

If a request for disclosure of the information you have provided is received, your explanation about why you consider it to be confidential will be taken into account, but no assurance can be given that confidentiality can be maintained. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.

The Department will process your personal data (name and address and any other identifying material) in accordance with the Data Protection Act 1998, and in the majority of circumstances, this will mean that your personal data will not be disclosed to third parties.

Is the revised GCSE content in each of these subjects appropriate? Please consider:

- whether there is a suitable level of challenge
- whether the content reflects what students need to know in order to progress to further academic and vocational education
- whether the amount of content in the qualification is appropriate and, if not, whether you have any suggestions for removing or adding content

1 c) Design and technology

<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Not Sure
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Summary Response

On whether there is a suitable level of challenge

We believe that the level of challenge is broadly appropriate, but have concerns about specific aspects, which we have detailed below, particularly in points 2.1, 2.2, 2.5, 5.2, 5.3, 5.4, 6.3, 7.3, 7.4, 7.5, 7.7, 7.9.

On whether the content reflects what students need to know in order to progress to further academic and vocational education

Yes, we think that the content is appropriate to support this progression (taking into account our comments on detail).

On whether the amount of content in the qualification is appropriate and, if not, whether you have any suggestions for removing or adding content

We have made suggestion below for changes to the content proposed, but believe the amount of content proposed is appropriate.

Detailed Comments:

1. Preliminary comments

- 1.1. We agree that having a **single GCSE title**, rather than a range of separate titles focussed on material areas, is a positive step for D&T. We believe that D&T can offer pupils a much richer experience of designing and making if it was the norm for them to be able to draw on a wide range of materials to design and make with (we realise this does happen in some cases but that these are the exception rather than the rule). We believe that this could make for a much richer working environment for D&T teachers and their pupils.
- 1.2. We are also pleased to see that **embedded control** is an element of the 'Technical Principles' for all pupils; an aspect of the subject that seems to be more than ever central to understanding the products that future citizens will interact with, as more and more of these products contain embedded processors, sensing and the ability to connect to the Internet (leading to what is often called the Internet of things).
- 1.3. However, these shifts do bring **risks** that need to be acknowledged and ameliorated. For these significant changes to D&T GCSE to be successful it should be accepted that many teachers will need support in making them. This support needs to include both CPD and access to the right kind of equipment. We've seen our ICT colleagues going through a similar change as they morph into teachers of computing – supported by CAS and, critically, some government and industrial funding. We believe strongly that D&T will require similar levels of support to make these proposed changes work effectively.

2. Comments on the introduction (Page 3)

- 2.1. In the introduction the first part of Point 2 reads:

“GCSE specifications in design and technology should encourage students to understand and apply **the** iterative design process that can be summarised as explore, create and evaluate.” (Our emphasis.)

We feel there is real the danger that this may be interpreted to mean that there is only one possible iterative design process in terms of explore, create and evaluate. Such an interpretation would of course be completely in conflict with what we know about the way creativity pursues its purposes in a variety of ways. Hence we think it would be better to rephrase the second sentence as follows:

“GCSE specifications in design and technology should encourage students to understand and apply an iterative design process, for example one that can be summarised as iterations of steps such as explore, create and evaluate.”

2.2. In the introduction, we feel that **point 2** is weak in saying:

...”encouraging (*as opposed to requiring*) students to understand and apply the iterative design process that can be summarised as explore, create and evaluate.”

2.3. Similarly, in point 2, the use of creativity and imagination is ‘encouraged’ as opposed to required.

2.4. However the requirement to:

“...solve real and relevant problems, considering their own and others’ needs, wants and values”

is to be welcomed.

2.5. **Point 2** defines outcomes as either **products or prototypes**. We welcome this as an important distinction and one that supports pupil creativity and enables a wider range of pupil responses than might be the case if the outcome was restricted to fully functioning products.

2.6. We believe very strongly **point 3** should include a justification of educational worth of the subject. We think this is important, as it justifies teaching D&T on the grounds of cultural significance. A suggested justification follows:

Imagining what might exist in the future and using tools and materials to create and critically explore that future is a unique human ability, which has led to the development of successive civilisations across history. Such activity embodies some of the best of what it means to be human. Learners study design and technology because it introduces them to this field of human endeavour and empowers them to become people who see the world as a place of opportunity where they and others can, through their own thoughts and actions, improve the world in which they live. At the heart of this activity is an iterative process that can be summarised as explore, create, evaluate.

2.7. Such a justification firmly confirms D&T as a subject for the general education of all young people whatever career path they might choose.

3. Comments on Subject aims and learning outcomes (page 4)

3.1. This is an encouraging list of requirements. However, the way these are interpreted by the Awarding Organisations in the specifications they develop will be critical and we urge those scrutinising proposals from the Awarding bodies to ensure the proposals really do meet all of these aspirations.

4. Comments on Subject content (page 5)

4.1. The introductory points (5-9) are welcome in their focus on designing and making that is dependent on a combination of knowledge, understanding and skill.

5. Comments on Designing and making principles (page 5/6)

5.1. We broadly welcome these principles, as far as they go, and think they provide continuity from previous good GCSE practice.

5.2. There is, however, a lack of appropriate emphasis on **context** and this is paralleled with an over emphasis on the design brief. It is our view that at Key Stage 4 briefs should rarely be given, but derived by pupils from contexts. A further area that we think is underplayed is that of expecting pupils to have a clear view of the **values** that underpin their designing and making – and this includes thinking about the environmental implications. We also think that some reordering of the items would be useful to group items concerned with similar features together.

5.3. Within the designing and making principles there is an indication of support for **pupil collaboration**. But this appears as the statement “identify and understand client and user needs through the collection of primary (including consideration of collaborative discourse) and secondary data”.

5.4. We think that this doesn't do sufficient justice to the possibilities of pupil collaboration and that the role of collaboration needs much more emphasis. We understand that for assessment purposes it will be essential to prevent collaboration obscuring individual performance but we believe that the role of collaboration in enhancing individual performance should be acknowledged and promoted. In support of a higher emphasis on collaboration, it is worth noting that in many design & technology fields working as part of a team or a group as opposed to an individual is the norm

5.5. Hence we think that the re-wording along the following lines would be useful:

[GCSE specifications in design and technology must require students to demonstrate the ability to:]

- *understand that all design and technological practice takes place in contexts which will inform outcomes*
- *explore a variety of challenging contexts that have historical, social, cultural, ecological and economic relevance*
- *identify and understand client and user needs through the collection of primary data*
- *use insights informed by exploration of different cultures, values, ethics, whole system thinking*
- *be aware of current developments in design and technology, including new and emerging technologies, their impact on individuals, business, society and the environment, and the responsibilities of designers, engineers and technologists*

- *analyse the work of past and present professionals in this area*
- *be ambitious and take risks when designing and making, including continuously developing ideas, testing, critically analyzing and evaluating their on going designs in order to inform their decision making*
- *use different design strategies to generate initial ideas and creative intentions*
- *develop, communicate, record and justify design ideas, applying suitable techniques for example: writing, sketching, drawing, planning, labeling, annotating, 3D and mathematical modeling, present orally and digitally and using computer based tools*
- *design & develop innovative, functional, aesthetic and marketable products that respond to needs and are fit for purpose*
- *make informed and justified decisions about their own products/prototypes (and those of others) that identify the potential for further development and deliver solutions for how modification could be delivered*
- *use specialist tools, techniques, processes, equipment and machinery to produce high quality products/prototypes*
- *select and work with appropriate materials and components in order to manufacture functioning solutions*
- *be aware of the availability and cost of materials in relation to the design and manufacture of products*
- *Work collaboratively in those aspects of designing and making where cooperation is advantageous*

5.6. Finally, in this section, we report that we have heard concerns expressed from teaching colleagues about the apparently reduced amount of **making** in the proposals. We do believe there is clear support for making in the proposals and we welcome the fact that making is explicitly linked to designing, for example in both the Introduction and the Aims and outcomes. Making also features in the Designing and making principles, in the context of pupils using “specialist tools, techniques, processes, equipment and machinery “ to make products and prototypes they have designed, noting that pupils should “select and work with appropriate materials and components in order to manufacture functioning solutions” In the Technical principles (of which more below) this is revisited strongly indicating the need for calculation and tolerances.

5.7. However, it does seem likely that those pupils who enjoy ‘just making’ and who are often less excited by the design aspects of the subject will be challenged by the proposals. To some extent this is a pedagogical problem; how can we best support this kind of pupil in engaging meaningfully with design? We think that working from contexts (see above) rather than given briefs may help, as this will mean pupils are working on design and make problems of their own choosing. Also for such pupils (and others...) we need to be clear that much design thinking may well best be done through active exploration with materials. Once again there will be need for CPD

that supports teachers in developing such interactive designing approaches with pupils.

6. Comments On Technical Principles (page 7)

- 6.1. We welcome, on the whole, the Technical principles and in particular that all pupils following a GCSE in D&T will be required to study broadly across the range of materials. In particular we have already noted (in our Preliminary comments, above) our approval that technical content, including programmable components, is included in this broad content.
- 6.2. The division of the Technical principles between students 'having knowledge and understanding of' irrespective of their chosen area of interest (Point 11) and 'applying knowledge, understanding and skills' through their chosen area of interest (Point 12) is interesting and important. Our understanding of this division is that those features in Point 11 will be open to assessment in the written paper whereas those features in Point 12 will be need to be demonstrated in the NEA. It is important that this distinction is made clear. We have commented on the division of marks between the written examination and the NEA in our response to the Ofqual consultation.
- 6.3. There are some changes to the detail of Point 11 and Point 12 that are important which we detail suggest below.

Point 11

- "How materials work together to create functioning products" **to read:**
"How materials and components work together to create products/prototypes that meet functional and structural requirements"
- "The types and properties of the following natural and man made materials: papers and cards, wood, metals, plastics, composites, woven and non-woven fabrics and smart/modern materials" **to read:**
"The types and properties of the following natural and manufactured materials: papers and cards, wood, metals, polymers, composites, woven and non-woven fabrics and smart/modern materials"
- "The functions of mechanical fittings and devices, power sources and discrete and programmeable components and how they can be applied to products" **to read:**
The functions of mechanical fittings and devices, energy and power sources and discrete and programmeable components and how they can be applied to products/prototypes"

Point 12

- "Specialist tools, techniques, processes, equipment and machinery, including computer-aided design and computer-aided manufacture" **read:**
"Specialist tools, techniques, processes, equipment and machinery, including digital design and digital manufacture"

7. Comments on Areas of interest

- 7.1. We welcome the idea of Areas of interest in principle; in particular, in the light of our previous comments about the importance of context, we note that the proposals do, to some extent, offer support for the importance of context.
- 7.2. We do have a broad concern. ***It would be easy to see these areas of interest as simply the previous focus areas in disguise.*** This would not be in the spirit of modernisation that we see reflected in the rest of this new guidance.
- 7.3. We note that the ***nature of the six proposed Areas*** are not the same and, secondly, that the ***examples*** provided are not always suitably challenging for GCSE. Fashion, Interiors and furnishing, Advertising and promotion and Leisure are not the same kinds of thing as Consumer electronics and Mechanical systems. The former are 'areas of life' (or, possibly, fields of work) that allow for a wide range of product types to emerge from the area of interest, including, importantly, those utilising mechanical and electronic control. Consumer electronics and Mechanical systems, on the other hand, are technical disciplines that require a particular mode of functioning. We must emphasise that we very much do want more pupils to engage with the 'technical' aspects of D&T, especially programmable electronics. But it is not clear that trying to force this by contorting the Areas of Interest will be successful; it would be much better to ensure that the technical content that all GCSE D&T students will have to cover is robust enough to provide a basis for them to feel confident that they can apply, say, programmable systems in any Area of Interest.
- 7.4. We think that the three problems we have identified (the interpretation as a pre-existing focus area problem, the differing nature of the defined areas of interest problem and the need to encourage students to utilize their understanding of technical principles in their work problem), can be overcome by a **change of name** that more emphatically signifies the open and interventionist nature of the design & technology endeavour. We strongly recommend that the term "**Arena of Challenge**" replaces the term Area of Interest.
- 7.5. We think that the following would provide suitable Arenas of Challenge:
- Exploration,
 - Disaster relief,
 - Living and working spaces
 - Waste Management,
 - Climate change
 - Protection,
 - Safety
 - Comfort
 - Hygiene
 - Health and well being

- Looking good
 - Challenged communities
- 7.6. Note that we have taken inspiration for the chosen Arenas of Challenge from the work of the All Party Parliamentary Engineering Group.
- 7.7. It is important that the examples given do in fact indicate challenge. Those currently present under Consumer electronics are particularly weak e.g. “products that fulfil a practical need such as torches or light sensors” compared to the other areas of interest. Torches can, clearly, be very sophisticated, but the above could easily be read to suggest that a simple torch (often a KS2 project) might be a suitable GCSE project. The reference to ‘light sensors’ is even more puzzling since it is a peculiarly specific reference to a component or sub-system in an electronic circuit rather than something that (by itself) is a product “that fulfils a practical need”.
- 7.8. Much will depend on the way that teachers enable their pupils to learn within Arenas of Challenge and then respond effectively in response to open starting points (we have discussed this further in our response to the Ofqual consultation that is running in parallel with this consultation) and, as we have noted earlier, we see this as an area in which many D&T teachers would benefit from relevant and appropriate CPD to help them work in a more integrated way across the traditional material areas.
- 7.9. Teachers will need guidance as to the range of responses that are appropriate for any Arena of Challenge (as was provided for the Areas of Interest) and we suggest the following:
- Exploration – possible outcomes could include remotely controlled devices to visit, record data, take samples from a range of hostile/distant environments
 - Disaster relief - possible outcomes could include items concerned with providing short/medium term shelter, clean drinking water, communication with the outside world
 - Living and working spaces - possible outcomes could include models for elements of the intelligent sustainable city
 - Waste Management - possible outcomes could include items concerned with safe disposal, minimising waste, utilization of waste or eliminating waste
 - Climate change - possible outcomes could include items and systems to help individuals and small communities to reduce their carbon footprint
 - Protection - possible outcomes could include items for individual protection for people in different situations (leisure pursuits, different occupations, travelling)
 - Safety - possible outcomes could include items to keep possessions free from theft, individuals or groups free from harm
 - Comfort - possible outcomes could include items to provide physical comfort in a variety of situation or emotional security in times of stress,

- Hygiene - possible outcomes could include systems and devices to be used in the wild, in rural areas, in urban areas, and be concerned with individuals, groups and /or communities
- Health and well being – possible outcomes could include items to enable changing lifestyles, to enhance well being in the elderly, promote whole family well being
- Looking good - possible outcomes could range from items of apparel, accessories, hair-styles, cosmetics all in the context of occasion, culture and personal intent
- Challenged communities - possible outcomes could include items to enable disadvantaged communities to self-help

7.10. As the Arena of Challenge approach to NEA becomes successful it should be possible for schools to identify their own challenges

All DfE public consultations are required to meet the Cabinet Office [Principles on Consultation](#)

The key Consultation Principles are:

- departments will follow a range of timescales rather than defaulting to a 12-week period, particularly where extensive engagement has occurred before
- departments will need to give more thought to how they engage with and use real discussion with affected parties and experts as well as the expertise of civil service learning to make well informed decisions
- departments should explain what responses they have received and how these have been used in formulating policy
- consultation should be 'digital by default', but other forms should be used where these are needed to reach the groups affected by a policy
- the principles of the Compact between government and the voluntary and community sector will continue to be respected.

If you have any comments on how DfE consultations are conducted, please contact Aileen Shaw, DfE Consultation Coordinator, tel: 0370 000 2288 / email: aileen.shaw@education.gsi.gov.uk

Thank you for taking time to respond to this consultation.

Completed responses should be sent to the address shown below by 20 November 2014

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