

Examiners' Report/ Principal Examiner Feedback

Summer 2010

GCE

GCE Design and Technology (AS): Product Design
(6GR01)
Paper 01 Creative Skills Portfolio

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Principal Moderator's Report for 6GR01

Design Technology: Graphic Products

2010

The work seen this year from the vast majority of centres was appropriate and met the assessment requirements of the of the unit. Very few centres submitted work that was anchored in the previous assessment structure and the overwhelming majority approached the new specification in the manner expected. The most successful candidates submitted three discernible sections to their coursework, which were usually physically divided in one portfolio into product investigation, product development and product manufacture. The problems in meeting the requirements for the highest assessment criteria centred around candidates who had not met the level of demand required for an AS level submission. The best work came from centres that introduced elements of choice and diversity into their tasks encouraging individual work that fulfilled course requirements but allowed candidates to express their skills and talents. Many centres adopted a formulaic approach where all candidates investigated the same product, were given a very prescriptive design brief and all produced the same manufacturing task, or all 'investigating' the same product. Where candidates are asked to investigate exactly the same product they often "share" information, which sometimes shows enormous similarities in content between candidates and can in severe cases be referred to the compliance department at Edexcel on malpractice grounds.

The requirements of the Product Investigation element of the course are now more familiar to centres, the vast majority coping well with this section, producing commendable work. Most of the problems in this section still tended to be associated with the comparison of products that were too complex, or too similar.

Centres are comfortable with the familiarity of designing and making and standards were as always, mixed. There was some high quality design work seen, with an increase of the 'blue-sky' approach, which was pleasing to see. Some centres offered more than one design project as evidence in this section; although they were definitely in the minority. There were occasions where a project was submitted as a supplementary 2d design element, this is not a requirement for this submission and candidates can design just about anything in this section, however it often supplemented different design and development skills in the portfolio at this stage, gaining credit along the way. This year there was a significant number of products being designed that were traditionally not accepted as graphic products. Whilst there is no penalty for this and some centres find this a useful management tool, it does beg the question whether it is the best preparation for candidates going on to A2 when they have considerable restrictions placed upon them of designing within a specific graphic nature.

Making was the most productive element for most candidates in eliciting marks and overall, some very good standards were presented, although a few centres allowed

candidates to submit work that was barely of KS4 quality. Even more centres submitted only a single product outcome, hence failing to demonstrate the range of processes and manufacturing techniques looked for. The most successful centres offered two product outcomes, often from different graphical pathways, i.e. architecture and packaging. Some had found demanding projects that allowed for a very wide range of skills in the single outcome, such as a board game. Centres are increasingly finding new technologies to assist with the manufacturing process and we see an increase in the use of CAM outputs every year. This must be balanced with other modelling skills and the candidates must produce a range of skills, not just repeat the same ones.

Marking by teacher assessors was in the main acceptable, but generous on the whole. Most marks were supported by appropriate annotation and this helped moderators when writing E9 feedback to centres.

Moderators did not report any great administration problems coming from centres, beyond some addition errors, incorrect transfer of some marks to OPTEMS from CABs and some CABs not signed by teachers and candidates.

Some centres failed to label folders and pages clearly. This made the moderation process much more difficult for the moderators. Centres should ensure that each page in the portfolio is clearly labelled with candidate name and number, and title each page so it can be clearly connected with the relevant section of the coursework.

Electronic submissions must be in either PDF or PowerPoint formats, or we cannot guarantee them being seen. A number of centres submitted work on publisher this year and some files used fonts so small that the work could not be read and had to be sent back to centres for editing or printing.

Product investigation

There was still a broad spectrum of responses seen in this assessment section, although we are seeing an increasingly reduced range of products. Centres who adopted a clear and structured approach made it easier for their candidates to score highly. Some centres used tightly defined templates and some centres directed their candidates so closely that individual responses differed very little, bordering upon questionable submissions. When candidates employed tables, with appropriate headings, candidates fared better and produced more focused responses. The use of ICT helped candidates to organise and manage their work. Although the wholesale copying of information and then pasting onto sheets is not helpful and we need centres to discourage this from the outset as the structure of the vocabulary and language used often stands out from other work submitted by the same candidate.

The best work was seen where candidates had disassembled products in order to analyse the component parts in detail. Some candidates used only photographs of products to investigate, which severely limited their experience in this section.

Other high quality work was achieved where centres had allowed candidates a choice in products to investigate. Where the same product was investigated by all candidates in a cohort, there was replication of information and a lack of individuality when work was presented. If candidates are to be allowed to express their individual expertise and academic insight, centres need to be very cautious about only offering a single product for an entire cohort to investigate. Evidence from this year's submissions continues to show that such an approach leads to generic and formulaic responses that are of little benefit to candidates and are often no more than hoop-jumping exercises.

Again it is interesting to note how many centres submitted products that were not traditionally associated with Graphic Products, more so with resistant materials. Whilst this in itself would not be penalised, evaluating a graphic product does lend itself so well to the teaching of the associated graphic theory knowledge required for the examination. To disassemble a product such as a packaging item, allows openings for the investigation of plastic moulding, printing, card cutting etc.

Criterion A - Performance analysis

Most candidates were successful at accessing the bulk of the marks in this section, it is noticeable that the very highest mark range was less easily accessed. Too many candidates did not give sufficient detail to earn the maximum marks; they failed to justify their choices. A few still dealt in generic terms and some gave the information about the function etc. and failed to apply it to the chosen items.

The most successful scenario for the majority of candidates was to set the evidence out as described in the assessment criteria; form, function etc. and then go on to detail each of the elements and attribute them to the products to be compared.

The choice of a similar product to compare and contrast was central to reaching the higher marks and many candidates failed to consider this fully, selecting products that were too similar such as a glass perfume bottle, compared to another make of glass perfume bottle. Where candidates pursued these very similar products, opportunities to compare and contrast them were minimal. A small number of centres failed to recognise the need to compare and contrast at all.

Criterion B - Materials and components

This section was usually well-handled, particularly when candidates focused their responses in a table format. One of the key issues facing candidates in a successful response is the connection of this information to the actual product. Many candidates were able to draw upon functional and aesthetic properties to justify the choice of materials but they failed to justify them in terms of the actual products requirements. However, weaker candidates referred to material groups

(metal, plastic, etc) or identified inappropriate materials and provided little justification beyond simplistic statements.

Alternative materials were usually suggested. Most were appropriate enough to meet the requirements of the assessment criteria, but some were not justified successfully.

Sustainability was addressed by most candidates but often at a generalised or superficial level. Candidates sometimes failed to apply their analysis directly to their chosen product. When describing the environmental impact of using particular materials, the majority of responses were generic and superficial, usually mentioning energy use, depletion of resources and problems of disposal. A better focus would have been to consider extraction and processing of raw materials, processes when producing specific materials and disposal of specific products after their useful lifespan.

Criterion C - Manufacture

Where the choice of products was appropriate it was simple for candidates to suggest appropriate manufacturing processes. However, many responses were descriptive and failed to apply these processes explicitly to the product. Too often candidates gave a general answer to this section, many candidates simply offered a drawing of the method of manufacture and did not relate it to their product or part of their product. Some candidates failed to consider the advantages and disadvantages of their identified processes and/or omitted to suggest an appropriate alternative process. There was often evidence of candidates offering descriptions of how plastic is made, or the injection moulding process, without mention of the product or its desirable properties.

The majority of candidates dealt with the impact on the environment, although many slipped into talking about the material rather than the process. The justification of various printing processes tended to be given scant attention which was surprising for Graphic candidates.

In this section particularly, there was well spread evidence of plagiarism, where candidates had copied and pasted exemplar material from various websites and claimed it as their own.

Criterion D - Quality

As last year, this section often attracted a weak response. Many candidates failed to mention ISO, BSI or similar related QA mechanisms and standards. Candidates found this subject difficult to apply and many passages were lifted from generic resources. Centres should be encouraged to match manufacture to standards and explore organisational and structural issues related to quality.

Quality control tended to be understood by the majority of candidates. With the mention of checks, measurements and alignment of colours the majority showed a

good understanding of how control would be implemented. The real improvements came when they directly related their comment to the product rather than talking in general terms.

There was again no clear understanding of Quality Assurance and what it meant for many. More could have been made of the BS and Kite mark etc or indeed of examples such as Tesco's silver label etc. The best candidates used the relevant BS numbers and explained how they were applicable to their chosen product. They also went on to talk about branding and brand loyalty arising from quality assurance.

Not many candidates were able to describe a Quality Assurance system for their product. Although those performing at a higher level were able to demonstrate through a TQM system how quality assurance could be guaranteed in a product's manufacture from sourcing materials to packaging.

Product design

There were some excellent examples of creative design seen in this assessment section, particularly where candidates were not constrained by having to manufacture what they had designed. This said, it is disappointing to note that there were few risk taking 'blue sky' designs, with the vast majority of centres setting topics that stayed within the safety zone of what they have been comfortable with in the past, or indeed adopting a resistant material approach to their designing.

A significant number of centres adopted the approach of designing a product that would be manufactured later, which was disappointing as it is not in line with the ethos of the course and not what was hoped for from the candidates. However candidates are not penalised for adopting this approach.

Criterion E - Design and development

This for most was a strong section, but for significant number it proved to be their weakest. Many produced a range of alternative ideas. Some centres entered more than one project, often to no real gain. Those that settled on a design early on were disadvantaged and many candidates wasted time compiling detailed research. Some offered simplistic ideas that were supported with too little annotation, these invariably failed to develop their idea to its potential, or show how they had thought about it, and produced the result from a series of small but incremental steps. The best all-round work came from candidates who added informed, succinct and useful annotation to designs, which demonstrated their understanding of materials and processes likely to be used in manufacture, and who presented summative evaluative statements focused on the set design criteria.

Development of a final design proposal varied from varied high quality explorations to an explanation of what manufacturing will take place for a given product. Good

levels of credit were achieved by candidates where they understood that development meant 'change', and that they should illustrate this by bringing together the best or most appropriate features of their design ideas into a coherent and refined final design proposal that met all of the design criteria.

For successful development there should be evidence of the final design proposal having moved on from an original idea through the results of graphical exploration and evaluation. It is not acceptable to simply take an initial idea and make superficial or cosmetic changes to it and then present it as a final developed proposal. Candidates should include as much detailed information on all aspects of their developed design as possible, as this is an opportunity to show knowledge and understanding of their design and make activities.

The use of modelling was often an afterthought by many candidates and rarely used as a design strategy. This important aspect of design development should be used to test features such as proportions, scale, mechanical details, sub-systems etc. At the end of the development section, most candidates were able to produce a final design proposal that included some technical details of materials, processes, techniques, fixtures and fittings that would be used during product manufacture, but not many were able to produce clear concise working drawings that a product could be manufactured from.

Where CAD was used the results were often clearer and with greater resolution. Interestingly, where the CAD was used the degree of understanding of materials, processes and techniques was better. It may have been that through spending more time on a single design project more elements had been resolved. However, too often the final design was not significantly different from, or improved on, the early attempts. The best use of the CAD was to bring the work up to the standard where the product was capable of third party manufacture. A viable working drawing in orthographic was then invariably supported with an isometric derived from the orthographic. Interestingly, many of the architectural modellers used the programme Google Sketch-up for this stage and to very good effect.

The evaluation of this section was not a feature that many candidates spent time on. Candidates should be encouraged, or at least well advised, to create a design specification at the outset of this task. That way they may more readily access the full annotation marks. Evaluative comment can then accompany the development of the section and the specification be used to objectively evaluate at the end. The design criteria sometimes appeared for the first time at the end, and it was often skimpy. Generally, the better candidates covered this section with some pithy bullet points that could not have taken long to address. The justification of this section was invariably good when it was completed.

Criterion F - Communicate

Many candidates achieved good marks in this assessment section. Credit in this section can be gained from communication evidence throughout the design portfolio. However, the level of communication was very varied. Candidates, in some cases, had been coached to use a variety of media to good effect. It is

important that the centres realise that the non-use of CAD is no longer an option. To centres without this facility there are options of free downloadable software such as the use of Google Sketch Up, which can be easily utilised.

The use of CAD was often of high quality and the vast majority of candidates demonstrated expert skills in using CAD programs they were familiar with. There was little evidence of candidates producing drawings and enough information for a skilled third party to manufacture a designed product, and the quality and skills used varied greatly. A disappointing feature of this section was again the widespread lack of basic drawing ability. It was obvious that some centres had spent time on developing skills in drawing and this was reflected in the work presented by their candidates, but in many other instances, drawing and sketching was weak and lacking in precision.

Product manufacture

Criterion G - Production plan

This section was usually completed to a good standard. Detailed production plans of the manufactured product appeared in most folders, with support from Gantt charts, flow diagrams, working drawings and cutting lists. A diary was often given as supporting evidence; although this did not support the assessment in this section it was useful as a guide for criterion H.

Detailed times were commonly missing from the plans, often blocks of days, or lessons, were cited but considered too vague. We must see the candidates, in this section, using their understanding of materials and processes and not producing a record of manufacture; it must be planned in advance.

Criterion H - Making

Without doubt, this assessment section elicited the highest percentage of marks for most candidates from those available in any section. Many centres opted to set only one manufacturing task, which is acceptable. However, a significant number of these tasks used only a single material, which does not match the criteria for the higher levels of response despite being generously rewarded by centres. The assessment criterion states that a 'range' of appropriate materials must be selected and that candidates should work with a 'variety' of materials, processes and techniques. In order to fulfil these requirements, the use of at least two materials and processes must be evidenced. It is important to note that candidates for Graphic Products do not need to submit a 3 and 2d element for this submission, but where they did it no doubt supported the understanding of the theoretical elements involved in other parts of this course.

The majority of centres embraced the ethos of this section and set manufacturing tasks that allowed candidates to experience a range of materials, processes and techniques, planned to develop skills that candidates could call upon when designing and making their A2 project, and some high quality outcomes were seen.

Most centres set two tasks and a few set three, which seemed to prove difficult to complete successfully in the time allowed. Where centres had designed and made; they often failed to perform on this aspect as the outcomes did not demonstrate sufficient range of process and materials.

However, there was often an excellent range of projects with a high level of making skills shown. Naturally there were occasions when the level of demand was wanting and candidates were thus unable to access the full range of marks. Where very tight single tasks were set and all candidates in a cohort were given the same detailed working drawing, cutting list and materials, the outcomes were often difficult to differentiate between unless high quality photographs showing individual skill levels were provided. In much of the work presented, there were opportunities for candidates to make manufacturing decisions, such as choice of materials from those available in a centre, choice of joining techniques, use of certain processes, finishes etc, which would have given candidates more ownership of their work and helped in differentiation.

The Level of accuracy and precision needs to be in-built to the project selected. Using a laser for cutting and printing did mean that some of the projects were unable to show a full range of skills and techniques. The work produced was unquestionably of a good quality, but this is not within the spirit of the course or the exam or demonstrating arrange of skills and processes. It is vital that centres control the range of skills utilised in the manufacturing section, in order that candidates demonstrate a range of manufacturing processes. A simplistic guide is 50/50.

In general, marks awarded by centres in this assessment section were agreed during moderation, and where there were discrepancies between centre and moderator marks, this was often because candidates had not justified their selection of materials. Where candidates were given no choice of materials, for example when a task involved aluminium casting, they should still have an understanding of why that material was appropriate to the product under construction, i.e. good strength to weight ratio, printability, fluidity for moulding, good light conductivity, etc. This information should be offered as justification. Where it was carried out successfully, justification of selection was evidenced through annotation of photographs of making or in the plan for production. Where photographic evidence was shown of the making it made it much easier to credit a range of making skills, techniques and materials. Safety awareness was invariably demonstrated through statements within the schedule of making.

Criterion I - Testing

Falling at the end of the project this section often appeared to be rushed. While there was evidence of good practise many responses failed to address the assessment criteria at a meaningful level of response. Many candidates simply evaluated their work and failed to take the opportunity to conduct objective and measurable tests, when testing did take place it was often superficial and the results uninformative.

To enable the evaluation and testing to take place with some value attached, it is worth the candidate putting together at the outset, a specification for the projects undertaken. Candidates then should apply tests to the specification points and use this data to inform their evaluation of the product manufactured. The majority of candidates failed to earn full marks as they carried out an evaluation solely from a personal stand-point. Where third parties were involved, often with a questionnaire, results were fuller and more interesting in that they usually carried a broader spectrum of comment.

The use of photographic evidence was invaluable at this stage and often conveyed the outcomes or experiences of testing at a glance. Elements of the making could be reviewed at this stage to show difficulties or more often moulds, jigs and fixtures that had been used to ensure accuracy and precision.

Grade Boundaries

GCE2008 AS Unit grade boundary model

Grade	Max Mark	A	B	C	D	E	N	U
Raw mark boundary	90	73	64	56	48	40	32	0
Uniform mark scale boundary	120	96	84	72	60	48	36	0

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