

Examiner's Report /
Principal Moderator's Feedback

Summer 2016

Pearson Edexcel GCSE
In Design and Technology:
Paper 01 Graphic Products
(5GR01)

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Introduction

This specification can now be seen to have settled into an established pattern for most centres. The work submitted is increasingly marked closer to the board's standard as centres are confident with the coursework requirements at each level. The moderators have seen a significant number of design and make projects submitted, centres overwhelmingly opting to design and make a model of the one product. However we have seen a significant number of separate design and make tasks, with centres choosing to design a product such as a perfume bottle then make something that they consider to be much more demanding to design like a building or an interior.

The vast majority of centres have chosen products to design or make that were selected from the appropriate lists of products on the Edexcel website at; (<http://www.edexcel.com/quals/gcse/gcse09/dt/Graphic/Pages/default.aspx>).

I would also like to welcome to the board a number of new centres who have chosen to enter candidates with us for the first time, I would urge you to glean every whatever information you need from the following points raised in my report in order to enhance any future submissions for this qualification.

Administration

2016 has been a year where centres have in the main completed the tasks of submitting the admin for this course appropriately. There are less errors made each year but I need to highlight those that centres have made but I need to stress this is very much in the minority and understandably focusing largely where there are new centres or new teachers to the specification.

There were a small number of centres who failed to adhere to the Edexcel selection requirements, regarding the sample of students selected from centres. It is important to note that the submission of the selected candidates, as indicated on the OPTeM's form, should be supplemented with the highest and lowest marked candidates, where they have not already been selected. Centres also need to replace any candidates that have been selected, but are no longer part of the centre entry, with any additional candidate (usually on a similar mark). Where centres had failed to comply with this important starting point they would have to be contacted to complete the correct collating of the sample before any moderation could take place.

Again a small number of centres sent incorrect sheets from the OPTeM's form, sending all copies to the moderator, or the wrong coloured copies. This in itself is not a significant issue to the moderation process and is becoming a largely redundant requirement due to the growth in EDI entries. If EDI is not used it is important that the top copy be sent to Edexcel, in order that the centre marks are entered on the system. The green copy is retained by the centre for their record of marks sent and the yellow copy should be sent to the moderator. A number of varying combinations of these colour coded submissions were observed by moderators, but centres should have been informed of any errors in writing, usually on the E9, or by direct contact to the exam officer if the marks did not match the entry on the system.

The centre mark record booklets (CMRB) were completed very well on the whole. Centre markers completed the booklets as intended, including the annotation required for the evidencing of making skills undertaken in the manufacturing process. Very few failed to complete this section at all. Annotation in general was often excellent and most moderators found the additional comments to be of use to them during the moderation process. An increasing number of centres failed to sign the CMRB to guarantee the work is that of the candidates.

The single biggest issue that moderators found within the CMRB was again the failure for centres to add the marks correctly. These addition errors often jeopardised not only that candidate's mark but also how the rest of the centre

would be treated during the moderation process. It is vital that any addition errors are corrected at source by the centre, so that the marks input by the centre are accurate, as addition errors could invoke adjustment with the final moderator mark and the incorrect mark that is on the system. All centres with addition errors would have been contacted by the moderator through the exam officer on an E6 form, which would have listed the errors. These corrections can only be made by the centre and must be accurately input if accurate moderations to take place. There were examples of centres failing to change these addition errors by the end of the process, it should be noted that the entry of marks by the exam officer at the centre are the marks that will be accepted by the system and should those marks not be changed then the centre are taking serious risks with their entire sample as Edexcel cannot change these incorrect marks without direction from the centre.

Photographic evidence for practical work was clear and well documented for many candidates, there were a number that were taken at too great a distance, or were not clear for technical reasons – printer cartridge needed changing! This has to be a more important priority for some centres. This is the opportunity for the centres to demonstrate clearly that the marks asked by the centre are evidenced in the photograph. Time needs to be set aside for this important part of the submission, ensuring that the photographs are going to clearly show how the marks asked can be justified against the products made. In the best cases, centres provided evidence in the folder of the products being manufactured as an addition to the summative photographs in the CMRB, in these cases it was often easy to see the processes that would not be evidenced in the final product.

There continues to be a problem with some centres, with the failure to label folders effectively, with candidate name/number or centre name/number.

Admittedly they often physically attached the CMRB to the folders in an attempt to label the folders, however one of the first things a moderator will need to do upon receipt of the folders is to separate the CMRB from the folders, resulting in the need for them to label all the folders for the centre. Some centres also attached the CMRB's to the folders by very robust means; these were in danger of being ripped or torn when being separated from the folders, centres are requested to attach CMRB's loosely to securely bound folders, and to independently label the folders correctly.

The moderators reported that there was decrease in the number projects being submitted of a point of sale type product, with a growth in the number of architectural and interior projects being seen.

Where candidates submitted separate design and make submissions, candidates did well if they manufactured a more complex product like an architectural model and designed a different product. Designing architectural products often proves quite demanding for most candidates. There were some excellent examples of interior design work but this genre also provided the least well completed design aspect. Consistently the most successful area for design and development has been packaging, with excellent opportunities being offered for physical modelling and manageable CAD work.

Some centres entered projects as part of the manufacturing section that was set as themed class products. Some centres introduced a degree of flexibility into the final product, the decision being made by the candidate to change it in some way. Too many controlled too heavily how the product would be made, down to materials and construction techniques, even supplying jigs or nets for the candidates. It is concerning in more cases than we would prefer to see, that there was too much teacher control in the tasks, leaving little for the candidates to interpret. In this situation it is preferable for the candidates to decide on the materials and manufacturing processes themselves, rather than be given the answers to all these issues by the class teacher, where the candidate is given the materials or has jigs and mould provided, they will not be credited with the

range of skills in the same way as with a candidate who has made many more decisions themselves about their practical outcomes. This form of submission should involve the given sizes of a product but key information such as net design nor shape should be left to the candidates own decision if full access to the making mark range is desired.

Analysing the brief

The majority of candidates provided evidence of analysis work. The most successful candidates provided thorough analysis of the design issues, raising pertinent questions surrounding the design problem that directed future research. Most centres achieved a mid-mark in this section, but generously assessed in the highest assessment category. This tended to be where candidates produced simple mind maps of initial thoughts rather than a detailed analysis of the brief. Mind maps are a good starting point to highlight the issues that may need to be considered, but the problems to be faced, must then be alliterated. The majority of submissions saw the candidates write their own brief, where centre briefs were provided, the candidates often failed to develop an analysis in enough depth. This aspect was consistently an aspect of adjustment with moderators; centres clearly do not always have a grasp of the requirements for this section. We seek a demonstration of the key issues that will need to be researched by the candidate. They should explain what they need to find out before starting on this project through the use of questions, which will then be answered through the research.

Research

The general consensus from the moderation is that a number of centres assessed research more accurately but when it came to those candidates who were leniently awarded marks in the higher assessment criterion, it lacked key details; particularly detail about specific materials and processes involved when exploring existing products. Candidates also failed in some cases to research all aspects of their chosen design and make activity, e.g. bottle research but not packaging. There was far too much dependency upon the look of the product or the function, without reference to the key critical ergonomic information or reasoning for materials choice and manufacture. Where there was evidence of good product analysis it was from centres that used the criteria laid out in the mark scheme and encouraged candidates to adhere to this. Weaker performances by centres analysed existing product in a less structured format. Issues of sustainability were addressed by some centres as a page of global issues rather than in relation to the product being analysed. A clear understanding of sustainability issues did not come across from many candidates.

Yet again the single most common element that was missing, was again the lack of critical data, sizes etc. although this has improved. Many candidates designed products with no indication of key sizes or legal requirements. A room interior, but no indication of knowledge of the sizes of the room as a starting point, a package with no information about the necessary minimum legal information to be included on it, the design of a games controller without detail of key/relevant anthropometrics.

Questionnaires, when offered, were fairly superficial lacking useful questions and all too often the data not analysed in any significant way. The better submissions had a summary, explaining what had been gained by the completion of the questionnaire and clear indication of how this feeds into the specification. The most successful submissions in this section demonstrated a clear understanding of the need to analyse the problem then answer the questions raised through the research. The answers then directly link to the specification and what parameters must be considered during designing. Some centres offered linking explanations from the analysis or to specifications.

Specification

The moderators report an increase in lenient marking in this section. In the best performances, the candidates made obvious links to the research previously undertaken. Here the specification was presented as a series of answers to the questions raised in the analysis, at times though the points presented were not justified and lacked technical, measurable points and centres failed to take this into account when marking in the mid- top levels. Candidates that used headings such as form, function, user requirements or other similar sub-dividers, tended to perform better than those without headings.

Moderators have reported that specifications sometimes tended to be general and lacked sizes, performance and material data in enough detail thereby having difficulty making their points measurable. When relating points to the research section, some candidates highlighted key data within the specification points, or added another column to their specification table; this made it much easier to identify for the moderator.

Most candidates included some reference to sustainability but this was often superficial. In this section, architectural projects seemed to offer relevant and wide ranging sustainability points more successfully than others.

Initial ideas

It is disappointing to note that this section probably (along with) the development section again elicited more reasons for adjustment than any others. It is a growing concern that candidates are still offering more and more formulaic material for this section. Centres appear to be relying on the production of three ideas (a range) regardless of their quality and appropriateness. Concentrating too often on the whole product and failing to look in sufficient detail at its sub-system or key elements. This broad approach to designing does not allow the candidates to demonstrate a detailed understanding of the materials and processes that will be needed to consider the designs in detail. The opportunity to link to research as well as discuss alternative technical information is increased if the candidates are looking at the individual sub-systems that make up the whole.

Where design work was successful, the ideas were a realistic range, offering detail into the sub-systems and clear technical information about the reasons for rejection or selection of those aspects or components. The meaningful use of research where it was evidenced was a clear distinguisher between a good and an average performance at this level.

Where candidates evidence initial ideas that are well produced, with a good range of ideas communicated in a range of formats, they have usually broken down the product into sub-elements and these have been key issues in their designing story. Indeed many design ideas were often well communicated, with the utilisation of good sketching techniques and a variety of CAD software being evidenced. A small number of centres successfully combined a variety of sub-systems to enhance their range of design strategies and presentation techniques; the use of CAD modelling for bottle design, physical card modelling for container design and the manipulation graphically of images to be used as logo or labels.

Where centres failed to meet the board's standard in this element, the work lacked the depth, detail/information and range of ideas to justify the centre marking. However some centres adopted the strategy of devoting one A3 page to each idea which helped candidates to explore their initial thoughts in more detail, adding detail or alternatives to the sheets about sub-elements relevant to the design work. Attempts were made, to refer to materials and processes but in some cases references were generic: 'plastic', 'card' etc. The value of evidencing materials, processes and construction in general, was again largely overlooked

by many candidates/centres in this section. Many ideas across the range of samples based their ideas on pure aesthetics and layout and there was limited evidence of technical annotation, generic material terms were plentiful.

Review

The review section was focused against specification criteria and was evaluated in a more detailed way than previously seen. This was usually completed successfully although use of third party feedback was varied; centres should encourage candidates to make it clearer where third party views have been sought. Most centres opted for a discrete review sheet with the specification reproduced in a table and added brief statements regarding each specification point or used a colour coded chart or mark out of 10. Others reviewed their work alongside their ideas in their annotation. Some centres had included issues of sustainability which sometimes were simplistic and failed to stretch beyond recycling.

The opportunity to gain and utilise user group feedback was still an area of weakness for some centres.

Communication

At the highest level of achievement there continued to be a wide variety of well communicated skills being demonstrated, with good use of CAD. Centres are increasingly evidencing demanding CAD programmes and some excellent use of Google Sketchup for interior and architectural work. Few centres used formal drawing techniques to communicate ideas until the final design section. Occasionally centres awarded high marks to candidates who produced all their design and development work using CAD and vice-versa. Most candidates still would benefit from being encouraged to highlight the most important design decisions on their design sheets.

The clarity of communication can be improved in the majority of cases with some simple colour coding, the following quote is taken directly from one of the team leaders feeding back to me at the end of the process this year;

'I did find some centres colour-coding the annotation based on materials, processes, specification, and client and so on; marvellous ... it really assists the moderator and focuses the candidate too'.

Centres also need to be aware that the assessment criteria for this section can use evidence in the development section as well as the design section.

Development

Candidates failed to impress in the main, in the submission of work in this section. It would appear that many centres do not realise or fully understand what they should be presenting in this section and have often used this part of the coursework as a method of presenting how the product would be made. In this section we seek to see changes being made to develop the initial ideas to a sensible/feasible working solution. Modelling CAD and traditional should be utilised to establish different ways of solving the problem and the problems of the sub-systems in the design. The work should be evaluated and technical aspects be evidenced, alternatives technical solutions should be offered to show that the development has been used to consider 'other' ways of solving the problem. Candidates performed well when they made use of their specification to develop their selected idea so that it addressed most points of the product specification. CAD modelling was sometimes presented as a series of screen shots of the stages involved in building the single image, but the centre had credited each image as separate and discreet development when indeed it was merely the construction of a single proposal. Traditional material modelling was often completed and evidenced but was not used as a design tool, often being a practice model before the real one was made. Too often modelling in either CAD

or more physical modelling was used as a presentational tool, rather than as a design strategy. It was a common theme for the models to have no changes made to them before the final model was presented. The step by step 'build-up' of CAD drawings was occasionally erroneously given credit as development work by centres. Centres need to note that this is not development and it appears like a manual of how to produce a CAD representation of a proposal.

The holistic approach to the body styled designs prevented some centres from gaining credit for the application of changes and technical information. As the inclusion of sub-system consideration meant that the candidates had much wider opportunities to demonstrate decisions, technical information and communication skills. The modelling of a grip or perfume bottle body shape can be quickly and easily shaped in Styrofoam and then reviewed! Bottle or package labels can be professionally reproduced on a variety of CAD packages from Photoshop to Word and reviewed. The modelling in CAD of a building entrance or signage can be reproduced with changes easily, and then reviewed. The development of these sub-systems will not only lead to more successful outcomes, but will also provide more opportunities for demonstrating a variety of communication skills, but they should be used as exploratory tools, not just as presentational devices.

Final Design

The application of the assessment criteria by centres within the *Final Design* section was often generously dealt with by centres. Many omitted to identify materials and processes which had been selected. Clear, dimensioned final designs, containing levels of information sufficient to enable third party manufacture, were again rarely submitted.

The final design section is an opportunity for the candidate to present the chosen solution and justify its choice, giving clear and detailed information for a third party with some technical knowledge to construct the product proposed.

Many candidates failed to meet these requirements, particularly if they used a CAD drawing from their development section, and simply converted it to a working drawing. This often showed their lack of understanding of the needs of a working drawing and its purpose. Candidates would benefit from asking a third-party to look at their final design and decide if they could be made without referral to the designer. Other technical detail was also often missing. Some candidates produced final illustrations but lacked detail of materials, processes, size etc.

In best cases we were treated to a correctly labelled and dimensioned set of working drawings and perhaps a 3d or exploded view explaining how the product would be manufactured. The basic information was often left out, such as shape of nets and plans of buildings.

Production Plan

Moderators reported that all centres had evidenced some form of production planning; the actual planning was generally of a good quality in the form of flow charts and more often there was an increase in the use of tables. Centres were generally good at producing plans which showed the main stages and in the correct order but some statements were too broad for the top marks they had been awarded. 'Make bottles on lathe' is not a detailed statement. The same lack of detail was often applied to the manufacture of vacuum forming moulds (if they were documented at all).

Where candidates' production plans took the form of a flow chart, showing a sequence of stages of production, the charts often had the correct sequences, but quality control (QC) points were often generic phrases, merely suggesting what needed to be tested without suggesting how. The specific QC was rarely named or described, for example 'check size against template', but was instead a broad statement 'make sure it's the right size' Most could organise their practical

work into a series of processes but many did not cover all the requirements of the assessment criteria to gain full marks.

Quality of Manufacture

In this section the centre needs to demonstrate to the moderator that the candidate has used tools, processes and equipment with precision and accuracy. The moderators found that when centres had provided good quality photographs clearly showing the step-by-step manufacture of the product, assessment of this section was usually straightforward, and centre marks were often easier to agree. However, where this did not occur, it was much more difficult to agree marks as evidence was not always available.

Witness statements on the whole were generally accurate and helpful. Although there is still some evidence that some centres appeared to have allowed the candidates to fill this section in, which is clearly a concern if they have assessed their own level of participation?

Increasingly popular are the centre submission whereby the class have been involved in the manufacture of a class product. Whilst this is a perfectly suitable method of submission for this section, candidates should not be given any more guidance than the working drawing that can be provided by the teacher. They then have to make their own decisions about the manufacture and selection of materials for the product. The provision of moulds and formers is clearly inappropriate for this submission and needs to be a decision that the candidates make for themselves, rather than following a step by step assembly as prepared by the member of staff or technician. It has to be noted that the submission of work that was too structured is on the decrease and most centres have built in slight changes or decisions for the candidates to make themselves. But it remains the case that the centre must provide the evidence that the candidate have justified and undertaken their own work. If they are supported heavily with the supply of nets and jigs to assist the manufacture of products, they quite clearly have not decisions in the manufacturing process and the centre will not access the marks at the higher end of the making mark range.

The majority of candidates undertook projects of an appropriate challenge. Where problems occurred, centres completed projects such as simplistic concept models, that may have involved a range of processes but they may not have been very demanding, or the product was almost entirely 3d printed. The lack of demand often meant that centres incurred an adjustment due the range of appropriate processes being too simplistic to be counted in the 'range'. To a lesser degree there was occasionally an over-reliance on one manufacturing technique, particularly the over use of CAM. A general guide for this should be no more than a 50/50 balance between CAM and more traditional manufacturing processes. Clearly an over-reliance on laser-cutting or 3d printing is not demonstrating a range of manufacturing processes. Candidates who do rely heavily on laser cut products or other such CAM outputs are likely to be restricted to a mid-criterion award in this section.

The submission of board games increased this year and they were particularly successful in producing a range of processes for the manufacturing section. Their design though is particularly demanding and a little too involved for this level. Architectural products also provide a wide range of processes to be evidenced in the manufacture sections, but they also encourage over-use of the laser cutter.

Quality of Outcome

Here we are looking to see the quality of the assembly and finish of the entire end product rather than the processes involved in the individual manufacture of the components, although the quality, assembly and fitting of the individual components into the final product, is an essential aspect of producing the finished item.

This section was again more accurately marked and evidenced than the previous section. The inclusion of as many photographs in the folder as the centre feels necessary to justify marks, is encouraged. This is often assisted by photographic evidence submitted in the evaluation section under testing. Where good quality photographs had been provided, moderation was often straightforward, although some candidates were marked a little generously.

Most candidates had produced some practical outcomes but not all were completed. Problems occasionally arose with centres over marking work that involved minimal skill and processes. There were some difficulties assessing identical make tasks particularly if not photographed clearly. It is important for the centre to offer very detailed justification of the marks in these cases in order that the marks can be accepted.

As previously pointed out, the demand and CNC issues did lead to some adjustments as the work submitted from a CAM output has a predetermined level of quality that is often little to do with the skill of the candidates. This said where there were complex joining of laser cut components to create a whole then credit was given for this as it is appreciated that the skill to ensure that components relate to each other and fit well need a significant amount of thought and effort.

Health and Safety

Good quality annotation of photographs showing the step-by-step manufacture of the product regarding safety was helpful. Where there are dangerous practices evidenced in the portfolio these marks were adjusted accordingly.

Testing and Evaluation

In this section candidates are expected to evidence a range of tests. This did not always happen, indeed around half the candidates seen did not offer the testing as expected, just ploughed straight into the summative evaluation. The evaluation should focus on the summative comments around the testing of the final product and not credit work submitted in the design section.

Candidates would benefit from being encouraged to test against the specification to determine the effectiveness of the final product. 'Tests' were sometimes omitted completely or amounted to a user/client survey. Candidates sometimes failed to focus upon the models that had been produced, referring instead to the real building etc. It would appear the many candidates had failed to plan for this section when writing their 'Specifications'.

However in some cases the Evaluations were done well. Many centres evidenced candidate's evaluation against the specification as expected, even if it was only based upon the candidates own opinions!

Third party opinions were evidenced to varying degrees, but were very much secondary to the candidate's immediate thoughts. Evidence of user group testing was generally limited by most candidates.

A significant minority of candidates did not attempt this section at all.

Centres are reminded that QWC marks are only awarded for work produced in this section. Many did not read the requirements of the mark scheme and submitted generalised comments that did not relate to that requirement. Indeed justifying marks that had been allocated from evidence in other sections.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.as>