

Moderators' Report/
Principal Moderator Feedback

Summer 2013

GCE Design & Technology (6GR04)
Paper 01 Commercial Design

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2013

Publications Code UA035723

All the material in this publication is copyright

© Pearson Education Ltd 2013

Introduction

The work submitted for moderation this year was again largely appropriate to the requirements laid down by the specification and the vast majority of centres had undertaken projects from the requested areas of study listed in the specification. There were significantly less centres who failed to include the design, development and manufacture of a 2d element. Although rather worryingly we saw a slight increase in the number of resistant materials style products being submitted. Any product outcome that is feasibly made by a student at A2 level in its final form, such as furniture, lighting or jewellery; then it is unlikely to be appropriate as a Graphic Products entry.

It is a requirement of this submission that centres should select a pathway through which the **design, development and manufacture** will be evidenced. Part of the requirement of this submission is also to evidence the design, development and manufacture of a 2d as well as a 3d element within this pathway (as defined on page 111 of the specification). It is essential then, that centres recognise the need to submit work that meets these criterion. To assist in the correct interpretation of a graphic product I again offer the following interpretation.

A suitable product for a graphics student would necessitate them in modelling the outcome because it is too big to be made in its final form (architecture, garden, vehicle, etc.), or require too expensive a mould or moulds for its mass production (plastic moulding, die cutting, printing). Hence it would be expected that a prototype model be made. The only exception to this rule might be a fully working Point of Sale display, which would be accepted as a submission as it is particularly mentioned in the specification. To simply make a model of a product (chair, table, etc.) is not going to meet the requirement of a graphic product as these outcomes could be reasonably made in final form by an A level student. As a guide; storage, furniture and lighting products are not likely not to meet the criteria of a graphic product outcome as it is reasonable to expect an A level student to make them in their final form through a Resistant Materials pathway. The vast majority of centres have recognised this and the work submitted on the whole was entirely appropriate. Where candidates have chosen to submit design work that is not included on the list of products from page 111, then significant changes can sometimes be seen in the expected mark outcomes for this section. Specifically if evidence of 2d or 3d design work was missing it would not be able to achieve in the highest marks available in designing, developing or making.

Almost all centres are now using the correct assessment booklets and the vast majority correctly completed it. However there was an increase in centres failing to submit appropriate photographs this year. It is not acceptable for centres to simply state 'see photographs in the folder'. It is a requirement that centres add photographs of both the 2d and the 3d elements within the coursework assessment booklet (CAB). Centres are also requested to add annotation to the CAB in support of the marks requested by the centre. Some annotation is detailed and directs the reader to pages where the evidence can be found in the folders at other times it simply repeats the assessment criterion. Obviously there is no need to simply reproduce the assessment criterion statements as the application of the mark to that criterion directs the moderator to the words anyhow. It is much more useful for the centre to explain where the evidence is for the marks allocated. In making it is even more important to explain the

rationale behind the marks requested. Offering information appertaining to the processes used and why they are assessed at the level requested would be helpful.

Some very good work was seen and many centres have coped well with the A2 coursework. This said a lot of candidates appear not to have been encouraged to delve to the appropriate depth of the problems being investigated, often skimming the surface of issues and decisions being made with little or no justification. Design work in particular was occasionally disappointing, candidates focusing on a body styling exercise and not looking into the detailed sub-systems of the working solution.

Where centres marked generously the significant differences tended to occur where centres failed to submit 2d elements or the product manufactured was simplistic and lacking in the demand required for this level. Some centres have not taken on board the need to encourage candidates to design with a commercial methodology in mind; indeed some centres pay only lip service to this and then fail to produce the evidence required in the assessment criteria for the very highest marks. At other times centres credited work that was too simplistic for this level. Designing a leaflet or simple folded menu offers less scope for range of technical processes than does the design of a more complex product, thus the simple products may be well designed or well made, but they are not difficult to get right and hence they are unlikely to access the full mark ranges.

Overall the standard of candidate responses and the application of the assessment criteria by centres were again mixed. There were examples of very good samples, which tracked the assessment criteria closely, and others where the centres had failed to focus in on the requirements of the mark scheme, applying the design process with a degree of familiarity that did not always formally address what was required in this submission.

Almost all students identified a client/user group at the beginning of their work, but as in previous submissions, many failed to mention them again until the final summative evaluation. Students are required to employ a commercial methodology to their work at this level and act as a commercial designer might when working for a client/user group, which means that consultation between designer and client should take place at key points in the design/make process, which amount to almost all assessment sections. Where this designer/client relationship was well developed, the whole design and make process was enhanced and justified. Unfortunately, more students than ever before paid only cursory attention to this relationship seeing it as a necessary inconvenience that needed to be addressed to comply with the assessment criteria. There was often a proliferation of coloured inserted notes stating 'client' opinion. With no other evidence that a client has been involved at all, leading to a very unconvincing impression of commercial design methodology.

Section A: Research and Analysis.

The work seen in many cases failed to convince the moderator that the candidates had actually got to grasp with the issues at the heart of the problem,

this said the centres tended to take this into account with the marking. Analysis often took the form of mind maps and to a lesser degree analytical comment. All too often there were not enough questions raised about the pertinent points that should be questioned at the start of a project such as this. It is important for candidates to ensure that they have clearly explored the issues that the problem throws up. Questions must be asked of the problem and this is an ideal way of involving the client at the outset, which was often evidenced. It is intended that the analysis should raise the questions being answered in the research, and then the answers be presented through the specification. Candidates who had completed a thorough analysis, often produced focussed and relevant research, and this tended to be accurately assessed by the centre. Where candidates failed to evidence clear communication with the client or user group, they were less clear about the specific research required and tended to produce generalised research, which was often very well presented, but not linked directly to the task, pages of information about materials – about which the designer has no idea whether they will be needed or not. This type of work was often over-marked by the centre. Use of the research is an essential element; but a detailed and clear analysis will lead to detailed focused research.

Some centres approached the research section more effectively and there was a clear attempt to demonstrate how research was appropriate and selective. These centres usually went on to link their research explicitly to design constraints established within their specifications. Others used summative 'research analysis' pages which concluded their findings. However centres prefer to present the work it is essential that the work submitted is appropriate to the problem being tackled.

Section B: Specification.

All candidates presented a specification of some kind even if it was a generic list of points. A minority of candidates produced these generalised specifications, but there was more evidence of centres attempting to link the research to the constructed specifications and evidence of client or user group involvement. Many candidates justified their specification points, but measurability was an issue for some candidates – the concept of measurability seemed misunderstood by a few centres. Admittedly it is sometimes more difficult for a Graphics candidate to offer measurable specification points, with issues of aesthetics being more prevalent to many of the products being designed. Aesthetics can be measured by questionnaires if they constructed properly and this is an ideal way of connecting to the client or user group. Other techniques that can be used are the use of scale rules to determine scaled components sizes, or the use of other measuring devices to show angles or verticals. Components that interlock or fit together can be visual compared and physically tested. It may be useful for candidates to state how they will test during the construction of their specification. Most candidates included some reference to sustainability but this was often superficial. Where sustainability was realistically covered it was often through the connection to sustainability the problem at the outset. Client consultation on a meaningful level was often limited in evidence in this section yet at other times candidates were constantly linking their justification to the client's requests. A number of candidates did not include the 2D element within their Specification which could lead to loss of marks in later stages when 2D outcomes were not reviewed or evaluated.

Section C1: Designing.

All candidates usually submitted evidence for this section. A significant number of candidates designed the 3D element with the 2D outcome appearing as a 'bolt on' at the end of the project. Some candidates did not present a 2D outcome and would not have been able to access the marks at the highest end of the mark range. It is important that candidates evidence the design of 2d elements even where they are constituent parts of the whole product, as in applied graphics for the design of packaging. Client feedback was often evidenced but was sometimes limited in quality and seemed tokenistic, it would be much better for the candidates to show they have connected this stage with the client and show the feedback being given, as opposed to just recording a decision from the client. Annotation around the design ideas included reference to processes and manufacturing techniques in the best instances but this was, in general, lacking in quality annotation that had detail and knowledge appropriate to this level. Analytical comments linking the specification and research to the design work was often evidenced but increasingly as a generic input. It is a little disappointing to note the lack of design strategies adopted by some candidates, simple sketches being offered that were holistic considerations, offering little detail and few considerations of the sub-systems in the design work. Where the candidates accessed the full range of marks in this section, they offered work that suggested alternative ways of solving the key issues within the designs thus allowing them to demonstrate knowledge and understanding of the subject as well as applying research undertaken previously or now as part of their design work.

It is essential that candidates offer evidence of designing both 2 and 3d elements in this section. All too often the 2d element was an afterthought and contrived, at worst it was ignored completely and presented just as final solution at the end. In this section we are looking for evidence of working as a commercial designer would, the involvement of a client or user group being essential at this stage.

Section C2: Review.

The Review section was attempted by the majority of candidates. In most cases the review section was done reasonably well, a formal review was often evidenced at the end of the ideas section and in general we saw some good evaluative commentary. Review in some cases was a discreet page at the end of this section, in others it was all the way through the ideas section in commentary form. Whichever is used the review must include the use of the specification and indeed may, in the best cases, need to draw on further research. There was often a lack of comparison taking place between the ideas being considered, the design solutions being considered on their own merits. It is necessary for candidates to make comparisons against the other designs being considered too. This is often done in a summary of the review at the end.

It should also use the client; we did see this in a number of cases but this was not always so. The specification was clearly referenced in the best cases and client feedback obtained. It should be pointed out that whilst we seek realistic client or user group input, we do not expect the candidate to undertake a route suggested by a client that will jeopardise the end product in terms of its level of

demand or range of manufacturing outputs. This product is first and for most a necessary tool for assessment at A level.

Section C3: Develop.

The development section was a little better completed than in previous submissions. Although the development tended to focus entirely on the 3d element and at times ignored, or paid lip service to the 2d element. To attract marks at the highest end of the range we must see client feedback and designer evaluation being used as part of the final modification stage. While there was evidence of good practice the application of the assessment criteria by centres were still often generous. Candidates achieving high marks in this section clearly attempted to move on their ideas and there was some excellent use of CAD to explore modifications. Sketch Up increasingly used effectively within interior design/architectural projects to explore alternative spatial arrangements, but Solid Works being more popular in the design of concept products. There was an increase in the use of CAD seen this year, but sadly not being used as a design tool, simply as a practice or presentation piece for the finale design. CAD is an ideal way to present the designs to the client and gain feedback from them, it offers enormous opportunities for making minor changes and presenting these considerations, all too often though it is not used for this.

We consider development to mean 'change' or at least to consider it, and this should be shown in students' work through their ability to use the results of design review and bring together the best or most appropriate features of their design ideas into a coherent and refined final design proposal that meets all of the requirements of the product specification and matches the client/user group needs. 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. Some 3D modelling was purposeful, but more often it failed to lead to significant changes in design thinking. It appears to be being used more often as a presentational tool, to show what the final product will look like, rather than as a tool to make minor yet realistic changes to a proposal to elicit the final outcome. This year most candidates managed to make improvements to their chosen design idea through the development stage although candidates rarely fully refined and extended their ideas through development tasks, often making only cosmetic changes. The best candidates reviewed their developmental work with their end user/client.

The input of technical information and even additional research is usual here where candidates are demonstrating a commercial design methodology. Input from the client or user group would be essential at this point too. Few clients would be happy to set a designer a brief, and then have no input with the way the product is being developed until it is finished! Candidates failing to score highly in this section tended to fail to demonstrate a sufficient range/depth of information and/or detail in their development sections to justify access to the higher assessment tiers.

Candidates who failed to address both 2D and 3D elements within their designs were restricted in their mark acquisition. In these cases developments were not used to produce a final design proposal that was significantly different to previous design ideas. Final Design proposals again sometimes failed to include technical details of materials and/or components, processes and techniques and

where they did, they focused too much on how the chosen design will be made, rather than exploring alternatives. A necessary aspect of the development section is a design proposal; this was better completed than last year. Although some candidates would benefit from the using the final proposal, presentation drawing or exploded view, to be used as a tool in justifying the choice of manufacturing processes and materials, which will be later credited in the manufacturing section.

Enough information should be provided through the final proposal or working drawings, for a product to be made by a third party. The most effective way to complete the proposal aspect seems be, to offer a presentation drawing with justification of materials choices, with a working or exploded drawing with relevant sizes applied to it. It was noted by moderators that in many cases the utilisation of a working drawing via a previously completed CAD drawing was a common method of presentation but it often also indicated that candidates did not understand the purpose or correct standards applied to the working drawings. It is felt that candidates are often encouraged to present a drawing from a CAD package at the click of a button, without any understanding of what information can be gained from the drawing, hence many candidates are not offering the detail required for drawings to be used by a third party and some adjustment may well be then required through communication.

Section C4: Communication.

One of the key aspects on the mark scheme is that the candidates at the highest level offer a range of communication techniques and media including ICT and CAD. There were occasions where candidates failed to offer this variety and simply presented sketching/word processing as the main presentation medium. The work must also be presented with precision and accuracy. Regarding this centres were again usually accurate in their assessment, and candidate marks reflected these requirements. At the very highest level, the moderators saw work of superb quality, utilising a wide variety of ICT skills, an increasingly comprehensive range of CAD packages, used with considerable skills and accuracy. The application of the assessment criteria by centres tended to be accurate in many cases but it was difficult for candidates to access the highest marks. This was because communication techniques generally lacked sufficient precision and accuracy to convey detailed and comprehensive information to enable a third-party to manufacture of the final design proposal. The inclusion of a cutting list would be an obvious starting point here. The use of dimensions on a working drawing or exploded view, with additional component drawings or electrical wiring diagrams as appropriate would be expected.

Section D: Planning.

This section was generally well completed by the vast majority of centres and well-marked by the centres. Where the application of the assessment criteria was generous, it was again when centres were asking for high marks. Many candidates drafted Tables/Charts, which were also used to address H&S and QC. Although it was relatively simple to meet the requirements of the lower tier assessment criteria, planning sections, in general, lacked the detail necessary to justify centre assessments at higher levels. The charts quite often look impressively complex, but upon the reading the detail they often still made broad sweeping statements, like 'make the vacuum form mould' and 'turn the

bottle'. There were very few instances where candidates planned to manufacture the 'real' product almost all made plans that related to the actual model being made. Naturally the candidates do not have to pan for the real products as they will not be making the real thing.

Making.

It is clear to say that candidates were again disadvantaged across the making section if they selected a low level demand project or a project that didn't allow them to evidence a range of tools/materials/etc. at a more advanced level. Candidates who submitted a simple single technique model (possibly with no 2d element) would often find marks had been quite seriously adjusted in this section.

Some centres expected that that they could submit a page from the folder as the 2d element, this is not the case. The final drawing in the folder is assessed as part of the development section; it is not then reassessed as the 2d element. The 2d element must be independent to the folder and either from part of the model itself or be a separate entity. A back to client presentation board with a representation of the product designed on it should be developed within the folder and made as a stand-alone product.

We continue to see the over-reliance on the use of CAM; especially the laser cutter, but we have increasing submissions of work from 3d printers. Many centres have clearly taken on board the requirements that only ½ of the manufacture should be CAM and the rest balanced by more traditional manufacturing methods however we have seen some submissions that have wholly relied upon the use of a CAM output. To simply draw a product (a necessary part of the design and developments section and credited there) and then press a button to set the 3d printer running is not evidence of a utilisation of a wide range of skills or processes. We also see centres submitting work that contains a range of skills and processes; however they are at times too simplistic a process to be recognised as an advanced level skill. Simply placing a mould in a vacuum former and vacuum forming HIP's is not as demanding as constructing a complex mould with drafted angles, vent holes and fillets.

In terms of products that are inappropriate for the specification we did see a number of these. The specification is clear in that candidates are expected to work in essentially two areas:

Conceptual Design

Built Environment

As mentioned previously; Tables, benches, lamps and storage items are real products (RM focused) and so would not be able to access the full mark range in the making section. The specification is clear that all Graphic Product candidates must select work from either if the two pathways (see previous comments in the introduction).

Section E1: Use of tools and equipment.

In this section we are looking for candidates to have demonstrated that they have used a range of tools and processes skilfully. This should not necessarily be

viewed as holistic process at the end of making but a build-up of a collection of skills and processes as the product is completed. Individual process can be evidenced for component manufacture through the use of photographs very easily. Most centres attempted to use a range of processes and much of the photographic evidence submitted was entirely appropriate. Evidence of safety awareness was usually offered through documentation in the folder of risk assessments or in the planning documentation.

At the very highest levels of manufacture we saw evidence of some high quality, demanding, manufacturing processes. Polystyrene and clay modelling was particularly popular this year, showing a high degree of finish in the best examples. Wire mesh and various finishing techniques has been increasingly used to assist in the shaping of amorphous architectural products. Lathe and other more traditional machining are still seen regularly along with some casting and machining work and some very demanding net constructions, often in conjunction with extensive Photoshop (or similar graphic manipulation packages) 2d graphic applications. In contrast we are still seeing candidates presenting models, without a 2D element, which required little more than a craft knife, safety rule and cutting mat. The absence of a 2D outcome limited assessments for candidates here who failed to benefit from the additional process, which may have been used. Over reliance of the use of CAM, in particular the use of a laser cutter will prevent access to the higher mark category due to the previously mentioned 50/50 guidelines. However there was more of an attempt to justify the selection of tools and equipment and centres were clearly directing their candidates to employ an appropriate range of techniques when CAM was used.

Section E2: Quality.

Yet again we some of the work submitted was outstanding; however it tended to be very much in the minority. This section alone was possibly the single most over marked section of the coursework. The levels of quality of outcome offered by candidates tended to be exaggerated by centres for work that was not obviously worthy of statements relating to quality or indeed for products that did not match the final outcome.

Whilst some outcomes lacked the level of quality/demand expected at this level and were over-marked others failed to evidence the manufacture of a 2d outcome. The submissions this year in general did not always allow us to see items of real quality and again I have to report that many products lacked the level of sophistication required to gain access to the higher levels of the assessment criteria. In some cases the materials selection were not always justified and their working properties not clearly identified in relation to their use within the project. The justification of the choice of materials and processes is also required to be evidenced in the portfolio; where it was offered, this was usually completed satisfactorily by the candidates but occasionally lacked justification. The presentation of a work diary with photographic records of candidate production processes allowed the clear evidencing of the range of processes used. Some candidates generally failed to demonstrate an explicit and detailed understanding of the working properties of materials used in order to justify their selection.

It is apparent that more and more centres have access to CNC equipment and in some cases this led to an over-reliance upon CAM technologies. The increase in

quality is often mirrored by a decline in demand in this situation. More judicious centres ensured that their candidates incorporated additional processes as the utilisation of CAM outputs requires little effort from the candidates to achieve a high level of finish.

Section E3: Complexity/Level of Demand.

A significant number of centres have failed to guide candidates towards the production of a complex enough product at the final outcome. It is not enough just to design a suitable answer to the design problem, but as teachers we must ensure that our candidates have enough demand in their final proposals to gather the marks expected. There are hoops to jump through in order to comply with any demands of an assessment criterion and we have to monitor candidates to ensure that they are ready for those hoops. Where centres have understood the requirements and have submitted appropriate products, then the marking tended to be accurate. In this section centres have a good idea of the level of demand on the whole. Where there is an over reliance of repeat or very similar simplistic techniques being used (use of a glue gun, laser cutter, etc.) then the level of demand mark would and should not be high. The use of specific jointing in construction of architectural models and the assembly of complex laser cut items was credited though. A range of additional modelling techniques of a more demanding nature were also credited; clay modelling, graphic manipulation and printing, use of polyfilla in finishing block models, electrical work, casting, sheet metal work, use of jigs, moulding and mould making are just a techniques seen and credited. Where candidates submitted nets of a simplistic nature with straight forward flaps and locking mechanisms, they will not achieve as highly as a product that has double folds or more unusual locking mechanisms or closures.

Again an area of weakness in this section would be the 2d outcome, here we see a lot of very simple outcomes, failing utilise the more demanding graphic skills in the production of what appear to be at times, after thoughts to main item. Greater utilisation of graphic manipulation packages or conversion into signage (with possible use of electronic components here) or similar 3d outcomes would be welcomed.

Section E3: Testing and Evaluating

The application of the assessment criteria by centres was quite often accurately marked. There was evidence of good practice from candidates where 3rd party feedback was evidenced and testing took place. However client responses were not always analysed in any detail or used to inform evaluations and modifications.

It's pleasing to note that objective and physical testing was more prevalent than it has been in the past, although it is still rare to see candidates explaining and justifying their choice of testing procedures. Weak specifications, lacking measurable criteria, may have limited the effectiveness of testing in some cases.

Candidates need to justify the tests being undertaken. This important factor seems to be an area commonly overlooked this year. Indeed it would be beneficial for more candidates to evidence the tests though the use of photographs, this could also evidence the involvement of the client or user group too. Evaluations generally referenced the specification and addressed both 2D

and 3D elements, but could utilise the tests results rather more. When candidates performed well in this section, they used a variety of techniques to test their products. Questionnaires and feedback from clients would feature strongly in this section. In the best cases tests had been derived from the specification and justified.

Many more centres had encouraged a Life Cycle Assessment as part of this section. This factor only needs to be applied to a single part of the product if the product is of complicated nature. It would be quite onerous to apply a life cycle analysis to the whole building but the key elements could and should be considered.

Grade Boundaries

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

<http://www.edexcel.com/iwant to/Pages/grade-boundaries.aspx>

Ofqual



Llywodraeth Cynulliad Cymru
Welsh Assembly Government



Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE