Moderators' Report/ Principal Moderator Feedback

Summer 2015

Pearson Edexcel GCE
A2 Design and Technology
Design Technology: Graphic Products
Commercial Design (6GR04/01)

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The work submitted for moderation this year was again mostly 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 was a slight rise in the number of centres centres who failed to include the design, development and manufacture of a 2d element, but I'm pleased to report that we saw less products submitted that were more appropriate to resistant materials and not selected from the given pathways in the specification. 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 criteria. To assist in the correct interpretation of a graphic product we offer the following interpretation.

A suitable product for a graphics student would necessitate them 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, blow 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; iPod docking station, storage, furniture and lighting products are not likely 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.

Centre coursework assessment booklets are generally well completed. However there were a number of issues that related to administration and the completion of the booklets that moderators were consistently reporting. There were a number of examples where centres have failed to return changed marks after being informed of addition errors. The failure to do this

could then result in the adjustment of work unnecessarily in some cases. The marks submitted by the centres are unable to be changed by Edexcel staff, without direct authority from the centre, even if it is an obvious addition error. In these cases it is the examination officer's responsibility to make sure these changes are made after being informed in writing on an E6 form by the moderator.

It is also a requirement that centres add photographs of both the 2d and the 3d elements within the coursework assessment booklet (CAB), the 2d element is still being consistently left out. It would appear that centres continue to have a varied view of the 2d element, some centres being vigilant in giving it an appropriately high profile, others ignoring it altogether. It is not an aspect that can be ignored if a centre is seeking marks at the highest level and in some projects it can be as demanding as the 3d element to get right. However it is viewed, a photograph of the final 2d element is required in the CAB whether it is stand alone or as an inherent part of the 3d element.

Centres are also requested to add annotation to the CAB in support of the marks requested by the centre. Most 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. 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 much more helpful.

Yet again 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. Similarly to last year the design work in particular was often disappointing, candidates focusing on a body styling exercise and not looking into the detailed sub-systems of the working solution. This lack of depth prevents candidates from accessing the highest marks at A2 as they often do not get the chance to exhibit the knowledge they need to for this level. There was an increase in formulaic presentations, with some centres offering class set projects at this level, which is deemed inappropriate. At this pinnacle of the candidate's school based designing and problem solving, we seek much more demanding original work than the usual, formulaic, linear design presentation seen at GCSE. Candidates should be much more intuitive and the product solution should develop and grow as the process evolves. The client input

throughout is essential in delivering this. We still see on page 1 of designing an almost perfect replica of the final product, or a photograph of a building that appears to have been developed to be exactly the same as the model presented at the end. The work presented in these cases lacks authenticity, integrity and does not convince the moderator that the candidate understands the design process at the level expected for the higher mark ranges.

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.

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, candidates continue to pay 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 again 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; far better to evidence the meeting with the client with photographs, email or tweets. Where client involvement was more genuine the work flowed with greater realism and the decisions taken fed into the design and development work realistically giving a better flow to the work.

Section A: Research and Analysis.

The moderators report that that the work in this part of the coursework was relatively well completed, with candidates often scoring marks in the highest category, but not always at a maximum. Analysis often took the

form of mind maps and to a lesser degree some analytical comment in the form of questions. All too often, candidates are not demonstrating that they understand in enough depth the potential difficulties associated with the problem they are about to undertake. 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. It is often the case that 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. The lack of sizing information was again apparent this year, with buildings being designed on sites that had 'no limits'. This kind of lack of focus is a direct result of the client not being realistically involved.

It is also a worrying trend that moderators are reporting an increase in the number of pages in this part of the folder, with up to 40 being used for the submission of work that lacked focus and which had clearly not been used in any meaningful way by the candidates. Generic research was evident in some centres, with each candidate completing what appeared to be centre structured pages. It is not a requirement to evidence a range of specific research techniques, but it is important to complete all the relevant research needed to provide a well-informed and measureable specification.

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.

Virtually all candidates presented a specification of some kind even if it was a generic list of points. Many candidates justified their specification points, and measurability was often evident, the moderators reporting in fact that this section was often accurately marked and at higher levels. It is acknowledged that some of the focus of a graphics specification can be difficult to 'measure', aesthetics can be measured by questionnaires if they are 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 visually compared and physically tested. It may be useful for candidates to state how they will test during the construction of their specification. Sustainability remains a little superficially treated, with many candidates giving it lip service. Where sustainability was realistically covered it was often through the connection to sustainability in the problem at the outset or candidates kept a focused eye on re-use, recycle and reduce as a designing mantra.

Section C1: Designing.

All candidates usually submitted evidence for this section and a mixed response was reported by the moderators. A significant number of candidates designed the 3D element with the 2D outcome appearing as a 'bolt on' at the end of the project. This lack of focus on the 2d element has been noticeable this and previous years and many moderators have found it difficult to justify centre design marks because of it. 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.

The work in the designing section was considered some of the weakest and more leniently marked in the entire assessment criteria. Candidates at best produced beautifully presented intricate and detailed work, but quite often the work was simplistic, body styled work, which was representative of an average performance at GCSE. It is not enough to simply present a shaped outcome such as a hand held electronic device, without considering how the key components would be positioned, used, accessed or even charged with a power source. Buildings that have basic external shapes with no detail or alternatives for key structural elements will similarly fail to meet the needs of the 'workable and detailed' in the top assessment criteria.

Client feedback was often evidenced but was sometimes limited in quality and seemed lacking in real connection, 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 continuing disappointment 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.

At the highest end the work was well presented and technically detailed, showing a clear understanding of the intimate sub-systems that make up the whole in the design being presented. Candidates will have explored possibilities for these sub-systems and dealt with them individually rather than just drawing a building and pointing out constituent parts.

Section C2: Review.

The Review section was attempted by the majority of candidates. Generally this section is more often completed as a stand-alone task rather than reviewing as the designer progresses, both were credited.

Review usually referred back to the specification and took into account its parameters and specific issues, although the results of this specification review rarely turned into real changes in the development section later. We rarely see numerical scoring systems as part of the review section indeed these are generally seen to be lacking in objectivity and comments are preferred.

Here we should also see use of the client; we did see this in a number of cases but this was not always so. 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.

Section C3: Develop.

The development section is a growing concern, it is apparent that many centres do not understand the need for change, exploration, testing and modelling. The work in this section was one of the sections most commonly over-marked. The number of candidates failing to evidence the development of a 2d design component has also grown this year. Often 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 generously marking work that had too little testing of components, modelling aspects of the design, or gaining and using feedback from users or clients.

Candidates achieving high marks in this section clearly attempted to move on their ideas and there was some excellent use of CAD and traditional modelling to explore modifications. Sketch Up and other more sophisticated CAD packages are ever increasingly used effectively within interior design/architectural projects to explore alternative spatial arrangements, and gaining in popularity for concept modelling. There was an increase in the use of CAD and traditional modelling this year, but again 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 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. At the higher level in this area we saw candidates modelling products and allowing third parties to test them and feedback, this use of models to develop designs would immediately attract a higher level of assessment.

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, in this we advise the individual exploration of alternatives for the sub-systems in the design.

A necessary aspect of the development section is a design proposal; this was better completed than last year. Although some candidates would benefit from 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.

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.

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 to be to offer a presentation drawing with justification of materials choices with a working or exploded drawing with relevant sizes applied to it.

Section D: Planning.

This section was generally well completed and well-marked, by the vast majority of centres.

Many candidates drafted Tables/Charts, which were also used to address H&S and QC. Quality control sometimes remains an issue, with candidates simply stating 'check for the right size' or 'make sure that it fits'; these

comments need to be backed up with how they would do this, perhaps; 'check size against the prepared template' or 'complete physical fit check'.

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 reading the detail they often still made broad sweeping statements, like 'build vacuum form mould' and 'make 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 plan for the real products as they will not be making the real thing.

Making.

This section has improved a great deal over the last few years, with centres marking work much more appropriately as experience of the expected submission is gained. Attendance to feedback session and the use of materials provided at these sessions has I feel assisted here. We continue to see work of great complexity and high demand, but in equal measure we see work that is repetitive in its collation of skills/processes, or these processes are of a basic and undemanding nature.

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 it difficult to justify high marks being allocated against their work.

A minority of centres felt 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 see less work that is over-reliant 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 small 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, ipod docks 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. Architectural modelling was still popular, but concept modelling has gained in popularity this year, showing a high degree of finish in the best examples. Styrofoam modelling and various finishing techniques has been increasingly used to assist in the shaping of amorphous concept models, whilst the balance of process is best seen in the production of architectural models, with 3d printed components to add to the processes used. 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 or 3d printer 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 some of the work submitted was outstanding; however it tended to be very much a 50/50 split. The levels of quality of outcome offered by candidates tended to be exaggerated by centres when work was too simplistic for this level, or where the work was not supported by a 2d element.

Many submissions have again this year disappointed in terms of them being items of real quality and again I have to report that often products lacked the level of sophistication required to gain access to the higher levels of the assessment criteria. This said, at the highest level we have seen some remarkable work that has a high quality of finish with a good range of advanced processes being evidenced.

In many 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 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 to 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. However complex packaging and more imaginative 2d outcomes can be demanding and will adequately support the complexity of a simple 3d element.

Section E3: Testing and Evaluating

The application of the assessment criteria by centres was quite often accurately applied. 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 still 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 a whole building but the key elements could and should be considered, such as the use of reclaimed materials as part of a building or the design or a green roof in its construction.

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