Moderators' Report/
Principal Moderator Feedback

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

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Principal Moderator's report for 6GR04

Design Technology: Graphic Products 2012

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 a significant minority of centres who failed to include the design, development and manufacture of a 2D element, perhaps more significantly because this is the third year of submission to this specification.

Almost all centres used the correct assessment booklet and the vast majority correctly completed it. Approximately half the centres submitted accurately marked work, which required no adjustment. 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. Centres are reminded that it is vitally important to encourage candidates to design with a commercial methodology in mind. Often this is not evidenced and candidates do not produce the evidence required in the assessment criteria for the very highest marks.

Some very good work was seen and many centres have coped well with the A2 coursework. However, a lot of candidates need to be encouraged by centres 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.
Overall the standard of candidate responses and the application of the assessment criteria by centres were 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. It needs to be stressed that this is a key issue that must be addressed to comply with the retirements of the unit and the assessment criteria.

It is a requirement of this submission that centres should select a pathway through which the design 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 that centres recognise the need to submit work that meets these criteria. To assist in the correct interpretation of a graphic product I 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. 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.

Section A: Research and Analysis.

This section tended to be approached in much the same way as previous submissions. However, as in previous submissions, candidates quite often failed to get to grasp with the real hub of the issue. Analysis often took the form of mind maps and to a lesser degree analytical comment. All too often there were no 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. 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 centres. Use of the research is key; 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. Although Research is generally more focused, as a result of the reduced mark allocation, there were still isolated cases of research-heavy projects with candidates submitting disproportionate amounts of un-related research at the expense of other areas.

Section B: Specification.

There was an improved response to this section. In previous submissions centres failed to connect with the research, presenting a simple list of statements that may or may not have connected to the 2D and 3D elements of the problem. This year candidates still produced generalised specifications, but there was evidence of centres attempting to link the research to the constructed specs and evidence of client or user group involvement. Specific reference to earlier client consultation, with justification, was better. Many candidates still failed to include a sufficient number of quantifiable and measurable statements within their 'Specifications'. Sometimes these statements were rather generalised, at times however we saw a good deal more detail and sensible justifying comments, some candidates even attempted to point out how these aspects might be tested, which may not elicit marks here, but could easily be used to justify testing at a later stage. This said, many failed to justify statements and a significant number of candidates chose to present their design criteria as prose rather than bullet points which made it difficult for them to focus their thoughts. Where candidates produced succinct well thought through specifications, the link to the research was obvious and this could be traced back through the analysis presented from the brief.

Section C1: Designing.

It is essential that candidates offer evidence of designing both 2D 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. This section of the assessment criteria has in the past attracted a significant adjustment; often due to a lack of understanding of materials processes and techniques, this year we saw little improvement on this but it was more accurately marked by centres. The lack of generation of ideas for the 2D element was also an issue. It must be stressed to all candidates that this is imperative and is a requirement in the specification. Most candidates submitted something for this section. A significant number of candidates only designed the 3D element, the 2D outcome appearing as a 'bolt on' at the end of the project. Client feedback was often evidenced but was almost always limited in quality being unrealistic and unquantified.

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. 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.

Unlike the ideas section the development often attracted adjustment in terms of the moderation process. The main issue was to do with the lack of a significant improvement and the details of components processes and techniques. To attract marks at the highest end of the range we must see client feedback being used as part of the final modification stage. While there was evidence of good practice the application of the assessment criteria by centres was 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 also in the design of concept products too.
We consider development to mean 'change' or at least to consider it, and this should be shown in candidates' 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 is a key area for centres to focus attention on, an area that we see as being misinterpreted or in some cases, simply not taught. A significant number of centres have not submitted work that one would traditional see as developing towards a final solution, more appropriate perhaps to explaining how a final product will be made.

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. As referred to previously, this section was often an area in need of additional attention.

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 glue together the frame'. 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.

There appears to be an over-reliance on the use of CAM; especially the laser cutter, but as well as the 3D printer, although this is less common than in previous years. 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.
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 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).

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. Casting through the use of pewter is particularly popular, often used in conjunction with CAM manufactured moulds. 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 is seen regularly along with clay modelling and some very demanding net constructions, often in conjunction with extensive Photoshop (or similar graphic manipulation packages) 2D graphic applications. In contrast we also still saw 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 weaker 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.

Some of the work submitted was outstanding. Other outcomes lacked the level of quality/demand expected at this level and were over-marked. The submissions this year did allow us to see some items of real quality but 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 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. There was still often little reference to the final design proposal.

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.

Section E3: Complexity/Level of Demand.

This year, a significant number of candidates required far more guidance regarding the production of a product that is complex enough at the final outcome. It is not enough just to design a suitable answer to the design problem, but candidates must be guided to ensure they have enough demand in their final proposals to gather the marks expected. There are requirements to meet in order to comply with the demands of the assessment criterion and candidates need to be monitored to ensure that they are able to meet those requirements. 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.
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 generous. There was evidence of good practice from some 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 disappointing to note that objective and physical testing was still less prevalent than it should have been. It was rare to see candidates explaining and justifying their choice of testing procedures. Weak specifications, lacking measurable

criteria, may have limited the effectiveness of testing. All too often, candidates failed to justify the tests being undertaken, if they were actually conducted at all. This important factor seems to be an area commonly overlooked this year. Evaluations generally referenced the specification and addressed both 2D and 3D elements. 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. Some centres had indeed sourced websites that offered free calculators to work out carbon footprints for some or all the components in the products manufacture. This offered a glimpse into the real world and was particularly useful if being used as a discussion starting point with clients during feedback.

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