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Moderators' Report/ Principal Moderator Feedback

June 2011

GCE Design and Technology: Graphics Product (6GR04) Paper 01 Commercial design.

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Principal Moderator's report for 6GR04 Design Technology: Graphic Products 2011

The work submitted for moderation this year was 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. There were a significant number of centres who failed to include the design, development and manufacture of a 2d element, perhaps more significantly than the first year's submission.

Almost all centres used the correct assessment booklet and the majority correctly completed it. The marking was again closer to the board's standard than it has been in the past, 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 very good work was seen and most 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 formulaic, candidates focusing on a body styling exercise and not looking into the machinations 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, many students paid only cursory attention to this relationship seeing it as a necessary inconvenience that needed to be addressed to comply with 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 2 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 offer the following interpretation.

In providing guidance as to what constitutes a graphic product, centres are advised to compare that which a resistant materials student might produce.

A resistant materials student is expected to design and manufacture a product that is a fully functioning working item, can be evaluated in its final form and used. A graphic product, in contrast is too big to be made in its final form (architecture, garden, vehicle, etc) or too costly to make in its final manufactured form due to costly mass production mould being required (plastic moulding, die cutting, printing), hence it would be modelled. 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; the model must be justified from a size point of view. As a guide I return to my earlier point, if it is reasonable to expect an RM student to make design and make the product (storage, furniture, lighting), then it is likely not to meet the criteria of a graphic product outcome.
The vast majority of centres have recognised this and the work submitted on the whole was entirely appropriate. It is the minority of centres who still continue to submit work that is more appropriate to the development section of an RM project, that these comments are addressed. Modelling furniture, such as chairs or tables is not going to access the mark range many centres desire.
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, candidates quite often failed to get to grasp with the real hub of issue. Analysis often took the form of mind maps and analytical prose. Some centres however continued to pursue the ‘situation, problem, needs, design brief’ approach which was less successful in divining and exploring the underlying/pertinent issues. 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 produced more limited analysis, often in the form of extended paragraphs, they were less clear about the specific research task and tended to produce generalised research, which was often very well presented, but not linked directly to the task, for example generic pages on injection moulding and blow moulding without any reference to the problem / task. This type of work was often over-marked by the centre.

Many centres approached the research section more effectively and there was a clear attempt to demonstrate how research was appropriate and selective. Many centres used a structured approach which forced candidates to focus and justify their investigations. 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 was 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 a mixed response to this section. Some centres failing to connect with the research, presenting a simple list of statements that may or may not have connected to the 2 and 3d elements of the problem. Candidates often produced generalised specifications. Specific reference to earlier client consultation, with justification, was rare. Candidates often used catch-all phrases such as 'after talking to my client, he/ she said it must no be too big' etc. Many candidates failed to include a sufficient number of quantifiable and measurable statements within their 'Specifications'. Sometimes these statements were rather generalised. 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 2 and 3d elements in this section. All too often the 2d element was an after thought and contrived. 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 did, on a number of occasions, attract a significant adjustment; often due to a lack of understanding of materials processes and techniques. The lack of generation of ideas for the 2d element was also an issue. It must be stressed to the centre's that this is imperative, and is a requirement in the specification. Almost all candidates submitted something for this section. A 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 sometimes limited in quality being (literally) stuck in at the last minute. Annotation around the design ideas included reference to processes and manufacturing techniques in the best instances.

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.

Section C3: Develop.

As with 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 was again used effectively within interior design/architectural projects to explore alternative spatial arrangements.

Development means 'change', 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 failed to lead to significant changes in design thinking. It is much more important for candidates to use modelling as a design tool, to try out alternatives or sub-system issues, rather than as a presentational tool demonstrating what the final product will look like in a smaller scale!
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 often 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 left this part out completely, whilst others failed to offer enough detail for the 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.

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 usually accurate in there 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 particularly 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. Working drawings were still being included as part of this section (according to teacher annotation); these should be included in the development marks.

Making.
It is clear to say that candidates were disadvantaged across the making section if they selected a low level demanding project or a project that didn't allow them to look at a range of tools/materials/etc. Candidates who submitted a simple foam board model of a room interior (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 increasingly the 3d printer. Centres should be warned that the guideline of only ½ of the manufacture should be CAM is flagged to the moderation team and if it is evidenced then they will adjust that candidates work if it is not all ready taken into account by the centre (usually informed via the annotation).
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

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. This said an RM specialist would moderate the work so that the candidate was not heavily disadvantaged. It specification is clear that all Graphic candidates must select work from either if the two pathways (see previous comments). These marks would then be reduced as the product would not necessarily represent the delivery of a range of graphic product skills in its manufacture.

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.
In contrast we 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, indeed would not look out of place in a first year degree show, a point moderators are reminded of when making judgements about the standard. Other outcomes lacked the level of quality/demand expected at this level and were over-marked.

The submission this year did allow us to see some items of real quality but this again I am sad to report was not the norm 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 sometimes little reference to the final design proposal.
It is apparent that 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. More judicious centres ensured that their candidates incorporated additional processes and/or provided evidence that candidates had set up their machining variables or alternative processes.

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.
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 pop up mechanisms, graphic manipulation packages or conversion into signage or similar 3d outcomes would be welcomed.

Section E3: Testing and Evaluating
The application of the assessment criteria by centres was usually accurate. There was evidence of good practice from stronger 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 much 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. 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. There was some confusion as to whether the life cycle assessment was for the real design or for the model they had built, it is more useful to consider the actual outcome in the situation, but we would try to credit either.

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