

Examiners' Report/ Principal Examiner Feedback

Summer 2010

GCE

GCE Design and Technology (A2): Product Design
(6GR04)
Paper 01 Commercial Design

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Principal Moderator's report for 6GR04

Design Technology: Graphic Products

2010

This year was the first submission of 6GR04 and it is pleasing to note that the vast majority of centres have implemented the new assessment criteria. It is also pleasing to note that the pass rate at A and corresponding grades in the coursework section is comparable to previous years.

Almost all centres used the correct assessment booklet and the majority correctly completed it. The marking was closer to the Edexcel standard than it has been in the past, but this has to be tempered by the fact that a similar number of centres were found to be outside the accepted tolerance and had to be adjusted.

Some excellent work was seen and most centres have coped well with the A2 coursework bearing in mind its familiarity to the previous specification. However, this familiarity has had some negative effects in perceiving the changes designed into the new assessment criteria and has resulted in some candidates not being given the necessary guidance to keep them on task effectively, losing them marks or time wasted in pursuing tasks needlessly.

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 clearly misinterpreted a basic requirement of an aspect of this submission. In some cases the work lacked appropriate levels of demand, range and depth and over-marking became a significant issue.

Almost all candidates identified a client/user group at the beginning of their work, but many failed to mention them again until the final summative evaluation. Candidates 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 candidates 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 moulding 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 design and make the product (storage, furniture, lighting), then it is likely not to meet the criteria of a graphic product outcome.

Some centres clearly have not recognised this and have submitted work more appropriate to a resistant materials submission, in this case the candidates would of course have been penalised for not choosing a product from the given pathways. If the product submitted was obviously a resistant material product then it would fail to access the full mark range in making.

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. Often describing what will be made or approaching the problem from their point of view rather than the client or user groups point of view. It was clear from moderators comments, that any candidate utilising the services of a genuine client, tended to delve far deeper into the issues connected to the problem and the independent input to the questioning was helpful in establishing a way forward. In this section we are looking for candidates to demonstrate an understanding of the problems issues. Which will then probably lead to a number of questions that will need to be answered, in the research section. The research section appears to have been given less credence in this mark scheme, but it should be remembered that a clear investigation of the problem and resulting exploration in the research would inevitably lead to a greater range of more realistic ideas in the ensuing sections. It should also be remembered that we are looking for concise research, and this does not mean the presentation of every single page of Internet research or questionnaire be presented, the results and findings are enough. In truth it is how the candidates uses their research that will really prove beneficial to them.

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. Some producing specifications that were technical, measurable and detailed. This said, many candidates quite often overlooked the need for measurable statements. Whilst it is difficult to attach measurable statements to an opinion based issue, there are often statements to do with size and scale of a defined look that can be compared with datum parameters. A lack of detail is an oft-repeated issue by moderators, at this level we are looking to reward statements that have a level detail and justification beyond the simplistic statements repeated at GCSE. The key issue about sustainability was often offered as an add on at the end, and rarely followed through in the designing at a later date.

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. It is disappointing to report that the moderators felt on the whole that they saw much work that lacked flair and saw centres and candidates opting for a safe text laden approach that prevented the freer exploration of design ideas. This said I appreciate the need for centres to evidence the technical knowledge and depth of understanding around the issues they are exploring. The best work seen here would tackle the individual sub-systems in the design problem and deal with them separately demonstrating flair in the solutions proposed as well as a good level of technical understanding. It is interesting to note that those who clearly understood the issues intimate to their problems, offered a sound specification and sound research to back it up, often scored highly in this section.

Section C2, Review.

Centres had good grasp of what is required in this section on the whole. 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. This section is a moment that allows the candidates to show an understanding of the commercial process, a review of progress would clearly take place, and so in many cases this was a missed opportunity to display a more commercial methodology.

Section C3, Develop.

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 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 often failed to address both 2D and 3D elements within their designs. In these cases developments were not used to produce a final design proposal that was significantly different to previous design ideas. Final Design proposals 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 not on the whole well done. A significant minority of 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 to 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 in these cases candidates often left out relevant detail as they did not understand the drawing being presented. It may be necessary or centres to take a more structured approach to the teaching of this aspect of the coursework.

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 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. Sketching was less commonly well presented and is possibly an area that centres need to take time to teach specific presentation skills. The area of discrepancy focused around the requirement to offer information to enable third party 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 made broad sweeping statements, like 'make the vacuum form mould' and glue together the frame'. Clearly in these instances we need to see that the candidates are anticipating

the difficulties they may face in the construction of the products. Timescales were sometimes too long or unrealistic and deadlines quite often absent.

One of the key issues with this section was the failure to focus on the planning of the product to be made. Some centres submitting architectural projects misinterpreted the 'commercial' strand of the project to mean that it was necessary to include plans for the 'real world' structure rather than for the manufacture of the model. It is never intended that a candidate should 'plan' to build the real product. There would be no advantage in them doing this for their own product manufacture, indeed the level of understanding required to plan the build of a major architectural structure, takes a professional years of study to achieve. Candidates must focus on the planning of the product they are to manufacture, whether it is an architectural product or packaging and point of sale outcome.

Making.

In many cases 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. In some cases it was a little difficult to understand the low expectations of centres and the sometimes-formulaic approach they adopted. Some of the work was a lower standard than the GCSE or AS. In these cases then marks in the making section would be restricted.

It is also a fact that candidates that fail to submit the 2D element were most often adjusted as centres had failed to take account of this.

We did see some over-reliance on the use of CAM especially the laser cutter, 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. The specification is clear that all Graphic candidates must select work from either of 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 a 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. There were examples of packaging projects overlooking the internal packaging, which would have enhanced the practical mark.

Section E2, Quality.

In many respects this section was the least accurately marked section of the making criteria, for those centres that needed adjustment. Here the main issue was a lack of precision or accuracy in the final product. Unlike the previous section, here we are looking at the completed final product, its accurate assembly and final product quality. A number of issues are relied upon if access to the higher marked categories is available; level of demand, a range of process in the manufacture and the evidence of a 2d as well as 3d element. Hence there are areas for centres to stumble here if the product manufacture is not monitored carefully.

Some of the work submitted was outstanding, indeed it 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.

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.

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

Section E3, Testing and Evaluating

This section was largely accurately marked by centres, although from the apparently hurried nature of the compilation of this section, it is suggested that centres give more time to the testing and evaluation of the manufactured products. Most centres made use of client/user group feedback. However, objective and physical testing was much less prevalent. 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. Modifications were often suggested but rarely described in detail or justified effectively.

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. Most 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.

Grade Boundaries

Grade	Max Mark	a*	A	B	C	D	E	N	U
Raw mark boundary	90	79	71	63	55	47	40	33	0
Uniform mark scale boundary	120	108	96	84	72	60	48	36	0

a* is only used in conversion from raw to uniform marks. It is not a published unit grade.

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