Principal Moderator's Report

Summer 2016

Pearson Edexcel GCE Design & Technology: Product Design, Resistant Materials (6RM04)

Unit 4: Commercial Design

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The 6RM04 course in RMT focuses on a synoptic task of a student's own choice and offers individuals the opportunity to demonstrate the skills and competencies assimilated during the entirety of the course thus far.

In this course students are required to work on a single integrated design and make task that reflects how a professional designer might work in dealing with a design problem and its resolution. They have free choice of design task, but must work with an identified client or user group, seeking feedback at a number of stages in the design and make process.

It is a requirement that throughout the research and design processes, students should consider sustainability and the impact their product might make on the environment.

It is expected that student work will be presented on about 30 to 35 sheets of A3 paper, but there is no penalty for exceeding this number.

Overall, moderators reported that while some work was of an excellent standard, much of what was seen was uninspiring and 'safe'. Students tried and tested products to design and make rather than taking risks to achieve creative and unusual results.

While the majority of work was adequately designed, well made and met the assessment requirements, it lacked flair and creativity and was often described by moderators as 'ordinary'.

Research and analysis

Work in this section has made some improvements this year, but overall there was a lack of focus on the design needs of the task in hand and often there was little or no guidance for research as a result of the analysis of the design brief.

Many students gathered lots of information on materials and processes that were generic and unselective. Some research gathered into joining methods suggested that students had already decided what their design solution would be. There was also evidence of a formulaic approach to this section from some centres where students produced generic analyses, mood boards, anthropometric and ergonomic data irrespective of the design task.

All students identified clients, some of whom were not quite believable based on interviews and subsequent evaluative comments. In high quality work, client input was a feature, but in many cases little further reference was made and no useful consultation was recorded. In this section it is important to establish client needs and this is best done through a detailed first hand interview.

Research tools such as mind maps and bubble diagrams were often used, but these were often generic and could have referred to many products.

Where storage was a feature of the proposed design, hardly any students looked at sizes, quantities or range of items to be stored. For example when designing a storage unit for books, but failing to take into consideration dimensions, range of books or how many needed to be stored.

Once again this year, questionnaires were in evidence based on identified design needs and were widely circulated. However, when working for a client on a bespoke product, all relevant information should be focused on the results of interviews from the client.

Hardly any students summarised the results of their research to identify key points that should be included in the product specification as a priority.

The vast majority of students scored two or three marks in this section, but hardly any achieved maximum marks. This was due to important omissions as explained earlier, or by producing copious amounts of irrelevant and unselective information.

Product specification

Specification writing has improved in some respects, where students have a better understanding that statements should be measurable wherever possible and justified to say why they are appropriate to the needs of the proposed product.

However, many specification statements were generic, vague and non-technical. Most students presented specifications under the recommended headings of form, function, user requirements etc, but often offered only a single statement for each. The important areas of user requirements and performance requirements were often treated cursorily, but should have been focused on in detail as this is where technical, performance related statements appear. These statements are used in designing, review, development and final outcome to test and evaluate against.

Reference to sustainability was generally weak, poorly addressed and often ignored.

Good specifications referred to research material, while others gave no mention of the information gathered, failing to link research to the specification

Design and development – Design

This section, along with ‘Development’ remains a problem for many students. Some excellent designing was in evidence with students demonstrating high calibre work and advanced knowledge with understanding of materials and processes, but this was the exception.

Many ideas were simplistic and alternatives were repetitive and lacked the depth and detail to demonstrate a good level of knowledge and understanding of materials, processes and techniques.

In the best work seen, students referred to specification points as designs progressed, to check their viability and sought client feedback for objectivity, emphasising the commercial approach to designing. In many cases however, specification points were not mentioned, which rendered research and specification writing meaningless.

In the best work, students demonstrated their understanding by using cameo sketches to show graphically how component parts could be made to adjust or move, while lower down the ability range design features were specified but not explained.

Where ideas were limited, this was often due to starting points that were simplistic and lacking in challenge.

Design and development – Review

Review was carried out with a good understanding of the requirements, as well as referencing specification points. Completed design ideas were compared against each other to determine which was the ‘best-fit’ for the specification and should be carried forward for further design input and development.

Consideration of sustainability issues in this section was generally weak and usually only briefly mentioned. Client feedback was usually present, but often superficial, especially where there was no genuine client.

In the best work, students summarised their findings in a statement to justify their selection for development and to explain how client/user group feedback would guide further design input.

Design and development – Develop

As was the case last year, some excellent work was seen in this section from more able students, with well structured development activity in evidence, based

on the results of review and client feedback and including further design input. However, many students do not understand what is required in development. It was rare to find students with an approach that reflected the results of review and involved further design input to change and refine an initial idea. A lot of students made simplistic or cosmetic changes to an initial idea then focused only on construction details.

Modelling was used effectively by most students to test some aspects of proposed designs. Although some modelling was used for cosmetic or presentation purposes, most was used constructively. However, some models were so badly made they could not possibly have informed the design process in any useful way.

Some excellent use of 2D and 3D CAD was seen and almost all students are expert users. A minority of students however, used CAD simply to draw a neater version of a final design proposal, which is not worthy of credit.

Design and development – Communicate

In this section most students were able to achieve well and the teaching assessors marked accurately in most cases.

A wide range of communication techniques was seen and expert use of CAD was widespread as part of design development.

Freehand sketching was sometimes of poor quality, which is surprising as this is a key communication tool that should be in constant use during this course and in 6RM01.

Some students did not appreciate that enough information had to be included in final design drawings to enable third party manufacture and where working drawings were generated automatically from 3D CAD sketches dimensions were often unrealistic, being labelled to two or three decimal places.

Planning

In this section most students were able to score up to four marks, but hardly any achieved the maximum because, despite comments in E9 reports and repeated advice in PM reports, quality control checks were yet again inappropriate. Statements such as “is it 90^0” or “is it the correct size” are questions not checks and “check that it fits” gives no indication of how or with what equipment the check should be carried out.

As usual, planning was presented in the form of flow charts or Gantt charts which considered the order of assembly of parts or components, tools, equipment and processes to be used during manufacture.

Where Gantt charts were used, a few students included the whole design and make process instead of focusing only on product manufacture

A minority of students recorded 'time' in lessons, weeks or dates, which does not convey real-time i.e. hours/minutes.

Product manufacture

As reported last year, the making sections have become stable in their outcomes, where centres who are fully aware of requirements and who apply the mark scheme accurately, have their marks agreed.

Where marks were not agreed during moderation it tended to be because the task tackled lacked the complexity or potential to achieve at the highest levels. Where CAM was used this tended to be well-balanced by hand skills in most cases, but there were some centres where over-use was encouraged, leading to disappointment when marks could not be agreed.

Making – Use of tools and equipment

Marks awarded by centres in this section were generally accurate and some high quality skills and competencies were in evidence. However, despite demonstrating good skill levels, some students produced undemanding work that could not support the marks awarded by centres. Simplistic and undemanding work, no matter how well made using appropriate tools, equipment and processes, that is unchallenging, cannot elicit high levels of credit here. Centres must ensure that the work students embark upon is appropriate to the capabilities of individuals and will allow them to achieve their potential.

In this section marks are awarded for the skills used by students in manipulating tools and equipment. High level skills will demonstrate precision and accuracy. Consideration of safety awareness should be credited here, but any risk assessment illustrated in planning can be used as evidence.

Making – Quality

As was the case last year, this section was marked fairly by most centres. Marks are gained here for the quality of the completed work and its component

parts, whether it functions as it is meant to, whether it matches the final design proposal and whether it is appropriate to the expected A2 level of response.

Some excellent work was produced but a minority of tasks lacked the scope and potential to allow students to demonstrate their abilities. More ambition and risk taking would be of benefit to students at the outset.

Not many students justified their choice of materials for manufacture, which could be done easily through simple annotation of photographs or in planning.

The vast majority of students presented a good range of clear images to support their practical work, but some photos were too small to illustrate technical details and some did not convey any useful information. It is better to have fewer, larger and more detailed images than many thumbnail size ones that are difficult to see.

Making – Complexity / level of demand

In this section, some high level work was seen which was generally well marked by centres, but conversely some work was of mediocre quality which was rewarded generously, where students had produced well made products which demanded relatively low level and repetitive skills. Where it was in evidence, it was pleasing to note that most centres had restricted the use of CAM to the recommended 50% or less, allowing students to demonstrate their personal manufacturing skills. Only a few centres allowed an over-reliance on CAM in their students work.

Testing and evaluation

In this section, some very good work was seen where students tested their products against technical and measurable points of specification, describing the point of the tests and recording in detail how they were carried out. Client testing was also a feature of high level responses as were photographic evidence of realistic field trials.

As a result of a weak product specification, some students did not have clear, measurable criteria to work from so effective and realistic testing was not always possible. Some testing was limited to comments on a few photographs of a product with no explanation of what aspect of performance was being tested. In weaker testing and evaluation, quite often the client did not feature strongly, possibly because the client was made up.

Life cycle assessment was tackled by most students, who did so quite well, but it was sometimes generic and not directly related to their product. In the best instances students used a detailed ‘cradle to the grave’ analysis.

Grade Boundaries

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

http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx