Principal Moderator Feedback

Summer 2022

Pearson Edexcel GCE
In Design & Technology: Product Design
9DT0/02

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Principal Moderators report 9DT02

2022 Series

Introduction and general comments:

This was the first year of moderation post pandemic and was a year of much change as the submissions were all electronic and the moderation team were working from home, this did inevitably lead to some teething problems, which we will learn from in the future. The board and the moderation team followed the Ofqual guidance regarding the Covid-19 mitigations that were necessary to try to avoid penalising candidates in this most difficult of submissions. The moderation team were instructed to look carefully for client/stakeholder input and try to find evidence to support an iterative approach and credit even limited client interaction. This of course may not have been possible due to the pandemic lockdowns.
Centres were also informed of the omission of Grid 10, Quality and Accuracy and informed of the notion of a 'proof of concept'. It should be noted here that some centres did not undertake any manufacture and so it did become somewhat difficult to award manufacturing marks in Grid 9. The proof of concept was in place to enable some element of testing and evaluating to take place the guidance went on to state. "Evidence associated with the demonstration or use of tools and equipment can be through the making of a final prototype, the making of parts of the final prototype, making dissociated from the final prototype, but cannot be through the making of a proof of concept." That said this occurred in a limited number of centres, and moderators were asked to look for evidence of manufacture across the portfolio to mitigate against this oversight.
The principal areas of concern were the candidate's submission at the front end of the portfolios (Grids 1-4) and the review along with some issues regarding manufacture and evaluation.
Where the centres had a level of reality in the identification of need the work was well structured and had a real commercial feel to it, these centres were commended in the E9 reports.
The material area breakdown was approximately 55% for Resistant Material style product and 45% in concept or architectural, with limited numbers of Electronics and Textiles products.
Overall, the quality of the submissions was slightly down on the quality of the work that we saw in 2019 but this of course is to be expected after what has been a very difficult time for centres to manage and so the moderation team would like to thank centres for their efforts to ensure the submission and completion of this series.

Centre Admin:
The centre administration this year was rather different and so we did see several issues resulting from the use of the LWA/LWT platform, this is something that the moderation team has raised with the board and so we would hope for a more stable submission in the future. Moderators did report that centres need to be made aware that after the upload process, which we understand could be lengthy! They do need to submit the upload. This, on occasion, was missed and so did delay the moderation process somewhat.
A number of centres submitted supporting audio and video files which of course acceptable, but centres should be selective in their approach and ensure that the audio/video input enhances the submission, we did see centres where an individual candidate uploaded 78 video/audio files and centres that had in total almost 200 files to look at. This does impact on the moderation process.
It was a difficult year and the moderation team accept that this must have been a difficult year for this centre submission, as was the moderation process, and so it is imperative that we learn from the experience and ensure that future 'iterations' are more streamlined
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Part 1: Identifying opportunities for design:

Grid One: Identification of a design possibility.

In this section we are looking for the candidates to identify design possibilities and explore them. This will then allow them to fine tune their thinking and produce an initial statement of intent. This section should have a commercial approach and is therefore most successful when the candidate has a meaningful narrative with a client or realistic stakeholders.
There was significant variation in the responses from candidates for this section. Some centres submissions were highly templated, and centre led. This impacted on the performance of some candidates, especially those of higher ability. The moderation team felt that the candidates often mis-interpreted this assessment criterion, they often started the process by talking about solutions and choosing a project that they wanted to do. There is often very little focus on the client apart from a cursory interview where inferior quality questioning elicited little useful information.
This is really the start of the iterative process and so a meaningful client stakeholder narrative is essential to access the higher levels of this criterion. The moderation team accepted that this may have been rather difficult to undertake due to the restrictions, but often the opening statements would be something like “I am going to make a storage solution for my brothers’ bedroom!” The candidates missed numerous opportunities to explore the needs wants and values of the potential client immediately focussing on a solution.
This section was rather weak across the whole of the submission which then went on to affect the Research and the Specification. There was too much evidence of product led rather than client/stakeholder/market led solutions at this early stage. It was often more successfully completed with the exploration of a broader starting point; however, it could also be successfully undertaken as part of a meaningful narrative with a single client.
We also saw submissions where the candidate explored three quite different scenarios and simply chose one, this often watered down the depth of the exploration of the design possibility. It is possible to structure the work in this way, but the candidates must interact with the client exploring the needs thoroughly not simply suggesting that they might need three remarkably diverse products for example bedroom storage, a cycle maintenance stand, and a desk light.
This often led to a moderation out of the highest levels in this criterion, that said we did see an initial statement of intent at the end of this section which of course is commendable and should be amended as a result of the research phase.
In the best cases we saw the candidates identifying somewhat broader areas of possibility such as sustainable products which may have manifested itself eventually as a rainwater harvesting system and controlled irrigation system or the re-generation of a town centre which resulted in the modelling of a range of relevant street furniture.

Grid Two: Investigation of needs and research.

In this section we must see a clear plan of action in terms of the research, the needs, wants and values of the client/stakeholders should be established and a perceptive selection of both research sources and a sound linkage between the design needs and the research must be evidenced. In effect the research must have a justification that relates to the design context.
The main issue reported by the moderation team was generic/textbook style research, it was often the case that the candidates had produced pages of materials and process research which had little or very limited relevance to the potential design scenario. Candidates must ensure that research remains selective and focused to the potential scenario should and offer a sound insight to the design context. It was deemed that research lacked the perceptive selection of sources for many candidates, client/stakeholder input at this stage is vital.

In the best cases the candidates produced very focussed research that had relevant ergonomic information and had real evidence of a meaningful client narrative that then went on to further influence the research that was undertaken. This would be a particularly good example of an iterative approach. For example, a candidate may be looking at cycle maintenance methods and after further conversations with stakeholders realise that pre-race tuning is essential and so might explore folding mechanisms for portability purposes.

Exemplar moderator commentary

"Centres appeared to be formulaic with this. Students rarely followed an iterative route."
"… generic research which is very much 'textbook' research not always relevant to the chosen project."
"…Few candidates seemed to research what might fit into or onto the chosen [storage] product."
"… very prescriptive … candidates across a centre submitting very similar work in this section."
"… still many centres using charts of anthropometric data but not extracting anything relevant"
"… sites studies, which was really useful and explored the issues beyond the size of a plot."
"Client input was generally a quick comment agreeing with what the candidate had discovered."

Grid Three: Specification.

This section should be characterised by a fully re-worked design brief that reflects the client's needs and is a product of the investigations that have been undertaken. It should reflect the changes that have been made to the candidates initial thinking, this again evidences the iterative/commercial approach to the design work. The specification should then be realistic, technical, and measurable.
The majority of centres offered a revised design brief and specification. However, often the specification points were quite generic, and the justifications were limited. It is important that the candidates avoid overly simplistic statements such as 'the storage must be big enough.' This clearly should be a product of the research and therefore specific, enabling testing. The ability to test should be built into the specification to enhance the testing and evaluating section.
In many cases again the client was somewhat invisible and so the specifications lacked that iterative feel that is in the spirit of the qualification, again this may be a product of the restrictions in place and moderators were asked to seek evidence to mitigate against this but often the points submitted were simply too generic.
Where this section was completed successfully the candidates had undertaken meaningful stakeholder narrative and had therefore focussed research that enabled them to write specific and justified statements that could be tested. In the absolute best cases the candidates had also accounted for the use of a 'proof of concept and explained how that may be used to test the product, for example a virtual walk through of part of an architectural scheme.

Part 2: Designing a prototype:

Grid Four: Design ideas.

This section should be characterised by candidates using a range of design strategies to produce a range of design ideas that are realistic, workable and address the criteria in the specification criteria from the previous section. Candidates should be thinking like a commercial designer and apply their knowledge of technical skills and materials and back it up with the research they have carried out previously and indeed any additional research that may be required. They must try to be imaginative and draw inspiration from many areas such as nature, industry, design movements and innovative technology. This was familiar ground for most centres, and they were able to produce three or four detailed designs, however, clients were not used extensively and when they were, the comments were rarely used to move the project forward.

The candidates generally performed in the middle level of this criterion however the use of sub-systems to explain the concepts in more detail were often missing, along with a lack of details about potential manufacturing processes that could be used.

The annotation was too often descriptive and not analytical or offering alternatives which is perhaps a reflection of the loss of teaching time but at this level we would expect to see examples of technical knowledge and understanding embedded within that annotation.

The candidates are getting better at using a range of design strategies and often conceptual initial sketches with a stakeholder commentary, many termed this ‘ideation’ this is very commendable but should be then backed up with a detailed exploration of these ideas with technical details and sub-assembly exploration.

The sub-assembly issue was the main area of concern here, the weaker and indeed many of the mid-range candidates submitted wholistic ideas with little exploration of how parts interact, or mechanism fit etc.

We did see some excellent design work that was supported by astute technical annotation which was very heartening, these candidates had a mastery of the graphic communication skills required and adopted a very creative approach to the resolution of the design issue that they had explored and the brief that they had developed, they also evidenced the client narrative that allows for an iterative approach.

Grid Five: Development of design ideas.

This section should show that the candidates are drawing on their research, and indeed, in the best cases completing further relevant research in response to the client/end user. This should be evidenced in the annotation that supports the design work. Candidates should use modelling to beneficial effect to test out aspects of the design possibilities which, as a result of the modelling allow the candidates, in conjunction with the interested stakeholders, to develop the prototype further. This of course again would allow the candidates to evidence further iterations of potential solutions.

The moderation team reported that centres are beginning to address this section of their portfolios with a higher level of response. Most candidates used sketching, card, and block modelling to push their ideas forward and the final design is usually different or significantly different to the ideas in the previous section previous section. There was evidence of effective modelling used to favourable effect to explore elements of the proposal. That said we did still see complete models at this stage as well.

As a further mitigation against the pandemic restrictions if the candidates had not undertaken any manufacture moderators were asked to possibly use the modelling here to award some marks for tools and equipment, this did however mean an adjustment to the development marks to avoid a double award.

Where the work was not in line with the criterion it was often due to a rather tick box structure for example make a model ‘tick’ do some colour experiments ‘tick’ etc. Moderators reported that they did see limited evidence of an iterative approach here. The weaker candidates also produced rather cosmetic or superficial developments.

We did see some very detailed CAD work and many candidates displayed a good grasp of the packages that they employed; however, they must try to avoid falling into the trap of thinking that a step-by-step guide to how to draw the proposal is real development.
In the best cases the candidates presented on-going research that benefitted their final design proposal which of course is an iterative approach to the work.
Where this section was completed well the candidates had used modelling to test sub elements of the proposals and there was clear evidence of the informative client interaction that illustrates a more 'rounded' approach to the design process including further research, market testing and excellent technical annotation that draws on research undertaken, or stakeholder intervention

Grid Six: Final design solution.

In this section we are looking for the candidates to be making final refinements and then presenting a detailed final design solution that would enable third party manufacture to take place. The candidates should then produce a manufacturing specification that details the technical information needed for manufacture. This is often well completed if the candidates produce cutting lists, parts drawings or a tabulated illustration of the operations that need to be undertaken on each part including tools processes etc. Incorporated into this, calculations regarding , for instance strength or avoidance of waste could be evidenced.
Assessment on this criterion deemed to be mainly lenient. There were mixed examples of engineering drawings, invariably produced using a CAD package; however, in a number of cases, these lacked sufficient dimensional detail to allow interpretation by a third party. That said the moderation team did observe drawings with good dimensional detailing and parts lists. We saw extensive production plans, but it would have been good to see more exploded type views detailing construction. Some included detailed calculations and waste reduction strategies, but this was not common. One phrase that has become more common is DFM (design for manufacture), which seemed to evidence a more commercial design approach more akin to a manufacturing specification, this of course is commendable.
A key element is providing enough information for a third party to manufacture the solution but not all candidates had this at the core of their thinking, if the candidates always have this 'rule of thumb' in mind often the outcome will access the higher levels of this criterion. Where the candidates had not taken this into account they would have been moderated for example where they had simply produced a CAD drawing of the exteriors of a building with no notion of size scale etc.
Where this section was completed well, we saw particularly good detailed final drawings often using CAD and each operation that contributed to the manufacture detailed therefore evidencing the candidates understanding of a range of tools materials and processes, this is perhaps most often completed with a detailed cutting list and often exploded views or parts drawings.

Grid Seven: Review of development and Final Idea.

This section is where the candidates must undertake an intellectual analysis of the work they have undertaken so far, the commentary must be analytical and evaluative it must not be simply descriptive. In the best cases there should be strength and weakness analysis that provides balance and should consider all factors such as materials, processes, techniques and have reference to feedback. The evaluative element must be balanced and ensure that any conclusions undertaken can be supported.
This section was the weakest area in most folders and was deemed to be particularly lenient throughout the centres submissions. The Moderators were asked to look for helpful evidence elsewhere in the folders, and centres should be aware that the awarding of these marks can run from ideas through to the evaluation of the design proposal and the evaluation of the work

of others can be drawn from all relevant areas that may even be from grid 2, provided that centres do not double award.
The candidates had tried to include a running commentary alongside their design development although the quality of these commentaries varied significantly. Some were detailed, focused on the specification and client led; others were more descriptive rather than analytical. Many candidates reviewed their initial ideas and final designs, often using a table, but there was often limited actual analysis. It is important that the candidates submit a balanced view here of the design work perhaps via a positives/negatives analysis
The very best candidates gave balance reviews throughout, starting in the ideas and there was evidence of the work of others being considered and used but centres will need to be encouraged to draw this out more and encourage candidate to make it relevant to what they are designing. The best tended to use colour coding to highlight pros and cons.
This was the section that was clearly a struggle for most centres. In this grid many candidates failed to reach the higher marks mainly as a result of not utilising their client feedback on a regular basis or making clear design decisions about each aspect of their development.
Candidates failed to realise that the work in this section must be analytical in nature and NOT descriptive; it must review the development from client feedback, and the evaluative commentary must have some balance in terms of advantages and disadvantages but more importantly a full dialogue throughout, where the client/stakeholders are consulted, and the design moves forward from these discussions. forward.
This is a section of the assessment criteria that requires attention in future submissions if the candidates are to access the very highest levels of this criterion.

Grid Eight: Communication of design ideas.

This section splits into three distinct sections in that we should see evidence of more traditional communication techniques along with CAD and a more overt emphasis on written communication.
One of the issues as we have moved on to a digital platform is that the quality of the sketching work appears to be diminished, this may be in part poor quality scanning which on occasion did cause some issues as the definition was rather poor. The centres should be encouraged to ensure that the candidates sketch work will scan with enough definition to show all the detail.
The sketches amongst the weaker candidates also lacked real detail and technical annotation candidates should be encouraged to balloon off parts and detail them especially if they have some complexity to them, this then illustrates a perceptive selection of a communication technique that shows detail, a requirement of the level 3 in this criterion.
In a limited number of cases the candidates submitted low-level drawing skills that affected the quality of the work, but it was often complimented with some useful CAD.
Generally, this section was completed well and assessed well. Submissions rarely had a limited range of communication even at low level responses. Students are using traditional sketch skills, and CAD was used in almost all folders to some level. Written annotation was found to be reasonable but as usual some poor examples of one-word annotation on designs. In most cases here the centre assessments were realistic.

Part 3: Making a final prototype:

Grid Nine: Tools and equipment.

In this section candidates are expected to demonstrate a range of accomplished making skills at and advanced level standard in relation to a sophisticated design problem. The level of demand, range of skills and complexity in the production of a high-quality fully functioning prototype or parts of that prototype or indeed some unrelated manufacture that evidences A level standard use of tools and equipment and also provides a suitable level of challenge that is higher than a GCSE qualification.

Centres need to ensure that the level of skills used in the manufacture optimises the use of tools and equipment at an A level standard.
In the first year after the pandemic restrictions the moderation team looked for evidence of the use of tools and equipment across the portfolio to try to mitigate against a penalty for the candidates that said the guidance that went out to centres did explain that candidates did have to evidence some manufacture, this could be a part manufacture of the prototype a completed prototype or manufacture dissociated to the prototype. It is pleasing to report that most centres did undertake manufacture of some description. Where there was no evidence, the centre should expect to be moderated, but the team tried to find evidence to assist the candidates wherever possible.
We did see some outstanding manufacture for example a rotational moulder, but in general the work was of lesser quality than previous the submission, this of course was to be expected and again the moderation team tried to look favourably on the centre marks. However, we often saw work that was not at the standard required for an A level indeed some might not have faired well at GCSE.
This of course is a situation that will need to be addressed for ongoing submissions.
We should see A level standard use of tools and equipment such as turning, casting, steam bending, along side complex CAM with interlocking or interdependent parts.
The moderation team reported a very mixed submission here and is a concern for the qualification going forward, it is imperative that the candidates and centres understand that this manufacture element is what sets D&T apart and it must be cherished.
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Grid Ten: Testing and evaluation.

In this section we are looking for the candidate's ability to discern the difference between testing and evaluating. The notion of testing implies putting the product into service and considering its success, especially in terms of the specification and the clients' needs wants and values, whereas in the evaluation phase we are looking for a critical review including strengths and weaknesses which will then give a balanced conclusion supported by all the analysis undertaken. This could lead to further suggested modifications therefore illustrating a post manufacture iterative approach. The definitions in appendix 5 of Analyse and evaluate in the specification may help with candidates further understanding.
This section was again a rather mixed submission, in most cases the candidates could undertake some form of testing as they had made something for example a candidate who had started the manufacture of a cycle storage rack for a small flat had made the Base and could load it appropriately to test the strength. Whereas the candidates that had produced a proof of concept needed to think creatively to test the product, in the best cases the candidates did gather opinions and tested aspects with stakeholder opinions but often this was not the case, the work was rather superficial with the commentary being largely descriptive.
Centres again need to stress to the candidates that they should design the specifications in such a way that the tests are embedded within it, such that this section becomes much easier to manage.
In some cases, the submissions seem to have improved in quality and centres seem to understand what needs to be submitted in terms of testing, client and 3rd party feedback, evaluations, suggestions for modifications and life cycle analysis. While this was sometimes carried out very effectively, weaker submissions just paid lip service, failed to respond to feedback, included very little analytical detail in their evaluations and submitted limited suggestions for modifications to improve the outcomes.
Weaker performances here were often a direct result of a weak specification which impacted the project all the way through. Architectural students experienced greater difficulty in devising tests effectively. Better prepared candidates conducted sun path analysis using torches, weight tests, size tests (such as fitting in a car boot), virtual walk throughs, using CAD to site the design in its environment and using avatars to demonstrate scale.

The LCA's submitted were often a product of a generic software package which could fail to be bespoke to the product, candidates should try to ensure that the life cycle analysis is focussed on the product.

General:

The centres should make full use of the NEA guidance on the Edexcel website and check on the site for further exemplar materials that will be posted later in the year. It should be noted that this report draws upon some of the issues raised in the 2019 examination series as well as looking at the experiences for this submission. It also of course should be noted that the current guidance is that the candidates in 2023 will be assessed using the full assessment criteria as we move back to the standards that were set out in the first year of the examination in 2019.

Finally, the moderation team would like to thank all the centres for their efforts this year we understand and appreciate that the pandemic has caused multiple issues and indeed stress for all involved but it appears that as always, the D&T community are very capable problem solvers and together the qualification has been delivered.