



Pearson
Edexcel

Principal Moderator Feedback

Summer 2022

Pearson Edexcel GCSE
In Design & Technology
1DT0/02

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1DT0/02 GCSE Design and Technology Non-Examined Assessment 2022

Report from the PMs.

Introduction

In the past few somewhat “turbulent years” for education and our candidates, the GCSE (9 - 1) Design & Technology specification has seen some alterations and amendments in what we would see as a normal year. The temporary acceptance of proof-of-concept prototypes and removal of assessment criteria has allowed many of our candidates to still flourish and be as “normal” a GCSE experience as possible. The requirement for digitally uploading candidate work and documents via the Learner Work Transfer platform (LWT) has caused a few issues but is seen as a vast improvement for security and access to candidate’s work. We would like to take this opportunity to thank centres for continuing to choose us for their awarding body and to welcome the many centres that submitted work this year for the first time with Pearson.

As Principal Moderators, it has been very rewarding and encouraging to see that so many centres have embraced the many changes that have occurred to allow their candidates to perform across all the assessment criteria. Whilst it has to be acknowledged that there were some discrepancies in both assessment, protocol and compliance issues, the vast majority of centres have produced portfolios, proof-of-concept work and prototypes that have addressed the contextual challenges and have been successful. We hope that the E9 report specific to the centre and future access to training opportunities in the Autumn and Spring terms will allow centres to adjust their performance if necessary and improve year on year for their candidates.

It should be noted that this year we are seeing a larger than normal increase in administrative errors from centres that could be concerning either: incorrect samples uploaded for moderation, incorrect digital documents used, issues with presenting portfolios that have been scanned, addition errors either on the Candidate Assessment Booklet (CAB) or errors in transferring the candidate’s mark to the EDI forms or recording different marks on Edexcel Online. This is a basic quality assurance checking procedure that needs to take place in the centre prior to the uploading of the sample for external moderation. It should be noted that the given portfolio proof-of-concept work and prototype must still have the complexity and skills required at Key Stage 4 to access all of the available marks, many moderators reported lesser projects claiming inappropriately high marks. Centres are to be congratulated on ensuring that the vast majority of candidates presented work that was within the six contextual challenge themes set by the board, as a reminder they are different each year and are launched on the 1st of June annually.

Our team of moderators have reported a number of factors that we would like to share with you in this document. It is hoped that everybody will be able to glean some information both here and with the centre specific post moderation E9 report, that will continue to help you to improve the centre’s performance in future years. It should be noted that the E9 report is available post results day from the centre’s Examination Officer.

Administrative issues

Centres are reminded that only the work of the requested sample from Pearson should be uploaded for moderation, if any requested candidates are withdrawn then centres should upload a replacement portfolio. In addition to the sample, the work of the highest and lowest scoring candidates should also be uploaded if not included in the original sample request. This is very important as it enables us to capture your highest and lowest scores for the process of awarding grades to each centre.

The majority of centres produced work that was in a format that was very accessible, however, there were a lot of centres who had not read the guidance for submission document and had sent physical folders, or submitted work in the incorrect file or nomenclature format. One such problem was the Candidate Assessment Booklets (CAB) used by centres for each candidate. These should be used to guide the moderator to understand how centre assessment has been awarded. **Centres should page reference this work to allow the moderator to be directed towards it** and then the moderator can compare the centre’s assessment to national standards for accuracy and fairness. This works only

if the candidate's work is clearly labelled, is sequential and consists of a portfolio where page numbering has been used throughout. It is vital therefore that each CAB from the sample requested is utilised to the maximum which have now been adapted to Excel format (.xlsx) which mitigate most errors of addition for centre assessors. Centres who submitted 2019 Word (.docx) and PDF equivalents were asked to resubmit this document in the preferred format prior to moderation.

Centres can now upload a separate document to the LWT containing photographic images of the final prototype, or indeed MP4 files that might show a working aspect of the prototype or testing being carried out if appropriate. This is really helpful to the moderation process in attempting to agree centre assessment. Centres are requested not to send MP4's of every aspect of manufacture but to be selective and choose only appropriate files that support centre assessment.

Unfortunately, we did see some irregularities in the contents of portfolios and issues of plagiarism from some centres where candidates included the same work as a peer / had traced over existing product images or had used templates produced by the centre. There were instances where centres had supplied portfolios which had been laid out with pointers for what to include on each page. In other instances, centre assessors had left feedback on the portfolio, which is also not allowed. Centres are reminded to be mindful of the current JCQ rules regarding the use of templates, feedback and plagiarism to avoid the centre being referred to the Malpractice team for investigation.

Contextual Challenges

Most centres responded to the contextual challenges well and really entered into the spirit of working producing some well-made projects, proof-of-concept work and prototypes. There were some instances where centres had not responded to the Contextual Challenges set by Edexcel and this served to limit access to many marks in the assessment. Most centres had allowed candidates to have a free choice of the contextual challenges and candidates had selected from across the range; Neurodiversity, Theme Parks and Town Centres. It was also observed that some centres did not consider the full range of contextual challenges allowing their candidates a full choice of the themes. JCQ ruling states that all candidates should be given access to the full range of contextual challenges and they should be open to respond to these in their own way without being led or coerced by centres into choosing a specific context.

Assessment criteria:

1.1 Investigation of needs and research:

This section was reasonably well completed by many candidates who used this section to really set the scene of the contextual challenge, offered some photographic evidence of visits and showed some insight into who they were designing for (the client) and their needs. It was nice to see that many centres had listened to previous feedback and now only researched one contextual challenge, rather than investigating or brainstorming all three themes before deciding. Generally marks were appropriately allocated and centres appeared to know how to access the middle and top range of marks. This section is about **investigating the needs** of the user within the context of the challenge selected. The best responses were where the candidate had not only identified the key aspects for research, they had then explained why they were key points and had then also informed the reader how they were going to gather the information required. Where candidates did not always consider the contextual challenge in enough detail or approached it with fixed ideas in mind, this led to superficial research. Questionnaires sometimes contained a range of closed questions and sometimes asked questions that would not have informed the design ideas or specification. Some candidates unfortunately decided on the prototype that they intended to develop, too early on in the design process, making little reference to the contextual challenge. Some centres had included lengthier legacy style research into materials or joining methods; this research usually did not link to the contextual challenge in any meaningful way and was felt to be better placed in the 'development' section with reference to the refinement of the prototype/proof-of-concept. **Mood boards** (although reduced) were again seen that often bore little or no relation to the project being undertaken, **these should be avoided.**

1.2 Specification:

Candidates generally correctly included the Design Brief in this section or in the investigation section just before the specification, however, some candidates still are omitting this requirement and this will limit assessment possibilities. Candidates often produced a good range of specification points with realistic points and higher-level candidates added many measurable factors including writing technical points. It was found that candidates had either written a broad specification that allowed them to come up with a wide range of ideas, or they had written a very tight specification which made the ideas narrow. The criteria refers to the justification of the performance requirements however, this was often the weakest part in the specification rather than focussing on it. This section is perhaps best achieved where candidates have a format with the specification point, a detailed justification, with a measurable point/section. This detail will help candidates in the final section where the product is “tested and evaluated” as it gives measurable points to test the end product against. This work will also be used in the **review** section looking at how the initial ideas rate against the specification points. Moderators reported that some candidates produced specifications that were limited to the middle mark band as they lacked any sort of justification back to the contextual challenge.

2.1 Design ideas:

Most centres submitted good work in this section with many centres submitting excellent sketch work, although the use of pencil work needs addressing as the scanning quality can be weaker if not dark enough. Annotation of sketches however, was not generally focussed on the project’s specification points. Some centres had directed their candidates to produce three or four different design ideas to solve the contextual challenge but other centre’s candidates might produce ten ideas plus but they often overburdened the candidate lacking any real detail and taking up far too much time to be useful. They must be encouraged to annotate in more detail and add mini sketches to indicate the possible fabrication processes that could be used to make them or explain what materials might be used to make the prototype. Centres that have clearly taught their candidates to sketch and design well, indicate that ideas were well annotated with a detailed understanding of materials, processes and techniques, score well. Many candidates are not meeting the assessment criteria of using a design strategy, referencing user needs and wants or specification points. Where candidates were leniently assessed, it was generally due to lack of these points. Research gathered in the earlier sections needs to be better used in leading and formulating design ideas that relate to all key specification points. Due to the nature of the specification, we saw electronic systems projects, graphic-based projects, product design-based projects and textiles projects. There were a few centres who were using textiles with electronics, product design with textiles, product design with electronics and systems and graphics-based product design projects. Those centres that used only CAD here did not usually successfully generate a good range of ideas. A combination of CAD and sketch work should be encouraged. In some centres however, much of the work seen was too similar, showed limited creativity with little annotation to explain intention, materials or processes. It should be remembered that this section is for initial ideas. **The finished “final design” the candidate produces should not be identical to images produced here, there has to be room for refinement and development otherwise access to marks later could be restricted.**

2.2 Review of initial ideas:

The moderators reported that the review stage was generally completed well this year, but that it remains a very mixed approach across many centres. If a centre approached it well then most candidates were successful. Those who did not include measurable points in their specifications tended to not score highly here. Some good work was seen where candidates had clearly reviewed their work objectively against the initial specification as a separate sheet and had considered user group feedback all in relation to the contextual challenge. On too many occasions however, candidates simply resort to using RAG colour coding, tick boxes, smiley faces or a scoring system ranging from 1 to 10 for example to review their work often alongside the idea in question. Where candidates work was

repetitive and simplistic, candidates did not score highly. This is simplistic approach is not subjective and candidates must be better guided in future series to undertake objective evaluations. Reviews were often seen beside sketched ideas. If this is the case centres still need to annotate, including page numbers, the CAB's to help identify where the marks are coming from. A separate sheet is preferable rather than making comments alongside the initial idea sketches where more room exists to expand the thoughts and decisions. Ideally targeted user group feedback should be used which is relevant to the product rather than using peers in the class for opinions. A summary of findings, might then guide the candidate into the development stage with better results both here and potentially in the development stage.

2.2 Development of design ideas into a chosen design

Most candidates entered into the true spirit of the iterative development section by carrying out further research, developing the design over several iterations, including modelling to test the functionality culminating in a chosen design with details for a third party to manufacture it. The variation of work and assessment presented by some centres in this area was disappointing.

Many candidates scored highly in this criterion, centres should remember that where it is worth 12 marks, then there should be enough work when referenced against the other sections. Some candidates had limited extra research, many centres credited research that was at the beginning of the folder as opposed to in this section. Candidates who started their project with a design fixation of what they wanted to make for the prototype tended not to develop their initial ideas well, and need to be encouraged to provide evidence of iterative design where the design solution has clearly been refined, through modelling of specific features.

The use of traditional modelling approaches was well observed alongside 3D drawing work which in some cases was very high level and effective. All too often though, development was limited to basic refinements with little consideration of the user or as part of the final prototype "making" journey. Occasionally centres credited written comments and development from the 2.1 and 2.2 sections of the folder. Testing of the prototypes at this stage was also usually limited. Candidates should use a range of methods to iterate, using sketch models, cardboard models and maquettes, toiles, methods of manufacture samples including jointing and seams, circuit diagrams, PCB schematics, mechanical kits, breadboarding, computer aided design. Candidates do not need to use all of these methods but should be using a range of these and using them in a cyclic fashion, for example, sketch, model, sketch, model, CAD, model. Some candidates' folders tended to progress almost directly from the review of ideas to the final design with only very limited development work. It is important that the design really moves on during this section and candidates should be considering form and function, e.g. dimensions, joining processes, user needs and the overall needs of the product in relation to the contextual challenge.

The inclusion of CAD was present for a good number of centres utilising 2D, 3D and graphic development and this dovetailed nicely in the iterative design process by carrying out some light CAD work in the earlier stages and some more detailed CAD work later once the designs had been firmed up.

This section also includes the Chosen Design which should include the details needed for third party manufacture. Here candidates produced working engineering drawings in third angle orthographic, cutting lists, bought in components, assembly drawings, exploded diagrams, final CAD renders, vector drawings of CAD/CAM CNC files, circuit schematics, PCB track patterns, bill of materials, wiring diagrams, coding and programming, patterns, line drawings and lay plans, design for print and graphic DTP images. Some centres used commercial patterns and clearly evidenced changes they had made to these patterns, through the use of sketches and photographs which helped clarify the marks awarded.

Communication:

It is in this section that we can credit the communication that is used to design and develop the candidate's ideas. In too many cases we saw that centres had written 'throughout' in the CAB and this should be refrained from. Communication is only assessed through 2.1 Design Ideas and 2.3 Development of a Chosen Design and these criteria assess not only the use of graphical communication, but also the use of written communication and the use of computer aided design.

Graphical work was well assessed by centres and saw candidates using a wide range of graphic techniques including 2D, isometric, perspective and orthographic. Written work was also appropriate to the design work and candidates were able to annotate in some detail.

Where candidates used CAD in a well-thought-out manner, they were able to achieve the higher mark band. Candidates that utilised CAD had used it in many ways: 3D CAD software, circuit schematic software, circuit board software, electronic programming software, graphic design software for graphics and textiles drawings and 2D CAD vector-based drawing packages. Most candidates included photographs in the development stage (modelling) – at best these were clearly annotated and added much to the project's overall feel. In several cases, we saw no CAD work utilised in centres. In a modern age, CAD should be used as a tool for design and with more and more types of CAD becoming cheaper and many web based ones are free. In a few cases we saw that CAD had been used by the candidates but not credited by the centre assessor in the CAB. Some candidates showed laser cutting in their manufacture diaries for instance, but had not included screenshots of the vector drawing package here in this section, that could have supported an increased mark in this area.

2.5 Review of chosen design:

What is expected here is for candidates to look at the points taken forward from the "Review of Initial Ideas" and evaluate if these points have now been improved post development as opposed to looking at the points that had not been changed. The first bullet point in the criterion relates to the analytical points that review the design idea across the development section. The second bullet point relates to the evaluation of the chosen design against the specification points. Candidates generally produced a review on a separate sheet, which made it easy to see where the marks were awarded. There were incidents where centres were asking for marks when the candidate had evaluated their work in the previous section, which was difficult to agree.

The Review of Chosen Design section was in a lot of cases omitted from portfolios. In most cases, candidates had reviewed the chosen design against every point of the specification but was broad and lacked detail. A large number of candidates failed to complete this in any depth, instead they had completed this section using evidence from the annotation of the final idea which resulted in weaker responses.

3.1a Manufacture – selection of materials:

This criterion relates to evidence that underpins and exemplifies the candidate's reasons for choice of materials used (or could have been used if the proof-of-concept route was taken this year), and their fitness for purpose (what appropriate properties do they have). This section tended to be leniently assessed by a large number of centres as most candidates had used appropriate materials but they had failed to explain and justify why they had chosen these materials in any depth. Quite simply, this section could be completed on a single A3 page. Centres generally awarded credit in this area where no explicit reference to materials was made anywhere other than in the diary of manufacture, which did not include properties and as a result centre assessment tended to be leniently awarded. Where candidates had included a separate area where different materials were identified and listed with material properties, candidates often did not analyse or justify these in relation to the final prototype or proof-of-concept model. It must be remembered that assessor's annotation alone in the CAB cannot be credited, without evidence from the candidate in the portfolio.

3.1b Manufacture – skills and processes:

This section relates to the skills and processes used by the candidate to manufacture the prototype and pertains to the competence or skill of the process. Centres are to be congratulated on the whole for the level of outstanding products that were made this year under difficult conditions. Due to the restrictions on centres in 2021-22 and the year preceding this, many candidates opted to manufacture a proof-of-concept model in a range of different ways; cardboard models, paper toile, digital circuit simulations and digital CAD, and a mix of these depending on the projects. Although candidates were able to make proof of concept models, most candidates were able to show photographic evidence of the stages of manufacture, but failed to show how this may be made had they had access to machinery. In many centres candidates had produced work that was suitably challenging and had demonstrated a wide range of skills accurately performed and were appropriate for Key stage 4.

Candidates had produced an extremely wide range of final prototypes for the contextual challenge across all material specialisms and in some cases overlapping specialisms. We did see prototypes that were solely Timber, Metal, Polymer or a mixture of the three, Textiles prototypes and Textile prototypes with electronics encased inside, Systems products that were encased in a range of different materials. but invariably we saw what we hope is a growing trend of candidates' crossing over materials to produce a prototype. A number of centres took full advantage of the ability to use mixed materials to create innovative prototypes or proof-of-concept models.

In some instances, candidates had provided little or no information / justification as to why tools, equipment and processes had been used especially to record health & safety issues. Often the centres had correctly filled in the CAB but in some cases it was difficult to justify how marks had been awarded particularly at the top end when trying to judge competency through manufacture. Centres would be advised to guide candidates to include such evidence either via photographs or written comments to justify these high marks, **good sequential manufacturing photographic evidence is so important here to help support marks awarded by centres, through this we can see the candidate using a wide range of tools and equipment and can better assess the quality of what has been produced.**

Looking ahead to 2023 submissions, candidates should return to full manufacture of a prototype and documenting the manufacture of this through a photographic diary with annotation to explain the tools, equipment, fixtures and fittings and health and safety, for each stage. Under the changes to the 2022 submission, 3.2 Quality and Accuracy marks had been omitted and therefore candidates were not assessed on the quality and accuracy of their proof-of-concept models or prototypes and centres were not expected to mark this section. This section will be assessed in 2023 submission as we move back to a "more normal" way of working.

4.1 Testing and Evaluation:

The responses to this section varied widely across centres; at best this section was very detailed with a clear range of relevant and measurable tests analysing the prototype or proof-of-concept model that the candidate made in response to their chosen contextual challenge. This was often with good photographic evidence of the tests alongside their results also containing user group feedback. These tests were developed from the ones initially described in the initial specification points. The photographic results of tests in situ were displayed in a detailed, objective evaluation and future modifications proposed and were fully justified.

A Life Cycle Analysis should discuss the sustainability of the prototype from cradle to grave through headings like Raw Materials, Materials Processing, Manufacture, Distribution, Use, Maintenance and Disposal. The Life Cycle Analysis was attempted and accomplished well in many cases, meaning that the higher band grades could be reached by many candidates, although many life cycle analysis' were based on a single material and did not refer to the prototype in its entirety. A number of centres failed to produce a life cycle analysis of any depth, where they were evident, they often included generic comments. There were many candidates who had failed to understand how to conduct a life cycle analysis effectively with many missing it out completely.

Third party and user group evaluation was in evidence but for the most cases it lacked objective or detailed evaluative comments that were of use in assessing the merits of the prototype. In other cases a simple table of specification points and met/not met assessment occurred. This was often subjective especially with tick boxes being used or where one or two generic tests which were not objectively measurable against the specification were used. Where specifications were not measurable, technical and specific, evaluations tended to be vague and meaningless. In some cases, we saw a copy and paste of the specification which was then RAG colour-coded or merely with an added column to a table that said 'Yes/No' which was very basic and would have only scored points if there was a greater body of work to help support the criterion. It is recommended that the user group feedback does not necessarily come from peer groups but reflects the thoughts of the target user of the prototype and the challenge it was set in.