

Pearson Edexcel

Design and Technology

NEA Q and A

9DT0/02

2nd Oct 2023

First teaching in 2017

First assessment 2019



Agenda

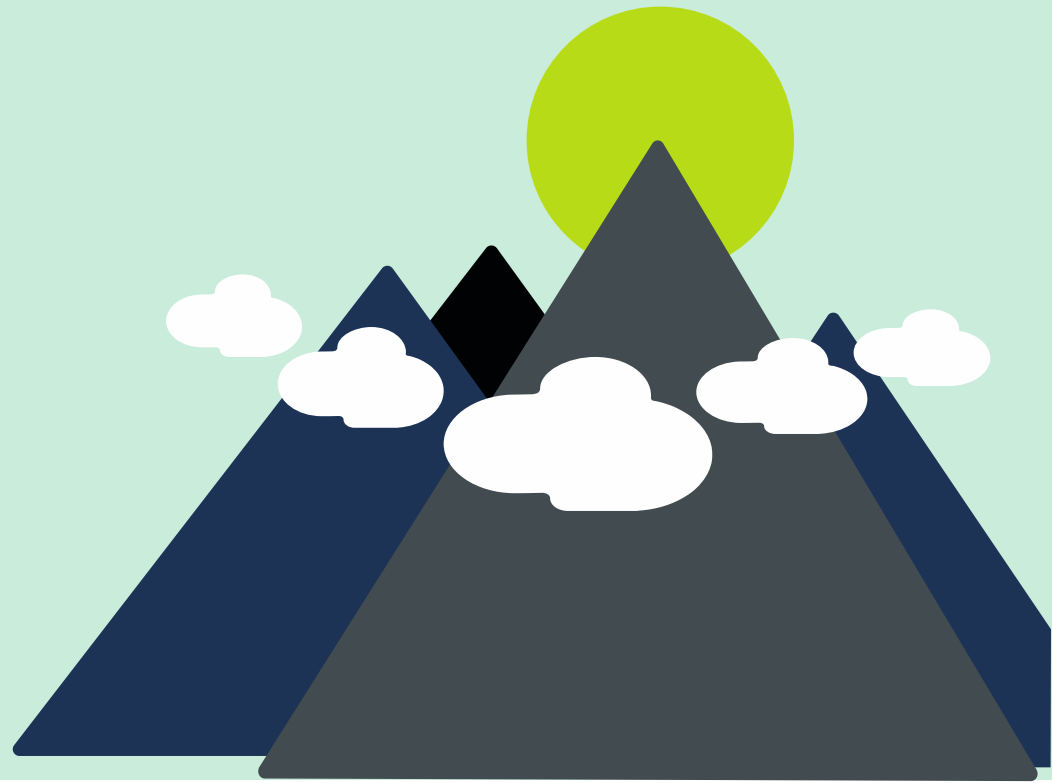
Aim

To review the submission for this series and to discuss successful strategies to build on future performance

- The iterative issue.
- Review 2023 submission.
- Pre submitted questions.
- Q and A session.

2023 Submission Review

Grids 1-11



REVIEW

Grid 1 Identification of Design Possibilities

The submission in this criterion was at a lower level than expected. Candidates often attached a client to a design scenario or chose 6 scenarios with disparate clients. We saw little real client / stakeholder dialogue used to ‘hone’ a design intention.

In the worst cases the candidate’s opening line was “I am making a storage cupboard for my brother”.

In the best cases the candidate had a client and explored the client’s needs, wants and values.

Do

- ✓ Undertake real client dialogue.
- ✓ Explore client’s needs

Don’t

- ✗ Attach a client to a scenario or simply state what you are to make.
- ✗ Identify many differing clients and choose one with little justification.

REVIEW

Grid 2 Investigation of needs and research.

In many cases the research was too generic, text-book and on occasions irrelevant. The research must have a focus on the proposal and be driven by client/stakeholder dialogue. The candidate should research relevant areas, liaise with the client and be selective in the research undertaken. The key word in the top assessment level is **Perceptive!**

Do

- ✓ Undertake real client dialogue.
- ✓ Explore client's needs
- ✓ Be selective in the research

Don't

- ✗ Submit generic or irrelevant research.
- ✗ Ignore the client or stakeholders
- ✗ Omit vital elements that will affect the specification e.g., size of site footprint of furniture.

REVIEW

Grid 3 Specification

In this assessment grid the candidates must ensure that the specification points are relevant (not generic), focussed on the client and have measurability in the points that would enable testing and an evaluative commentary. The candidate should re-work the brief as a result of client narrative.

Do

- ✓ Undertake real client dialogue.
- ✓ Submit relevant measurable spec points.
- ✓ Suggest how the specification might be tested.
- ✓ Do submit a re-worked brief.

Don't

- ✗ Be vague or generic.
- ✗ Omit measurable elements based on the research.

REVIEW

Grid 4 Design ideas.

The centre assessments were generally lenient. To achieve higher levels candidates need to produce a wide range of designs that address the specification and meet the needs and wants of the user. They must detail sub systems alternatives. Designs may change and develop through consultation with the client and by appraising them against the specification. Initial modelling alongside focused and selective research could play a part within this process to show how designs may evolve.

Do

- ✓ Undertake real client dialogue.
- ✓ Submit sub-assembly designs.
- ✓ Include technical annotation illustrating knowledge and understanding.

Don't

- ✗ Submit holistic designs
- ✗ Omit client/stakeholder narrative
- ✗ Submit vague/generic client feedback. (The word nice should be banned!)

REVIEW

Grid 5 Development of design ideas.

This section was slightly leniently handled by the centres but is much improved as they are using modelling to good effect to test aspects of the proposals. In the best cases the candidates' model and then use these models as visual prompts to promote discussions with the client or stakeholders to trigger further iterations of the proposal. This again evidences the client designer relationship and hence the iterative design process.

Do

- ✓ Undertake real client dialogue.
- ✓ Model to test aspects of the design and promote client narrative not just a final model.
- ✓ Undertake further research where necessary, perhaps post client dialogue.

Don't

- ✗ Just produce a step-by-step CAD drawing.
- ✗ Submit simplistic developments such as colour changes.
- ✗ Fail to explain development with analytical annotation.

REVIEW

Grid 6 Final design solution.

This section is improved partially as a result of CAD packages, but candidates must ensure that they edit the drawings. The key to unlock the highest levels of the assessment criterion is enabling third party manufacture and detailing technical elements along with calculations regarding quantities and costs.

Do

- ✓ Undertake real client dialogue.
- ✓ Submit detailed drawings to enable accurate third-party manufacture
- ✓ Show complex details with appropriate communication techniques e.g., exploded view.
- ✓ Submit a manufacturing specification that details operations on each part.

Don't

- ✗ Submit unclear small-scale drawings with little detail and unedited dimensions.
- ✗ Submit plans for production that are largely descriptive.

REVIEW

Grid 7 Review of development and final design

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 and 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. The centre assessment was often lenient.

Do

- ✓ Undertake real client dialogue.
- ✓ Provide a balanced overview as a result of the dialogue with the client/stakeholders.
- ✓ Use analytical language (again ban the word nice!)

Don't

- ✗ Simply describe the product.
- ✗ Omit feedback from the client and interested users.

REVIEW

Grid 8 Communication of design ideas

This section was generally well done, and many candidates accessed the highest levels of the assessment criterion. We often saw all aspects of the communication techniques referred to and often at a high level. Where the performance was less good it was often as a result of poor sketching technique/communication.

Do

- ✓ Use spontaneous sketching to show client interaction.
- ✓ Show CAD skills to illustrate detail.
- ✓ Use technical language to describe detail.

Don't

- ✗ Produce very limited design sketches.
- ✗ Submit naïve and simple annotation.

REVIEW

Grid 9 Tools and equipment

This assessment criterion was often very polarised with very good performances or a lack of demanding A level processes. Where candidates had modelled products, they were often at a low level and on occasion relied heavily on a CAM output with limited interlocking parts.

Do

- ✓ Undertake real client dialogue.
- ✓ Utilise demanding A level skills.
- ✓ Select processes and tools that show sound technical understanding.

Don't

- ✗ Submit simplistic outcomes using limited skills and processes.
- ✗ Submit work wholly CAM produced without complexity.

REVIEW

Grid 10. Quality and accuracy.

This section should be characterised by demonstrating high level making skills that evidence accuracy, leading to a quality artefact that is a fully functioning prototype that meets the end user needs identified in the specification. We should also see candidates not being afraid to consult with the interested parties and amend the design during the manufacturing as a result of this consultation or indeed in response to issues during the manufacturing process, therefore evidencing an iterative approach during the process of manufacture.

Do

- ✓ Undertake real client dialogue, illustrate an iterative process.
- ✓ Undertake A level demanding manufacturing techniques and making skills.
- ✓ Produce an accurate prototype that is well executed and finished.

Don't

- ✗ Submit simple outcomes.
- ✗ Submit inaccurate scale models

REVIEW

Grid 11. 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 and limitations, 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 of the analysis undertaken. This could lead to further suggested modifications, illustrating a post manufacture iterative approach.

Do

- ✓ Undertake real client dialogue. Or use interested stakeholders.
- ✓ Use the specification to explore success and be balanced.
- ✓ Undertake testing in-situ and analytically evaluate showing balance. Suggest post manufacture modifications. Be iterative!

Don't

- ✗ Be descriptive and possibly lacking in analysis.
- ✗ Omit to undertake a testing regime based on the specification.

Pre submitted questions. 2nd Oct

Investigation section.

Question from Carmen Lee. Unsure if this is the grid 1 or the grid 2 so have some slides for each of them.

General support.

A number of centres have asked for this so this short session is the start of a number of sessions to support the work in centres including some face to face training. I hope this does help and of course questions are welcome.

I would just really like to see top examples.

I think this is from Arthur Roper. I have included some examples of top design and manufacturing work and the website materials are being reviewed with a view to update them, so please revisit at a later date.

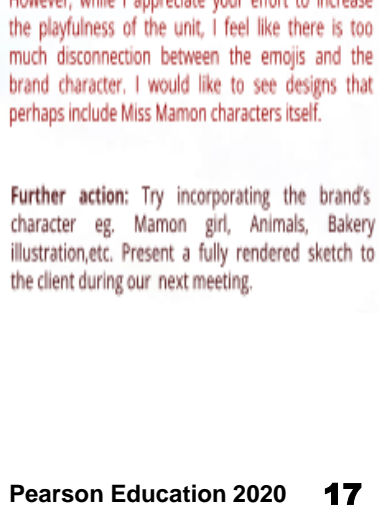
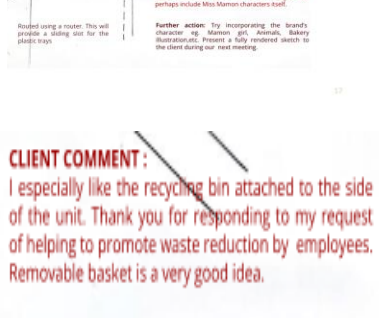
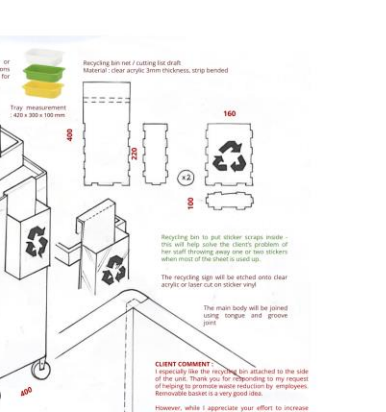
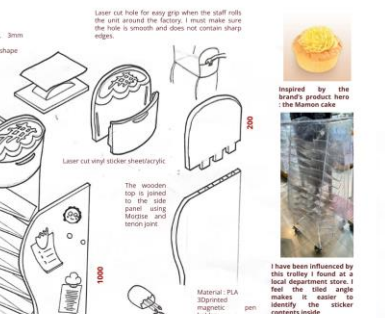
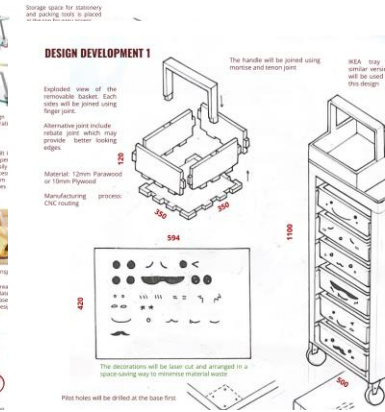
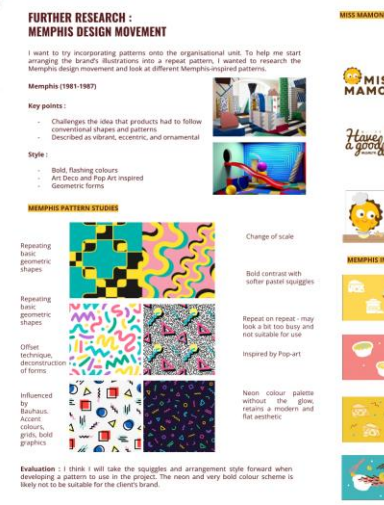
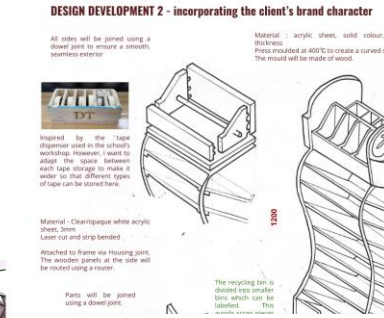
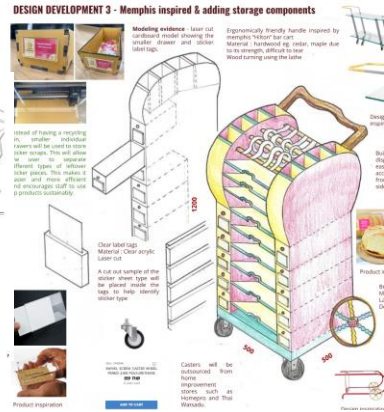
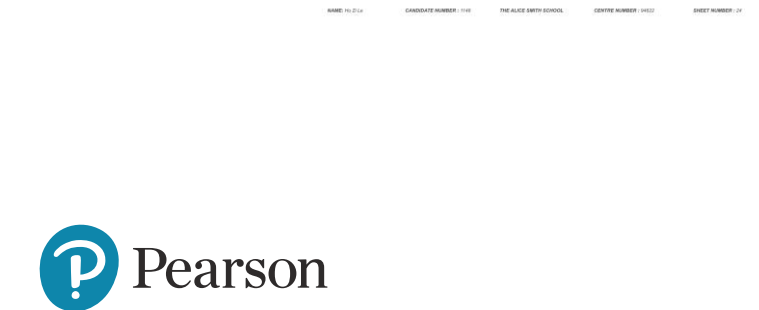
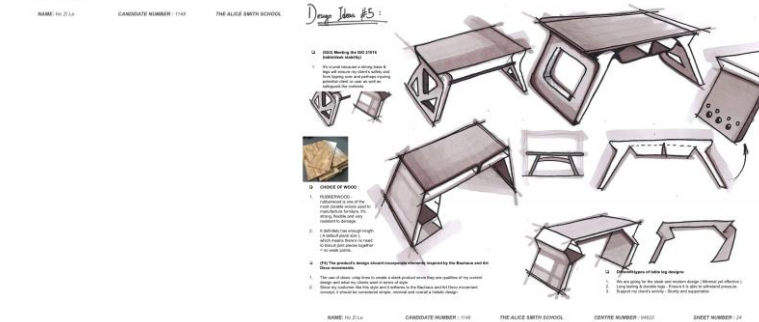
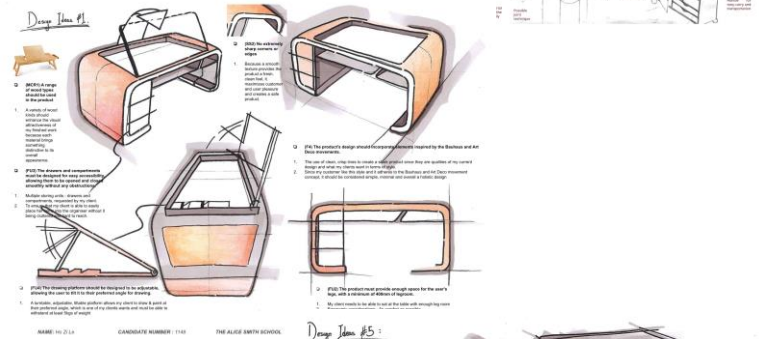
Specification and Manufacturing specification.

Question from Peter Flanagan. We have some slides on the specification requirements and some examples of top manufacturing.

General support, Client Input throughout.

Question from John Bowen. Client support throughout. This is probably a discussion point but I have made an attempt at some examples of good and less good examples.

Range of ideas and development



Depth of Research

The candidates should always remain focussed and select the relevant research. If we see very 'text-book', in style research this will be mentioned in the E9 report. It is imperative that the candidates do not submit irrelevant or generic research.

Secondary research			
Method	Source	Pros (+)	Cons (-)
Internet	Google, Microsoft edge, Firefox	Lots of information available on the internet	Some information may be incorrect, trusted websites will have to be used to collect correct information.
Magazines	Local newspapers as well as shops like Tesco, Waitrose	Newspapers are packed full of information that can be used to research the product	Most newspaper columns wont be useful therefore not providing the information required
Scientific data	Human comparison to products, anthropometrics	Using anthropometrics can determine how big a product will be in comparison to a person, this will help determine the correct dimensions for a product as well as adding any accessories	Some data may be difficult to comprehend, bad illustrations could cause confusion and lead to bad assumptions of dimensions.
Journals	Libraries, book collections	Books created by specialists on certain topics will contain very in depth information about the design process of a product, actual production and the creation of the final product	Some libraries may not contain the information required
Encyclopaedia	An encyclopaedia book, websites such as Wikipedia	A large sum of information can be gathered quickly by using the internet but an encyclopaedia is a more trusted source of information	Anyone can change the information so you have to be vigilant and not note down false things.
Books	Libraries and shops	Most books can be relied upon that there information is correct whereas the research books from the library can only be lent out for a certain amount of time	There may not be enough books with the information required to complete the research, books from the library can only be lent out for a certain amount of time

Research table

6

The candidate here produces some very simplistic research and generic descriptions. We do see some client commentary but again it lacks real analysis.

Material	Advantages	Disadvantages	Sustainability	Price comparison
Hardwoods	There is a wide range of advantages for using hardwoods in my design, using hardwoods would make my design durable as well as aesthetically pleasing.	Hardwoods are generally more expensive because they take many years to grow, if the wood is not finished correctly it could be damaged if it comes into contact with a liquid.	Hardwoods take many years to grow and mature, furthermore trees are not replanted fast enough. Transporting the trees to the factory as well as the machinery used to produce the wood all use fuel and electricity	Hardwoods are expensive due to their long time to grow and mature as well as their durability
Softwoods	Softwoods take much less time to mature than hardwoods, some softwoods take as little as 25 years. Therefore they are much less expensive to grow and buy.	Softwoods are not as strong or durable as most hardwoods hence their name, they take less time to grow. Softwoods have a wider grain width therefore making it less sought after. They can often warp over a long period of time.	Softwoods are more sustainable than hardwoods because they grow and mature much more quickly, however because softwood is weaker it is more prone to warping and being damaged possibly deeming it unsustainable	Softwood is much cheaper than hardwood due to its fast grow time, it would be a good option for my project as it wont cost a large amount.
Manufactured woods	Manufactured woods can be a recycled wood such as chip board or MDF. They can be made from wood chips and dust, certain woods such as plywood are both strong and cheap.	Many manufactured woods may give off the impression of low quality. Personally I would go for plywood over other materials due to its durability. It could be hard to work with and cut manufactured boards due to their strength.	Manufactured boards are generally made from recycled materials, woods that have been already used in another product. Reusing old wood is more sustainable than importing new material from other countries.	Manufactured woods are much cheaper than softwoods and hardwoods
Steel	Stainless steel does not corrode or rust therefore it'll have a long lifespan.	I have not worked with metal that much, I have manipulated it and warped it however I have never cut, I would need to learn how to safely do so. Steel can also be a hard material to work with.	Stainless steel is generally 60% recyclable, however the process of production requires a lot of energy	The price of steel has increased due to covid-19 delays and Brexit, steel is an expensive material due to its strength.

Materials research

Client feedback

Manufactured woods sound good due to their strength and low cost however I'm not a fan of their low quality look therefore I think softwoods could be a better choice of building material, hardwood would also be a good choice but it is quite expensive and heavy

Conclusion

My client prefers the soft and hardwood over the manufactured material due to the aesthetics and quality of the material.

7

RESEARCH INTO BRIQUETTES

Below I have included some of the many advantages of using wood briquettes on the fire.

Wood briquettes have a lower ash and sulphur content, comparable to fuel. The CO2 balance is even because the wood briquettes release just as much CO2 as the atmosphere as the trees they once were did.

Briquettes have a higher energy content per cubic foot due to their high density which means less storage space is needed and more heat is released per lb.

Regular firewood naturally contains moisture, bark, knots and more which can make the burning of the wood irregular and difficult to control. But due to the large amounts of compression wooden briquettes burn evenly and in a controlled way.



When briquettes burn they only leave 1% of their original volume as ash which means that you have to empty the stove as seldom as with regular firewood.

Briquettes produce much less smoke than regular firewood logs.

Although there are many advantages of wood briquettes there are also some disadvantages to using them compared to regular firewood.

Briquettes lack the aesthetic appeal of regular fire logs.

Briquettes also don't offer the same range of aromas that natural logs do. Briquettes have to be kept in a dry place because if they expand if they get wet.

Some dust can cause serious health problems, it can cause asthma, which carpenters and joiners are four times more likely to get compared with other UK workers. The Control of Substances Hazardous to Health (COSHH) Regulations 2002 link to external website require that you protect workers from the hazards of wood dust.

Hardwood dust can cause cancer, particularly of the nose and sinuses and dust contains the fine particles that are most likely to damage the lungs.

Key Reasons to use Briquettes:

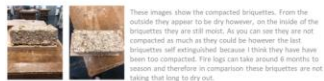
- Easy to use and Transport
- Light up quickly
- Breaks up easily for smaller stoves
- More cost effective than normal logs
- Obscured - Safe for open fire cooking
- Very little smoke
- Very little ash



FURTHER TESTING - FLOUR AND WATER 2

So far the only briquettes that have bonded together are the flour and water briquettes. However, these were small circular briquettes as opposed to the other briquettes I have made which have been much larger and rectangular. The small briquettes although being held together were so densely compacted that they did not burn. So my intention is to make the flour and water mixture again but make the briquettes the same size as the other tests to make this a fair test.

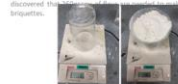
I began by remaking the flour and water mixture by adding 260grams of flour with two cups of water. I then mixed it in the stove and brought it to a boil. Then I took the flour glue and added it into speedwell and used the wooden jig that I used to make the other test briquettes. To ensure they were the same shape and size for the fastest result. Once again the briquette compressed well and held together. I left it to dry for a few days and then came back to it. Like the small round briquettes from the outside the briquette appears to be completely dry but once you cut open the briquette the inside is still moist. From my previous research I discovered that many briquettes are manufactured with a hole in the middle to increase the surface area which makes drying the briquettes more effective as the moisture can dry out.



These images show the compacted briquettes. From the outside they appear to be dry however, on the inside of the briquettes they are still moist. As you can see they are not compacted as much as they could be however the test briquettes self extinguished because I think they have been too compacted. The logs can take around 6 months to season and therefore in comparison these briquettes are not taking that long to dry out.



I also decided to work out the cost of manufacture for one of these briquettes. Flour is a much cheaper alternative to wallpaper paste and commercial glue. I weighed a plastic cup and then weighed the same cup with the required amount of flour in it to make one briquette. I discovered that the cost of one briquette is:



1.5kg bag of plain flour = £0.60p

I then calculated how many briquettes could be made out of the bag of flour.

1300/260 = 5.7 briquettes per bag of flour.

£0.60p/5.7 briquettes = £0.105

One briquette therefore costs £0.10p to manufacture.

I compared this to the average cost of fire logs that are on the market.

For 100 logs you would pay on average £80. This would cost an £0.80p per log which makes the flour briquette 70p cheaper. Although this appears cheaper, we did not know how long they burn for. Depending on how long they burn for they may not be too much cheaper at all if they burn much quicker than the fire logs.

RESEARCH INTO MATERIALS

I decided it would be beneficial to research into some possible materials that I can make my briquetting press from. I have chosen three metals and three woods because from my market research I discovered that there is a mixture of wood and metal briquetting presses on the market.

Pros of Teak	Cons of Teak	Pros of Pine	Cons of Pine
Resistant to bacteria	Difficult to purchase because of the risk of the bacteria	Low Cost	Low Cost
Resistant to warping	Expensive to buy	Paints well	Paints well
Resistant to cracking and splitting	Can split and crack easily because of its grain	Resists staining	Resists staining
Excellent for outdoor use			
Pros of Stainless Steel	Cons of Stainless Steel	Pros of Oak	Cons of Oak
Highly Durable	High cost	Very Durable	Very Durable
Easy to maintain	High quality machines needed to turn	Resistant to warping	Could warp and crack easily
Resistant to fire and heat	Difficult to cut	Widely available	Heavy
Aesthetically pleasing	High cost of raw material	Good at staining for outside use	
Easy of installation			
Pros of Mild Steel	Cons of Mild Steel	Pros of Aluminium	Cons of Aluminium
Highly available	Not strong under high stress	Corrosion Resistant	Resistant to corrosion
Easy to shape	Heat treatment affects the surface in the heat	Lightweight	Accessible to tools
Resistant to rust		High strength to weight ratio	Relatively Expensive
Resistant to easy to weld		Non magnetic	
Resistant to easy to weld		Recyclable	

Whereas here the work lacks some focus and relevancy

Specifications

The specifications should be exactly that, specific!!

Initial Specification

Specification	Point	Supporting Research/ Justification	Next Steps/Testing
Function/Purpose	<ul style="list-style-type: none">My product must be able to keep the user productive when working from homeMy product must increase concentration and organizationMy product must be multifunctionalMy product must be able to be used in any environment where the user is working from home	Though my stakeholder interview and questioner I managed to gather the following information on what my product must achieve to help my user and potential customers with working from home. This was done by asking them what their main struggles were and what they think the best solution for that is. Furthermore, by completing my existing product research I managed to gather ways in which products on the market already fight against these issues and how I can integrate these features into my product	The next steps to make sure this specification point is full met is by completing some initial models to test the mechanical features that my product will include. Furthermore, once these models have been completed, I will go to my stakeholder and ask for their opinion on what I can integrate into the product to make sure it reaches all the functions it needs to.
Form	<ul style="list-style-type: none">My Product must be aesthetically pleasingMy product must be appealing to the 16 to 30 age rangeMy product must have a minimalist lookMy product must be up to date with current trendsMy product must have a good finishMy product must be a dark natural color	By completing my site visit and questioner I have gathered that my products environment is either in the client's bedroom or home office. Furthermore, my questioner showed that the most common use for this product would be a student either in school or college so therefore my product must be appealing to the 16- to 30-year-old age range. From looking at my existing product research I found that the best-selling products in the working from home market were minimalist.	The way to move forward with these specification points is by researching current trends to make sure my product will be appealing to my target market. Furthermore, I also need to complete some material research to use what material will work best with my product and which material is most aesthetically pleasing.
Durability	<ul style="list-style-type: none">My product must be able to be used by the client for at least one hour a dayMy product must be able to withstand heavy weight from items such as textbooks and computersMy product must have a life span of at least 10 years	By using my questioner I have gathered the information that my potential clients will be using my product for a minimum of an hour a day. Furthermore, as my product will be used in my client's bedroom from the site visit, I was able to see the things my stakeholder had around their working area. These consisted of books and electronics. Therefore, my product must be able to hold these items.	The next step with this specification point is by completing a wide range of test to check the strength and durability of my materials and product. These tests will include testing how many textbooks my product will be able to hold and for how long
Cost	<ul style="list-style-type: none">My product must be within the price range of £10 to £30 for a small product and not exceed £300 for a larger productMy product must be minimalistMy product must be able to be used in any environment where the user is working from home	This information was gathered from my questioner/ stakeholder interview and existing products one question the questioner was about how much would the client be willing to pay for a product in this price range. The main answers consisted of a range of 20-30 pounds. In addition, looking at my existing products the price range of those products was very similar to the questioner answers. This consistency shows that the right price range for my product is £20-£30.	To complete this specification point I must do some research and choose the cheapest materials which will still be high quality for my product. Furthermore, I must use the cheapest manufacturing techniques to keep costs down as much as possible. In addition, I will be looking at my product and see how much they are charging for their product in the same market area as mine.
Methods of Production	<ul style="list-style-type: none">My product must be mass producedMy product must not be larger than 140cm*70cmMy product must be available in both online and retail stores	This information was gathered from both my existing product research and site visit. From completing my existing product research, I have found that products in the working from home category are mass produced. Furthermore, they are also both available both online and in retail stores which my product will be as well. In addition, from completing my site visit in my client's bedroom I have gathered that my product must not be larger than 140 cm * 70 cm.	To be able to complete this specification I must consider what materials which fit the size requirements of my specification. To do this I must complete a material research slide which will highlight what materials would work for this specification area. In addition, I will be looking at my product and see how much they are charging for their product in the same market area as mine.

Specification

1) Introduction <p>My specification will set out the main considerations and factors when manufacturing my product. The importance of each factor is listed out in order where function is the most important. Because in a factory, the products needs to be functional to improve efficiency but also serve the purpose of the product and the reason it exists. On the other hand, aesthetics is least important because the design of the product should be basic and minimalist.</p>	2) Quality <p>The factor that this is the second most important is the quality of quality. This is suggested by both my client and user group, as a main priority to maintain a high-quality product. This will also improve the durability of the product as well, increasing the usage life for my product making it more cost-effective. Moreover, this is also key for manufacturing of the product where each component should be made accurately so the finished will improve, with consistency including the materials as well as the depth of each unit and built. Furthermore, the finish of the product needs to be exceptional, there shouldn't be any visible scratches or dents on the product.</p> <p>Quantitative Data: The size of each part must be accurate tolerance ±0.5mm, so the surface of each part will be smooth and will be even.</p> <p>Qualitative Data: The quality of my product can be analyzed and reviewed by other students as well as my client where they give me feedback and provide feedback for my product and whether the quality has reached his standards.</p> <p>How to test: To test the quality of the product impact the product whether there are any potential defects such as a joint not fully sealed.</p>	4) Cost <p>The client with business, their goal is to maximise revenue and minimise cost. So I think that cost is important to any business, but not the most important. As suggested by both my client and user group, it is important to make the cost of manufacturing my product as low as possible. It is important to make the cost of manufacturing my product as low as possible. It is important to make the cost of manufacturing my product as low as possible. It is important to make the cost of manufacturing my product as low as possible.</p> <p>Quantitative Data: The cost of materials used, as well as the wasted materials during the manufacturing process. Where this will be used to calculate the price of the product and whether the my client and user group, reviewing whether it is too expensive.</p>
1) Function <p>The main purpose of my product is to provide protection to the product inside from insects. One tangible feature is the protection from various environmental factors such as dust, UV, heat and rain. This will prevent the plastic inside from being affected and ruining the quality of the product including spoiling the color and finish of the plastic. As an example, the quality of the plastic. There are a few features, which are essential to the product including a modular part holder which can be used for different products, this will help increase the duration of use for the product. The main aim of this product is to provide protection to the product inside to maintain a pristine quality throughout from the manufacturing process all the way to the customer.</p> <p>Quantitative Data: The information that can be measured are the environmental data of the factory interior and outdoor, where the packaging is used, including temperature, humidity, dust, UV, noise. These data will allow me to understand what kind of environment the packaging must be able to withstand. Also, another piece of important information is the dimensions of the product that my packaging will be used for.</p> <p>Qualitative Data: Before the product's deadline is reached the user should be able to use and test the product to review how the product fits with their purpose and usage. And they will be able to give feedback in terms of verbal communication.</p>	3) Scale of Production <p>The most important factor in my opinion is the scale of production. The main body of this product can be produced for mass production. However, the product holder might have to be made in batch production to fit different products, depending on the company. This serves as a very important factor for my product because usually they require larger numbers of packaging. Depending on the size of the company, it may differ from several 100s to several 1000s of packaging. In order to meet the scale of mass production, I need to use processes which is automated including CNC milling and injection moulding. For the assembly process, the product should be easy and fast to assemble, where there should be clear lines to faster together using rivets and bolts.</p> <p>Quantitative Data: The manufacturing process can be represented using a Gantt Chart.</p>	5) Durability and Maintenance <p>In terms of packaging, it is important for it to be tested. As it will help reduce the cost in the long term, by the company not having to repurchase as often. In order to make the product durable, the materials will have to be strong and withstand shocks for long periods of time, also the quality has to be good to have strong protection. And eventually everything degrades, so the parts will need to be replace, so in order to make my product replaceable, the parts will need to be removable using temporary joints techniques such as rivets and bolts.</p> <p>Qualitative Data: When my product is built, I will let my client evaluate whether the packaging is durable and up to standard, including the overall design and structure of the packaging itself.</p> <p>How to test: Move the product around the factories including questions on rough terrain. And inspect the joints around the frame and also the product holder.</p>

Standard Consideration

According to The Institute Standards Institute (ISI), in order to evaluate the safety and quality of the product, the product needs to be properly tested in different areas and scenarios. Including the stability of the product where how easy the product can be loaded over. Also to evaluate the quality how the product is made, the durability of the product needs to be tested using a impact test.

Design specification

Purpose:
The product is going to be a desk for the drama department for use during performances with the ability to also be used by examiners during exams. With this in mind, the product must have a clear area which can hold and support a room's pro lighting panel; support or include some form of lighting element; a place to put the monitor; some form of cable management and be easily transportable or storable. This is essential to the success of the product.

Form:
The product should look professional and appear to be a commercial product with fitting color schemes and design elements tailored to the clients desires and following research of ergonomics. The client stated within the interview that she would like the product to look professional and classy to impress others. Aesthetically like this is desirable and not completely required.
The desk must be created in correlation to the anthropometric data researched to ensure that the desk can be appropriately used. I.e. the seated knee height must be measured with the 9th and 95th percentile in mind to ensure the majority of users can sit comfortably under the desk. This means that I must consider the seated knee height in the product and make the product to be at least between 450mm to 600mm for optimal ergonomics.
The desk must be able to hold paper for notes and lighting cues as mentioned by the interviewed user; which means there must be some form of compartment which allows the storage of at most 200mm x 220mm paper. This is needed because the client talked about how there is never anywhere to safely place down performance and lighting notes.
The product will have to fit at the back of the south hall, so space will be limited. The product must be either reusable or complete to the space at the back of the hall. This can be frequently tested through the products development.
The product should be no heavier than 15kg so that the product is still viable to be moved around with relative ease, or have some form of mechanism which allows the product to be transported easily as specified by the client.

Functions:
The product must primarily be able to hold a lighting panel which operates the lights for the stage. The desk must be strong enough and/or have enough support to hold the lighting panel for extensive periods of time.
The product must be durable to withstand the chest of being attacked repeatedly by children, as well as holding up the lighting panel.
The product should have some form of holding area for notes and lighting notes which can be referred to during performances which is at least 200mm x 220mm to fit the size of a paper.
The product should be able to hold a weight up to only with the lighting unit being at pig itself, this means that the product should ideally hold up to 10kg besides the intended lighting unit.
The product should have some foldable compartment which allows for easier storage.
The product will have a LED light to make the product stand out in the dark.
The client insisted that transport was a very important value, so the product must have some features which allow the product to be transported around. This is a requirement as it was specifically required by the client.

User requirements:
The product must have to be practical and reliable so that the client can use it whenever for whatever purpose the desk is, this was specifically mentioned by the client so it is essential that this is met.
The product must be able to withstand and reliably hold a lighting unit (pig) and a computer for an extensive amount of time, to the point of holding it for days at a time so requires a strong and stable foundation.
The product will have a link to the entirety of performing arts, as the client wanted the product to not only represent drama through its aesthetics, but also music and dance.
The product must be easy to clear from spillages from drinks or crumbs from snacks that the user may have depending on the situational usage of the desk that it can easily be maintained and cleaned. Varnishing or other kinds of finishes would make the product easier to clean.
The product needs to be lightweight so to be moved around and from locations that the client requires it, but it also doesn't necessarily need to be carried depending on the chosen design. If the final desk is foldable or modular, then it should weigh no more than 15kg to ensure it can be moved.

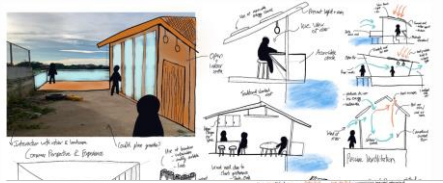
Performance requirements:
The product must be able to be easily set up and moved about to different locations with ease without using any wear or breaking. The product won't be used in harsh conditions, but moreover will likely be the recipient of rough handling, so the product would have to be strong and durable to ensure that this has no lasting effect on the product.
The product should have some form of mechanism which is secure and doesn't cause the product to collapse upon compiling. This is for safety and performance purposes.
The product must be able to hold the weight of at least a lighting unit, computer and several sheets of paper without showing stress or breaking under the weight, once again the product should be sturdy and durable.
The product must provide a safe bright light from LEDs which do not cause glare or shine too bright as to cause strain on the eyes.
The product must have some form of mechanism or feature which allows the organisation of wires and cables, making them neat and tidy compared to where they are originally thrown around all over the work station.
The product should be protected with some form of dust or scratch as varnish.

Material and component requirements:

- The product should be made of lightweight materials so that the client will be able to transport and move the product around to several locations without exerting too much energy on the process - referencing to use desk weights, the product should weigh between 10kg and 15kg to ensure transport by at most two people. Using lightweight materials also minimise the risk posed to the students if the product were to somehow collapse or a piece fall off.
 - The product will have to be created with durable materials such as plywood as it will be used for long periods of time according to the client. This means that any weight must be sustained by the product appropriately for an extensive amount of time without breaking or collapsing in on itself.
 - The product should mix together different materials to create a more unique and professional looking product, such as gaining the strength and support from aluminium tubing metal while also utilising the varnishing capabilities of plywood.
 - The product must be made of materials which are high quality and look aesthetically pleasing which are viable to have a finish applied. Some want the product to be protected by some form of finish such as varnishing, the materials must be able to still look professional with a coat of finish applied. Depending on the desired aesthetics through input of my client, I may have to stain the chosen wood with a different colour, so materials which take stain well are also highly valued.
 - Any additional modular components of the product should use materials such as can be easily hidden within the product due to the lack of available space at the back of the hall. This also keeps all components together.
 - The light used must be strong enough to provide a sufficient lighting source to illuminate the area.
- Sizes:**
The desktop should be at least 1350mm x 600mm to be big enough to hold the lighting panel, monitor and an array of papers depending on what the client wishes to use at a given time.
The height of the desk must be within the boundaries of 900mm to 750mm to conform to the researched anthropometric data and to suit a wide variety of users for the product. Using a measurement which takes towards the higher end of the range would also allowed inclusivity for wheelchair users too, who will also be able to fit under the desk comfortably.
The product will need to be constantly checked throughout the project and positioned within the desired client location to ensure that it fits perfectly in place without blocking entry or exit.
- Safety:**
The product must be made of non-toxic materials and finishes to ensure that the materials used pose no threat towards the client and possible users of the product.
The product must be free of any sharp edges, so the user is not hurt whilst using the product.
The product will be subject to risk assessments throughout the development process and appropriate safety gear will be used whenever handling materials or tools.
When assembling any modular components of the product, it should be free of any areas which pose the risk of becoming hand traps or tools.
The product must be strong and durable enough to withstand prolonged usage with weight applied for at least 5 years to ensure that the client or any users do not get hurt by the product collapsing.
- Quality:**
The product should be made to a tolerance of ±0.5mm so it all fits together when assembled and also ensures the overall quality and accuracy of the product as originally planned.
The product should be made up of materials which have had a finish applied to protect it.
The product will be able to hold the weight of a lighting unit for an extensive period of time without collapsing or breaking for at least 5 years time.
- Scale of production:**
The product should be made via processes that enable the product to be made in batch production. Although my product is a one-off for my client, the product will be made by processes that can be easily replicated, such as CNC machining, drilling using a jig or injection moulding, which would lead the product to be made via batch production.
As the product is going to be tailored to my clients specific needs, the processes of a one-off design should take priority and be required while the aspects of batch production should be instead a desirable attribute. It may be decided to draft two versions of the product which could be mass produced while tailoring the actual product specifically to the client, providing two options.
- Cost:**
As discovered in my research, the average value of a desk reaches from £90-£250 depending on the functions. My product should reach a level of quality similar to this price value which can be achieved through the use of careful planning, high quality materials and careful construction and manufacturing.
The cost of the product would vary depending on the types of materials that are chosen, for example wood like ash and oak will tend to cost more than common metals such as aluminium and steel. The cost of the product would increase or decrease depending on the materials ultimately chosen.
- Sustainability:**
Selection of materials should consider the amount of waste will be produced, whether the materials are recyclable or whether the materials can be reused in other products.
The product is planned to be made of wood, so to counteract the sustainability concerns about deforestation, the wood used should be FSC, which comes from a managed forest where more trees are planted per cut down tree.
The lifespan of the product must be around 5 years depending on the products which are used.

Top Candidate Work Architectural

Page 12
Jal Drawing 1



INITIAL IDEA 1



INITIAL IDEA 3



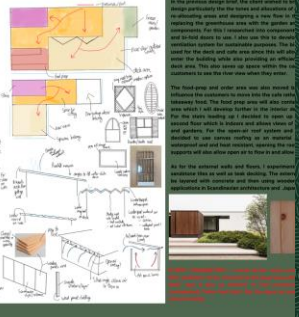
Page 13

INTRODUCTION AND INSPIRATION
My idea for this design process was a small, modern building with a flat roof and large windows, situated on a raised platform. The drawing includes a small figure of a person for scale and a simple landscape with water and trees.

INTRODUCTION AND INSPIRATION
This idea was really inspired by the modern use of space and the way that buildings can be designed to be both functional and aesthetically pleasing. I wanted to create a building that was both functional and aesthetically pleasing, and that could be used in a variety of ways.

INTRODUCTION AND INSPIRATION
The addition of the greenhouse to the project adds another level of complexity to the design. It allows for a more integrated approach to the building's design, and it provides a space for growing plants and vegetables. This is a key feature of the design, and it is one that I am proud of.

REDESIGN AND CHANGES



Page 13

CAD MODELLING



During the development I decided to use CAD software to create a 3D model of the building. This allowed me to see the building from a different perspective, and it helped me to identify any potential issues with the design. I also used CAD software to create a 2D plan of the building, which I used to create a physical model of the building.

Evaluation

Physical Testing



Model Assembly/Disassembly

Model Assembly/Disassembly



Candidate shows evidence of good evaluative commentary and well-made final model.

FINISHED PRODUCT

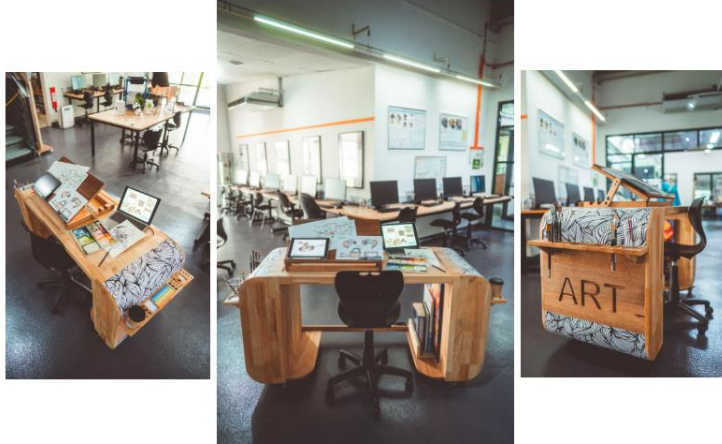


Candidate shows a good range of ideas and evidence of some sub-systems design



High quality Manufacture

FINAL PRODUCT



Design Drafting desk



Laminated storage

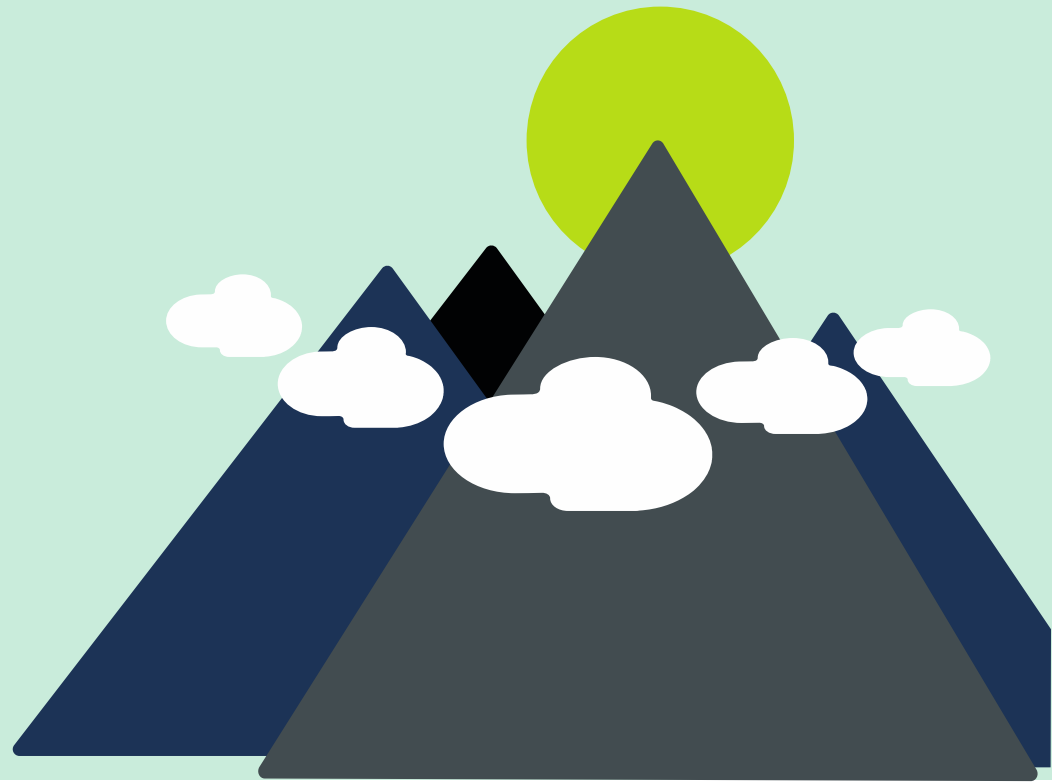


Deco Record storage



Summer villa retreat

Q and A session



Your Subject Advisor

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