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| Design Technology – Investigation PhaseAlia Ragab – 8S2Mr. ThorburnFebruary 11th |

**Introduction:**

This is the second term here in IICS, and we will be finishing the second Design Technology project this term. This unit is called The Clock Unit, and the aim of this project is to create a clock for our clients, and design it to fit their needs. The clock can be any type, wall clock, bedside clock, even a clock you can carry around, but it must work. You can create this clock using any materials that are available to you, in the DT lab, or at home. You are allowed to bring in any materials you need, if they are not available. You may choose the design, and the shape, but it must be based on what your client told you he/she wants. You will need to build the clock based on your client’s needs, so it must complete what the clients want to use it for. The clock must be created to the highest standard possible in the time given to complete it. We will carry out the 5 phases of the design cycle, and we will create the clock in the 4th stage, and we will be planning how to create it up until then.

January:

In January, we are going to be introduced to the clock project, and we will start preparing to write the investigation phase. As preparation for starting the investigate phase for a new unit, we are going to complete the subtasks, which are aimed to help us have a better understanding to what this unit is about. There are three subtasks, and subtask one is due on 21/1, while the second subtask is going to be due on the 28/1. That is all of the work that is planned to be completed by the end of January. We will spend the last few days of January preparing to hand in the third subtask, and working on that.

February:

We’re going to start of February by handing in the third and last subtask on the 4/2. This subtask will lead up to the actual Investigation phase’s due date, and from the 4/2, we will be preparing to hand in the investigation phase, which is due 6 days after the final subtask is handed in. We are allowed to copy and paste all of the needed information from the subtasks, if there are any related topics. It is due around mid-February, on the 11/2. We have no subtasks to complete for the design phase, so we will be spending all of the time since the investigation’s due date working on the design phase. We will have around 11 days to complete the design phase, working on the planning phase after we have completed it.

March:

In March, we are going to be expected to complete the planning phase, which will be due on the 15/3. We will have 23 days to complete this phase, but there is a holiday in-between the 2 phases. We don’t have a lot of things due on March, but after the planning phase’s due date, we will be expected to start trying to complete the create phase, leading us up to April, the final month being spent on the clock project.

April:

We will spend around 27 days completing the create phase, including weekends. We will be expected to hand in our create phase document, and the actual clock that we are supposed to have finished creating by the time it is due. It’s due on 12/4, and after we are done with the create phase, we will be expected to move on to the evaluate section, which is the final part of our clock project. The evaluate phase is due on 19/4, giving us a week to finish writing up the evaluate phase. After we are done with the evaluation phase, we will be done with the clock project.

**Brainstorm of problems:**

* The cost/budget
* Quality of material
* Proportional issues
* Time taken to be built
* Machine not working
* Machinery fitting through material
* Quality of design
* Time being incorrect
* Pendulum not working
* Weight
* Durability
* Size
* Mobility
* Endurance
* Evenness

**Brainstorm of solutions:**

* The cost/budget

The problem with the cost is that we cannot use materials that are too expensive for poor governments to afford, but also not too cheap, so that it doesn’t rip, or easily get damaged. I can make sure I ask for the client to give us a high budget, and make sure that I don’t spend any extra money for things I cannot afford.

* Quality of material

I will make sure that I use materials that are good quality, but I will buy them from a cheap, affordable place, where they are still good quality. I have to make sure that the materials I use are good quality, and that it doesn’t rip or break. I will try and spend most of the budget to insure that I’m using the highest quality materials that I can fine

* Proportional issues

I will have to make sure that all of the clock hands and the clock size are proportionate, and that the clock background isn’t too big for the clock hands to show what time it is. To make sure that I do not face this problem, I am going to measure both of the clock hands, and the clock background before creating my clock, to insure that their sizes are not too far apart, and that the clock hands would show.

* Time taken to be built

I will have to make sure that I don’t take too long to create the clock, because the client wants the clock by April. I will create a plan of the time it should take to create every part of the clock, and I am going to stick to it to make sure that I send my client the clock by the time that was told. I will make sure that I stick to that time.

* Machine not working

I will test the machine before I insert it into my clock to make sure that it is working correctly. I will insert different batteries in the clock, to insure that it is the machinery’s fault, or the battery. If it is the machinery not working, I am going to replace the machinery with different machinery, to insure that the clock still works.

* Machinery fitting through material

To avoid this problem I am going to make sure that I measure how tall the area that goes into the material is, and then measure how thick the material is to make sure that the part can fit through the material effectively. If the material is too thick, I will find another material that does fit.

* Quality of design

I will make sure that I try and draw the design in the clock a lot on scrap pieces of paper, and then when I draw it onto the clock background, I’ll use pencils and make sure that it is drawn nicely instead.

* Time being incorrect

If the time on the clock proves to be incorrect, I am going to solve this problem by correcting the time on the clock. If that doesn’t work I am going to check the batteries and making sure they work correctly, and if they are fully charged. If it isn’t the batteries, and the time proves to be incorrect even after I changed them, I’ll try and change the clocks machinery.

* Pendulum not working

I will make sure that the pendulum is working, and I will test it by putting it on the clock machinery along with the pendulum’s machinery. If the pendulum does not work, I will make sure that the clock machinery works properly, and if it does, I will replace the pendulum machine in attempt to make it work. I will replace the pendulum machine until one eventually works.

* Weight

The clock being too heavy on the wall might be a problem, because I do not want it to break the wall or anything. If the clock weighs more than 500g, there will be a problem with the nail. If there is a problem with the nail, I will buy a different nail which can withstand heavier weight.

* Durability

The clock is going to have to be able to be able to survive having things thrown at it, and it constantly being touched, so it will have to be made out of strong materials so it can survive any rough handling. It will also be made so it can withstand earthquakes. This is a problem because if the materials aren’t well put together it won’t withstand anything. I will do this by making sure that I stick everything together really well, and if I face the problem that they aren’t stable, I will add more layers of glue on the clock.

* Size:

To avoid any of the problems when it comes to the size of the clock, I am most defiantly not going to make it exceed the size of 300mm x 300mm. However if there is a problem with the size of the clock, I am going to try and put it in a different part of the room, because I cannot control the size after I am done making the clock.

* Mobility:

The clock is going to have to be mobile just in case my client moves houses, or moves rooms, because she will have to take the clock with her. To make my clock mobile I am going to give the client the option to hang the clock using a rope, which will be easy to take off, and place in a different room.

* Stability:

The clock is going to have to be stable on the wall, because if it isn’t stable there is a huge chance that it will fall off, and that cannot happen. To make sure it is stable I am going to have to very evenly measure and cut out the hanger so that when it is placed, the clock is very stable, and hangs on the wall correctly.

* Evenness

I might face a problem with how straight/even the clock is on the wall of the bedroom. To make sure that it is even, I am going to have to measure out the clock’s hanger very well, and position each side of the rope in equal places. I am also going to make sure that the hanger is as far away from the middle and the edge on either side. I will test the evenness before giving it to my client.

**Problem definition + choice of client**

Time keeping is one of the most important thing to keep track of these days, as time controls every aspect of your life; when you go out, when you sleep, when you wake up, what time you finish your work, when you eat, how long you watch television, etc. Your life is in sync with everyone else’s due to being able to keep track of what time it is, and the balance of time is what makes everyone able to decide on when to do things, without getting mixed up, and being confused. Clocks are a great way to keep track of time. They are usually correct, and you can fix the time so that it is correct. They are a great way to stay organized, and to manage all of your tasks correctly. You can set certain times of the day for certain things, and if you always keep track of what you are doing, while staying organized and not missing any of the other appointments you have. Clocks can be located wherever you want them to be, and they benefit society by giving all of the humans a way to keep track of everything, and a method to use if you want to plan anything. Time controls a lot of aspects in everyone’s day-to-day life, and it is used to keep everyone’s lives balanced, and organized.

**Client interview:**

**1. What is the purpose of the clock? Wall clock, desk clock, travel clock**

I would like it to be a wall clock, because I would like to hang it up. I don’t have many wall clocks, as most of my clocks are bedside clocks, so it would be a great change!

**2. What room in the house would you like it to go in?**

The ideal place for my clock to be placed would probably be my bedroom, as it is where I will use it the most, and I am missing a clock in my bedroom. I have a lot of space for it, but ideally, I’d like to have it near my door in a high up area.

**3. What theme would you like?**

I don’t actually have a specific theme in mind, although I would like something along the lines of a type of sweet, or something abstract! I would also like something that is meaningful, or a very interesting design that will be attractive, and eye catching.

**4. What materials would you like it to be made from?**

I wouldn’t mind any material, as long as it doesn’t affect how the design is going to end up looking; as the design is one of my number one preferences. I want it to be a material like foam board, or high-density foam board though, because I am going to want it to be sort of strong, but not too heavy.

**5. What shape would you like the clock to be?**

I’d like my clock to either be square shaped, or circler. I don’t like abstract, irregular shapes, as they are annoying when it comes to clocks, I’d like a simple, straightforward shape. As I said before, I think a square or a circle would be ideal.

**6. What size would you like your clock to be?**

I’d like the clock to be a medium size, big enough to see from the furthest corner of where the clock is located in my room. I wouldn’t like the clock to be too small though, because my eye sight isn’t very good. Well, maybe it could be around 20-30cm? Nothing bigger than 30cm though, because then I won’t have anywhere to hang it!

**7. When would you like the clock to be finished?**

My ideal date would be the 12th of April, because that’s the day where I will be done setting up my new room, and I need the clock for my newly designed room. But any time before that would also be good, but I don’t want it past that date, because then I’ll be done with my room and I won’t be able to hang it.

**8. Would you like a pendulum to be used in your clock?**

I would love a pendulum! I think they’re so cool! But it can’t be taller than the clock, because it wouldn’t be as interesting, and it would start looking ugly. The pendulum doesn’t have to be used though, if it doesn’t fit the theme of the clock, I would rather not include it.

**9. Is there a certain design you would like on your clock?**

I don’t know, I don’t think that I have a certain design I’d like to include. Maybe it could be a certain design of a type of sweet, or something abstract. Or maybe an eye, or something, which is symbolic? As long as most of the colours match, I think anything would be great.

**10. Do you want your clock to be made out of recycled materials?**

I’d love that! I’m all for saving the environment, I wouldn’t mind at all. I think it’s a great idea and I would love for my clock to make a difference to the world. No pressure though, although recycled materials would add a very nice twist to the clock itself.

**11. Would you like the clock to be modern looking, or classic looking?**

I’d like to have a modern looking clock, but I don’t want it to be completely modern, and not at all classic. Overall I want it to not look classic.

**12. How long are you planning to use this clock?**

I’m planning to just hang it up in my bedroom, far up the wall, close to the ceiling, but not too close. I would also like to hang it sort of near my door, opposite to where my bed is, so I can always see it when I am sitting or lying on my bed.

**13. Would you like your clock to be used for a long time?**

I’m expecting to be using it for as long as possible, as I don’t like to go clock shopping regularly. It should be used for around 5-6 years, as I have no intention of moving out of my room soon, and even if I do move to another room unplanned, I will still use it in my new bedroom.

**14. Is there a certain color scheme you want the clock to follow?**

No, but I dislike the colour light pink, and dirt brown. But other than that I am okay with all the other colours that could be used. I like things to be sort of dark though, or very bright. Nothing between dark and bright though, because I don’t like those types of colours either.

**15. What color is the room you’re placing it in?**

Its dark blue and white, but these are not my preferred color choices. As long as the colours match, I think I will be fine hanging up the clock in my room.

**16. Would you like any numbers or drawings to get out of the clock frame?**

No please, I want the clock to be its exact size, or else it will start being very tacky, and I don’t like those types of clocks, which are very tacky and annoying.

**17. Would you like the clock hands to be exactly the same size as the clock background, or smaller?**

It can be smaller, because I want the clock to be big. As long as I can see everything clearly from a distance of about 2 meters, I am fine with whichever one of those two options you choose.

**Choice of product:**

I chose to make a clock for my client because she is one of my closest friends, and she is always running late for all types of different things. I think that having a clock in your house will enable you to have more responsibility, and be able to manage and organize your time correctly. To make sure that you don’t take too long doing one thing and completely miss all of the other things you had to do such as appointments, work, and important phone calls. Time keeping is one of the most important parts of our day to day lives, and no matter how old you are, time will always have a huge effect on what you do, and at which point of the day you do it. the clock will help my friend manage her time, and keep up with all of the important day to day tasks that she has to do, and it will help her organize when she will do all of these tasks.

**Case study:**

**Clock One: The Mustache**

I think that this clock is very simple, but it has a creative and colourful design that can attract people’s attention. The time on this clock can be told very clearly, and you can tell the time from far away because of the clock’s simple design. I think some of the negative points of this clock are that the design is way too simple, and it looks like there wasn’t much effort put in while thinking of the design and creating it. it also doesn’t include any numbers, and this is a bad point because the numbers make telling the time a lot clearer, and can add to the beauty, and the design of this clock. However, this clock also has some positive points, and those include the fact that the clock hands are easy to see, and that there aren’t many colours in the clock, which make it simple, but it also makes the clock look a little elegant; also making the colours blend in together nicely, and match each other. Overall, I think that this clock is too simple, but the design is still eye catching and elegant. In my opinion, the negative points overweigh the positive points, but it still has enough positive points to help me create my own clock for my costumer.

**Clock Two: The Books**

This clock is a very interesting clock, and it is especially attractive because it is very creative, and it uses this different idea compared to all of the other clocks out there. This clock also has some negative points, which include the fact the 3 book colours aren’t that nice, and that at one point, one of the clock hands are going to get out of the clock, and reach outside. This clock is also not hang-able, since it is 3D, which is a quality I will not be looking for. However, there are still a lot of positive points when it comes to this clock, such as the numbers being big and clear, and even though there is a very simple design, the clock still looks like there has been a lot of effort put into creating it. I like the fact that there are numbers, and letters on this clock, which adds to the creativity. The clocks hands are nice and bold, and even though there are only 4 numbers on the clock, it is still very easy to tell what time it is. In conclusion, I think that the positive points cover up the negative points, because this is a very creative clock, which is very attractive and well made. I think I will be able to use this clock to build up some ideas for the clock I will be designing.

**Clock Three: Jumbled up Clock**

This clock is very creative, but also very professionally made, which will make it hard for me to get ideas out of it. Some of the negative points in this clock include that it could be a little hard to tell the time, for people who can’t tell the time very well (children, very old people) another negative point is that the clock hands are very small, and can be hard to see from a distance. Some of the positive points include that the clock is very creative, and the design is very attractive and eye catching. The two colours in the clock blend in together very nicely; however it would not match with a lot of rooms in the household. This clock is probably too hard to build by hand, but I can still get some ideas on how to make my clock abstract and interesting from this example. I think it is one of the most creative clocks I have seen while looking for ideas, and I will be able to benefit from it by comparing its negative points and its positive points.

**Ideas for my own product:**

I can take in a lot of different ideas from the examples I’ve seen above, for example, in the first picture, I can start using the idea of having a simple design, which is still very abstract and looks nice. I can learn a lot from using similar colours that match well together. From the second image, I can use the idea of mixing together words, and numbers, which adds a creative twist. I can also not include any numbers other than 12, 3, 6 and nine, to add some creativity, and simplicity to my clock. I also saw that simplicity and creativity lead to a very good end product. I can also use the idea of having all of the numbers jumbled up, but I don’t think I will use that when it comes to my clock, because it is too professional for me to do. Also, from the last clock, I think that the idea of having two simple colours, and no details very attractive. I think the clock is very simple, detailed, yet attractive, and simplicity is defiantly an idea that I can use when I design my clock.

**Materials and Tools**



**Hacksaw:**

****A hacksaw is a fine-tooth saw with a blade held under tension in a frame.  Hand-held hacksaws consist of a metal arch with a handle. They are used for cutting materials such as metal or plastics. (6)

**Glue gun:**

Gun-shaped electric tool used for melting and applying sticks of adhesive. They are used to stick things together, which are hard to stick on with regular glue sticks.



**Coping saw:**

A light handsaw with a slender blade stretched across a U-shaped frame, used for cutting designs in wood. (8)

**Steel rule:**

A simple measuring instrument consisting of a long, thin metal strip with a marked scale of unit divisions. (9)

**Engineer square:**

Is an all-metal square, consisting of a blade and stock. The stock is thicker than the blade, allowing the stock to be placed against an edge in order to mark a right angle, and also to make it more stable if it's stood with the blade facing upwards. Engineer's squares are usually manufactured to a high degree or accuracy, and often used to check and calibrate machinery. (10)

**File:**

A file is a [metalworking](http://en.wikipedia.org/wiki/Metalworking), [woodworking](http://en.wikipedia.org/wiki/Woodworking) and plastic working [tool](http://en.wikipedia.org/wiki/Tool) used to [cut](http://en.wikipedia.org/wiki/Cutting) fine amounts of material from a workpiece. It most commonly refers to the [hand tool](http://en.wikipedia.org/wiki/Hand_tool) style, which takes the form of a [steel](http://en.wikipedia.org/wiki/Steel) bar with a [case hardened](http://en.wikipedia.org/wiki/Case_hardened) surface and a series of sharp, parallel teeth. Most files have a narrow, pointed [tang](http://en.wikipedia.org/wiki/Tang_%28weaponry%29) at one end to which a handle can be fitted.(11)



**Pliers**

A variously shaped hand tool having a pair of pivoted jaws, used for holding, bending, or cutting.



**Scissors:**

A hand-operated cutting instrument. They consist of a pair of metal blades pivoted so that the sharpened edges slide against each other and cut the material



**Screw driver:**

A hand fool for turning a screw consisting of a ling narrow shank, usually made of metal, which tapers and flattens out to a tip that fits into a slot in the screw.



**Craft knife**

A very sharp knife used for cutting paper, thin wood etc. (11)

**Hammer** 

A tool with a heavy metal part on a long handle, used for hitting nails into wood. (12)



**Tenon saw**

The hard fibrous material that forms the main substance of the trunk or branches of a tree or shrub. (**13)**



**Wood:**

The hard fibrous material that forms the main substance of the trunk or branches of a tree or shrub. We have a lot of different types of wood available for us to use in DT.

**Design Brief:**

I am going to design and make a mechanical wall clock, which correctly tells the time, for my best friend. The clock is going to be creative, and it will fit the purpose of telling the time correctly, and effectively.

The clock will be easy to see from a distance, and it will fit into the budget my client gave me, as well as being of high quality materials. I will include a pendulum in my clock, and it will be proportionate to the rest of my clock. The clock will also be mobile, just in case she decides to want to move it to a different room.

The clock will be specially designed, and it will involve colours that are cheerful and bright, and the colour scheme would be chosen to match her room’s colour scheme, while also looking good with different colours that will be around its surroundings. It will impact my best friend by giving her the ability to always be on time, and to have access to what time it is at all time (while she’s in her room).

**Specifications:**

1. Budget and Cost

The budget for making the clock is going to be around 100 Turkish Lira, and I am aimed to spend around 80 TL while buying of all of the materials required, so I can leave some extra money that I don’t spend just in case there is a last minute emergency, and I need to buy something else to fix it.

1. Aesthetic appearance

I will make sure that my product includes a lot of bright colours; purple, blue, brown, and yellow. I will also make sure that my clock is square shaped, because that is what my client requested. I will also make sure that the clock numbers are big, so they show.

1. Ergonomics

The clock is going to be fairly big, but not too big. The maximum size of the clock is going to be around 300mm by 300mm, because I have to make sure that the client will be able to see what time it is from a faraway distance.

1. Functions

I am going to make sure that the clock is well functioning, and that the client is able to use it for exactly what she needed; to tell the time. The clock will have to be able to show the time correctly throughout the day, and be seen from a faraway distance.

1. Weight

My clocks weight isn’t going to be over 500 grams because I have to make sure that it isn’t too heavy when I hang it up, so that it doesn’t break the nail or do anything to the wall.

1. Life Span

I will make sure that my product can live up to 5 years, because the client wants it to work for a long time, as it is a special clock. The product will be in good condition for a long time, and will only require new batteries throughout the long period of time.

1. Time scale and planning

The product will have to be finished by April, and I will have all of these months to complete it. it will be finished by April, and I will create a plan for what time everything will be finished, and I will keep up with this plan to ensure that I am on time with all of my work.

1. Tools and equipment

I will use a variety of different tools to create my clock, which will include a hand saw, a steel rule, scissors, pliers, a file, a glue gun, and a craft knife. I will use these materials to aid me in creating my clock, and I will use them carefully, in order not to hurt myself.

1. Mobility

The clock that I designed is going to be mobile, so I can transport it from room to room without any problems if I ever need to. It is going to be very easy to move, and it will enable my client to freely change its position in the room whenever she wants to.

1. Maintenance requirements

The clock is not going to have to need any maintenance requirements, until the batteries run out. The batteries are going to have to be changed regularly in order for the clock to work for a long period of time, but the clock itself won’t need any checkups.

1. Quality Assurance

Quality assurance is going to be carried out to make sure that all of the procedures are in place, and to make sure that a clock which is very good quality is going to be produced and created for the customer.

1. Quality Control

The quality of the clock is going to be checked every after every day of the create cycle, and I am going to make sure that it is of top quality. I will keep some notes on things that can be improved (if the quality isn’t of high standards) for the next period of time I have to work on the clock, and I will fix it then.

1. Safety Precautions

I am going to make sure that I am paying attention to all of the safety precautions when I am creating the clock, so that I do not get hurt in the process, and so that my craftsmanship is very good. I will aim to not get injured at all when creating this clock, and the safety guidelines will always be paid strict attention to.

**Testing against specifications:**

1. Budget and Cost

To make sure that all of the materials I am going to use, I am going to evaluate the price to make sure that it all fits the price range that I am going for. If the materials don’t fit the budget, I am going to go find different materials, and reevaluate them until I find some materials that fit the budget that I am going for.

1. Aesthetic appearance

I am going to go through all of the details about the aesthetic appearance with my client again, once I have gotten them completely sorted out. I will look at all of the different colours and shapes in the area she is placing it in, and I will make sure that my plan matches the room that the clock will be placed in.

1. Ergonomics

I will test and make sure that all of the ergonomics of my clock are correct by using a steel rule, and checking the measurements 3 times, to make sure that they are as accurate as they can be. I will make sure that it measures below 300mm x 300mm.

1. Functions

I will insure that the clock functions correctly. I will look at it over a period of time, and make sure that all the times are correct. I will check to see if it’s correct 5 times, over a period of 5 days at different times, and then I will be sure that it functions correctly.

1. Weight

To make sure that my clock doesn’t weigh above 500 grams, I am going to weigh all of the materials I am going to be using, and I will reevaluate some of the very overweight materials, until I reach the correct weight that I am aiming for.

1. Life Span

to check that the clock is working correctly, I will make sure to check the times 10 times, over a period of 2 weeks, at different times of the day, to make sure that it always tells the times correctly, and that is it never off track.

1. Time scale and planning

To ensure that all of my planning is done properly, I will keep a journal in which I will make sure that I check off and meet all of the important dates that I will pass while creating this clock. I will make sure to efficiently use my time, and keep organized.

1. Tools and equipment

To insure that I am using all of the correct tools, I am going to test them on replicas of the materials that I will be using, to make sure that they all work correctly, and efficiently with everything that I will have to work on.

1. Mobility

To insure that my clock is mobile, after creating it I am going to try and move it to 3 different places, of different heights, and I will see how easy the clock is move from one place to the other. If it isn’t easy to move, I’m going to make sure that I change the method of hanging.

1. Maintenance requirements

To test how often the clock’s batteries will need maintenance, I will check up on them after a long time of being inside the clocks machinery, then I will see how long they take to stop working properly.

1. Quality Assurance

To test whether the clock’s quality is of standard, I will hang it up in a room, and after a week, I will go check if it is still working correctly, and if the quality is still of high standards. I will make sure that I take the clock back to quality control if it is not.

1. Quality Control

I will analyze the different parts of the clock throughout the project, and at the end I will look at each part of the clock to make sure that it is all functioning, and working properly. I will test the quality of the clock by showing it to another person, and asking them if it is of high and reasonable standards.

1. Safety Precautions

I am going to follow all of the safety guidelines and procedures I know before and while working on the clock. I will pay very close attention to them, and make sure that no one gets hurt in the making of my product.