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Website Exemplar

GCE D&T Food Technology

Unit: 6GR04

Topic: Student Study Area.

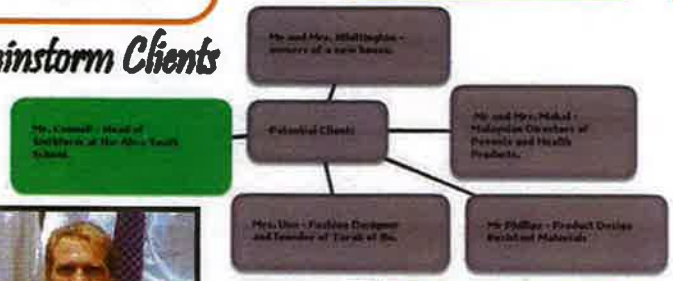
Edexcel GCE
Design & Technology: Product Design (6GR04)
Unit 4 – Commercial Design

Brainstorm Opportunities

There are two pathways which could be taken for A2. As I chose conceptual design for AS, I have decided to broaden my skills as a Product Design student and therefore have chosen the built environment, more specifically interior and garden design.

After choosing the pathway, I then listed possible clients who may have some suggestions of an area I could design.

Brainstorm Clients



Client

I have decided to approach Mr. Connell to be my potential client. He has recently accepted the role as the Head of sixth form and is currently designing the new sixth form centre. As a member of the current sixth form, I am aware that the school is renovating the sixth form common room into a sixth form centre for learning (SFCL). I feel that designing an area for the sixth formers would be relevant as well as improve life at school.

Potential Areas

Before I carry out my initial interview with my client, I feel that it is necessary to generate possible areas that could be renovated for the sixth formers. After having an informal discussion with fellow sixth formers, they believe that there needs to be an area for the sixth formers to unwind. These are the four possible areas:

1. Lawn between the cafeteria and basketball court.
2. Lawn outside the Design and Technology block.
3. The balcony outside the lecture theatre.
4. Lawn between the swimming pool and library.

Initial Interview

Interview with Mr. Connell on June the 30th 2009.

In this initial interview, I introduced myself to the client and explained what my proposed ideas were and did he have any area which he felt needed to be designed. We talked about the 4 different areas and we came to a conclusion that the area outside the lecture theatre would be more suitable. This was because it was right outside the SFCL.

Mr. Connell explained that during the summer holiday the sixth form area was being refurnished and remodelled into the SFCL. A large amount of money was being invested into this project; however, there was the balcony which he described as being a 'dead area'. Mr. Connell and fellow members of the sixth form team had discussed on turning this area into the sixth form garden lounge.

Designing the interior space for the garden lounge was favoured by my client as well as me. I arranged a meeting with Mr. Connell for the following day which allowed both my client and I to think about this idea over night.

Design Brief

To design and model the Garden Lounge for the new Sixth Form Centre for Learning for the Alice Smith School, Kuala Lumpur. At the moment, the common room is being refurbished into a learning environment however; there is no place for sixth formers to relax. The balcony outside the lecture theatre is a dead space and therefore can be utilised in a more useful way.

I intend to turn this area into a Garden Lounge for students to use for socialising as well as studying. This area overlooks the school and it will also provide another area for the expansion of the sixth formers.

Client: Mr. Connell – Head of Sixth Form
User group: Sixth formers

Signed
Date 2.07.2009.

Floorplan

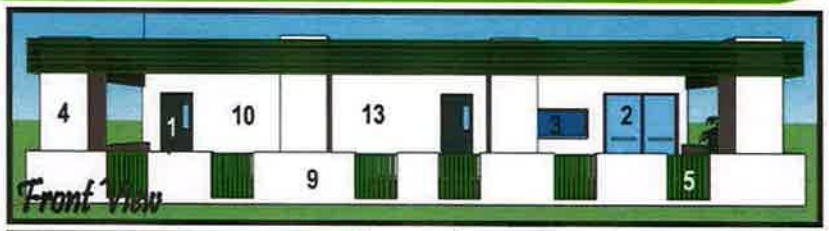
This is the floor plan of the SFCL given to me by my client after the initial interview. The highlighted area is the garden lounge which I will be designing.

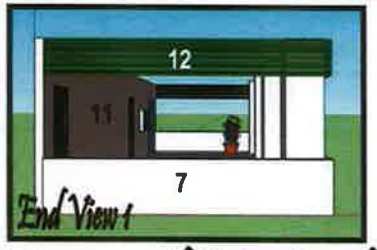
Analysis of Area

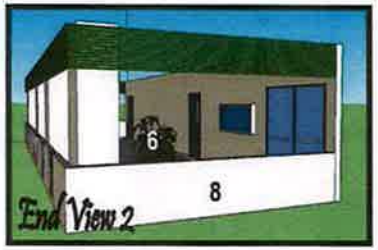
Before the second interview, I decided to analyse the proposed area. This will help with the research plan. I created a 3D pictorial drawing of the area using Google Sketch Up. The following list was made on June the 30th. The numbers code for the features on the CAD pictures below.

1. Two doors leading to lecture theatre – there is a back door into lecture theatre.
2. Double doors leading to IT suite – glass doors
3. Window looking into office.
4. Metal Railings – There are 6 sets of railings
5. 4 pillars.
6. Potted plant.
7. End View 1 looks onto the Gym roof.
8. End view 2 looks onto humanity building.
9. Front view looks onto concrete standing.
10. Colour scheme of area – Dark green railings and facia. Peach walls and pillars.
11. No lights or fans.
12. Facia around all walls.
13. Water seepage from pipe.

NB: The area is very long and narrow as it's used as a corridor connecting the IT suite to the lecture theatre.







Interview with Mr. Proud

Interview with Mr. Proud on July the 6th 2009

It is important to do some focus research into interior design therefore my A2 coursework will reflect a real interior design project. Mr. Proud, owner of RDM design, agreed to help with my focus research. Below is a summary of our interview which will help in the future pages.

Mr. Proud graduated from Manchester University in 1979 as an interior designer and has worked internationally for the past 30 years. His company has been designing luxury hotel interiors, public spaces and private residences since 1995.

Interior designers help clients pursue their dreams by leading the project. A budget must be shown and from their idea and budget a design brief can be created. Mr. Proud said after the design brief he analyses the area. He then creates a questionnaire for the user group and client to find out the criteria. The criterion is then researched. It is separated into two sections; hard and loose furniture. Hard furniture is floors and ceilings and loose furniture or soft furnishings are items which can be brought in on the last day. At this point, Mr. Proud forgets what the budget is as items can easily be cut back near the end.

To get his inspirations he uses personal experiences, the internet and magazines. Another idea is to think like the user group and think what would I miss out on? An existing idea should not be copied but your own original spin can be put on it by pushing the imagination. He also suggested looking at feng shui. To present your work, create lots of conceptual drawings with different perspectives so the customer understands. Client liaison is very important which means you need to meet with them regularly.

The only way you know when to stop is when you feel ready. Overdesigning has consequences as small details can take forever. The timescale of projects varies from a couple of weeks to years.

Research Plan

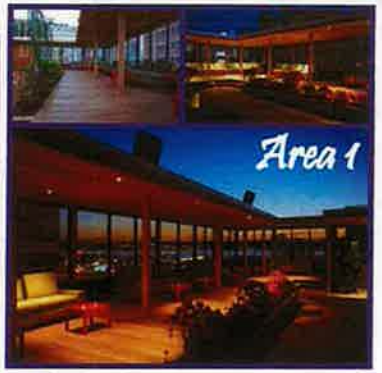
After analyzing the area, I created a list of questions shown in the table below. These questions were asked in the second interview the next day (1st of July 2009). Mr. Connell's feedback was recorded (highlighted in green); this will help me with the focus research on the following pages. Any additional criteria will be gotten from the questionnaire conducted to the user group.

During this interview, I presented Mr. Connell with 4 pictures showing different interior styles which summed up the words 'Garden Lounge' to me. These styles were Contemporary, Asian, Country and tropical. These styles were based on the environment of the school as well as the Asian culture. He chose the contemporary style but wanted some Asian influence shown in the design.

	Question	Primary Research	Secondary Research	Client's (Mr. Connell's) feedback
Purpose	○ What is the aim of the room?	○ Interview with client	○ Examine existing areas	The SFCL is a place for kids to study in a suitable environment. The purpose of the garden lounge is an area where they can work but also take a break during the day and socialise with their friends.
Form	○ What colour scheme would be appropriate? ○ What style would fit in with the surroundings of the school? ○ Should there be separate zones in the room? ○ Should the door leading to the area be taken out?	○ Interview the client ○ Take a look at the existing colour scheme around the school. ○ Questionnaire for user group.	○ Examine existing areas. ○ Look on the internet for the meanings of colours. ○ Look at ways of how a room can be split up.	The area needs to keep with the same external colour that it already has. The colour is neutral. The style needs to fit in with the surroundings. There should be zones. One of them should be convertible for when there are guests. The double doors should not be removed as this will affect the temperature of the learning cafe.
Function	○ How many people can the room hold? ○ What relaxing furniture should be in the room? ○ How many seats and tables should there be? ○ Could there be a large electronic notice board?	○ Interview the client. ○ Look at furniture catalogues for ideas. ○ Questionnaire for user group	○ Examine existing areas.	The room should be able to hold 20 – 30 people. This means there needs to be enough furniture to accommodate them. Garden furniture would be appropriate with some coffee tables. Although the electronic notice board is a good idea, it won't suit the surroundings.
User requirements	○ How high is the average 16 – 18 year old? ○ Does the area provide enough shelter from wind and rain? ○ Does the user group want the area to be covered completely so younger years can't see in? ○ Should there be a smoking room? ○ Should there be plants in the area?	○ Questionnaire for user group asking about heights. The mean height can be used. ○ Examine the area over the next few weeks and take note if water goes in when it rains. ○ Interview client.	○ Research what genre of music helps people to relax. ○ Research plants and the care they need.	The area provides enough shelter but I do want shutters on the railings for more protection and privacy. Smoking is not allowed at school so there will be no smoking room. Plants will need to be carefully chosen. Keep the area open to allow sunlight into the room. Fans could be put in.
Performance requirements	○ How long does the furniture need to last? ○ Should the furniture be flexible to the surroundings? ○ How many chairs and tables are needed?	○ Interview client ○ Questionnaire for user group.	○ Examine existing furniture.	The furniture needs to withstand a couple of years. The furniture should be flexible to move. There needs to be around 5 tables with 25 chairs but this can change depending on the type of furniture.
Safety	○ Does a fire escape need to be built? ○ Does the railing looking over the hard court need raising? ○ What safety equipment needs to be added?	○ Interview client ○ Questionnaire for user group.	○ Examine existing products for safety.	Fire escape to the room is through the IT suite and down the two sets of stairs. The railings will remain the same.
Quality	○ What materials are going to last the time wanted by the client? ○ What quality control procedures need to be looked at?	○ Interview client ○ Talk to a professional interior designer for quality control procedures	○ Examine existing products and their lifespan. ○ Look at quality standards and take note of their requirements.	The materials that are going to be used should look natural i.e. wood and stone however, steel can be used.
Size	○ If there are to be zones what size should these be? ○ Can the area be extended out?	○ Interview client ○ Talk to a professional to see how they would go about expanding the area.	○ Look at blueprints of the area.	The area will not be expanded out for the project. The zone sizes will depend on what the zone is used for. I think there should be around 3 zones. One of them could be for eating, the other for reading and the last one for guests.
Materials and components	○ Should there be a mixture of materials for the furniture? ○ What kind of flooring is wanted? ○ What sort of materials can be used for sustainability? ○ What sort of materials resists vandalism?	○ Interview client ○ Interview user group	○ Examine materials and try a number of different tests on them to see which the best to use is. ○ Examine existing products.	The flooring has already been decided. We will be using Shanghai plaster for the floor as its long lasting. Furniture is likely going to have some wear and tear after a couple of years so the furniture has to be inexpensive yet appealing.
Scale of production	○ Is the furniture going to be mass produced or have one – off furniture? ○ When does the project need to be finished?	○ Interview client ○ Find out how much the budget is. ○ Questionnaire for user group.	○ Examine the price range of different products that are mass produced and a one off.	Furniture that is mass produced is a lot cheaper than luxury items. The deadline for the design proposal will be June 2010.
Cost	○ What is the budget for the 'garden lounge'?	○ Interview client.	○ E xisting products	There is no budget for this project however, the prices do need to be sensible.

Analysing Existing Areas

Analysing existing areas is an important process when doing research. It allows you to see other people's designs and gives you inspiration. The idea is to get motivated and put a new spin on a design. I have chosen these two areas as these were the images I conjured up during the second interview with my client.



Purpose: The Hudson Terrace's Garden Lounge is located in New York. It is a spectacular haven of serene opulence which offers unforgettable venue amenities.

Function: The Garden Lounge can hold 150 people. It has different furniture with neutral colours except for the red tables. The similarity of the furniture makes it chic.

Form: Urban vista with contemporary style. This can be seen in the bold colours of the table as well as the simple lines and vast amount of space. Plants are used as room dividers. An example is the seating that goes around the outside while there is a centralised fire place as a conversation area.

Safety: Fire extinguishers and exits have been implemented in case of a fire. The rooms are enclosed in glass which will prevent people from falling from the room.

Performance Requirements: The furniture needs to last a long period of time but be flexible enough to change if items get damaged as the room needs to keep the expensive appearance.

Materials and Components: Mahogany flooring and structures – generally straight grain, easy to work with and durable. Reddish–brown colour – warm tone. Ash small coffee tables painted red. Cream leather sofas with a hardwood support – long lasting. Clay square plant pots.

Quality: High class lounge - all the furniture needs to be of high quality. It needs to have quality assurance to ensure that the customers are receiving an enjoyable experience. All the electrical equipment will have undergone control checks by manufactures.

User Requirements: There are wooden cabanas which protect the user group from rain and wind. The room is glass enclosed except the roof which has the option to be open – aired. It suits the 'garden lounge' theme as there is a lot of wooden furniture and plants.

Scale of Production: As all the furniture needs to be the same the scale of production will be mass. This will keep the costs down as there will be economies of scale.

Purpose: This lounging area of a hotel is located near the beach. It is an area for people to relax in as well as eat from the restaurant.

Form: The hotel has gone with a Balinese style. Nature and light are prized in the Balinese culture. The area is laid out with views and natural light in mind. There is a vast amount of space.

Function: This area can seat 16 guests. The furniture is all the same but is very elegant. All the colours used are natural to fit in with the surrounding environment.

Scale of Production: The furniture is made in mass production as the hotel chain will be able to use the exact same. This will reduce the cost of the overall total as the hotel can get discounts.

Performance Requirements: As there is no covering over the area the furniture needs to be able to withstand rain. The cushions on the seats can easily be removed. All the wooden furniture has a waterproof coating which will protect it from rotting. This will keep the high quality appearance of the area and hotel.

User Requirements: No protection from wind or rain. However, for this tropical area, there would be limited rain in the peak seasons. Comfortable seating and other furniture have been provided for a comfortable environment.

Quality: Everything to do with the hotel needs to be of high quality to keep its reputation. This will encourage guests to stay at the hotel. Certificates are sometimes presented to show quality assurance at the front desk.

Materials and Components: Low furniture pieces and open floor plans allow light and air to flow throughout the space. The materials used are natural. The most notable material is wood of different origins and shades. There is large bamboo pots in the background and small metal candle holders in the foreground used for decoration.

Safety: This area is very safe as it is open. The only hazards are that the ground becomes very slippery when it has been raining and the wooden furniture is a fire hazard especially with the candle light holders around.

A questionnaire for the user group needs to be conducted to find out their criteria. As I wanted results quickly, I decided to make my questionnaire using Google documents. A link for the questionnaire was sent to the entire sixth form as well as a few of the younger students using facebook and e-mail. I was able to get over 30 responses in the first day. The results were automatically put in a spreadsheet and suitable graphs. The photo opposite is a screenshot of the questionnaire I posted.

Questionnaire

1. **Occupation – student in the sixth form, student below the sixth form or staff member.**
The majority of students submitting this questionnaire should be in the current sixth form. This will mean that the results are reliable and the criterion presented is exactly what the user group at the moment wants. The younger year's input is important, as when they are older they will be using the sixth form centre. Staff members have been asked as they have opinions of how the area should look in order to help us with our studies.

2. **Following the contemporary/ natural theme, what style of furniture would you like to see? – Jungle, Balinese, Zen, Contemporary, Bauhaus or other.**
If the user group chooses a different style than the client then a compromise can be made between both parties.

3. **What will you be doing in the Garden Lounge? – Relaxing, working or other.**
This question justifies the need for the garden lounge. The SFCL has been designed so sixth form students have a suitable environment to work in. The garden lounge is another area for students to work in but also allows them to relax and socialise during break and lunch.

4. **What colour makes you relax?**
This question was open. Colours convey different emotions. Contemporary style usually has a bold colour which contrasts the neutral colour. The aim of this question is to determine that colour.

5. **Would these colours be Pastel, Bold, Earth tones or Natural? - Pastel, Bold, Earth Tones or Natural**
Neutral colours have underlying tones. For example beige may have an undertone of pink, tan or gold while beige may have a slight hint of blue, peach or yellow. The results of this question will show what type of colour they want to contrast the neutral.

6. **Should there be plants in the room? – Yes or No**
Although the area is called the Garden Lounge, the user group may feel that there is no need for plants.

7. **What kind of furniture material would you like? – Wood, Stone, Metal, Plastic, Composite, Combination or Other**
Like the style, the material of the furniture has already been chosen but the user group will be the ones using it so should have an opinion. A compromise may be needed if the client's criterion is not the same as the user groups.

8. **What furniture should definitely be in the Garden Lounge? – Storage, Electronics and Surfaces, Seating**
This was a multiple tick list which allowed the students to choose which furniture items must be in the area.

9. **Is there any other furniture you would like to see in the area?**
This was an open question which allowed the user group to say what they would like to have. This would help with the focus research and draw my attention to other parts which I would not have considered. This question followed on from the previous which allowed the user group to be more specific.

10. **Are there anymore suggestions or comments you would like to make?**
This allows the user group to express themselves and add suggestions for criteria that has not been covered. The suggestions from the user group are revealed in the focus research.

Contemporary Interior Style

The first step to the focus research is determining the interior style. Contemporary style is simple, subtly sophisticated and showcases space rather than objects. The colours used are neutrals, black and white but items can be accented with bright and bold colours. The most obvious element of contemporary style is line. Each item stands out as an individual and unique. Structural elements should be taken as an advantage, Air ducts, broken bricks and plumbing pipes are acceptable. To make them more appealing they can be painted in bold contrasting colours. Smooth, clean, geometric shapes are essentials for furniture. The main concept of contemporary style is less is more!

Asian Interior Style

Asian interior design is also known as oriental. This showcases the cultures of Japan, China, Vietnam and Thailand. Chinese design shows bold colours, such as red as it means good luck in the Chinese culture. The furniture tends to have carved wooden designs with hand – painted details. Chinese influence is often seen in pavilions and garden pagodas. The zen – like effect of the Japanese style is accomplished by the use of the natural materials and neutral colours. Bamboo, stone and other natural materials make up the neutral colours of brown, gray and green. Floral patterns are often incorporated into the designs. Furniture is near the floor of the room. Natural fibres are used like silk. Translucent fusuma or shoji screens are used as doors or room dividers. They allow a lot of natural light.

Zones

Mr. Connell suggested that there should be zones in the Garden Lounge during the second interview. I have decided to create 3 zones and each will focus on what the sixth formers want to be doing in the area, relaxing, socialising and eating.

Focus Research

The following points needs to be discussed to determine what furniture will need to modelled in the Garden Lounge.

- Seating
- Surfaces
- Soft furnishings
- Room Dividers
- Storage
- Electrical Equipment
- Models
- Ergonomics
- Legacy
- Roofs
- Windows
- Vegetation
- Shutters
- Quality Standards
- Flooring

All Items Are Marked Out Of 3 By The User Group.

Seating

The types of seating I will be looking at are the:
- Chairs (C)
- Sofas (S)
- Bar Stools (B)

Surfaces

The types of surfaces I will be looking at are the:
- Tables (T)
- Bar Table (BT)
- Coffee Table

Summary from Questionnaire

The results below have been taken directly off the spreadsheet on Google Documents (figure 1). Two of the graphs have been shown below as examples - question 3 (figure 3) results have been shown as a bar graph while question 12 (figure 2) is a pie chart.

- Contemporary style was popular choice.
- The Garden Lounge will be used for relaxing, eating and socialising.
- Blue and green make people relax.
- More people wanted the colours to be pastel.
- Plants should be in the Garden Lounge.
- Storage, Surfaces, Electrical Equipment and Seating were wanted by the user group.
- Wood was the desired material that should be used for the furniture.


Figure 1

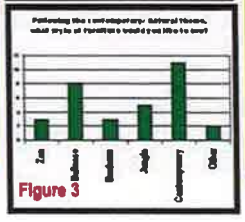


Figure 3

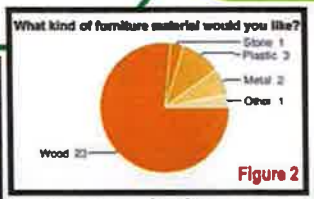


Figure 2

Focus Research with User Group

I approached Rachel Fairclough, Head Girl, and Tom Dyas, prefect, to help me with the focus research. I will discuss the criterion that was collected from the user group in the questionnaire using Facebook. Pictures will be loaded onto an album; this will allow Rachel and Tom and other interested sixth form members to comment on them. Throughout this project, I will collect feedback from these two sixth formers in order to produce a desired product.

- Chosen Furniture

User Requirements for chairs - "The table and chairs need to match. They must be comfortable and the colour should be neutral. The chairs need to be durable."

C1 – Chair is upholstered. The seat covers can be removed to wash. Seat cover materials are made of NatureSphere fabric. Round steel legs. All materials have been recycled. The colour is neutral. Mark: 2

C2 – The curved back is well crafted and supportive with a symmetrical and eye –catching design. Upholstered cream cushions to contrast the [illegible]. The square tapered legs finish off the long lasting look. Mark: 3

Dimensions: 19 5/8"W x 21 5/8"D x 35 5/8"H x 18 1/8"HS.

C3 – Chair legs are made of oak which are tapered. They provide stability. Seats are made of microfiber and are comfortable. Seat covers cannot be removed – can't be cleaned easily. Comfortable back which provides support. Mark: 1

C4 – High quality materials have been used such as the walnut wood – sustainably harvested. The seat cushions are made of beige microfibers. The ventilated back touches the floor – modern look. Very expensive. Mark: 1

User Requirements for sofas - "They should be comfortable. The materials used should be natural with the colour fitting in with the surrounding environment."

S1 – Sophisticated sofa. Materials used is a rich silver grey microfiber fabric. It comes with floral print cushions – garden lounge theme. It has adjustable sofa headrest and arms – versatile and comfortable. Mark: 2

S3 – This daybed is a versatile design which expresses modern allure. It gives a sense of luxury and lounging needs. It comes with shelves or drawers – storage. It is constructed using sustainably grown plantation hardwoods with a cappuccino finish. Mark: 1

S4 – Convertible sofa with a dynamic shape. It has a split back design which offers different seating options – takes up too much room. Easy to take care of. Leatherette over dense foam cushions with chrome legs. Mark: 2

S2 – Asian design sofa. It has a rich dark oak finish – nice appearance to a straightforward design. It is made from sustainably harvested wood. Upholstered microfiber cushions – easy to clean as they can be removed. It comes in 3 different sizes – Nice match when they are put together. Mark: 3

Dimensions: 83.50"L x 33.50"W x 32.25"H

User Requirements for bar stools - "The bar stools need to match the bar table. They need to provide comfort for the user group as well as be made of natural materials."

B1 – Bar stool has a chrome frame with a black high grade Italian leather seat – very expensive. Has a hydraulic lift which can raise the seat. The low back provides little back support. Has a foot rest. Mark: 1

B2 – A modern bar stool – very elegant. Beige leather seat cover with a natural beech frame. It is a high quality product which is extremely comfortable. Mark: 2

B4 – The bar stool is a versatile piece as its height is adjustable. Materials used are chromium plated steel frame with a leather seat filled with polyester. There is no arm or back support. Does not suit the surroundings. Mark: 0

B3 – Modern design – same as chairs that have been chosen (C2). Wood is selected through an ecologically aware replanting process. All the waste material that is produced is recycled. It has a curved back with an appealing design. It's very comfortable with cream cushions. It has long tapered legs. Mark: 3

Dimensions: 21 1/4"D x 19 5/8"W x 43 1/4"H Seat Height: 19 1/2"

User Requirements for tables - "The table needs to match the chairs. As the chairs are light the table has to be preferably darker. The majority needs to be made out of wood. It needs to accommodate a minimum of 4 people."

T1 – Elegant eucalyptus wood, round table. It is FSC approved which means the wood come from well managed forests – it is environmentally appropriate, socially beneficial and economically viable. It is too big. Mark: 1

T2 – Elegant eucalyptus wood round table. It can fold flat which makes it versatile and easy to store. Very durable for everyday use. Other properties include weather and termite resistance. Eucalyptus is a sustainable choice as it grows very quickly. Mark: 2

T3 – Polywood table – 100% post consumer waste which is comprised of processed of recycled plastic bottles. Can accommodate 2 people. It can be left outdoors in any climate. It is easily cleaned and comes in a range of colours. Mark: 0

T4 – Table can function as a coffee table or dining table - 7 adjustable heights and can double in length. Materials used come from sustainable harvested solid hardwoods. Come in two different wood finishes – ash and cherry. Mark: 3

Dimensions: 41"W x 27"D x 29"H

User Requirements for bar table - "The bar table needs to match the bar chairs that have been chosen. A similar wood would be preferable. The design needs to be simple as the focus should be on the bar chairs."

BT2 – Walnut wooden table that is simple in design. The lighter shade of wood will suit the bar chairs (B3) that were chosen. The high gloss finish might be overwhelming for the chairs. It is a very expensive item. Mark: 2

BT3 – Martini Bar table – not appropriate for the learning environment. Top is made from black ABS plastic resin. Chrome Steel base – looks aesthetically pleasing. Its height can be adjusted. It is too small – however, it would be good for after school events. Mark: 1

BT4 – The table is made of hardwood and veneers. Dark shade of wood – due to cappuccino finish. This will not suit the light bar chairs. The chairs shown in BT4 are the same design but different origin. High gloss finish. Very wide – need a narrower item. Mark: 1

BT1 – Solid wood table – hardwearing natural material. It seats 4 people. The table, bottom rail and leg are made of solid pine. The stain used is a clear lacquer. Very simple design. The light shade of wood will suit C3. Inexpensive – assembly is required. Mark: 3

Dimensions: 43 ½"L x 27 ½"W x 40 1/8"H

User Requirements for coffee table- "Black coffee table is required. Needs to have a simple design and made of wood to suit the sofas that have been chosen."

CT1 – Very elegant for the space. Durable – high quality walnut veneer with a rich espresso finish. It has a clean traditional finish. The curves will not suit the sharp lines of S2. It has a Maple inlay. It's very simple design. Height is perfect . Mark: 2

CT2 – Made from Radiata pine. The wood is very dark, curved and organic. Highly attractive – durable and sturdy even though it's a softer wood. Small in height – makes the smallest rooms appear bigger and more spacious. Integral shelf beneath – used for storage. Expensive. Mark: 2

CT4 – A classic Asian design with a modern twist. It has clean simple lines with versatile storage – table top slides open. The table features a sleek platform base where the two square segments are stop. Low table – suitable level for sofas. Very expensive – wood name is not mentioned. Mark: 2

CT1 – Straight, clean lines – will suit the sofas chosen (S2). It has solid wood legs. Wood Veneer over MDF top – inexpensive table. Height is suitable as it is quite low – suits the sofa height. It's small – less room is taken up – enough room to hold drinks. Mark: 3

Dimensions: 44"L x 22"W x 17"H

Soft Furnishings

The types of soft furnishings I will be looking at are the:

- Cushions (U)
- Planters (P)
- Paintings
- Clocks (A)

User Requirements for cushions- "This should be a bold colour – light colours will not suit the sofa. A different material would be nice. The colour needs to match the surroundings."

Paintings

Art students in the sixth form will be providing paintings from their 'art jam'. Most of them will be hung in the Sixth Form Centre for Learning. However, some students will be hanging up their work in the Common Lounge. The size of these will depend on the canvases that the students use. They should be finished by the time I start the development section in November.

R4 – These are weave planters – natural materials and suits the areas style. They don't take up too much room – design is tall rather than wide. Contemporary style – contemporary space. Pieces come from renewable plant sources as company actively participates in reforestation projects in the Philippines. Mark: 3

Dimensions: 45", 35" and 25"H

P1 – Contemporary vases – suits the style of the room. They incorporate bright colours with modern abstract styling. They come in three sizes from 12" to 18" – too small for large plants. They are handmade ceramic vases from Peru – décor accents. Would be easily broken in this environment. Mark: 1

P2 – Black and Scarlet Pottery bowls. They are large – perfect for large plants. Would only be suitable with plants – not for decoration. These couldn't be broken easily – only chipped. Mark: 2

P3 – Concrete spherical planters – cannot be broken easily. Comes in a range of sizes – the smallest is too large for the room. Suits small plants as well as large. Too heavy to get to the balcony. Mark: 0

User Requirements for planters- "Asian influence can be shown where they are only used for decoration. Some will need to hold plants. They need to be large and preferably unbreakable."

U1 – Cotton black cushions – renewable material. Made from 100% cotton. The filling is 100% polyester. These would suit the S2 sofas. Size of cushion is too big. There needs to be some colour in the area. Mark: 2

U3 – Reversible cushion in vibrant olive – colour is too light for the sofa. It has a soft velvet face with a complementing metallic reverse. Front: made of viscose and cotton. Reverse: made of viscose and silk. Very expensive. Mark: 1

U4 – Cotton velvet with extra lustre and softness – aesthetically pleasing and soft against the skin. Concealed zipper – cover is easy to remove for washing. Cotton fabric is renewable. Bolder colour is needed. Mark: 2

U2 – Simple pleated cushion – raspberry colour. The rich colour contrasts well with the sofa (S2). Metallic's used are subtle and add a touch of class. Price is reasonable. A throw pad is included. Mark: 3

Dimensions: 40cmH x 40cmW

User Requirements for clock- "The clock needs to be elegant. A bell needs to be seen so the students will be able to get to lessons on time."

A1 –This is an excellent looking contemporary clock with metal batons extending from the clock face. From a distance it would be hard for the user group to tell what time it is. Wall is light in colour – the clock may be lost on wall. Mark: 1

A2 –High design wall clock – fashion statement. All metal number and elements are hand welded and painted matte black. White dial is made of frosted glass and is topped by easy to read black hands. Colour contrasts against cream back wall. Very expensive design – too elaborate for the garden lounge. Mark: 2

A4 – Small orbit wall. It is made out of silver – too expensive for the garden lounge. Like A1, clock colour may be lost against light feature wall. Retro designed wall clock – doubles up as a work of art. Too expensive. Mark: 1

A3 – These are weave planters – natural materials and suits the areas style. They don't take up too much room – design is tall rather than wide. Contemporary style – contemporary space. Pieces come from renewable plant sources as company actively participates in reforestation projects in the Philippines. Mark: 3

Dimensions: 45", 35" and 25"H

Room Dividers and Storage

I will be looking at bookcases and room dividers in this section:

- Room Dividers (R)
- Bookcases (O)

User Requirements for room divider- "Room dividers are needed to separate the zones. A shoji screen is preferred as they highlight the Asian influence. It needs to be able to cover the width of the area."

R1 – Made in Malaysia – cheaper to transport to Malaysia. It is a unique design- uses natural rattan stained in dark brown finish. The frame is made of a solid hardwood stained in dark espresso finish. It is 3 panels. Very expensive furniture item. In the wet, the rattan would rot. Mark: 1

R2 – A different style of Shoji screen – larger panes. Comes with complete kickplate at bottom – provides extra stability and protection. Panel frames are made from Scandinavian Spruce – durable and lightweight. Uses Asian style mortise and tenon joinery. Fibre reinforced pressed pulp rice paper – allows diffused light but complete privacy. 3 Panels. User group did not like this design. Mark: 0

R3 – This is the smaller counterpart of the Shoji screen – traditional of shoji screen. It is smaller in height – area height is small. It comes in a range of fine wood finishes. It is crafted from durable, lightweight Scandinavian spruce. Pressed pulp rice paper is also used for the screen. User group wants a bold colour incorporated into the design. Mark: 2

R4 – Paper panels decorated in Traditional Japanese drawing. Flowers – suits the garden lounge theme. The bold red colour on the Shoji Screen is subtle – the colour is similar to the cushions (U2) that have been chosen. Dark wooden frame. It have the full storage width enough to fit the width of each panels enough room for user group to get between zones. 4 panels and is 6 feet high. Mark: 3

Dimensions: 50"L x 6"W x 70"H

User Requirements for bookcase - "A book case is needed in the area to store magazines and university prospectuses. A medium sized bookcase is needed as the school holds a lot of university prospectuses from the UK, Canada, Australia and America. Bookcase could also be used as a room divider."

O2 – Bookcase comes in a range of colours - birch veneer and white finish. Shelves are adjustable – arranged for the user group's needs. Bookcase is made from renewable material – chips and fibres. It is possible to separate - material or energy recovery. The main parts are made from particleboard, birch veneer, paper and clear acrylic lacquer. The back is made from fibreboard. If used as room divider – cannot be accessed from both zones. Design is unique - would suit the surroundings. Mark: 2

O3 – Same bookcase as O1 only with a walnut effect and without any shelves. Bookcase is finished on all sides. Key feature - can be used as a room divider – can be accessed from both zones. Bookcase comes with an anti – topple device – safety considered. If putting against a wall fasteners may also be used. The main parts are made from particle board, fibreboard, ABS plastic, paper, printed and embosses acrylic paint and clear acrylic lacquer. This design is wanted but there are too many dark coloured furniture items in the room – light coloured wanted. Mark: 2

O4 – Similar stair shape to O2. Bookcase has a black finish. It has a simple design – be put anywhere in the area. It is functional – has a lot of storage space – not enough for the university prospectuses. It is stylish and offers space for surface area display. It is sturdy but tips over easily Mark: 1

O1 – This bookcase is finished on both side and can be used as a room divider. Has shelves – perfect for holding plates and cups in. It has an anti – topple device – safety considered. The main part is made out of particleboard, fibreboard, ABS plastic, acrylic paint. The third shelves are made out of particleboard, ABS plastic and melamine foil. The white colour will match in to the room. The feet shelves – same colour as Shoji Screen (R4) and cushions (U1). Mark: 3

Dimensions: 140cmW x 35cmD x 140cmH

Electrical Equipment

The types of electrical equipment I will be look at are the:

- Lights (L)
- Water Dispensers
- Vending Machines
- Fans (F)
- Electrical Outlets
- Internet

User Requirements for lights- "The lights will be hung on the wall as the fans will be on the ceiling. There are no lights at the moment but they will be needed for after school events."

L2 – It is an elegant and modern wallwasher type wallsconce. It washes wall with a dramatic light with shadows. Light comes in two colours – black and white glass. It can be used with a conventional wall – dimmer for energy savings. A lot of lamps will be needed to lighten up the area at night – not practical for this space. Expensive. Mark: 1

L3 – Handcrafted European glass. The arm rotates – 130 degrees and raises and lowers. The lamp head also pivots. There is a full range rotary dimmer. It has a beautiful bronze or satin nickel finish with a solid brass construction. The red lamp would go with the cushions (U2) and shoji screen (R4). It is very expensive – the lights wouldn't be used very often. The lamp comes in a number of finishes. Mark: 1

L4 – Contemporary wall light. It provides a burst of crisp, dramatic highlighting on the wall. Adds refreshing design element to interior décor. Metal body with stainless steel finish. The lamp is frosted halopin lamp. Beautiful lamp – not made for the outdoors. Mark: 0

L1 The outdoor wall light is a hand - crafted design. It features a glass shade and metal body. The finish is mission brown with the off white diffuser. It comes in three different sizes – small is preferred for the area. The elegant design is perfect for the area as it is simple, inexpensive light. Mark: 3

Dimensions: 5.12"W x 7.87"H x 4.25"D

Vending Machine

A vending machine is needed in the sixth form garden lounge to provide snacks and beverages to the user group. At the moment, the closest place that sells food and drinks is the canteen and tuck shop. The vending machine will need to be bolted to the floor to prevent it from toppling over. We already have a contract with a vending machine company. The vending machine (right) is being sold at a discount. It is a glass front vendor which is not too big or too small. It is stacked with snacks and candy such as crisps, chocolates, mints and healthy and nutritious snacks such as pastries – breakfast for students. It has an infrared light sensing unit in the delivery box to make sure that the product has been dropped. It accepts coins and bank notes. It can hold 23 different items with a total capacity of 384 pieces.

Dimensions: 153cm H x 74cm W x 87cm D.

Water Dispenser

It has a stainless steel appearance – stylish addition to the area. It is ENERGY STAR® qualified – energy efficiency. It has a push button faucet – makes it easy to dispense hot, cold and room temperature water.

Dimensions: 12 1/5"W x 39"H x 14"D

User Requirements for fans - "The fans will be hung from the ceiling. They need to be high enough to not be a hazard issue but provide enough cool air for the user group."

F1 – Modern Ball Ceiling Fan – minimalist approach. Perfect sphere – visual simplicity. Material used is brushed aluminium. Reviews give fan a rating 4/5. It is not supposed to be used for damp or wet conditions – outdoors. It is not energy star qualified. Hangs low – dangerous. Mark: 1

F3 – The fan comes in a satin Nickel. Controlled on a wall control. Reviews give fan a rating of 3/5 – decent quality.. It cannot be used outdoors. Style is contemporary. It may need more balancing during installation. The airflow for the fan is below average. Fan is aesthetically pleasing. Mark: 1

F4 – White fan with white blades (3). It is a commercial, high velocity fan. It is wall controlled – operated. Information does not allow user to see if it can be used outdoors. Cheap appearance. Mark: 0

F2 - Fans come in a range of colours. Black has been chosen as it will go with the rest of the furniture. Light is optional on the fans – user group has chosen that there will be no fan as (L1) is still wanted. There are 4 blades. Review for the fan is 4/4 – above average. These fans can be used outdoors. Fans are kept close to the ceiling – safety and perfect for the height of the area. Aesthetically pleasing design at a reasonable price. Fans will be installed be a professional. Mark: 3

Dimensions: Blade diameter – 130cm.

Internet

The user group will be able to use their laptops in the area due to the WiFi connection being put up in the Sixth Form Centre for Learning. It is easy to set up and inexpensive. Students will be able to log on to the intranet through their lap tops. This will provide security and privacy from outsiders. The printer will also be connected to the wireless network which will allow the students to print out documents from their laptops.

Electrical Outlets

Electrical outlets have slots and holes which accept and deliver current to the prongs of the inserted plugs. The plugs chosen need to have reduced the risk of electric shock and equipment damage. This could come in the form of socket slot shutters that open only for the correct plug, as well as inbuilt fuses and switches. Malaysia used the British Standards 1363 plug.

Extra Items

They two items need to be considered for the area to fit in with the surrounding environment:

- Plants
- Legacy wall

User Requirements for plants- "Plants are needed in the area as they were wanted by the user group for the garden theme. Brightly coloured flowers are wanted. All sizes are acceptable."

Mountain flax Cream Delight
Shrub with long shaped leaves. It is marked with a central cream band. Ideal for border areas. It requires low maintenance. It can located anywhere in the world and comes in a variety of colours. The conditions are ideal for the area as it needs partial shade. Its ultimate spread is 1m while it can grow 1m high. Pot size is 3lt.

Weigela Florida Variegata
Compact shrub with creamy margins to its leaves. Pale pink flowers can emerge. Ideal for borders and informal areas. It requires low maintenance. It is ideal for conditions with partial shade. It can spread over 2.5m and its height can reach 2.5 m tall. It requires 3lt pot. It will suit the plants that have already been chosen as they have different appearances and small bursts of different colours.

I will need to look at structural elements for the area. These will include the:

- Roof
- Windows
- Flooring
- Shutters

Windows

Windows were wanted by the client. He wanted small ones in the roof. The area is not to be closed in especially with windows as it could produce a greenhouse effect which will make the user group hot and uncomfortable. A design will have to be created in order for this not to happen. Glass blocks are also very popular in Malaysia. They can have a tint to them which would add extra colour to the area.

Roof

The client has approached me to redesign the roof. He has seen some ideas in existing spaces which may suit the garden lounge. These ideas include a sun roof and wooden beams. I will use these ideas in the design section which will allow the client to evaluate and distinguish which idea he prefers. The roof needs to fulfil its requirements: protects the building and its contents from the effects of weather. The roof will have to protect against rain, heat and sunshine. The elements that will be considered are the material, construction and durability.

Shutters

These are solid and stable to protect the window. They are constricted for light control, privacy and protection from different elements. I will use the fixed and operable louvers which shed rain, allow air transfer, filter direct sunlight, protect from small flying debris and provide privacy. They are constricted from solid wood. A finish is added to the solid wood which will extend its life. The natural wood will suit the area – being aesthetically pleasing. They will be fit in by the glaziers.

Flooring

The flooring has already been chosen by the client. We will be using Shanghai plaster which is durable and long lasting. It is similar to mosaic as the pebbles are assorted randomly onto a backing. The tile is designed in an interlocking pattern so multiple tiles fit together for a seamless appearance. The tiles that have been chosen are unpolished but are similar to polished pebbles as they are small round stones collected from various beaches. They adhere to a mesh background. They have no sharp edges – perfect for floors.

Legacy

In the mind map below, the user group and I listed what we thought a legacy was. During the prefects retreat in October, the prefects believed that students who have excelled should be remembered at school. As there is a large feature wall, the client believed this where the legacy should be. The design for this will be created in the design section.

Thunbergia Mysorensis
It is one of the most popular vines in the world. It has a spectacular chain of yawning red and yellow flower which hang from the twisting vine – it would brighten up the area. It's foliage is dark green and heavily veined. It can go along roof supports which hang in clusters. It can be grown outdoor in the tropical climates. It is easy to take care of. [illegible]

Technical Information [illegible] to be researched to create this space. This will ensure that my end product will be professional. The following are the techn[illegible] ormation I have regarded:

- Existing Interior Models
- Quality Standards
- Ergonomics

Models

An architectural model is a scale model which represents a structure. It helps to communicate design ideas to the clients which will be able to show the final suggestion. Rough models (development stage) can be made very quickly using cardboard, wooden block, polystyrene, foam, foam boards and other similar materials. These are efficient for 3D understanding of a design. It shows how the model looks from different angles. For this project I will use an interior model which will show the interior space planning, finishes, colours, furniture and beautification. For the development stage I will also using virtual modelling in the form of CAD. It will be able to produce technical drawings. The final model will be made of balsa wood and similar materials which are more durable. I will also have to determine the scale.

Quality Standards

When researching the furniture items, I came across the ISO 9001. It looks at how to manage risks more effectively to improve the user group satisfaction. It sets out requirements which are criteria which need to be met if the manufacturing company wants to operate in accordance with the standard to gain certification. It is suitable for any company to improve the way it is operated.

The ISO 14001 is used for manufacturer wants to address the balance between making profits and reducing their environmental impact. It first analyses the situation first then sets out an objective for improvement. This is becoming an increasingly important issue across the globe. Customers are becoming more aware which are forcing international governments to do their part as well as local parties.

Ergonomics

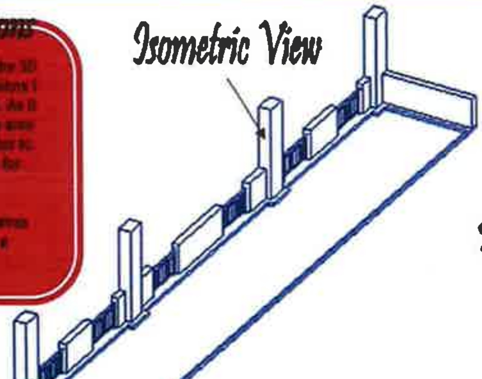
People have designed specific measurements for equipment and workplace so it fits the user group. It is necessary for this to be considered to prevent repetitive strain injuries, which can develop over time and can lead to a long-term disability. Ergonomics is used to fulfil 2 requirements: health and productivity. However, health is the one that will take priority in this environment. All furniture would have been tested which will allow the user to interact with it. For example, chairs – the back of the seat is at a suitable angle. If too much pressure is on the back it will cause a back injury.

Existing Interior Dimensions

I created a CAD image of the area to represent the 3D area. It is correct to all sizes. This is the dimensions I will be working from to create my scaled model. As it has already been stated in previous sheets, the area is very narrow but long as it is used as a corridor to the [illegible] theatre from the sixth form centre for learning.

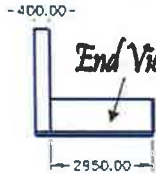
From the [illegible] research sheets, questionnaires and interviews, I will now be able to create a specification to produce the final model.

Isometric View

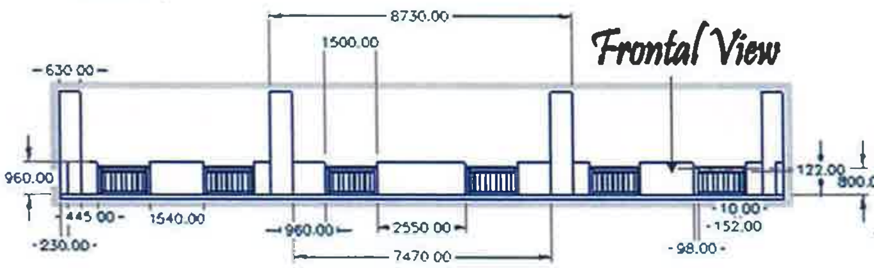


Plan View

End View



Frontal View



Specification

In order to produce a model that will satisfy the client as well as the user group, a specification needs to be created. This specification needs to be detailed as it will be used throughout the design, review and development process. As I have to meet the client's needs, Mr. Connell has been consulted and has signed the bottom of this page. The specification will be referred to later on in the project so all the criteria points have been coded to reduce space. The information I have gathered from the focus research has been mentioned in the specification and all points have been fully justified.

	Criteria	Justification	How will this be measured?	Coding
Form	The room must follow the contemporary style but have some Asian influence.	This will match the surrounding environment but is also the style the client and the user group have chosen.	If there is a lot of space in the room and the colours used are neutral that then room is contemporary. If the room fits in with the surroundings of the school then it fulfils the Asian influence.	FO1
	Neutral colours must be used.	Neutral colours are a key component in the contemporary style. It will also match with the surrounding environment which focuses on neutral and earth tones.	If the room has beige, white, black and ivory colours then neutral colours have been used.	FO2
	The area must be split into three different zones.	There must be a place to eat, relax and socialize. This covers the criteria the user group wants in the room.	If the students are able to tell that there are three zones in this area by the differences in the furniture.	FO3
	The feature wall must maintain the existing colour.	This will keep the school's colours which is important for identity.	This will be measured by looking at the feature walls. If the wall is the same as all the other walls then it has maintained the existing colours.	FO4
	The room must keep within the subsisting interior dimensions	The area around the balcony will not allow extension as it will affect other parts such as the library and the netball court below.	This will be done visually be referring back to pictures of the past area and comparing it to the new area.	FO5
Function	The area must be able to accommodate 20 – 30 students.	As the Garden Lounge is a small part of the Sixth Form Centre for Learning it must only hold a small number of people. This has been decided by the client for safety reasons.	This will be done by counting how many chairs there are in the area.	FU1
	The area must be a sheltered for the sixth formers to relax, eat and socialize.	When the monsoon season is occurring, shelter needs to be provided from the rain and winds or the user group and furniture will get wet. It also needs to provide shelter from the sun.	This will be done visually by the students to see if there is any furniture items which will keep the user group sheltered.	FU2
	The area must have multifunctional seating and tables for people eating, working, relaxing etc.	There are different furniture items which fulfill the different zone requirements. These items have been listed in the focus research section.	I will ask some students what they would be doing at different parts of the area pointing at the different furniture. If I get different answers for each of the furniture then it has been succeeded.	FU3
	The area must be comfortable and desirable for students to socialize.	This will encourage students to use this room effectively and keep the room in good condition as they will be proud of the space.	The students will be able to give me feedback on any furniture items that they like or disapprove on.	FU4
User Requirements	It must have fans to keep the user group cool.	In the middle of the day, when it is very hot, fans need to be used to keep the user group cool which will also provide comfort. It is an open outdoor space and air conditioners are not being used as they are very expensive and the school is trying to cut down by looking at cheaper alternatives which are also environmentally friendly.	If there are fans in the area then the students will be able to keep cool.	UR1
	It must provide comfortable and attractive furniture which is suitable for the teenager but still maintains the contemporary style with Asian influence.	As this area is for people to relax, sought after furniture needs to be used or the user group will not make use of the room and turn towards other areas which have different purposes.	I will ask the students what furniture they believe highlights Asian culture and which they find has simple lights to show that the furniture is also contemporary. Justification will be needed from them.	UR2
	The school bell must be heard.	Lessons must not be disrupted and therefore students must leave the room when the bell rings.	If there are no windows then the school bell will be able to be heard.	UR3
	The area must be sheltered.	This will keep the privacy of the room away from the younger years which can look up.	Furniture items will be looked at to see if it keeps the area sheltered.	UR4
	It must provide eye - catching soft furnishings which are suitable for the teenager but still maintains the contemporary style with Asian influence.	By putting in soft furnishings, it adds little details to the area making it that more attractive which will make the user group take care of their space.	This will be checked by asking the user group if they like the artwork, cushions, vases and the clock. If they believe that the soft furnishings look out of place in the area then it will fail to meet this point.	UR5
Performance Requirements	The furniture must be able to move when the area needs to be changed.	The area can then be used for small group events and is flexible to make the zones larger or smaller when needed.	I will ask the maintenance staff who help to move the furniture for special events if they see any problems with the flexibility of the furniture.	PR1
	The furniture must be easily cleaned	Students will leave cans and wrappers of snacks around. At the end of the day, the mess needs to be cleaned away quickly so that it is in a suitable state for the next day.	I will give a brief description of the furniture to the client and a few students. They will be asked if they would find any difficulties in cleaning the furniture.	PR2
	The furniture needs to withstand some wear and tear.	Over the years, the furniture is likely to get damaged as it will be used a lot. However, for the first year the furniture must last so it won't need to be replaced every year.	When I do the review section, I will ask the students whether they find the furniture durable or very cheap.	PR3
Materials and Components	Furniture must be made from natural materials.	Like the colours, natural materials suit the existing area. A lot of furniture made from natural materials is produced in Malaysia and so it will cheaper to buy in from here rather than another country.	From the focus researched pages, we can see that the furniture is made from natural materials. However, if any of the furniture is to be changed during this project then I will refer back to the specification to make sure that the materials are natural.	MC1
	All materials must be weather resistant and have a suitable finish	This will provide an aesthetically pleasing space as well as prevent corrosion during the Malaysian monsoon seasons.	The client will be asked if the furniture is suitable for this environment during the design process.	MC2
	If any metal is used for the furniture the edges and corners must be rounded.	This will provide some safety for the user group if they accidently come into contact with the edges.	I will ask the user group if they find any part of the room, focusing on the metal, dangerous.	MC3
	The materials that are used must be sustainable.	It reduces waste of the material and is better for the environment. For example, timber that is from sustainable run forests.	From the focus research, sustainability has been tackled throughout the project. The sustainability box in this page highlights other ways for the room to be sustainable. If this has been taken into consideration then it fulfills the criteria.	MC4
	The flooring must be made of Shanghai plaster	This is the chosen flooring of the client as it is hard wearing as it suits the 'garden' theme.	This will be done visually by looking at the flooring of the base.	MC5
Size	The size of the area must not be exceeded.	The area cannot be exceeded as it has met its limitations.	This will be checked by looking at the room. If there are any items that have been placed outside the room then the project fails to meet this criteria point.	S1
	There must be sufficient space for the user group to move around	The room must not be too crowded as this will put strains on the safety measures. It will also not go with the contemporary style.	The user group will highlight where more space will need to be added so the area is not crowded during the development pages.	S2
	The size of furniture must be correct to the anthropometric statistics for this age group.	If the furniture is the wrong size then a lot of money will have been wasted as well as the area will not be used.	If the furniture is not the right sizes this will be shown during in the final product as all the furniture will be made to the same scale.	S3

Safety	All furniture must have rounded corners and edges	If the furniture is bumped into it won't cause as much injury as if it was sharp.	I will look visually at the furniture to make sure that all the furniture edges are not sharp and have been rounded slightly for safety.	SA1
	It must be resistant to vandalism	As students get restless they may feel the need to destroy the furniture in little ways. If the furniture is resistant it will allow it to last longer and stay desirable.	I will ask the students whether or not they believe this furniture would be vandalized or would they be very protective over this area.	SA2
	As this area is a balcony, safety measures need to be implemented around the railings.	This will ensure that nobody is hurt when in the room.	I will find out during the development pages whether the client believes there is enough safety around the railings.	SA3
	The fans must not hang too low.	If the fans are too low then they will cause a hazard to tall people. It also means that people would have to be very careful when standing and walking around the area.	I will ask the students whether they believe the fans are too low even though the fans that have been selected in the focus research have stated that they do not hang low.	SA4
	Power sockets must have no gaps and have all the correct components.	As laptops and other electrical equipment will be plugged in there must be no risk that students will electrocute themselves or others.	I will ask the maintenance staff whether they find the electrical equipment to be in safe locations or would they want it to be put in other places. An electrician will also be asked for expertise.	SA5
Quality	All furniture must have quality assurance	This will guarantee the user group that these products have met safety requirements and quality control checks to produce the best.	In the focus research I have chosen furniture which has suitable standards which ensure that the furniture is made to the highest quality. I will make sure of this again if any of the furniture is changed during this project.	Q1
	Furniture should have a high quality finish	This will reduce the injuries and look more aesthetically pleasing to the user group. For example, the wood needs to be varnished to decrease the splinters.	The students will be asked if they feel that the furniture has a suitable finish. It will be measured visually.	Q2
	All the furniture must be durable	The furniture needs to last the life span the client is asking for or money will be spent to keep replacing these items.	The students have been asked during the focus research whether they found the furniture to be durable or not.	Q3
	A quality control check must be done on the flooring.	Although the flooring is unique it needs to be laid down so the joins of the shanghai plaster tiles match up correctly as this is easily seen if it has been laid incorrectly.	This will be checked visually before the furniture will go in.	Q4
	All electrical equipment must meet quality standards, for example, the ISO.	To provide the safety of the students, all electrical equipment must meet standards to provide quality assurance.	In the focus research I have chosen electrical items which have suitable standards which ensure that the furniture is made to the highest quality. I will make sure of this again if any of the furniture is changed during this project. This will ensure the client of the safety standards.	Q5
Scale of Production	All furniture must be mass produced	This will reduce the costs. Mass production also has rigorous quality control checks to ensure identical goods.	This will be checked by looking at the furniture and seeing if the furniture looks similar.	SP1
	The plants must be sourced locally from nurseries	If plants are bought from far away they could be easily damaged during transportation or even die.	If the furniture fits in with the tropical surroundings then the furniture will be sourced locally.	SP2
	The floor tiles must be laid down by the tiler	As the contractor, I must contact a tiler in order to put the Shanghai plaster tiles in. The tiler will be able to put them in perfectly with a high quality finish.	The client will make sure that the person who lays down the flooring is professional.	SP3
	The window panes must be inserted into the walls by a glazier.	A glazier is responsible for cutting and installing the new panes of glass into the room. They will be able to do the job faster and more effectively than if it was done by an amateur.	The client will make sure that the person who installs the windows is a professional.	SP4
	All electrical items including the fans and lights must be put in by an electrician.	Electricity items are very dangerous to install if they are done incorrectly. An electrician will be doing this to provide a safe environment for the user group.	The client will make sure that the person who installs the electrical equipment is a professional.	SP5
Cost	The cost of this project must stay within the budget	If the price is over the limit, the client will not pay for the extra items.	This will be measured by if I go over budget or under budget.	C1
	Local products must be sought to reduce the travel costs.	This will reduce the carbon footprint of the project and the furniture items will be cheaper.	Furniture that is made from sustainably managed forests in Malaysia are going to be bought rather than furniture that have been bought outside the country.	C2
	The furniture must be made of sustainable materials and by environmentally processes but keeping the costs down.	As furniture items that are made of sustainable materials and through environmentally friendly processes are the best for the world, they can be very expensive. This means a compromise needs to be made.	The furniture that was chosen in the focus research have been chosen because they are sustainable.	C3

Specification Agreement

I hereby agree that this specification fulfills the requirements needed for the Garden Lounge.

Client – Mr. Connell
Signed _____
Date 20.07.2009

Designer – Iona Whittington
Signed _____
Date 20.07.2009

Sustainability

For humans, sustainability is the wellbeing of the natural world as we are responsible for the use of the natural resources. We have to make sure that the world is sustainable for future generations. The population of the world is increasing which has caused the natural ecosystems to decline and the changes to the balance of natural cycles to have a negative impact on both humans and the other living systems.

For this project, I have looked at eco design which incorporates sustainability. When designing a product special considerations need to be made on the environmental impacts of the product during its whole life cycle. The life cycle assessment is divided into the extraction, manufacture, use and the disposal in the product. It evaluates the impact of the product on the environment from the 'cradle to the grave'. At every stage of the life cycle the environmental aspects which need to considered are the consumption of resources, emissions and the miscellaneous (noise and vibration for example).

Other factors which I will also consider when manufacturing the Sixth form garden lounge will be the materials. I will uses low impact materials which are non toxic, sustainably produced or recycled materials which require little energy to process. The energy efficiency of making this product will need to be regarded as less energy used is more sustainable. The furniture that I have already chosen were not only chosen on their aesthetic but also their quality and durability as longer lasting and better functioning products will have to be replaced less frequently which will reduce the impacts of producing replacements.

Designing an eco friendly space costs 5 – 20% more than the cost of standard construction. However, as the years past it will be cheaper and more sustainable to use these methods. Eco – friendly materials have been chosen and most of the furniture that will be bought is made locally and is natural, sustainable and require minimal processing when they are manufactured. Reuse the rain water for watering the gardens and purchase energy efficient appliances such as the light bulbs.

Design One

The size of the room has not been exceeded. **S1**

The room shows a lot of space which is part of the contemporary style. There are modest lines with no curves. **FO1, S2**

The feature wall has maintained its original colour – apricot. **FO4**

Eating Zone

The table and chair are not bolted to the floor so can be easily moved when more room needs to be provided for meetings and after school events. **PR1**

The furniture that has been chosen for the eating zone is dining furniture. **FU3**

The eating zone can accommodate 8 students. **FU1**

There is sufficient space for students to push back chairs without it interfering from others walking by. **S2**

Furniture that was chosen by user group for the eating zone.

Making the café chair and table
Measure the piece of wood and cut out using the band saw. Attach the pieces together with biscuit joints with PVA glue. When the pieces dry, sand them down with sand paper. Apply varnish for a high quality finish. **MC2, Q2**

Materials of chairs
The chairs are made from a **100% sustainable harvested hardwood** called, Meranti. It is sourced in Malaysia. The cream cushions are made from microfiber with Dacron padding to provide comfort to the user group. **UR2, MC1, MC4, C2**

Materials of tables
The tables come in two types of finishes – cherry or ash. Cherry wood has been chosen due to its natural luster, attractive grain and rich, warm colour. The cherry wood has come from a **sustainable harvested solid hardwood. UR2, MC1, MC4, MC2, Q2**

Problem: There are no plants or soft furnishings in the area which makes the zone look bare.

Inspiration
Vines crawl around arch. Mediterranean style. No arch in the Garden Lounge. Double door could be covered.

Disadvantages using real vines:
- Takes a lot of time to keep it under control
- Discolouration of paint underneath
- Vines can attach to wall creating cracks, making wall weaker.

Solving the problem
Flower stickers which are a self – adhesive, they fit easily onto smooth, clean and dry surfaces. The base material is made from polypropylene plastic made on a vinyl machine.

This will fit in with the garden theme. Only a few need to be used to get a sophisticated and subtle appearance. **UR5**

Candle holder as decoration for the table. It is a contrasting colour and material to the cherry table. **UR5**

Instead of putting a candle into the holder, replace it with a small plant. **UR5**

SAFETY HAZARD: candles left unattended could start a fire.

Making the candle holder
Take a triangular aluminium bar. Use a lathe to drill the hold in the middle. Lastly, sand the edges of the aluminium bar using a dread nought file and emery cloth till they are of correct curvature. **MC3, SA1**

Materials of Candle holder
Soft protector underneath will prevent it from damaging the underlying material and keeps the candle holder firmly in place. The candle holder is made of aluminium while the feet are a synthetic fibre.

Working Zone

The working zone can accommodate 8 students. **FU1**

The walk way between the working zone and the Shoji Screen is very narrow – bar chairs have not been drawn in.

The Bar chairs come from the same place as the Chairs for the eating zone. This means that the chairs and bar chairs can be made in batch for this design which will reduce costs. **SP1, C2**

Materials of bar table
The Bar table is made of solid pine with a clear acrylic lacquer. The solid wood is a hardwearing natural material. **MC1, PR3, SA, Q2**

Since the bar tables are not attached to the floor, they may be easily tipped. Any valuables which are on the table may fall off the balcony – safety hazard to students walking below.

Bar tables go down the balcony, students will be able to work while overlooking the school. The disadvantages are that on a windy day, students work may fly away from them.

There may be a gap between the railings and the bar tables due to the pillars. This gap may decrease the chance of injuries of students from objects falling onto them as well as students putting their feet on the railings as a footrest. This means that students are less likely to tip back on their chairs.

Inspiration

Students need an interesting place to work. The inspiration comes from chairs in a row with a beautiful skyline behind it.

Making the Shoji Screen
The typical size of the frame is three by eight inch square. Rice paper is fixed using rice glue. When getting dampened, the home made adhesive softens and this makes things easy. Water spray pot and electric blow drier makes the loose rice paper tightened around the frame. Basswood is the typical wood used for Shoji Screen.

The Shoji Screen separates the eating zone from the socialising zone. **FO3**

People coming out from the lecture theatre into the Garden Lounge could damage the Shoji Screen if the door is swung too hard.

If the Shoji gap did not have the gap in the flooring it would fall over easily. The gap in the floor is a safety measure. The exploded view image shows how it will fit in.

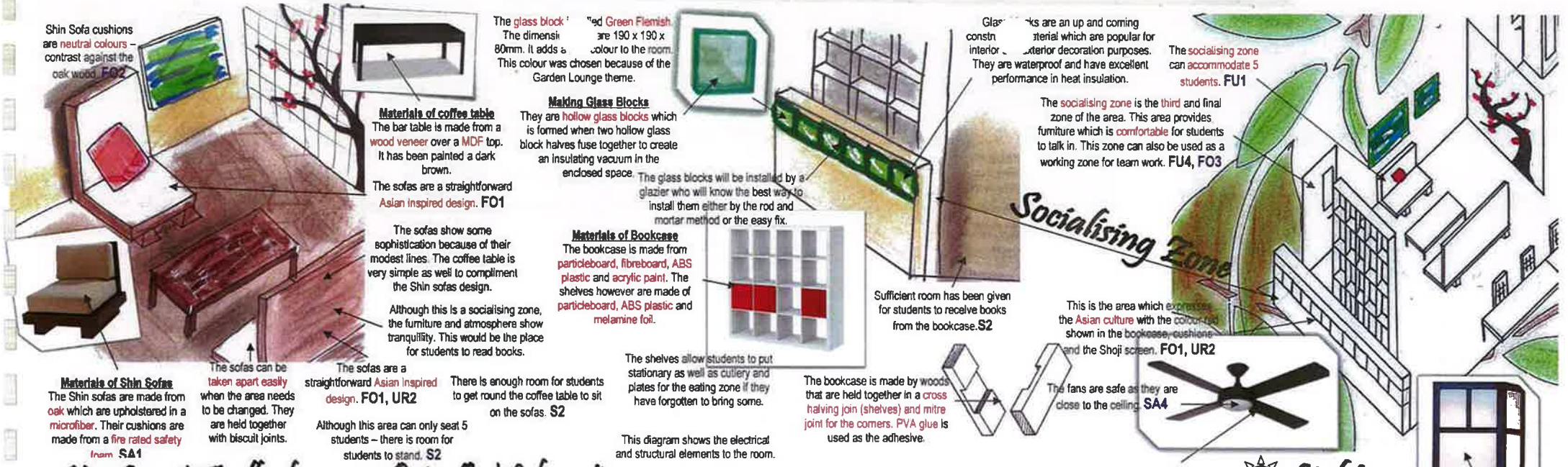
The gap in the concrete will be created using a chisel and hammer. This part will need to be of high quality as its outcome has an effect on whether the Shoji screen will fit in.

It needs to be a tight fit to hold the board in place. This may cause a problem when the Shoji screen needs to be removed. It could be difficult to take out. **PR1**

There is enough room for students to get to the vending machine and water dispenser without disrupting students who are working or eating.

Making the Vending Machine
The school already has a contract with a Malaysian company which distributes vending machines. To make a vending machine circuit boards, motors, hardware, software, keypad, bill reader and change mechanism. All these components are attached together to allow students to get snacks.

Materials of Water dispenser
It has a stainless steel appearance with PET faucets. Inside the water dispenser is some circuit boards as well as a heater and cooler to provide the different temperature of drinks.



User Group's Feedback

Positives
In some areas of the room, there are a lot of open spaces so are not over crowded. I like how the room is divided into two by the room divider. I like the idea of overlooking the rest of the school while working. Overall, it looks like a relaxing design.

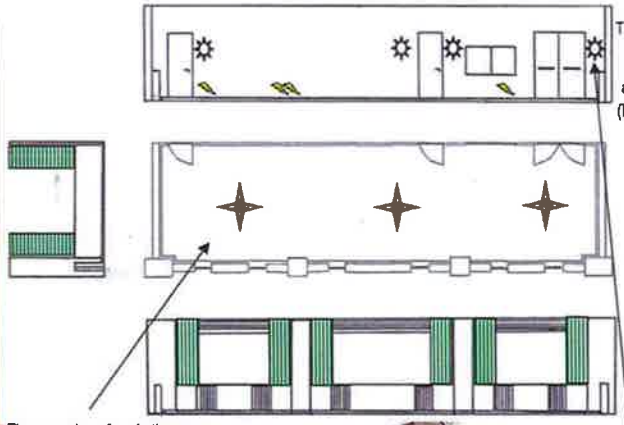
Negatives
I would like to see more plants in the room as it is a Garden Lounge. The room divider and the working zone make the walk way very narrow, which could cause a problem for students. The books on the bookshelf could get pushed off the balcony onto the roof.

Client's Feedback

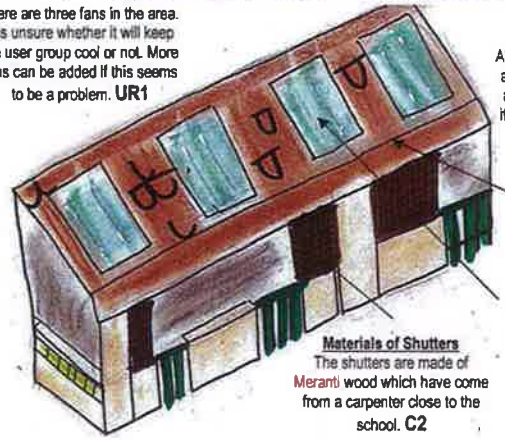
- First impressions of the room are good.
- There are not enough seating areas for the students
- The long stretch of the bar tables could be split into parts.
- The tables are going to get wet near the railings
- Although the seats are not going to get wet, they could get damp which could cause mould.
- The vines that go round the doors are a nice idea.
- The glass doors could always be changed to solid doors
- The skylight windows will allow more natural light into the area – the glass needs to be shatterproof in case it breaks. Safety
- More fans will need to be added – there are not enough fans to keep the students happy.
- There needs to be a backing to the bookcase if it is facing onto the wall.
- The glass blocks are interesting.
- More electrical power supplies will need to be by the water dispenser.
- I like how safety has been considered with the candle holders

Design One's Information

- Room can accommodate 21 students. FU1
- The area is split into three zones – eating, working and socialising zone. FO3
- The small ledge which runs along the border of the room has been removed to increase the size. FO5
- Multifunctional furniture is used (Eating zone: Café chairs and Table. Working zone: Bar tables and chairs. Socialising zone: Shin sofas and coffee tables.) FU3
- The focus research shows that all the furniture that was chosen was desirable to the user group. FU4, UR2
- Although there are windows, the area is still open which means the school bell can still be heard. UR3
- Paintings that are hanging on the wall are painted by the students in the sixth form. Makes the room more personal. Their requirements of the paintings were Kuala Lumpur. UR5, FO1
- All furniture can be removed for special events. PR1
- All the furniture can be cleaned; even the chairs have removable covers which allow them to be washed. PR2
- The flooring has already been decided which is Shanghai plaster, this will be laid during the holidays by a tiler. MC5, Q4, SP3



There are three fans in the area. It is unsure whether it will keep the user group cool or not. More fans can be added if this seems to be a problem. UR1



Materials of Shutters
The shutters are made of Meranti wood which have come from a carpenter close to the school. C2

Materials of Fans
The fans are made out of aluminium. They have a black finish and come with a light (if wanted). MC2,Q2

Lights

Power outlets

Fans

The shutters can be turned to allow more sunlight in but are there to provide shade. They are bolted to the balcony walls as a safety measure as well as to give protection from the wind. FU2, UR4, SA3

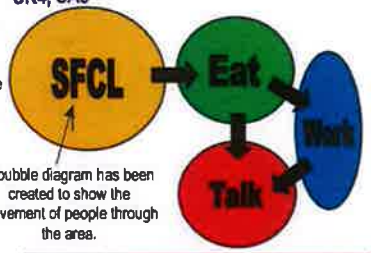
Materials of Lights
The lights have a glass shade and a stainless steel metal body. The finish is mission brown with the off white diffuser. The aim of the light isn't to provide light to the area but give a subtle glow in the evenings. MC2

All of the electrical and structural elements of the room will be installed by a professional. This will ensure the safety of the students as the quality will be ensured. SA5, Q5, SP5

All the lights and fans have been bought from a local electrical appliance store. They have agreed to give the school a discount on the items since they will be bought in bulk. They can also install the items for free. SP5

This diagram shows the roof that will be built on top of the area. The first part of the roof is at a shallow angle. This allows the rain water to flow down.

These windows have been fixed into the roof. They will let in a lot of natural light which is part of the contemporary design. When it is raining they will also provide a waterfall image was the rain flows over them. They will not be able to be opened providing shelter. UR4, SP4



A bubble diagram has been created to show the movement of people through the area.

All the furniture that has been chosen by the user group has been checked to ensure that it is of the highest quality as well as be under suitable certificates. Q5, Q1

All the furniture is mass produced but as this is a one off project, not many items need to be bought. SP1

Design Two

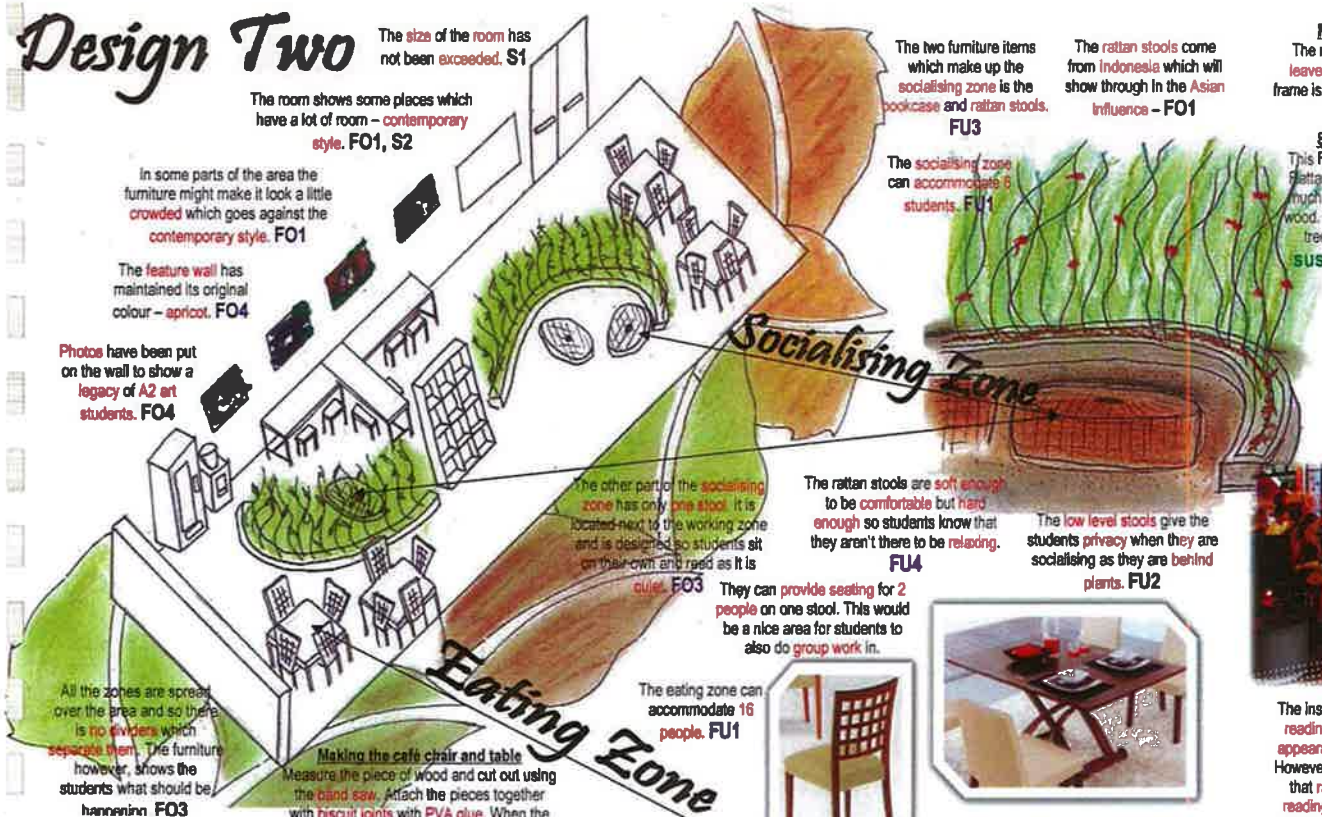
The size of the room has not been exceeded. S1

The room shows some places which have a lot of room – contemporary style. FO1, S2

In some parts of the area the furniture might make it look a little crowded which goes against the contemporary style. FO1

The feature wall has maintained its original colour – apricot. FO4

Photos have been put on the wall to show a legacy of A2 art students. FO4



All the zones are spread over the area and so there is no dividers which separate them. The furniture however, shows the students what should be happening. FO3

The other part of the socialising zone has only one stool. It is located next to the working zone and is designed so students sit on their own and read as it is quiet. FO3

The two furniture items which make up the socialising zone is the bookcase and rattan stools. FU3

The rattan stools come from Indonesia which will show through in the Asian influence – FO1

The socialising zone can accommodate 6 students. FU1

The rattan stools are soft enough to be comfortable but hard enough so students know that they aren't there to be relaxing. FU4

The low level stools give the students privacy when they are socialising as they are behind plants. FU2

They can provide seating for 2 people on one stool. This would be a nice area for students to also do group work in.

The eating zone can accommodate 16 people. FU1

The furniture items that have been chosen for the eating zone is the café chairs and tables that were determined in the focus research. FU3

Making the café chair and table

Measure the piece of wood and cut out using the band saw. Attach the pieces together with biscuit joints with PVA glue. When the pieces dry, sand them down with sand paper. Apply varnish for a high quality finish. MC2, Q2

Materials of chairs

The chairs are made from a 100% sustainable harvested hardwood called, Meranti. It is sourced in Malaysia. The cream cushions are made from microfiber with Dacron padding to provide comfort to the user group. UR2, MC1, MC4, C2

Materials of tables

The tables come in two types of finishes – cherry or ash. Cherry wood has been chosen due to its natural luster, attractive grain and rich, warm colour. The cherry wood has come from a sustainable harvested solid hardwood. UR2, MC1, MC4, MC2, Q2

There is enough room however for students to walk between the balcony wall and the tables.

The tables near the door don't have much room for students to walk past between the tables and the concrete planters. This could cause a safety issue as well as getting into the seat.

For both tables the concrete planters separate the eating zone which could potentially be noisy from the socialising zone and the working zone.

The furniture that has been chosen for the eating zone is dining furniture. FU3

The table and chair are not bolted to the floor so can be easily moved when more room needs to be provided for meetings and after school events. PR1

This was my inspiration for the eating zone. I liked how the eating zone wasn't covered by a roof. This may be a problem as in the Monsoon season it rains quite a lot so this area wouldn't be able to be used.

For a school event these café tables can be turned into coffee tables which would be good when different universities come in. The tables will be able to be moved to different parts of the area providing privacy - flexible. PR1

The rattan stools will go nicely with these tables if they were used as coffee tables. FU3

As they can be folded they can be stored easily which means that a lot of space is saved. PR1

There are no decorations on the table as there is already some decoration in the background and too much would be against the contemporary style. FO1

Outdoor umbrellas could be bought to solve the issue of not using the eating zone nearest the door in the monsoon seasons. The school has a few which are used as marquees for sports day and swimming gala. They are the school colours (dark green). This would also be suitable for natural colours.

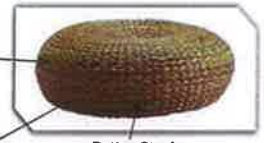
Inspiration

Materials for Rattan Stool

The main part is made from banana leaves and clear acrylic lacquer. The frame is made from steel, epoxy/polyester powder. UR2

Sustainability: Rattan Stool

This Rattan stool is made in Indonesia. Rattan grows wildly in the forest and is much easier to grow and cultivate than wood. This means that harvesting rattan tree is not destructing the forest – sustainability. FO1, C3, Q3, MC4



Rattan Stool

The rattan stool is made from a renewable material, banana fibre. The fibre may have dark spots however; this has no effect on the strength of the material. It can be wiped down with a clean cloth and is suitable for a patio with a roof and walls. When left in extreme heat the material can dry out and deteriorate. MC4, UR2

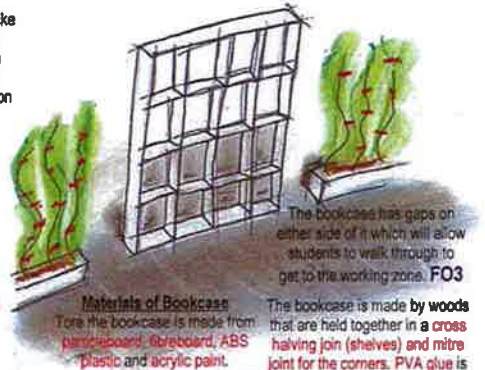
Making the rattan stool

The rattan is placed in a steam box for bending and to make it flexible to mold. The steel is used to mold the shapes. When the rattan is hot it is bent around the steel jig. It is then cooled for the shape to remain. Quality control is crucial to produce this furniture item as the weaving section is very difficult.

The inspiration for the socialising zone was the stools and a reading corner in a library. The stools had a sophisticated appearance to them as they were coated with black leather. However, to make them fit with the garden lounge, I believed that rattan would be a perfect material to use. I liked the reading corner as it looked very comfortable. The different shades of red were too bright but complemented each other. I decided that the colours for this zone needed to be more natural as well as give the impression that you were secluded.

All the furniture that has been chosen by the user group has been checked to ensure that it is of the highest quality as well as be under suitable certificates. Q5, Q1

All the furniture is mass produced but as this is a one off project, not many items need to be bought. SP1



Materials of Bookcase

Tora the bookcase is made from particleboard, fibreboard, ABS plastic and acrylic paint.

The bookcase has gaps on either side of it which will allow students to walk through to get to the working zone. FO3

The bookcase is made by woods that are held together in a cross halving join (shelves) and mitre joint for the corners. PVA glue is used as the adhesive.

The bookcase can be accessed from both the working zone and the socialising zone. This will allow people to put text books on it as well as more relaxing reads. FO3

Red shelves do come with this bookcase however; they are too bright and wouldn't suit the rest of the furniture.

The bookcase and the rattan stools can be moved which means that it is flexible for school events. PR1

The safety which needs to be considered is that there is nothing supporting the bookcase as there is no back wall. The bookcase would have to be bolted to the floor to ensure the safety of the students. PR1, SA3

Materials for marquee

The marquee has quality reinforced aluminium frames which ensure that the structure is solid and sturdy. The cover is made from premium cloth and PVC coverings which offer UV protection and shelter from wind and rain.

Making the marquee

The marquees are built at school by the maintenance staff. They build the aluminium frame using a metal band saw. The cloth is the then attached to the metal frame and covers the top half. The aluminium frame is coated so it does not rust in the rain.

Inspiration

When coming up with design ideas for how the working tables could be set, I went through the alphabet. The letter T stood out as it allowed students to work in groups as well as work on their own.

As the bar stools are going outside the surface can be treated so that it is waterproof as well as be treated against termites. FU3

The bar stools comes with FIXA self [illegible]ve floor protector[illegible]ect the underlying surface against wear. FU3

It can be wiped clean with a damp cloth. Stains can be removed using and eraser, fine sandpaper, soap, dishwashing detergents or paint thinner. PR2

After seeing the bar chairs for the inside of the garden lounge these are perfectly acceptable. They will look nicer with the bar table as they are made from the same wood. FU3

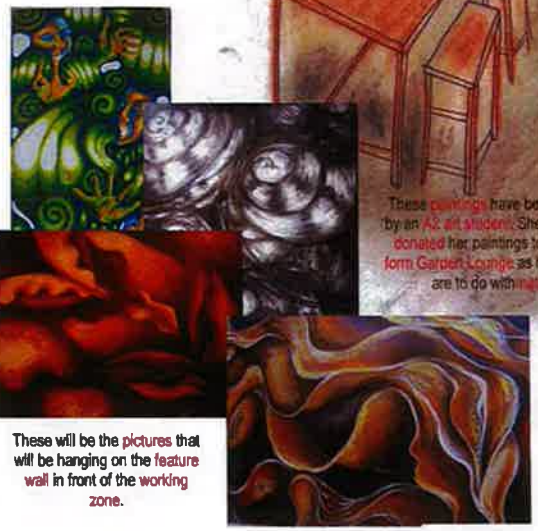
It has a footrest which provides extra sitting comfort.

Materials of bar stools

It is made out of a renewable material (solid pine). The material in this product may be **recyclable** however the community near use may not have the facilities to take care of it. MC1, PR3, SA, Q2

The[illegible] the bar stools that cam[illegible]e bar tables. These were [illegible]ed by the user group however they were unsure as there were no back support. FU3

This is a [illegible] for students to work[illegible] it is safer. The students will not walk their work or laptops over the balcony which was going to be the problem in design 1.



These paintings have been created by an A2 art student. She has kindly donated her paintings to the[illegible] form Garden Lounge as her pictures are to do with nature.

These will be the pictures that will be hanging on the feature wall in front of the working zone.

The vending machine and water dispenser have been strategically placed as they can be accessed from all zones.

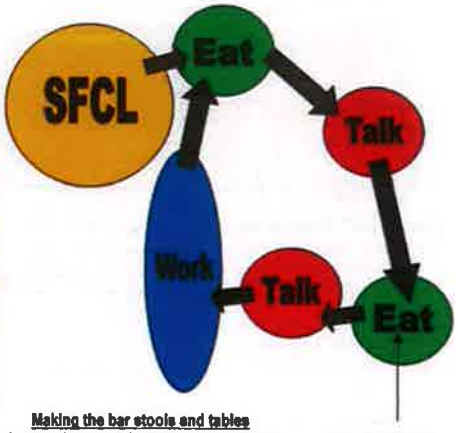
Materials and making the concrete planter

The planter that will form a swirl around the room is made out of concrete. It will be formed using a mould. The mould will be created in the area before all the furniture has been put in. When the liquid concrete is poured in it will be left to cool and solidify leaving the shape.

The colour of the concrete is a neutral colour which satisfies the client's criteria. FO2

The concrete planter acts as a room divider. It is filled with different plants that were chosen in the focus research which will give the area more colours. FO3

The inspiration for the swirl planter came from this image as well as the market place within the sixth form common room.



Making the bar stools and tables

Measure the piece of wood and cut out using the band saw. Attach the pieces together with biscuit joints with PVA glue. When the pieces dry, sand them down with sand paper. Apply varnish for a high quality finish. MC2, Q2

A bubble diagram has been created to show the movement of people through the area.

Materials of bar table

The Bar table is made of solid pine with a clear acrylic lacquer. The solid wood is a hardwearing natural material. MC1, PR3, SA, Q2

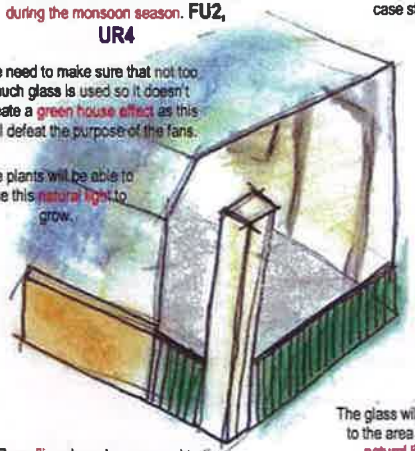
The glass roof only covers part of the area. The area closest to the door is in the open – covered by the marquee during the monsoon season. FU2, UR4

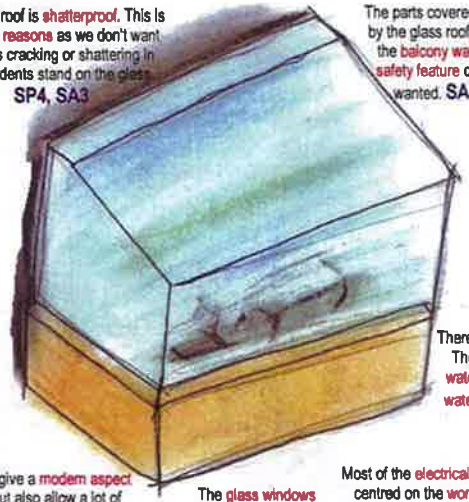
The glass roof is shatterproof. This is for safety reasons as we don't want the glass cracking or shattering in case students stand on the glass. SP4, SA3

The parts covered over by the glass roof have the balcony walls – safety feature client wanted. SA3

We need to make sure that not too much glass is used so it doesn't create a green house effect as this will defeat the purpose of the fans.

The plants will be able to use this natural light to grow.





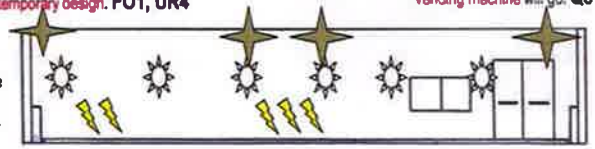
The railings have been moved to the open area as it gives the impression of more space.

The glass will give a modern aspect to the area but also allow a lot of natural light into the area – contemporary design. FO1, UR4

The glass windows cannot be opened.

Most of the electrical sockets are centred on the working zone. However, there are two where the vending machine will go. Q5

There are 4 panels to this roof. The roof is at angle so the water flows down creating a water fall effect. FU2, UR4



There are more lights in the room to brighten up the room. This may not be necessary during the day due to the natural light but at night it will be dark.

The electrical equipment has been put into the room. All the fans have been moved to the wall as they can't be hung from the ceiling. UR1

User Group's Feedback

- The concrete planter is in a unique shape and correlates with the room divider in the sixth form market place.
- There needs to be more stools to provide more seating areas.
- Some of the furniture needs to be removed to make the space wider as by the bar tables it looks like there is not enough room for students to walk through.
- I like the art work that has been shown as it shows natural and organic material.
- Working at the bar tables could be a problem as there might not be enough space to work at but I like the T shape. Group work will be able to be achieved here.

Client's Feedback

- I really like the curved plant pot as it makes areas more secluded such as the socialising zone. The screen of plants becomes the room divider.
- The bookcase position does not give the students enough room to walk through – safety hazard if there is a fire.
- The vending machine needs to be moved away from the study to the other side of the room where the students will be eating so the people working will not get distracted.
- The fans on the wall is not a good idea as if they are at angle they will blow students work. The cool air will also not reach the students on the other side because of the plants.
- I like the glass roof as it allows natural light into the area. However, when there is rain it could become very noisy. The sun will also make the furniture very hot during the heat of the day.
- I'm not too sure how easy the roof will be maintained as there is a lot of dirt in the atmosphere which could make the glass very dirty.
- I do like the art work on the wall as it makes use of the talent at school. It could be flexible and a way to show different students work.
- The furniture which is in the open area is not suitable for rain. The seats will become damp and mould. Other furniture needs to be considered.
- Some areas are too busy but there is enough seating in this area.

Design One's Information

- Room can accommodate 28 students. FU1
- The area is split into three zones – eating, working and socialising zone. However, the zones have not been clearly separated from one another. FO3
- The small ledge which runs along the border of the room has been removed to increase the size. FO5
- The two doors to the lecture theatre have been taken out which will stop the younger years from coming into the garden lounge. FO5
- Multifunctional furniture is used (Eating zone: Café chairs and Table. Working zone: Bar tables and bar stools. Socialising zone: bookcases and small stools) FU3
- The focus research shows that all the furniture that was chosen was desirable to the user group. The new furniture that was put into this design was acceptable by the students. FU4, UR2
- The area is covered by a glass roof and windows. The school bell may be heard but only very faintly as there is an open area. UR3
- Paintings that are hanging on the wall are painted by a student in the sixth form who is doing her A2 art. Her paintings are to do with nature. UR5, FO1
- All the furniture can be moved for special events except for the large planter in the middle as well as the bookcase. PR1
- All the furniture can be cleaned except for the banana fibre stools. PR2
- The flooring has already been decided - Shanghai plaster, this will be laid during the holidays by a tiler. MC5, Q4, SP3

Design Three

The room shows some places which have a lot of room – contemporary style. FO1, S2

The room has been split into three distinct zones – eating, socialising and working. FO3

The eating zone can accommodate 12 students but there is plenty of room for students to stand.

I have turned the table and chairs around to see if they take up less room at a different angle. I believe that this table should be turned round as this is a very narrow room and students need to be given sufficient space to walk around in case of an emergency. S2

The feature wall has maintained its original colour – apricot. FO4

The end door leading to the lecture theatre has been moved up. FO5

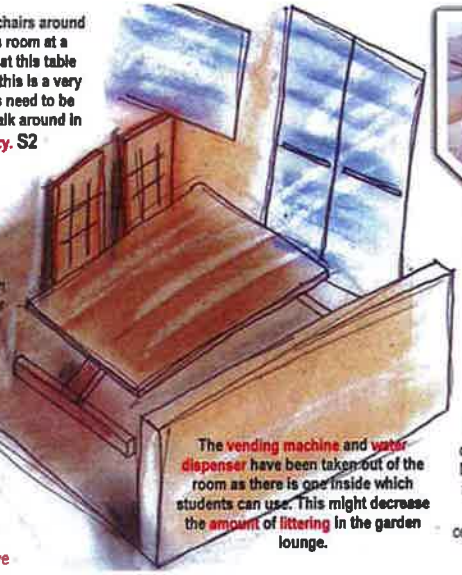
Eating Zone

The flooring in this area is Shanghai plaster. The client had decided this when we first met. It will be laid down by a tiler in the summer holiday when the rest of the room is being refurbished. MC5

A bin has been added by the door as students need a place to put there rubbish. This will make the area more aesthetically pleasing as less waste will be around. However, it may attract insects such as cockroaches to the area.

Material of bin

The bin is made out of EVA plastic. It can be recycled when it has been worn out. It is inexpensive and will fit the surroundings as it is made of a contrasting material. It has been rounded to provide safety.



The vending machine and water dispenser have been taken out of the room as there is one inside which students can use. This might decrease the amount of littering in the garden lounge.

These are the furniture items that I have chosen for the eating zone. The user group chose them in the focused research because they are durable, comfortable and desirable. UR2, FU3, Q3

Materials of chairs

The chairs are made from a 100% sustainable harvested hardwood called, Meranti. It is sourced in Malaysia. The cream cushions are made from microfiber with Dacron padding to provide comfort to the user group. UR2, MC1, MC4, C2

Making the café chair and table

Measure the piece of wood and cut out using the band saw. Attach the pieces together with biscuit joints with PVA glue. When the pieces dry, sand them down with sand paper. Apply varnish for a high quality finish. MC2, Q2

Materials of tables

The tables come in two types of finishes – cherry or ash. Cherry wood has been chosen due to its natural luster, attractive grain and rich, warm colour. The cherry wood has come from a sustainable harvested solid hardwood. UR2, MC1, MC4, MC2, Q2

Photos have been put up around the wall of students which have made an impact in the sixth form e.g. the head students

The floor of the Socialising zone is not Shanghai plaster but is wooden decking. MC5

Making the bin

This has been done by the process of Injection moulding. This is ideal for mass production. It has a low unit cost for each moulding in high volumes. It also gives a high quality surface finish or texture can be added. In this case it has a smooth finish. IT is done by injecting a liquid polymer into a mould by heating thermoplastic granules. Once the polymer has been cooled it solidifies and the finish product is ejected. Q2, MC2 SP1

These tables have been aligned. It shoes some sophistication in the design and also the contemporary style. FO1

The plant pots are black and so will fit in with the wooden furniture. The subtle designs on them are the Asian influence needed. FO1, UR5

The furniture that has been chosen for the eating zone is dining furniture. FU3

There is sufficient space for students to push back chairs without it interfering from others walking by. S2

Material of plant pots

The plant pots are made out of clay. They are very heavy which is good as they won't get easily broken. However, they can get cracks in them and need to be moved every so often as they discolour the flooring beneath them.

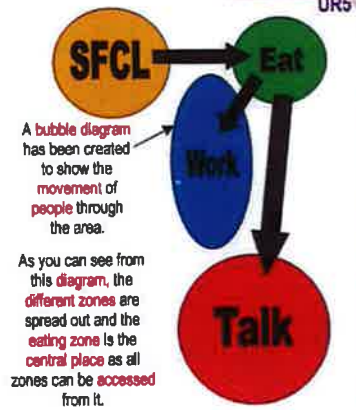
The table and chair are not bolted to the floor so can be easily moved when more room needs to be provided for meetings and after school events. PR1

Making the plant pots

Knead the clay with your hands as this will minimize the air pockets and bubbles. Do this by keeping the clay in a round shape. Once the clay is pliable roll the clay into a long snake to determine the thickness. Create a circle – the size of the circle will be the base of the pot. Keep twisting the snake around the circle. Smooth the inside and outsides as you go along or it will not hold together. Once it is done it needs to be left to dry or oven baked.

Inspiration

My inspiration for the eating zone is the Balinese culture. I have added some Asian influence by adding some Balinese plant pots into the room. They are very elegant and every one of them is unique as they are handmade. When visiting Bali I noticed different ways that they could be used to decorate a space – water, with plants and empty.



A bubble diagram has been created to show the movement of people through the area.

As you can see from this diagram, the different zones are spread out and the eating zone is the central place as all zones can be accessed from it.

All the furniture that has been chosen by the user group has been checked to ensure that it is of the highest quality as well as be under suitable certificates. Q5, Q1

All the furniture is mass produced but as this is a one off project, not many items need to be bought. SP1

User Group's Feedback

- The working zone and eating zone are too close together. The eating zone will be noisy which will distract people working.
- There are not enough plants in the area although the plant pots are very nice. More greenery is needed to make the space relaxing.
- The bookshelf should be moved into the working zone.
- The decking area is really nice however, as it is made out of wood it faces the chance of being eaten by termites. I don't think we should take the risk as it could put students at risk.

Client's Feedback

- The layout is very regimented – the socialising zone doesn't look like a place to be relaxing. Although the furniture is very nice the layout is wrong. This would have to e developed.
- I really like the decking area – a very unique idea and adds sophistication to it.
- The screen is a nice idea as it separates the different zones nicely. The sound will be quieter because of it and students working will not be distracted from those socialising.
- It is unnecessary to have the two doors so close together. They both lead into the lecture theatre and will cause a jam getting in.
- The picture on the walls will have to be updated regularly. Because of the turnaround in students.
- Air cons are well positioned but it is an open area so seems wasteful.

Design Three's Information

- Room can accommodate 27 students. FU1
- The area is split into three zones – eating, working and socialising zone. The zones are clearly separated by room dividers are different compartments. FO3
- The end door which leads into the lecture theatre has been moved up the room. FO5
- Multifunctional furniture is used (Eating zone: Café chairs and Table. Working zone: Bar tables and bar stools. Socialising zone: bookcases, coffee tables and shin sofas) FU3
- The focus research shows that all the furniture that was chosen was desirable to the user group. The new furniture that was put into this design was acceptable by the students. FU4, UR2
- The roof has been left the same as it will make attaching the roll down shutters easier. UR3
- There are photos on the walls of students that have been a positive impact on the sixth form. This legacy to the user group and the photos are flexible which means that they can be easily changed each year. UR5, FO1
- All the furniture can be moved for special events. PR1
- The furniture that has been chosen can be easily cleaned except for the Shoji screen which is made out of rice paper. This means that the Shoji screen cannot get wet or the paper will disintegrate and look anaesthetically pleasing. PR2
- The flooring has already been decided - Shanghai plaster and a wooden deck where the socialising zone is, this will be laid during the holidays by a tiler. MC5, Q4, SP3

Working Zone

This is the furniture that has been chosen for the working zone. Bar tables and chairs have been used inside the garden lounge but these ones fit with the surroundings as they are made out of wood.

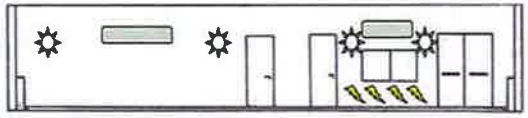
This zone can accommodate 7 people.

The Bar chairs come from the same place as the Chairs for the eating zone. This means that the chairs and bar chairs can be made in batch for this design which will reduce costs. **SP1, C2**

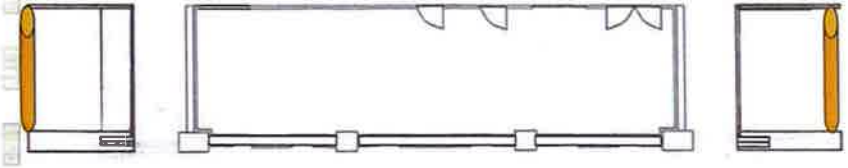
Materials of bar table
The Bar table is made of solid pine with a clear acrylic lacquer. The solid wood is a hardwearing natural material. **MC1, PR3, SA, Q2**

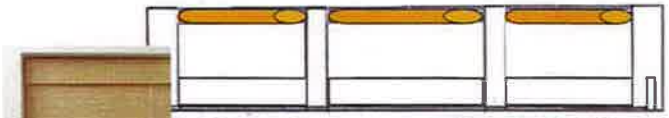
All the tables and chairs are joined together using screws.

This is the Eco Intelligence air conditioner bought in Malaysia. It received a 5 star energy rating as it has a intelligent inverter. It provides mild dry cooling. In intelligent inverter constantly adjusts its rotation and speed to provide the optimum performance at all times. It saves an electric bill by half. The air conditioner senses human presence and activity, and then adjusts the temperature for more comfort and savings.



This diagram shows the electrical and structural elements to the room.





All the electricity sockets are placed at the working zone as students will need these to power their lap tops.

There are four lights in this area which are at regular inters. More can be added if needed in the future.

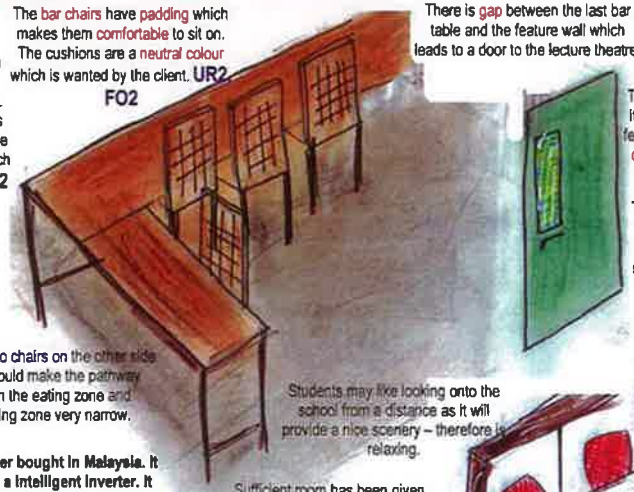
All the railings have been taken out and replaced with the walls. I believe that this is nicer although others might want to keep the railings in

Concrete planters are just out of the balcony filled with plants. These will give the room some protection as well as making the area greener. The water from rain will funnel into these pots.

sustainability

Sir bar tables are not attached to the ley may be easily tipped. Any valuables which are on the table may fall.

The bar chairs have padding which makes them comfortable to sit on. The cushions are a neutral colour which is wanted by the client. **UR2, FO2**



There are no chairs on the other side as this would make the pathway between the eating zone and socialising zone very narrow.

Students may like looking onto the school from a distance as it will provide a nice scenery – therefore is relaxing.

Sufficient room has been given for students to receive books from the bookcase. **S2**

The sofas are a straightforward Asian inspired design. **FO1**

This room has more little compartments which students can be comfortable in and read books. **UR2**

These are the roll down blinds that will be attached to the pillars. They can be adjusted during the day to allow natural light to enter the room. **FO1**

The furniture chosen for this zone is comfortable and very elegant with subtle lines and showing no curves. **UR2**

The cushions are red and compliment the shoji screen. They have a soft texture and go really nicely with the neutral Shin sofa cushions.

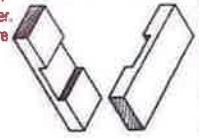
There are two air conditioning units which are placed over the working zone and socialising zones.

Materials of coffee table
The bar table is made from a wood veneer over a MDF top. It has been painted a dark brown.

The sofas can be taken apart easily when the area needs to be changed. They are held together with biscuit joints.

Materials of Shin Sofas
The Shin sofas are made from oak which are upholstered in a microfiber. Their cushions are made from a fire rated safety foam. **SA1**

The bookcase is made by woods that are held together in a cross halving join (shelves) and mitre joint for the corners. PVA glue is used as the adhesive.



The shelves allow students to put stationary as well as cutlery and plates for the eating zone if they have forgotten to bring some.

Materials of Bookcase
The bookcase is made from particleboard, fibreboard, ABS plastic and acrylic paint. The shelves however are made of particleboard, ABS plastic and melamine foil.

Inspiration

My inspiration for the working zone was a letter L. The students and client liked the letter T used in design 2 so I decided to try different letters. I had to make sure that they were straight letters and letters with curves or at angle would go against the contemporary style.

L

Students need to be careful when coming out of the lecture theatre. As the door open out on the shoji screen. It could rip the rice paper.

The shoji screen isn't attached to the floor. It is held up on its own as it provides a wide base. However, a push could knock this over causing a hazard to students in the socialising zone.

The Shoji Screen separates the eating zone from the socialising zone. **FO3**

Making the Shoji Screen
The typical size of the frame is three by eight inch square. Rice paper is fixed using rice glue. When getting dampened, the home made adhesive softens and this makes things easy. Water spray pot and electric blow drier makes the loose rice paper tightened around the frame. Basswood is the typical wood used for Shoji Screen.

There is gap between the last bar table and the feature wall which leads to a door to the lecture theatre.

The flooring here is shanghai plaster. **MC5**

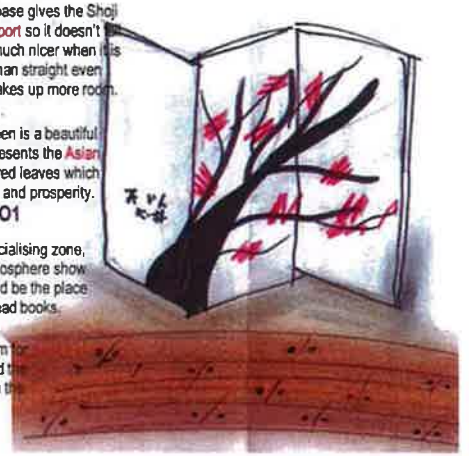
This area is a compartment – its own section. Students will feel secluded as they have got dividers going around them.

There is sufficient area back here for students to relax in. This was important as in design two the students felt that they were cramped when trying to work. **S2**

The wide base gives the Shoji screen support so it doesn't fall over. It is much nicer when it is folded than straight even though it takes up more room.

The sofas show some sophistication because of their modest lines. The coffee table is very simple as well to compliment the Shin sofas design.

The Shoji screen is a beautiful piece that represents the Asian culture. It has red leaves which signify wealth and prosperity. **FO1**



Although this is a socialising zone, the furniture and atmosphere show tranquility. This would be the place for students to read books.

There is enough room for students to get round the coffee table to sit on the sofas. **S2**

Although this area can only seat 8 students – there is room for students to stand. **S2**

The client wants the students to relax but not in way that they forget about work. I have tried to show this in this design by having comfortable chairs but they are separated from one another. **UR2**

Socialising Zone

Review

In this section I will evaluate these designs against the specification. I created many more designs for this area but designs 1-3 focused on the specification criteria. I believe I could develop these designs further. I gave each design a mark out of 129. Design 1 received 107 design 2 was 102 and finally design 3 was 105. This means that design 1 will be the design that I develop but features of each design will feature in the final proposal.

Coding	Design 1	Mark	Design 2	Mark	Design 3	Mark
FO1	As the room follows the contemporary style there is a lot of room for the students to move around. Natural light is brought into the room by the skylight windows in the roof. The furniture has been arranged to give the area sophistication. There are a lot of Asian furniture items which complements the contemporary style. For example the Shin sofas have subtle lines but are highlighted with the crimson cushions. The Japanese Shoji Screen divides the room into two.	3	This design doesn't follow the contemporary style as the main focus of this room is the curved concrete planter. There isn't enough space for the user group to walk around in which was pointed out by the user group and client. However, natural light is brought in by the glass roof. Asian influence is shown by the rattan stools and artwork on the walls.	1	The contemporary style is shown in this room by the straight lines and room to move around in. The Asian influence is shown in the colours (the red shoji screen, cushions and bookcase) but also in some of the furniture such as the Shin sofas and the Balinese plant pots.	3
FO2	The neutral colours are used in the cushions of the Shin Sofa, bar chairs and café chairs. The colour used though is beige which may get dirty easily. The white bookcase is also a neutral colour. Natural colours are also used because of the natural materials such as the oak shin sofas. The natural colours give the area a garden sense.	3	The neutral colours are used in the cushions of the Shin Sofa, bar chairs and café chairs. The colour used though is beige which may get dirty easily. The white bookcase is also a neutral colour. Natural colours are also used because of the natural materials such as the oak shin sofas and rattan stools. However, there are more natural materials used than the neutral colours. The user group liked this better as with the tall plants surrounding the chairs and tables it didn't feel like school.	2	Neutral colours have been shown in the majority of furniture items in this room with the few exceptions which use natural colours such as the Balinese plant pots. They give the room more characteristic. The bold colours are only part of the contemporary style.	2
FO3	The room is split by the Shoji screen into two parts – Socialising and Eating zone. The third zone is divided by the other two. The furniture is very different in all the zones to show the objective of that area.	3	After asking the client and user group to point out the three zones, they were able to point out the three sets of furniture but were unable to see where one zone began and the other finished.	2	The area is split into three distinct zones, this was seen by the user group and they were able to see the borders of each of them.	3
FO4	The feature wall has its existing colour. The wall does have the black vinyl vines which go around the doorway.	3	The feature wall has its existing colour. There are paintings on the wall of artwork that A2 students have produced. This leaves a legacy to those students as it will remain there.	3	The feature wall has its existing colour. There are some photos hanging on the wall of students that have made an impact on the sixth form. This was the client's idea as we needed a place for student's hard work to be acknowledged.	3
FO5	The area has kept within its dimensions. However, the small border that surrounds the room has been taken away to create more room.	2	The area has kept within its dimensions. The small ledge has been removed to create more room as well as the two doors leading to the lecture theatre. There was always a queue in the mornings without the furniture. When the furniture is placed in it may cause a lot of inconvenience and be slower. The client liked this idea as the younger students won't be able to get in.	2	The interior dimensions have remained the same. The only difference is the furthest door from the ICT suite that leads into the lecture theatre has been moved up the room to take people away from the socialising room.	2
FU1	The room can only seat 21 students. However, there is enough room for some of the user group to stand which means more students will be accommodated.	3	The room can seat 28 students. There is not enough room for students to stand around as it has already been pointed out that some places are too narrow to walk past.	3	The room can hold exactly 27 people and there is sufficient room for students to stand.	3
FU2	The room is sheltered by wooden shutters that are on the edge of the balcony walls. This should give some protection but not enough as the rain and wind will still be able to blow through the middle.	2	This area provides protection and shelter from the wind and rain as the windows and roof are made of glass. The only part of the roof that is not covered is where students can eat. When it is not monsoon season, students will be able to eat out here. When it is raining a marquee will go up to protect the students. However, the younger students will still be able to see in as the windows are transparent.	3	The area has roll down shutters which provides protection and shelter from the rain and wind. They span across the entire balcony walls. They are lightweight however, they do have a weight on the end of them so they won't be distracting in the wind. The height of the shutters can be adjusted with a string.	3
FU3	The area has a lot of multifunctional furniture ranging from sofas in the socialising area, bar tables for students to work on and café tables for eating at. The different furniture defines the purpose of the zones and is made clear by the user group.	3	There is a lot of multifunctional seating with rattan stools for the socialising zone, bar tables and bar stools for students to work at and café tables and chairs for them to eat at. The different furniture defines the purpose of the zone which makes it clear on what they have to do. However, it was mentioned that students could use the different areas to do different things – zones did not make it clear.	1	The area has a lot of multifunctional furniture ranging from sofas in the socialising area, bar tables for students to work on and café tables for eating at. The different furniture defines the purpose of the zones and is made clear by the user group.	3
FU4	All seats have cushions to provide comfortable seating. All furniture that will be bought has certificates to prove that they are ergonomically suitable for the user group so will provide secure furniture.	3	All the furniture that has been chosen is comfortable as the seats have padded cushions however, there have been mixed reviews about the rattan stools. People believe that they could be uncomfortable because they are wooden while others believe that the concave shape could make them comfortable.	2	All seats have cushions to provide comfortable seating. All furniture that will be bought has certificates to prove that they are ergonomically suitable for the user group so will provide secure furniture. The user group really enjoyed this area as they liked the fact that although this was a room it was split into many different compartments.	3
UR1	There are 4 fans in this area which will keep the user group cool. They are kept at a reasonable distance from each other which mean that more may be added if the students get too hot.	3	There are four fans in this area which will keep the user group cool. There is some distance between each fan. They are wall fans instead of ceiling fans due to the fact the ceiling is made of glass	3	Instead of fans air conditioning units were used. In the second design, the client suggested that these could be used to stop work from blowing away. The air conditioning has many different settings which can adjust the speed and temperature and so therefore will keep the user group cool. There are only 2 units in this area.	2
UR2	From the results from the user group, the students liked the furniture that had been chosen by the fellow students. They liked how the furniture looked expensive and how it was spaced out so the room wasn't too cluttered. The only concern about the furniture is that the light coloured fabrics on the seats could get dirty easily.	2	As it has already been mentioned the rattan stools have mixed reviews. The room looks very busy and so moving around in the area may be difficult. The light coloured fabrics on the seats are a problem as they can get dirty easily but the students like the furniture chosen.	2	From the results from the user group, the students liked the furniture that had been chosen by the fellow students. They liked how the furniture looked expensive and how it was spaced out so the room wasn't too cluttered. The only concern about the furniture is that the light coloured fabrics on the seats could get dirty easily.	3
UR3	The area is [illegible]oen and so the school bell will still be heard from the library.	3	The room is covered for the majority however, the eating place is not covered which means the school bell will still be able to be heard but maybe faintly.	1	The school bell will be able to be heard as there are no windows in the area.	3
UR4	The area is sheltered with a roof which lets the water run down and is taken away in gutters. This means that no water from the roof will get inside the area. However, the shutters do not provide too much shelter as they only cover parts of the walls which would allow wind and rain to come in through. This could cause a problem for students using the bar tables.	2	There will be no rain or wind in the area as the area is covered by glass. The marquee will be put up if there is rain which will only happen during the monsoon seasons.	3	The area will be sheltered by the roll down shutters however, moisture will still be allowed through as if there was strong winds they would blow inwards causing the rain to move in.	2
UR5	The soft furnishings which have been used in this design are the pillows in the socialising zone. It is a bold colour which is needed in the contemporary design. The user group found it disappointing that there were no plants in the area as the vases had a Bali inspiration to them.	1	The only soft furnishings in this area are the painting on the wall painted by an A2 art student. The artwork is on nature and so fits in nicely with its environment. There are two large curved concrete planters in the area filled with tall plants which was liked by the students and client.	3	The clients really liked the soft furnishing, especially the Balinese plant pots as many students go away to Bali for a holiday and the plant pots are placed everywhere. They look stunning with plants in them, water or just for decoration.	3
PR1	The only piece of furniture which is not completely flexible is the Shoji screen. A gap in the ground is needed so the Shoji Screen's wheels won't show. However, when it is taken out the gap shows which is not appealing for guests who may be visiting.	2	Moving the furniture items will be easy as they are not attached to the ground however, the concrete planters are attached to the ground and are therefore not flexible.	1	All the furniture is flexible which means if there is an event, all the furniture not in use can be taken out with little maintenance.	3
PR2	All the furniture that has been chosen can be easily cleaned except the Shoji screen. The cushions on the Shin Sofas can be taken off and washed if they get dirty. All the wood has been varnished and will not leave water rings if cold glasses are left there.	2	Not all the furniture chosen can be easily cleaned. As there are gaps in the rattan stool it may make cleaning the stool extremely difficult. All the other furniture can be easily cleaned as the cushions can be taken off if it gets too dirty. The wooden tables can be varnished and so will not leave water rings if cold glasses are left on the surfaces.	2	The furniture can be cleaned easily as the cushions on the Shin Sofas can be taken off and washed if they get dirty. All the wood has been varnished and will not leave water rings if cold glasses are left there. The Shoji screen is the only thing that will not be able to be cleaned as it is made from rice paper.	3
PR3	The furniture that has been chosen is durable which means it will be able to withstand wear and tear. The pieces can be replaced as they aren't too expensive. However, the items will be able to last a couple of years before they need replacing.	3	All the furniture except for the rattan stools is durable. The rattan stools can be picked meaning that the edges get frayed. They will not aneasthetically pleasing over time and will therefore need replacing. However, it is unsure of how long the stools will last.	2	All the furniture is durable except for the Shoji screen. It has been placed close to both doors which mean if someone comes out of the room with a powerful swing it could go through the rice paper. The Balinese plant pots could get knocked over and since they are made out of clay they will smash.	2
MC1	Most of the furniture that has been chosen comes from sustainable natural resources. Only a small amount of furniture is not made from a natural resource such as the parts of the bookshelf, vending machine and water dispenser.	2	Most of the furniture that has been chosen comes from sustainable natural resources. Only a small amount of furniture is not made from a natural resource such as the parts of the bookshelf, vending machine and water dispenser.	3	Most of the furniture is made from natural materials some which are from sustainable resources. However, other furniture has come from exploited resources including the plastic air conditioners. Although it is a natural resource it is affecting our environment and uses a lot of electricity – carbon footprint.	2
MC2	All furniture pieces have been varnished so are weather resistant. The wood pieces however, have not been treated for termites which may cause a problem later on.	3	Most of the furniture is covered over so does not need to be weather resistant. All the tables however are weather resistant which will provide protection underneath the marquee. If the rattan stools become too damp they will rot.	2	All the furniture is weather resistant except for the cushions on the shin sofas. When they get damp they will start to mould. The Shoji screen is in the same position as it is made of rice paper. The others have been varnished to provide an aesthetically pleasing finish as well as protection from water.	2
MC3	The only metal furniture is the vending machine and water dispenser. The school is renting the use of the vending machine which means that the edges of it cannot be sanded down. However, the edges are not sharp and won't be a safety hazard.	3	The only metal furniture is the vending machine and water dispenser. The school is renting the use of the vending machine which means that the edges of it cannot be sanded down. However, the edges are not sharp and won't be a safety hazard. The concrete planters may be the only hazard to the area as they will be sharp.	2	There are no metal railings or electrical equipment that has a metal casing. This is good for the environment as the metal is extracted from rocks and causes eye sores to the landscape. By having a minority of metal items, the Alice Smith is supporting the environment. In the heat of the day the metal will become very hot.	0
MC4	All the wooden furniture that has been used is from sustainably managed forests. The other materials which are used can be recycled. As the Alice Smith School is 'going green', all the furniture that was chosen is environmentally friendly.	3	All the wooden furniture that has been used is from sustainably managed forests. The other materials which are used can be recycled. As the Alice Smith School is 'going green', all the furniture that was chosen is environmentally friendly.	3	Most of the wooden furniture is made from sustainable resources as they have come from sustainable harvested forests. Other materials can be recycled.	3

MC5	Over the summer holiday, Shanghai plaster will be laid down on the garden lounge floor. This was the flooring chosen by the client.	3	Over the summer holiday, Shanghai plaster will be laid down on the garden lounge floor. T... the flooring chosen by the client.	3	In this area there is Shanghai plaster as well as a wooden deck in the café zone. It will be laid down in the summer holiday in the garden lounge. If rain gets into the area the water can fall through the cracks in the deck and fill in the water reserves for watering plants – re using rainwater.	2
S1	The size of the area has not been increased outside the walls. The small border wall that runs in the room has been removed to increase the inside space.	3	The size of the area has not been increased outside the walls. The small border wall that runs in the room has been removed to increase the inside space as well as the doors leading to the lecture theatre from the garden lounge.	3	The size of the area has been increased as there are plant pots outside which use the reserve water supply. Although it goes out there are no building features so the client and user group really liked this idea because the plants were also used as protection.	2
S2	As the room has a contemporary style, it has a lot of room for the user group to walk around and stand. This also makes the room safer to be in.	3	The area does not follow the contemporary style which can be clearly seen from the lack of space for students to move around. This is a safety issue which caused concern in the case of a fire.	0	There is sufficient room for students to move around in as it follows the contemporary style. Although there are 27 seats for students there is enough room for them to stand which is important as a safety feature.	3
S3	All the furniture that has been chosen is for the user group's sizes. The café tables which have been chosen are adjustable and can be turned into coffee tables when needed.	3	All the furniture that has been chosen is for the user group's sizes. The café tables which have been chosen are adjustable and can be turned into coffee tables when needed.	3	All the furniture that has been chosen is for the user group's sizes. The café tables which have been chosen are adjustable and can be turned into coffee tables when needed.	3
SA1	All seats have subtle rounded edges and corners. This reduces the risk of an injury. The tables and bookcase however, do not. The space around these items of furniture though makes the risk incredibly unlikely.	2	All seats have subtle rounded edges and corners. This reduces the risk of an injury. The tables and bookcase however, do not. The space around these items makes the risk likely.	1	All seats have subtle rounded edges and corners. This reduces the risk of an injury. The tables and bookcase however, do not. The space around these items of furniture though makes the risk incredibly unlikely.	2
SA2	The user group which have commented on this design proposal have been impressed with the transformation of the space that they would take care of the area as they feel very privileged. They believe that intentional vandalism will be minimal but there may be cases where items are damaged due to wear and tear.	2	Students and the client were impressed with this area as it complemented the market place inside. The students said that they saw no reason why students would want to intentionally destroy this area as they believed it was a privilege. Wear and tear was very likely though especially for the rattan stools which could look unattractive to guests.	2	The user group which have commented on this design proposal have been impressed with the transformation of the space that they would take care of the area as they feel very privileged. They believe that intentional vandalism will be minimal but there may be cases where items are damaged due to wear and tear. This room was a favourite to many students because the area was split into many compartments which made them feel secluded from the rest.	3
SA3	There are no safety measures which have been implemented around the railings. The bar tables are next to the railings which could mean that people may lose work over the edge with the fans blowing. This is a disadvantage to this design.	0	The glass windows provide safety. The only part which has no safety measure is where the marquee will go as this is where the railings will go and could be dangerous if one of the railings becomes loose.	2	There are no railings in this area. Instead, it has been replaced by walls. This is a step up on the safety features but is still not as safe as it could be. The client would have liked to have seen more development on this feature.	2
SA4	The fan which was chosen by the user group is a high ceiling fan which means it will not hang low in the area. The fans will be operated from the wall by the double doors. When they aren't in use students will be able to switch them off.	3	The fan chosen is different to the one that was chosen by the user group but is made by the same company. It is a wall fan and so will not hang low in the area. The fans will be operated from the wall by the double doors. When they aren't in use students will be able to switch them off.	3	The air conditioning is quite high up but since the area is open the client and user group felt that it is not beneficial as it will keep the area warm. Air conditioning also increases the utility bill by a lot and so is not a good use of electricity.	1
SA5	A contractor will be hired to ensure the quality of the power sockets. As this is a safe environment, we need to be assured that the user group will not be harmed using the electrical items.	3	A contractor will be hired to ensure the quality of the power sockets. As this is a safe environment, we need to be assured that the user group will not be harmed using the electrical items.	3	A contractor will be hired to ensure the quality of the power sockets. As this is a safe environment, we need to be assured that the user group will not be harmed using the electrical items.	3
Q1	All the furniture that has been chosen has been certified by the BSI and ISO. Being certified gives us quality assurance that the furniture we have bought is of high quality.	3	All the furniture that has been chosen has been certified by the BSI and ISO. Being certified gives us quality assurance that the furniture we have bought is of high quality.	3	All the furniture that has been chosen has been certified by the BSI and ISO. Being certified gives us quality assurance that the furniture we have bought is of high quality. The only furniture which does not have quality assurance is the Balinese plant pots which were found at a market.	2
Q2	The furniture that has been chosen has been certified that it is under the highest quality. This will ensure the client that the finish will not be toxic or harmful to the user group. The hardwood furniture also has a high decorative surface finish.	3	The furniture that has been chosen has been certified that it is under the highest quality. This will ensure the client that the finish will not be toxic or harmful to the user group. The hardwood furniture also has a high decorative surface finish.	3	The furniture that has been chosen has been certified that it is under the highest quality. This will ensure the client that the finish will not be toxic or harmful to the user group. The hardwood furniture also has a high decorative surface finish.	3
Q3	The furniture that was chosen is durable as the client wanted the products to last a couple of years before they need replacement. Most of the wooden furniture items are made from sustainable hardwoods. They are tough and strong due to their close grain.	3	The furniture that was chosen is durable as the client wanted the products to last a couple of years before they need replacement. Most of the wooden furniture items are made from sustainable hardwoods. They are tough and strong due to their close grain. The only furniture item which shows that it may not be durable is the rattan stools.	2	All the furniture is durable except for the Balinese plant pots which could get knocked over easily. This could cause parts to chip and cause a safety issue to the students. The shoji screen is not in a suitable location. It is in between of two swinging doors.	2
Q4	When the Shanghai Plaster is laid down during the summer holidays, the contractor that I will hire will do a total quality control on the flooring to ensure that it has been laid down correctly.	3	When the Shanghai Plaster is laid down during the summer holidays, the contractor that I will hire will do a total quality control on the flooring to ensure that it has been laid down correctly.	3	When the Shanghai Plaster and wooden decks is laid down during the summer holidays, the contractor that I will hire will do a total quality control on the flooring to ensure that it has been laid down correctly. For example they will make sure that the gaps between the decks are equal.	3
Q5	The electrical equipment has met the quality standards of the ISO as well the British Standards. Other electrical equipment that has been chosen is eco – friendly and meets other standards.	3	The electrical equipment has met the quality standards of the ISO as well the British Standards. Other electrical equipment that has been chosen is eco – friendly and meets other standards.	3	The electrical equipment has met the quality standards of the ISO as well the British Standards. Other electrical equipment that has been chosen is eco – friendly and meets other standards.	3
SP1	All the furniture that has been chosen is mass produced. However, for this project only a certain number of the furniture items are needed. For example, only one medium and small Shin sofas are needed. Mass production has rigorous quality controls to ensure that the products are of high standards. The cheaper prices for the bar chairs and café chairs come from the economies of scale in the bulk buying in materials.	3	All the furniture that has been chosen is mass produced. However, for this project only a certain number of the furniture items are needed. Mass production has rigorous quality controls to ensure that the products are of high standards. The cheaper prices for the bar chairs and café chairs come from the economies of scale in the bulk buying in materials.	3	All the furniture that has been chosen is mass produced. However, for this project only a certain number of the furniture items are needed. Mass production has rigorous quality controls to ensure that the products are of high standards. The cheaper prices for the bar chairs and café chairs come from the economies of scale in the bulk buying in materials. Some of the furniture for example the Balinese plant pots have been hand made an require labour intensive skills.	2
SP2	There are no plants in the area which was disappointing to the user group and client as it didn't match the garden theme.	0	The plants which have been chosen come from a local nursery in the vicinity of the school. The plants are very tall and provide a jungle theme to the garden lounge.	3	The plants which have been chosen come from a local nursery in the vicinity of the school. The plants are very tall and provide a jungle theme to the garden lounge. They provide the border as they go around the outside and provide some shelter and protection as a natural barrier.	3
SP3	The floor tiler will come in over the summer holiday to install the Shanghai plaster. This will be done when the rest of the Sixth Form Centre is being refurnished. The contractor that I hire will make sure that the floor tiles have been laid down correctly as a quality assessment.	3	The floor tiler will come in over the summer holiday to install the Shanghai plaster. This will be done when the rest of the Sixth Form Centre is being refurnished. The contractor that I hire will make sure that the floor tiles have been laid down correctly as a quality assessment.	3	The floor tiler will come in over the summer holiday to install the Shanghai plaster and wooden decking. This will be done when the rest of the Sixth Form Centre is being refurnished. The contractor that I hire will make sure that the floor tiles and the wooden decks have been laid down correctly as a quality assessment.	3
SP4	There are no windows in this design so a glazier is not needed.	0	The windows will be installed by a glazier however, there have been some concerns given from some of the user group that because the roof is made of glass it may make the room incredibly hot – green house effect.	2	There are no windows in this design so a glazier is not needed.	0
SP5	An electrician will be hired by the contractor to ensure that the electrical items are being fitted correctly. The contractor will then be able to ensure that the products have been installed safely and will not harm the students.	3	An electrician will be hired by the contractor to ensure that the electrical items are being fitted correctly. The contractor will then be able to ensure that the products have been installed safely and will not harm the students.	3	An electrician will be hired by the contractor to ensure that the electrical items are being fitted correctly. The contractor will then be able to ensure that the products have been installed safely and will not harm the students.	3
C1	As I am buying more than one of some of the furniture items, I will be able to get that at a cheaper price as buying in bulk can reduce the cost. The furniture items that I have chosen are at a reasonable price to stay within the budget of the school. They are not cheap products which are likely to break after a couple of months.	3	As I am buying more than one of some of the furniture items, I will be able to get that at a cheaper price as buying in bulk can reduce the cost. The furniture items that I have chosen are at a reasonable price to stay within the budget of the school. Most of the furniture is not likely to break after a couple of months.	2	The cost of this project has gone over the budget as the air conditioning units were very expensive. The electricity needed to power them will also be expensive and increase the carbon footprint of the school. The client wasn't too happy with this and suggested that we returned to the idea of fans.	0
C2	Furniture has been chosen from the local stores in Malaysia as decreasing the travel costs will ultimately reduce the total costs. The IKEA store in Bandar Utama has been used for some of the products. I will be able to get these products and have them assembled by IKEA.	2	Furniture has been chosen from the local stores in Malaysia as decreasing the travel costs will ultimately reduce the total costs. The IKEA store in Bandar Utama has been used for some of the products. I will be able to get these products and have them assembled by IKEA.	3	Furniture has been chosen from the local stores in Malaysia as decreasing the travel costs will ultimately reduce the total costs. The IKEA store in Bandar Utama has been used for some of the products. I will be able to get these products and have them assembled by IKEA. However, some of the furniture has been imported from Bali. This means that the travel costs will be expensive.	1
C3	All of the furniture that has been chosen has an eco – friendly component to them. Most of the wooden furniture comes from sustainably harvested forests. A balance needed to be made between the price and their cost on their environment as the products can be expensive due to the lack of people using them. The client, user group and I believe that the best compromise in this situation has been made.	2	All of the furniture that has been chosen has an eco – friendly component to them. Most of the wooden furniture comes from sustainably harvested forests. A balance needed to be made between the price and their cost on their environment as the products can be expensive due to the lack of people using them. The client, user group and I believe that the best compromise in this situation has been made.	3	All of the furniture that has been chosen has an eco – friendly component to them. Most of the wooden furniture comes from sustainably harvested forests. A balance needed to be made between the price and their cost on their environment as the products can be expensive due to the lack of people using them. The client, user group and I believe that the best compromise in this situation has been made.	3

Scale Model

The first part of the development process is to determine what the size and scale of the model should be. As the room is very narrow but long (1:5), I will need to take this into consideration when choosing a suitable scale. It needs to be big enough to communicate design ideas to the client. For this section, I will be using rough study models out of cardboard for an efficient three – dimensional understanding of a design. The highly detailed presentation model will be made as my final product.

The cardboard model will allow the client and I to get an idea of different angles of the area and explore alternative designs.

The size of the model the client would like is around 300mm in length. To produce this size of model, the scale would be 1:66. I have created the floor of this model using cardboard to represent the exact size of the model.

The model has a 15cm ruler beside it. This will allow a rough representation of the size of the model if it used this scale. The size is incredibly small which will not allow the client to get a true feel for the space. This model was brought to the client so he could choose a more appropriate size model. We agreed that we should increase the size of the model so it would be around 600mm in length (1:33).

This is the 1:33 model beside the 15cm ruler. It was brought to Mr. Connell and the concern was that it was still too small. He would like to see the model furniture at a reasonable size as it is an interior design project. I have decided to make the model at a scale of 1:20.

I have created the 1:20 model which has been approved by the client. It is shown in the picture above with the 15cm ruler. I have moved [illegible] with the rough model and added parts [illegible] walls, balcony walls, [illegible] doors and windows. As it is made of card, it cannot support itself. For the presentation model, I will use a stronger material.

Layout of Furniture

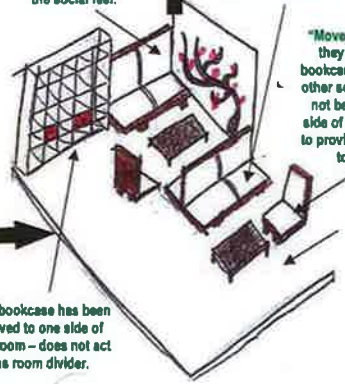
The second part of the development process is to establish the layout of the furniture. I will first create sketches of what the area should look like from comments and suggestions from the review process. I have split the areas into zones.

"The space is very crowded as the area is narrow – more space needs to be created."

"The Shoji Screen is in a nice location as it adds some privacy – it still allows students to cross zones with ease."

"The chairs should not face the bookcase – have the chairs facing each other with the bookcase at the other side of the room."

Design 3 – Socialising Zone



I have added another set of chairs into the area – they are now facing each other. This adds to the social feel.

"Furniture is away from the balcony – will not get wet if there is rain."

"Move one set of chairs so they are in line with the bookcase and diagonal to the other set of chairs – they will not be bunched up at one side of the room. Remember to provide space for students to walk through."

"There is enough room for the students to walk through."

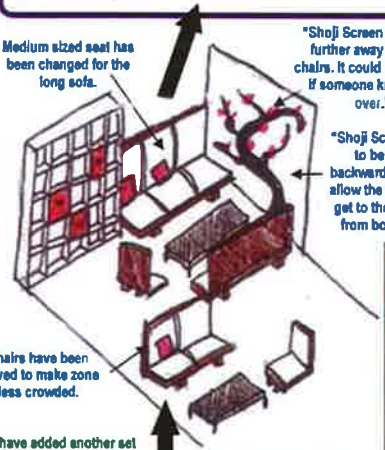
The bookcase has been moved to one side of the room – does not act as room divider.

As the room is very narrow I will have to change the Shoji Screen that was chosen in the focus research. I have found the same design Shoji Screen but narrower. This will hopefully allow access to the zone for the user group.

From this accurate scaled down model, I can see that there will have to be some modifications. Medium Sofa (2) will be changed to a small lounge chair due to lack of space.

In this picture, I have had to place Table (1) and Medium Sofa (1) at an angle. This may be changed again depending on the modifications made to Medium Sofa (2) and the Room Divider. Contemporary design encourages right angles.

As I have a sketch of what the area should look like, I will arrange them on my rough model and make any modifications to it from the previous development.



Medium sized seat has been changed for the long sofa.

"Shoji Screen should be further away from the chairs. It could be a hazard if someone knocked it over."

"Shoji Screen needs to be moved backwards – this will allow the students to get to the long sofa from both ways."

Chairs have been moved to make zone less crowded.

The Room divider and medium sofa have been changed. This has allowed the room to have more space – especially around the bookcase. This will allow students to stand and talk to their friends as well as sit down.

All the furniture is once again at right angles to each other – follows contemporary design. Due to this, the zone has been made bigger – which may be a disadvantage to the other zones as they have decreased in size.

For this development to succeed, I need to take into consideration the ergonomics of the zone. This will ensure that the user group will be able to interact with the furniture items. It will also be a safety feature in case of a fire.

To measure the distance between the chairs and coffee tables, I used existing similar products. A member from the sixth form, who is average in size, helped me find the correct measurements. We kept pushing the chair forward until we got a reasonable distance. We started at 1m gap until the gap was 370mm.

I asked the user group to walk through the gap and to see if he had enough room on either side of him. If there was a fire, students within this zone would be able to walk through safely.

The student then sat down on the sofa to see if there was enough leg room and could he still reach the coffee table from the sofa. We found that in order to have these two criteria met, another student could not walk through the gap past them. However, there were alternate routes for that student to go.

There is a lot of room in front of the bookcase. However, we measured what should be the minimum length the student should be from it – 400mm. This is in case the client would like to see bookcase in a different location.

The next part of this zones ergonomics was the distance between the chairs – to get through to the bookcase. The student and I pushed two similar items together and then walked through them to see if it was wide enough. The minimum width of the gap should be 400mm – contemporary style requires more width.

From these measurements, I will cut out card which will represent the amount of space needed for the user group to interact with it. The different pieces of card should not overlap each other.

The other zones will be much smaller due to this large zone. For my final development I have taken out some furniture. However, I have kept the layout the same.

As you can see there is only space for 4 students to sit in this area. That will keep the socialising area to be reasonably quiet.

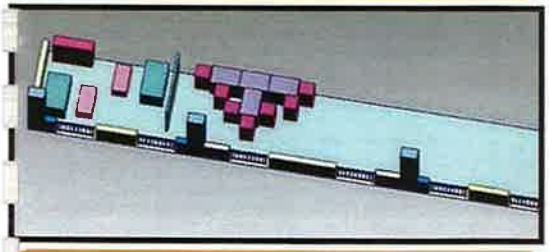
There is a lot of space for students to walk around without the area looking too crowded.

Design 1 – Eating Zone

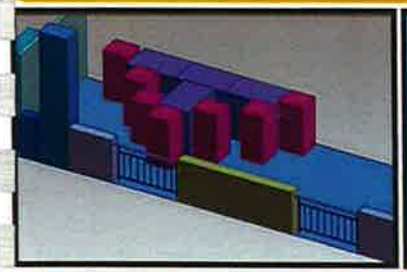
The second part of the furniture layout is the working zone. There are a lot of changes which need to be made to this zone as it wasn't as interesting as the other zones.

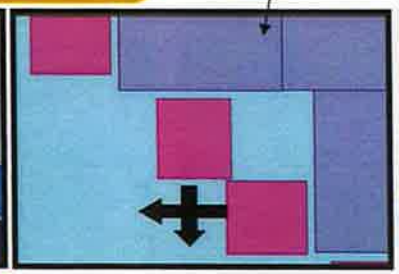
A student has been asked to sit on a seat and pretend to work then to get out of his chair in a comfortable manner.

The distance between the bar table and chairs should be of minimum length 300mm. This will be comfortable for the user group to get out of the chair. For this development sheet I will use pro desktop to help create the space that is needed. I will be able to move the furniture to the correct place to ensure that there is enough space for the user group to walk through.



I will be developing the working zone from design 2. This was voted the best area to work at as students could work independently or in groups. I created this deign using CAD software and the different furniture is represented by the boxes. The boxes are the right dimensions. I included the socialising zone to show the size of each of the zone at the moment. As you can see, leaving the design like this means that the eating zone will have a lot of space.

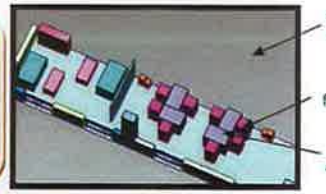




I have had to change this design from the original shown in design 2 as dimensions weren't taken into consideration. I found out that each bar table could only hold 1 student on each edge. It would be too crowded if two bar stools were on the length.

I need to develop the space of the working zone making sure that all the students are spread out giving enough room for them to work.

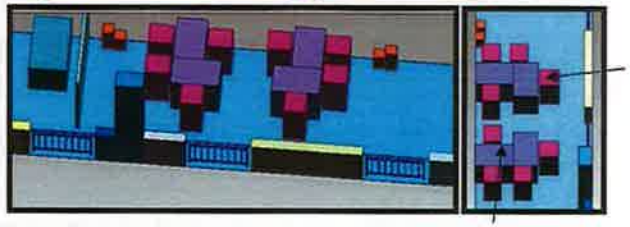
This is the final development of the working zone. I have gone back to my original design idea and added some of the second development. I have taken out the small lounge chairs from the aisle as from the plan view there isn't enough room to get around them. This is a safety hazard.



"The tables are separated but students can still work in groups."

"I have taken the L formation in the tables from design 3."

"This zone can accommodate 8 students."

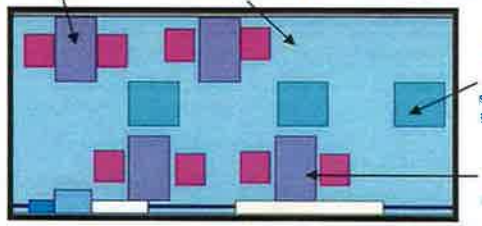


"I believe that students will like this area as it separated from the rest in its own little compartment.. Students will want to sit on the inside of the table rather than the outside."

"There are four plant pots in this area to add some more sophistication. The plant pots don't need to have any plants in them as they art decorations."

"Smaller paintings add sophistication to the room."

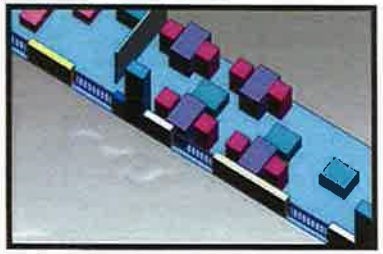
"Smaller paintings are used as the bigger canvas would have made the space smaller."

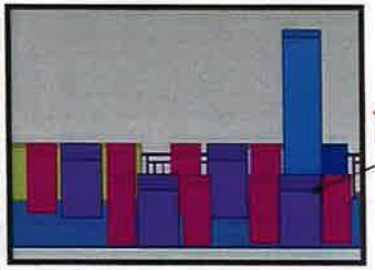


"I have added lounge chairs in the middle which provide more seating areas for the user group. It helps merge the zones together."

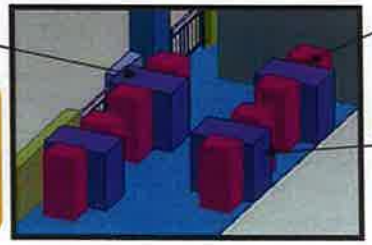
"No more tables have been added as it is a good number and has made the zone bigger."

"When creating this 3D image, I noticed that there were some problems with the layout. I offset each of the bar stools from the bar tables by 50mm. When the bar chairs need to be 300mm they are going to be interfering with the other furniture items. This is shown by the print screen image below. The arrows show the direction of the chairs being pulled out – they intersect."





"Other students may find this zone is very plain – the user group is more likely to work indoors where they are surrounded by brightly coloured walls."



"Different layers could be added to this zone – interesting design."

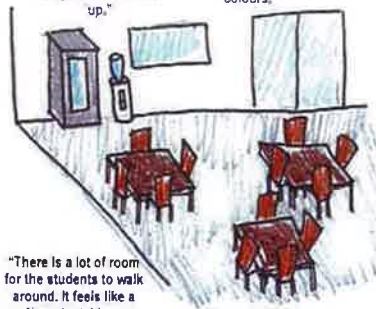
"Students art work could be put up here."

"There could be some plants in this area to help add more colours – students may want to have the plants as room dividers – for privacy."

The first development: I have separated the bar tables and chairs out. This has even added in another bar stool to increase the seating in the area. It has a very sophisticated appearance – some students may like this as they will feel separated from students but can also work in groups. There is also enough room down the middle for students to get to and from the socialising zone.

"The area looks very simple there is nothing in the room which brightens the room up."

"Greenery can be added to the room to give it some more colours."

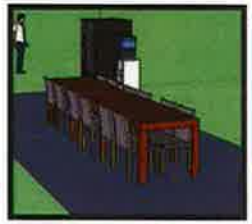


"There is a lot of room for the students to walk around. It feels like a café as the tables are separated."

"The water dispenser and vending machine are against the wall as this is when electrical sockets can be put in."

The third development on the zones was the eating zone. I knew I must include tables, chairs, vending machine and water dispenser to satisfy my client and user group. However, I needed to tweak the layout of the room in order to make sure the flow through the room was easy as well as make sure there was sufficient room for the students to stand.

The area is very narrow and the room left for the eating zone is very small due to the other two developments. I have decided to start with Design 1's eating zone. It is very basic. I added in another table however, due to the space this will have to be moved as the width of the room shown in this diagram is larger than the real model.



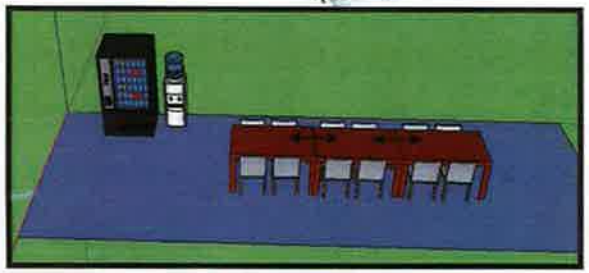
I have joined all the tables up together to make a long table. This is shown in the Google sketch up photos. It will make students feel more together and also be a place for students to work in teams. In the picture there are two extra seats that have been put in at the ends. However, there are beams here which mean that chairs won't be able to be pushed under.

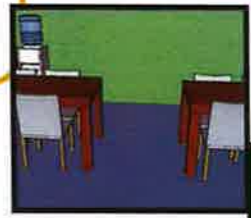
The second development, I took the suggestion of adding different heights and layers to the room. I decided to carry on the socialising zone into the working zone by adding some single shin sofas.

These three seats have been put in the aisle. Students will be able to read a book here but it will have to be quiet to respect the people working. That's why these chairs are singles and facing away from each other.

"There is more space for the user group to walk now as they no longer have to weave in between the tables."

"The vending machine and water dispenser have remained in the same position. This is a suitable place for them as if they were behind the door they would get broken."

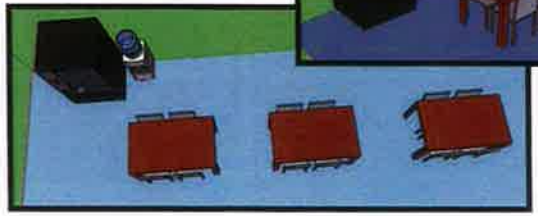




"The tables need to be split up. Students have said that they would prefer eating in smaller groups. There are very long tables down in the canteen and they would rather the area didn't remind them of there."

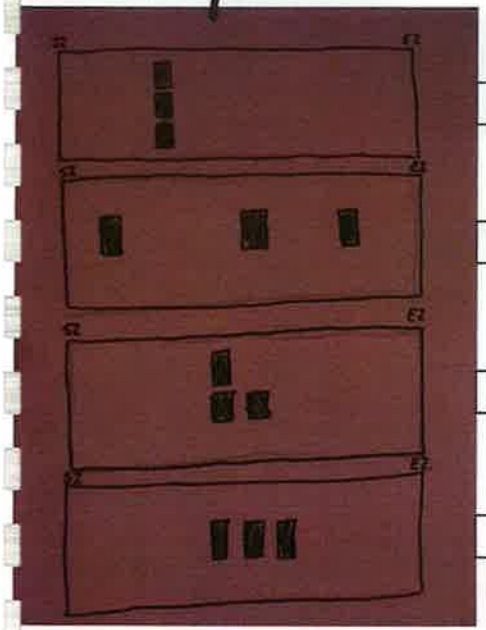
This is the final development for the eating zone. The table have been separated. I believe that this is a very sophisticated layout and follows the contemporary design which is criterion. The tables cannot be rotated by 90 degrees due to the lack of space.

"A plant has been added to the end of the room to give the area more colours. It is hanging from the ceiling in a planter."



"A suitable height of the planter needs to be determined so students are not bumping their heads on it – safety issue considered."

Development



The first structural element that I will be developing is the artwork in the room. Above is the development that I have created.

1. All the pictures are aligned vertically on the feature wall. They are in the socialising zone (SZ). This would be a nice place to put them as this is the zone where most students will relax. They will add to that atmosphere. However, if there is one picture near the ground it may get damaged by people putting their bags against it. DEVELOPMENT – having them horizontally.
2. The pictures are now horizontal – A picture is in each zone. The picture in the eating zone (EZ) will have to be removed as there is a window and door there – too much. The picture at the socialising zone will be behind the bookcase so the student will not be able to see it. DEVELOPMENT – artwork needs to be brought into the working zone.
3. Artwork has been brought into the centre of the feature wall. I have put it as an L shape as that is the design of the working zone. The user group doesn't like this idea as some of the pictures are big and the so have one on top of each other means that the art work won't be admired as much. DEVELOPMENT – have the artwork horizontally in the centre of the room.

4. The artwork is now in the centre of the working zone. This is the best place for the students as they will feel more relaxed as the largest photograph is mainly green which is a very relaxing colour. The user group really liked the art work here. The wall will have to be measured in order to know exactly where the paintings should go.

I measured the distance between the lights and fans in my house. This should be a good representation of what the distance in the room should be. The lights were 4m apart which means that I will need 4 lights in my area. If this is not enough and the client wants more after the final product then there will be enough room for him to add more. I believe that this will be enough as the lights in my house are smaller than the ones chosen for the garden lounge.

Modelling Techniques

The roof was first of all created with brown acrylic. This worked except for the fact that it didn't look like the school roof. I then cut some card board and put it on top of each other. This worked well as it created the tiling effect however; I needed corrugated card for it to look like tiles. I aligned all the cardboard on top of each other and was impressed with how it looked like the school roof. It could be stuck together using super glue.
The next stage was painting the roof. I knew that I was going to use acrylic paint but couldn't find the exact colour. In the end I mixed maroon, yellow, orange and red together to make it terracotta. I then painted on the black drains using an old pencil. To cover the edges I used plywood. This would cover up the end of the cardboard as they curled up in the heat.

The Shanghai plaster is made up of very small pebbles. It is smooth. To create this I came up with a numerous ways. I started off by doing some plaster of Paris. I mixed the paste with some grey acrylic paint. I then sprinkled stones on top of this. It worked really well except it started to crack after a couple of days because of the heat. I spoke to an art teacher and she told me to add some PVA glue as this will hold it together. This worked really well but was very time consuming. Instead I went for painting the base grey and applying PVA glue as it dried clear. The rocks themselves were bigger than I wanted them to be so I tried to crush them with a hammer. The first hammer I chose was too small and the rocks kept being scattered everywhere. In the end I used a metal mallet and an old rag cloth to keep the rocks in place.

I was going to create the back of the chairs using CAD and CAM software. However, when I got the image down to scale I noticed that the holes in the back of the chair were only 1mm by 1mm. This was going to be too small and it was likely the wood was going to snap. I decided to look for a better chair. The next chair that I found was similar to the one originally chosen but like the first was still too small. In the end I decided to go for a chair that was covered with material. I was unable to use CAD and CAM skills but I will try and find another place in the project to use them to show that I can use a range of skills and techniques. The chairs chosen were liked by the user group and they were similar to the ones in the picture with the table that was chosen.

The walls for the feature wall and pillars need to have a texture to them. This will be very difficult to do as it needs to be rough. I tried to create this by painting a block of wood and then sandpapering it – however this took the paint off and left it smooth. I then tried to dab the paint onto the wood. This created a small effect but not enough to be noticed. After watching the A2 art jam I noticed that they had created a similar texture in their pieces. They used textured paste which is similar to poly filler. I bought some and played around with the effect. This image here shows the crossing of the paste. This was created by drawing a pencil line through the wet paste. It was a very slow process. I used a spatula to dab at the paste while it was wet. This was much quicker and got the same effect.

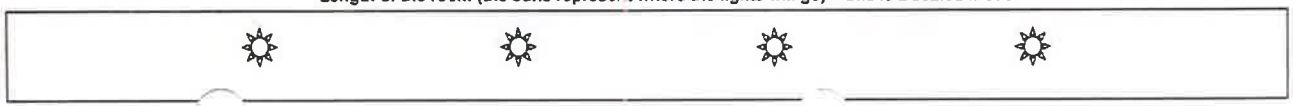
Length of the room (the fans represent where the fans will go) – this is a scaled model

Like the lights, I also measured the distance between the fans in my house. This was very difficult as I only have a fan per room. I had to look for similar areas which had fans and talk to professionals. As Malaysia is a very hot country, I was told by professionals to get as many fans as possible in order to keep the user group comfortable. When looking at similar areas, measured the distance between them. The distance was 5m. This means that in my area I will have three fans: this is a good number as a fan will focus on each zone.

The doors in the room have been talked about with the client and user group. By having the doors not in provides a lot more space for furniture to go against. The client is unsure at the moment of whether this a good idea or not due to the fact that they would like a door to funnel into the lecture theatre (not only from the back). It has been talked about that a door could maybe be added from inside the sixth form centre for learning where there is a lot more space for students to get to. The two doors in the garden lounge are going to cause a problem and furniture is likely to get knocked over especially the Shoji screen. For the final model I will not include the doors. In the testing and evaluation, the client may want to add the doors back in.

I wanted to get some practice creating the net for the vending machine. I got a spare piece of the black card that I would use and drew the net on the back. The card was cut out easily using a craft knife and metal ruler. However, I couldn't score it due to the fact that it was too thick. When the card was finally bent it showed the inside of the card which was white. I would have to go over this was a black marker pen.
To solve this problem I decided to waste less material by cutting out different size panels without having the tabs. I then glued the pieces together using super glue this worked really well and didn't need any touch up work. It was quicker to put together but I realise that it wasn't ideal for mass production.

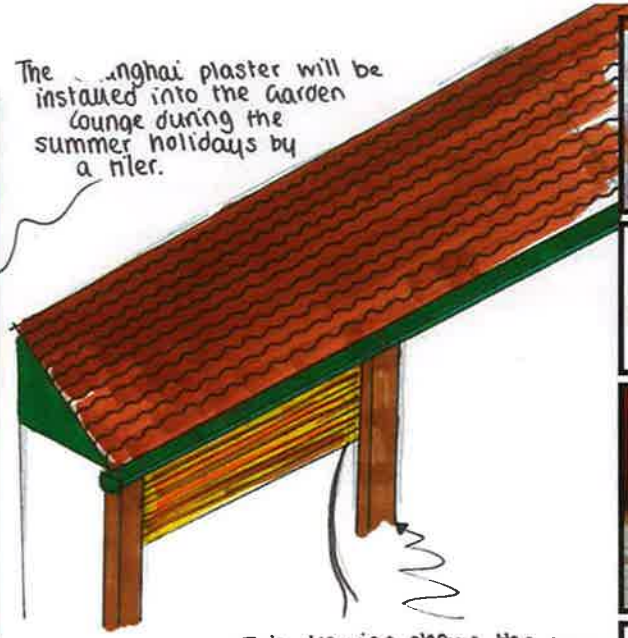
Length of the room (the suns represent where the lights will go) – this is a scaled model



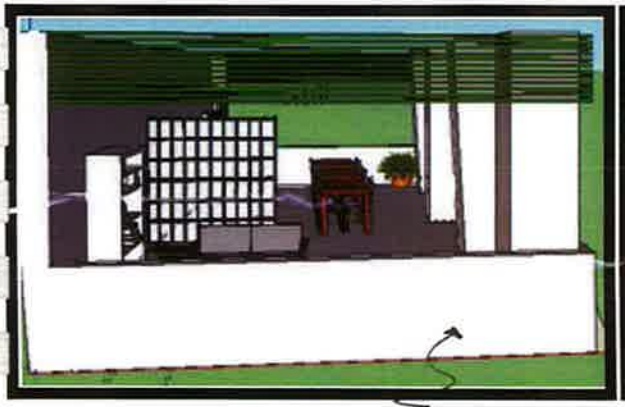
Communication

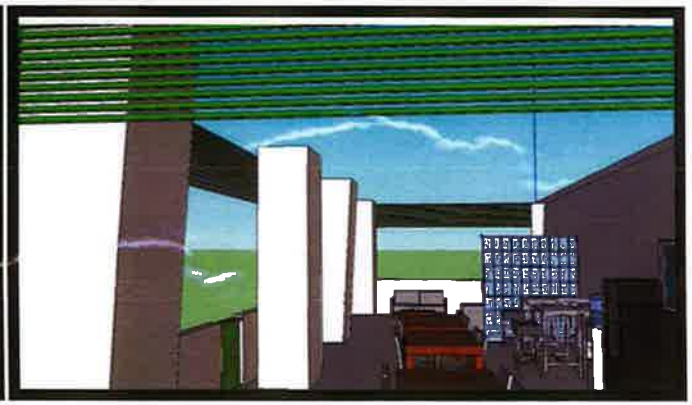
Power outlets will be placed in the working zone & near the vending machine & water dispenser.

The Shanghai plaster will be installed into the Garden Lounge during the summer holidays by a tiler.



This drawing shows the roof, gutters & blinds which are structural elements of the Garden Lounge.



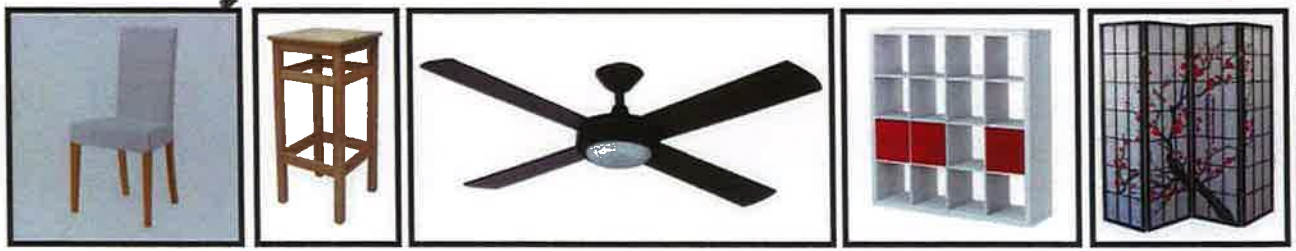


Above are some CAD created on Google Sketch up to represent the Garden Lounge.

These are some structural elements to the area:

Railings

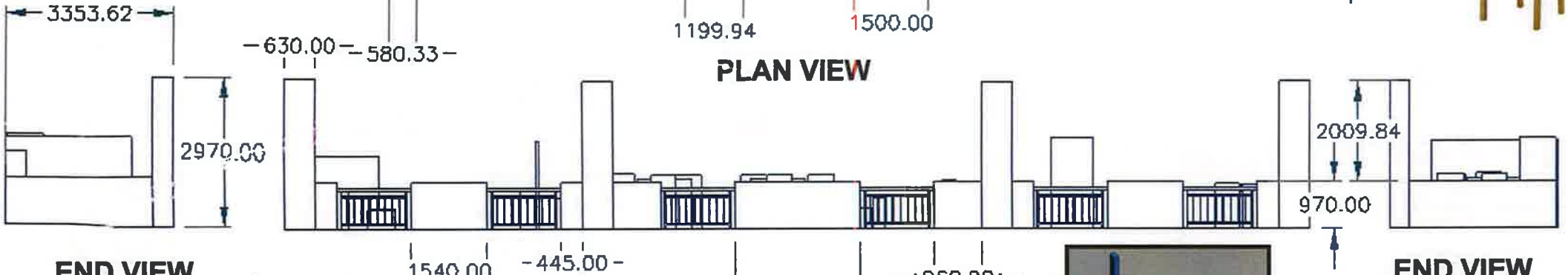
Below are pictorial images of furniture items & soft furnishings that will be placed within the Garden Lounge.



Garden Lounge

3rd Angle Orthographic Projection

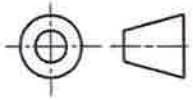
PLAN VIEW



END VIEW

END VIEW

FRONT VIEW

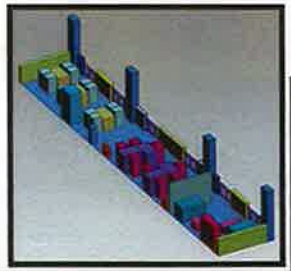


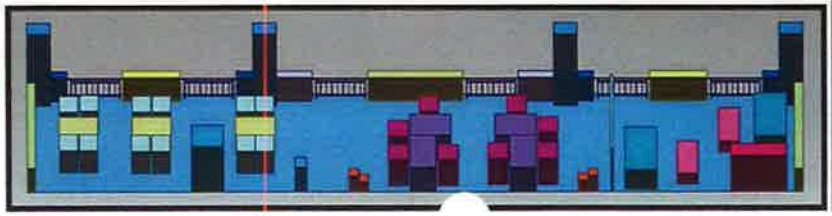
Furniture Items:

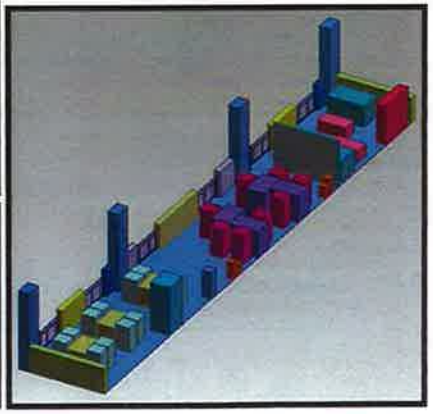
1. Two medium sized Shin sofas.
2. One bookcase – includes red bookshelves.
3. Two coffee tables
4. One Shoji screen
5. Four Bar Tables
6. Eight Bar Stools
7. Two large Plant pots and Two Medium Plant pots.
8. One water dispenser
9. One vending machine
10. Twelve Chairs
11. Three dining tables

I have used a 3rd Orthographic projection to represent the 3D Sixth form Garden lounge in 2D. It is drawn to the British Standards Institute standards. As you can see the 3rd angle symbol is visible on the drawing to signify to anyone that this is a 3rd angle orthographic projection rather than a 1st angle orthographic.

I have not drawn the exact furniture but instead created blocks which represent the height, width and depth of the correct furniture item. This engineering drawing is used for a third part to see where the furniture items will go. It also gives a good representation of the space around.







oduction Plan

The production plan shown on this page is a sample of the full one created for the project. As there are 24 different components that will be made, I have chosen a selection of them which highlight a range of **processes**, **techniques**, **materials** and **equipment**.

Key

- Start and Stop Symbols indicate the beginning and end of a process.
- Processes that will be taken.
- Decisions indicate where quality control should take place.
- Arrows indicate the flow of control.

Start (base)

Measure out on MDF the size of the base (995.5 x 199mm) using a pencil and meter ruler.

Are the measurements correct? QC1 (N)

Place MDF wood on the band saw top.

While the band saw is switched off, place one of the cutting lines against the blade.

Use the metal ledge and clamp it against the wood in order to create a straight line cut.

Has the clamp on metal ledge been tightened? QC2 (N)

Switch the band saw on. HS1

Push the wood slowly through the blade while holding it against the metal ledge.

Switch the band saw off.

Repeat process once more to create the base.

Is it smooth? QC3 (N)

Sand down the edge surfaces using a belt sander. HS2

Sand down the top surface using sand paper.

Using a pencil and ruler, mark on the base where the railings and walls will go.

Cover these areas with masking tape so they won't be spray painted.

Mix PVA glue and water together in a pot using a paintbrush. This will be used as the primer for the spray paint.

Paint two coats of the primer on the base.

Spray the base with grey spray paint from side to side. HS3

Are there any drips? QC4 (N)

Leave the base to dry for half an hour.

Sand down the spray paint using wet and dry sand paper.

Repeat the process of spray painting.

Recover the area with PVA glue.

Sprinkle small pebbles into the glue so they are flat.

Are there any pebbles overlapping each other? QC5 (N)

Stop (base)

Start (bookcase)

Measure out 10 pieces of plywood with dimensions of 20 x 75mm. Use a tri – square, pencil and a ruler to create the pieces.

Are the pieces straight? QC6 (N)

Cut out the pieces using a band saw. As the pieces are very thin the metal ledge won't be able to be used. HS4

Cut 2mm away from the cut line by free hand.

Sand down the edges using a disc sander to the original cut line. HS5

Sand down using sand paper to get smooth edges.

Is it smooth? QC7 (N)

Measure 10mm across the width of 6 pieces of plywood and mark with a pencil and a ruler.

Split the length of wood into 5 equal pieces. Mark with pencil for the 3 lines.

Are the lines straight? QC8 (N)

Mark a 1mm line on each side of the three lines so they are parallel.

Using the band saw, cut along each of the lines stopping at the half way point marked across the width. HS6

Use a needle file to sand along the cuts. HS7

Is it smooth and straight? QC9 (N)

Attach the pieces together in a cross halving joint.

Using an all purpose adhesive, glue the last 4 remaining pieces to the grid to create the frame of the bookcase. HS8

Clamp the pieces of wood together until the glue dries.

Mix PVA glue and water together in a pot using a toothbrush. This will be used as the primer for the spray paint.

Only 1 coat is needed for the bookcase.

Is there any PVA glue left in the corners? QC10 (N)

Spray the base with white spray paint from side to side. HS9

Leave the bookcase to dry for half an hour.

Apply another coat of paint

Are there any drips? QC11 (N)

Leave the bookcase to dry for half an hour.

Measure 20 x 30mm of red HIPs using a thin permanent pen and ruler.

Cut the pieces out using the band saw for plastic.

Use a metal ruler to scrape the edges. No white bits will be showing if it is smooth.

Is it smooth? QC12 (N)

Mark out using a pencil 10mm into the length.

Is the line straight? QC13 (N)

Turn on the line bender. HS10

Put the HIPs onto the line bender heating along the line. Leave it on there for 15 seconds.

Take the HIPs off the line bender and bend it along a table to create a right angle.

Slide the HIPs into one of the slots in the bookcase to create a shelf.

Stop (bookcase)

Start (vending machine)

Are there any tabs? QC14 (N)

Draw out net onto black cardboard to correct dimensions to create a box with dimensions of 95 x 50 x 40mm.

Mark out on one of the 95 x 50mm surfaces, using a pencil and ruler, a rectangle which is 65 x 40mm. It should be up at the top with a 5mm gap on either side. This is the screen.

Mark out 5mm below the screen a rectangle which is 40 x 10mm. Change the top line to a dotted fold line.

Cut out net using a craft knife, metal rule and a cutting mat. HS11

Close the craft knife after use.

Has the craft knife been closed? QC15 (N)

Using a metal scribe and metal rule, score along the dotted fold lines of the tabs and flap on vending machine. HS12

Mark out on acetate using a ruler and permanent pen a rectangle which is 70 x 45mm.

Cut out the acetate using a craft knife, metal rule and cutting mat. HS13

Put an all purpose adhesive on the card frame of the screen.

Place the acetate screen on top of the frame and press down lightly.

Is the screen visible from the other side? QC16 (N)

Find an image of inside a vending machine from Google images.

Crop and resize the picture so it is 70 x 45mm.

Print the image out onto glossy paper.

Cut the image out using scissors.

Put an all purpose adhesive on the acetate frame of the screen. HS14

Place the image onto the acetate screen and press down lightly.

Using scissors, cut pieces of double sided sellotape for the tabs. HS15

Put the double sided sellotape on the tabs and peel back the backing one at a time.

Create the net and put some pressure on the sides so it holds together.

Mark out on a sate stick 4 pieces of 5mm length. In between each piece there must be a 3mm gap.

Use a coping saw, to cut the pieces of wood out. HS16

Use very fine sanding paper and a needle file to sand down the pieces of wood so they are straight HS17

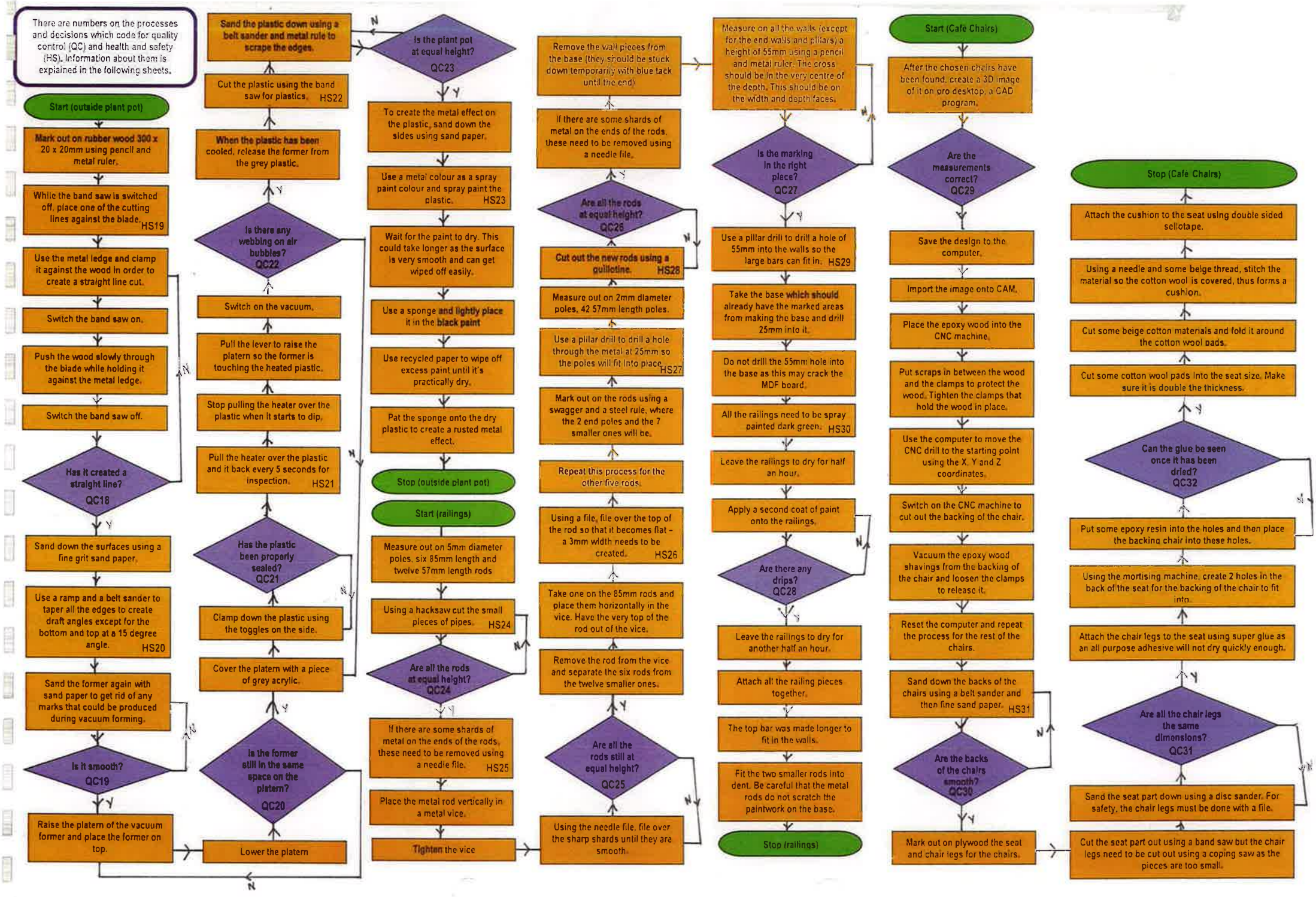
Are all the pieces equal? QC17 (N)

Paint the sate sticks black to represent the feet of the vending machine.

Wait for the paint to dry by leaving them for half an hour.

Attach the legs onto the vending using a hot glue gun. HS18

Stop (vending machine)


There are numbers on the processes and decisions which code for quality control (QC) and health and safety (HS). Information about them is explained in the following sheets.
Start (outside plant pot)
Mark out on rubber wood 300 x 20 x 20mm using pencil and metal ruler.
While the band saw is switched off, place one of the cutting lines against the blade. HS19
Use the metal ledge and clamp it against the wood in order to create a straight line cut.
Switch the band saw on.
Push the wood slowly through the blade while holding it against the metal ledge.
Switch the band saw off.
Has it created a straight line? QC18
N
Y
Sand down the surfaces using a fine grit sand paper.
Use a ramp and a belt sander to taper all the edges to create draft angles except for the bottom and top at a 15 degree angle. HS20
Sand the former again with sand paper to get rid of any marks that could be produced during vacuum forming.
Is it smooth? QC19
N
Y
Raise the platern of the vacuum former and place the former on top.
Lower the platern
Is the former still in the same space on the platern? QC20
N
Y
Cover the platern with a piece of grey acrylic.
Clamp down the plastic using the toggles on the side.
Has the plastic been properly sealed? QC21
N
Y
Pull the heater over the plastic and it back every 5 seconds for inspection. HS21
Stop pulling the heater over the plastic when it starts to dip.
Pull the lever to raise the platern so the former is touching the heated plastic.
Switch on the vacuum.
Is there any webbing or air bubbles? QC22
N
Y
When the plastic has been cooled, release the former from the grey plastic.
Cut the plastic using the band saw for plastics. HS22
Sand the plastic down using a belt sander and metal rule to scrape the edges.
Is the plant pot at equal height? QC23
N
Y
To create the metal effect on the plastic, sand down the sides using sand paper.
Use a metal colour as a spray paint colour and spray paint the plastic. HS23
Wait for the paint to dry. This could take longer as the surface is very smooth and can get wiped off easily.
Use a sponge and lightly place it in the black paint
Use recycled paper to wipe off excess paint until it's practically dry.
Pat the sponge onto the dry plastic to create a rusted metal effect.
Stop (outside plant pot)
Start (railings)
Measure out on 5mm diameter poles, six 85mm length and twelve 57mm length rods
Using a hacksaw cut the small pieces of pipes. HS24
Are all the rods at equal height? QC24
N
Y
If there are some shards of metal on the ends of the rods, these need to be removed using a needle file. HS25
Place the metal rod vertically in a metal vice.
Tighten the vice
Using the needle file, file over the sharp shards until they are smooth.
Are all the rods still at equal height? QC25
N
Y
Take one on the 85mm rods and place them horizontally in the vice. Have the very top of the rod out of the vice.
Remove the rod from the vice and separate the six rods from the twelve smaller ones.
Using a file, file over the top of the rod so that it becomes flat - a 3mm width needs to be created. HS26
Repeat this process for the other five rods.
Mark out on the rods using a swagger and a steel rule, where the 2 end poles and the 7 smaller ones will be.
Use a pillar drill to drill a hole through the metal at 25mm so the poles will fit into place. HS27
Measure out on 2mm diameter poles, 42 57mm length poles.
Cut out the new rods using a guillotine. HS28
Are all the rods at equal height? QC26
N
Y
If there are some shards of metal on the ends of the rods, these need to be removed using a needle file.
Remove the wall pieces from the base (they should be stuck down temporarily with blue tack until the end)
Measure on all the walls (except for the end walls and pillars) a height of 55mm using a pencil and metal ruler. The cross should be in the very centre of the depth. This should be on the width and depth faces.
Is the marking in the right place? QC27
N
Y
Use a pillar drill to drill a hole of 55mm into the walls so the large bars can fit in. HS29
Take the base which should already have the marked areas from making the base and drill 25mm into it.
Do not drill the 55mm hole into the base as this may crack the MDF board.
All the railings need to be spray painted dark green. HS30
Leave the railings to dry for half an hour.
Apply a second coat of paint onto the railings.
Are there any drips? QC28
N
Y
Leave the railings to dry for another half an hour.
Attach all the railing pieces together.
The top bar was made longer to fit in the walls.
Fit the two smaller rods into dent. Be careful that the metal rods do not scratch the paintwork on the base.
Stop (railings)
Start (Cafe Chairs)
After the chosen chairs have been found, create a 3D image of it on pro desktop, a CAD program.
Are the measurements correct? QC29
N
Y
Save the design to the computer.
Import the image onto CAM.
Place the epoxy wood into the CNC machine.
Put scraps in between the wood and the clamps to protect the wood. Tighten the clamps that hold the wood in place.
Use the computer to move the CNC drill to the starting point using the X, Y and Z coordinates.
Switch on the CNC machine to cut out the backing of the chair.
Vacuum the epoxy wood shavings from the backing of the chair and loosen the clamps to release it.
Reset the computer and repeat the process for the rest of the chairs.
Sand down the backs of the chairs using a belt sander and then fine sand paper. HS31
Are the backs of the chairs smooth? QC30
N
Y
Mark out on plywood the seat and chair legs for the chairs.
Cut the seat part out using a band saw but the chair legs need to be cut out using a coping saw as the pieces are too small.
Sand the seat part down using a disc sander. For safety, the chair legs must be done with a file.
Are all the chair legs the same dimensions? QC31
N
Y
Attach the chair legs to the seat using super glue as an all purpose adhesive will not dry quickly enough.
Using the mortising machine, create 2 holes in the back of the seat for the backing of the chair to fit into.
Put some epoxy resin into the holes and then place the backing chair into these holes.
Can the glue be seen once it has been dried? QC32
N
Y
Cut some cotton wool pads into the seat size. Make sure it is double the thickness.
Cut some beige cotton materials and fold it around the cotton wool pads.
Using a needle and some beige thread, stitch the material so the cotton wool is covered, thus forms a cushion.
Attach the cushion to the seat using double sided sellotape.
Stop (Cafe Chairs)

Quality Check

QC is part of quality assurance. It involves activities done by the manufacture to ensure that the product being sold is of high – quality. This is done by inspection and testing to the product. The table below show lity checks for the production plan. There are many more checks which take place during my project which have l lighted in the making sheets.

Quality Check coding number	Identify reason for check	How the check is going to be achieved.
QC1,QC17, QC23, QC24, QC25, QC28,QC29, QC31	The measurements of the material need to be correct to ensure that similar items are the same size as well as allowing pieces to join properly. Failure to do this will be easily noticed (i.e. the table legs are not the same size so the table top is slanted).	Allow tolerances and use accurate measuring devices apart from rulers, such as calibers. Cutting materials out using the CNC machine is very precise and will make items straight.
QC2	The metal clamp on the band saw needs to be tightened as the force from the band saw can cause it to move. This may cause the wood to be cut at an angle.	Before the band saw has been switched on, check that the clamp has been tightened fully. Turn the machine on but do not cut the wood to check that the metal ledge has not moved.
QC3, QC7, QC9, QC12, QC19, QC30	If wood or plastic has not been sanded down it can affect the overall image of the final product. Sanding them down is also a health and safety issue as they can hurt someone if they are sharp, for example the metal poles use for the railings.	Sand it down using sand paper but make sure that it's just the edges and not the faces as it will cause a matte finish (to the plastic and metal).
QC4, QC10, QC11, QC16, QC26, QC32	After spray painting, the drips can be unattractive to look at when they dry. It can also have an affect on the material as it could cause that area to soften.	When spraying, spray from side to side not focusing the nozzle in one area. Leave the layer to dry before applying the next.
QC5	The pebbles must be laid straight with no overlapping as this will cause the base to have an uneven floor. This could affect the furniture items that are being placed on top as they will look like they are slanted.	This will be a visual check. I will sprinkle the pebbles onto the base and scan over to see that there is no overlapping. I will also be able to turn the base over so any loose pebbles (ones that are overlapping) will fall out.
QC6, QC8, QC9, QC13, QC18	Materials need to be straight when they fit together as it can make the piece that has not been cut straight look slanted.	Use a tri square to get the pieces of materials cut out straight. Another way of getting a straight line – only used starting from a straight line – mark out two points and connect them together using a ruler.
QC14	There must be tabs on the net as this will allow someone to put it together with glue. Without them it would be virtually impossible for it to be attached without it looking wrong.	By making the paper template in the development stage which had tabs on, I will be able to use this as a template ensuring that the vending machine net is correct.
QC15	Equipment needs to be put away or closed to not only ensure the safety of yourself but others around you.	On craft knifes, they have covers which can be placed over the blade. Once finished with the equipment it should be put away where it was found.
QC20	When lowering the platem it can cause the former to move. This may not be an issue if there is one thing being vacuum formed however, with batch or mass production the movement of the former could affect the others.	Wear a pair of gloves, as it is very hot and move the former back to its original place on the platem.
QC21	Is the plastic hasn't been sealed then it will not form a vacuum within the machine. This will be a waste of material as the plastic will have been heated up and will not return to the original shape.	Place the plastic over the platem and use the clamps to seal the plastic. Then look around to see if there are any gaps.
QC22	Webbing and air bubbles can make the blister packaging look anaesthetically pleasing.	Make draft angles on the former and round the edges to deal with webbing. Air bubbles are caused by overheating the plastic. Look at the recommended time on the vacuum former for the type of plastic.
QC27	What was found out during the development sheets was if the material had not been marked correctly then it would affect how it was cut. Markings need to be very accurate to ensure that this does not happen.	Mark out using a pencil and a ruler, as the pencil can easily be rubbed out if a mistake has been made. If it is an item which has a lot of duplicates, compare them to each other as an obvious mistake can be spotted this way.

Health & Safety

Health and safety is very important. This table should help minimise the risks to a person when making this model. I have only evaluated the health and safety for uction plan. Health and Safety will be mentioned for the rest in aking sheets.

	Wear goggles to protect your eyes from shards of wood and plastic. Keep hands at a safe distance from the blade at all times. When finished with the band saw, switch it off immediately. If the wood is not easy to push through and gets stuck, switch off the band saw and remove it from the band saw. Never try to push the wood in this situation as you will not be under control.
	Wear goggles when dealing with the belt sander and disc sander because shards of wood and plastic are coming off the material. Keep hands away from the sander at all times. Switch off when it is not being used to ensure the safety of others as well as yourself. There is a safe zone on the disc sander as the disc moves in a clockwise direction. This means you should always use the left side it.
	When using a spray can, use it in a ventilated area. Wear a mask as the fumes may be toxic. Protect your clothing while wearing old painting overalls. Never use spray paint where there is fire around as it is highly flammable.
	Files are a safe tool to use as you have control over it. When using the files lock the wrist and use the shoulder as the pivot. This will decrease the chance of getting a sprain. One hand should hold the handle. The other hand can be placed flat on top of the file to add stability. After using the file, take it back where it has come from as if they are dropped on someone's foot they could cause some damage.
	Adhesives are flammable so never leave them in an area where there is an open flame. The adhesives that have been used as all purpose adhesive, PVA glue and super glue. All purpose and PVA glue are relatively safe as they dry very quickly however, super glue dries almost instantaneously. It can also attach any two materials including skin. Keep your fingers away when using super glue as when it dries it will pull off skin.
	Wear heat proof gloves when dealing with the line bender as it becomes very hot. Never leave the line bender unattended to ensure the safety of others as well as yourself. After the plastic has been bent, place it in cold water while wearing the gloves. This will ensure that it is cool enough to touch.
	When not using the craft knife, keep it closed. Have it on the smallest blade at all times as the blades can break off. Use the craft knife with a metal rule. The metal rule has a groove which the other hand can go in to keep it away from the path of the blade.
	Scribes are very sharp implements. Keep your hands away when you are using them. Use a metal rule and place your free hand in the groove for protection. Once the scribe has been used, place the plastic cover back on and put it back where it came from to protect others using the workspace.
	When handing scissors to another person, hold the closed blade so they can hold the handles.
	The wood needs to be securely clamped down before it is being sawed – you will not be able to hold it down with your free hand as you will quickly fatigue and the wood will slide around and the saw might get bent, therefore damaging the wood. Do not try to shift the blade while sawing as this could result in a slip or a breakage of the blade, which could result in you being hurt. Hold the saw firmly at a 90 degree angle. Move your shoulder not your elbow and it will prevent strains. If you are afraid that the blade will slip then wear a pair of thick gloves. Wear goggles as sawdust could get into your eyes.
	Keep your hands away from the tip as well as any glue that drips off the tip. The glue guns are designed to be used by one person at a time so avoid areas that have another glue gun being used at the same time. Be aware of people in your workspace. Concentrate on the job so distractions are avoided. Ice or cold water should be nearby for accidental burns. Once finished with the glue gun give it sufficiently time to cool before putting it away.
	The vacuum former is very hot so wear heat proof gloves when dealing with it. After the plastic has been moulded around the former, leave for a couple of minutes to cool down before touching it with hands. When the vacuum former is not being used, switch it off at the wall as the metal container will conduct heat.
	Wear goggles when using the pillar drill. Keep hands away from the drill and switch off the drill when it's not in use. Make sure that the clamp holding the material down has been tightened so it does not move. The drill that will be used needs to put in should be tightly clamped to avoid it coming loose when drilling the material. When someone else is using the drill, stay outside the zone to protect yourself.
	The guillotine is used to cut metal. Wear protective eye wear to protect your eyes from shards of metal. Keep your hands away from the guillotine when it cutting. Both hands should be on the lever. Be careful when picking up the metal afterwards as the metal will be very sharp.

School workshop vs. commercial production

Task/Process	School workshop production process	Commercial production process
Printing process	When printing the picture for the vending machine, it will be done using an ink printer. Although this produces a high quality image it is a very expensive process, especially when it is a small image on a big piece of paper which will be thrown away after.	Gravure would be used for the picture of the vending machine. It is used to produce a high quality art piece. The advantage of this process is that the colour produced is consistent. Although it is a high speed printing process, the ink dries instantaneously due to evaporation. It is an expensive process and is only efficient for long print runs.
Net	To cut out the net of the vending machine, I will use a craft knife and a metal rule. This is a slow method and is not economical.	A die cutter will be used to get the shape of the net. The die cutter also gets the grooves for where it has to be bent. It will be folded and glued by a highly automated gluing line.
Glue	When attaching components together, I will use double sided sellotape and different adhesives (such as an all purpose adhesive, super glue and PVA glue). I will then use a craft knife to cut off excess sellotape.	When making this commercially, manufactures would use an epoxy resin. It comes in two different parts, which when mixed together produce glue. It is left for 2 hours for it to become very study. This type of glue is usually used by modellers.
Vacuum forming	When making the outside flower pot, I will place only my former on the platem in order to get the blister packaging. This is a waste of material and is not economically friendly.	Commercially, many formers would be put on the platem to minimise the waste caused and also the amount of money spent on the material.

In this table I have compared four processes in which were mentioned in the flow chart. The processes that I have chosen have been determined by the equipment and tools around me. If this was done in a commercial production it would be produced differently. However, what needs to be remembered about the Garden Lounge Project is that **I am producing a one – off model**. The furniture for the real life room would be produced using mass production techniques. As this model is only being produced once, the processes being used are suitable. The commercial production processes which I have compared to the school workshop production are describing if this was a model that was being repeated, therefore talk about mass production techniques.

When looking at other modelling kits the components come in a grid, similar to the injection moulding products when they have come out of the mould. These products can be taken apart easily and then attached using glue. Instructions come with the grid to help the person to put the model together. For my project, I have not bought any of these kits to create the model. My final model is made from materials found in the workshop.

Belt Sander

Process covered:
- The use of bench machines to finish wood components for which only light pressure is required.

Hazards:
- Fingers or materials can become trapped between the belt and the drive pulleys.
- Work pieces can be thrown violently if not held correctly.
- Torn belts can be ejected violently.
- Human contact with moving parts can cause abrasions to the skin.
- Fine particles from the sanding process can enter the eye.
- Long hair, dangling jewellery or loose clothing can get caught up dragging the user onto the machine.

Risk Assessment:
- Inadequate guards can cause an increase in risk.
- Work pieces are rested upon fence or rest. The risk of these pieces being thrown is minimal if the rest is correctly set.

Control Measures:
- To reduce the risk of trapping, the drive mechanisms must be enclosed and the fences must be set correctly.
- A belt must be fitted to rotate in a certain direction and users must be aware of how much pressure they should apply to the work piece if flying objects are to be avoided.
- Eye protection should be worn to avoid shards of material from entering the eye.
- Long hair must be tied back; jewellery should either be removed or covered and loose clothing should be covered by a secure apron or overall.

Vacuum Former

Processes covered:
- A thermoplastic sheet is clamped down and then heated. A mould is then elevated into the heated plastic and then the air between the mould and the plastic is evacuated. Pressure on the material then presses it onto the mould.

Hazards:
- The pressure from the vacuum may fail explosively, causing injury to the user.
- The hot plastic can adhere to skin and cause dangerous burns.

Risk Assessment:
- Serious burns could result from the hot material while vacuum forming. Overheating the plastic can produce fumes which are either harmful or irritant.

Control Measures:
- Simple maintenance checks are needed to deal with the pressure system risks.
- Heat – resistant gloves should be used when dealing with the hot plastic.
- Care should be taken over checking the heating rate and timer settings for the appropriate plastic being used.

Line Bender

Process covered:
- Plastic is heated along a straight line so it can be folded at an angle.

Hazards:
- Many line benders use a bare wire heating element.
- The heating element is hot enough to cause burns and the plastic sheets can become hot enough to burn skin.

Risk Assessment:
- The bare wires use safety extra – low voltage and the mains powered heaters are insulated and so the risk of getting an electric shock are minimal.
- Receiving a burn from the element is very obvious so the risk is rare however, serious burns could result from the hot material.

Control Measures:
- Normal maintenance is needed to control the risk of the electric shock.
- Some pupils will need reminding of the hot element and heat proof gloves should be provided for handling the hot plastic forms.

Risk Assessment

A risk assessment is based on a 5 by 5 table. It rates the likelihood that the risk will happen by the severity of the risk. For all the equipment I will use I have assessed the risk. The likelihood of a risk is ranked from 1 meaning that it's unlikely to 5 being very likely. The severity of the risk is ranked from 1 being minor injuries to 5 meaning death. The table below shows the equipment used in the flow chart.

Equipment	Component	Justification	Likelihood of risk	Severity of risk	Rating
Craft knife	Vending machine	o Creates a smooth line o Used for cutting thicker materials such as paper, board, HIP and foam board. o Faster than using scissors – doesn't give an angular path when done correctly with a metal rule.	2	1	2
Metal Rule	Base, Bookcase, Vending machine, Outside Plant pot, Café Chairs and Railings.	o A safety ruler used with a craft knife or scalpel to create a straight line. o The groove in the centre makes sure that your hand is out of the way when cutting.	0	0	0
Band saw	Base, Bookcase, Café Chairs, Railings, Outside Plant Pot.	o Heavy – duty electric saw for cutting most sheet materials. o Faster than using a hand held machine. o Different sized blade can be used to create different thicknesses of cuts.	3	4	12
Line benders	Bookcase	o Used for bending plastics o It's more aesthetically pleasing than attaching plastic parts together with glue. o It's a very fast process and comes with a metal rule to create bends.	2	2	4
Ink Printer	Vending Machine	o Expensive process for batch production o Produces high quality images o The exact same image can be printed repeatedly. o Can be printed on most paper and card materials.	0	0	0
Vacuum Former	Outside Plant Pot	o The complimentary shape of the former can be produced in plastic. o Can be used for volume production. o Produces protection for products for transportation.	3	3	9
CNC machine	Café Chairs	o Good for volume production – can repeatedly produce the same product. o fast o It is inexpensive o Modifications to the product can be made easily using CAD	1	2	2
Belt Sander	Base, Bookcase, Outside Plant Pot, Café Chairs	o Produces a smooth finish to materials o Can be used on wood and plastic	3	3	9

Dust

Processes covered:
- Hand held machines do not create as much dust as machine operations do.

Hazards:
- When inhaled dust can be hazardous. Saw dust is also flammable.

Risk Assessment:
- Wood dust irritates the eyes and the respiratory system. Exposure to wood dust over the limit may cause skin and lung disorder. Wood working machines that do not have the extraction equipments have produced levels that are 10 times over the limit to work safely.
- The risk of cancer is extremely low.
- The general dispersion of the dust should be controlled.
- The design of the dust collection equipment should not increase the risk of fire and explosion.

Control Measures:
- Dust extractors must control the dust at its source.
- Eye protection must be worn at all times when using machines.
- Regular cleaning using a dustless method (e.g. an industrial vacuum cleaner) is needed to reduce the dust background levels and prevent fires.

Aerosol

Processes covered:
- Using aerosols in a well ventilated area.

Hazards:
- Most industrial aerosols contain organic substances which can be very dangerous. Butane, the most common propellent is very toxic and is highly flammable.

Risk Assessment:
- Organic substances when breathed in too long can be very dangerous. It can cause headaches, giddiness, mental confusion, blurred vision, nausea, weakness and fatigue, numbness of limbs and, in extreme cases, loss of consciousness.
- Solvents in contact with skin can cause irritation.
- Long-term effects of solvent exposure include damage to the heart, liver, kidneys and central nervous system.

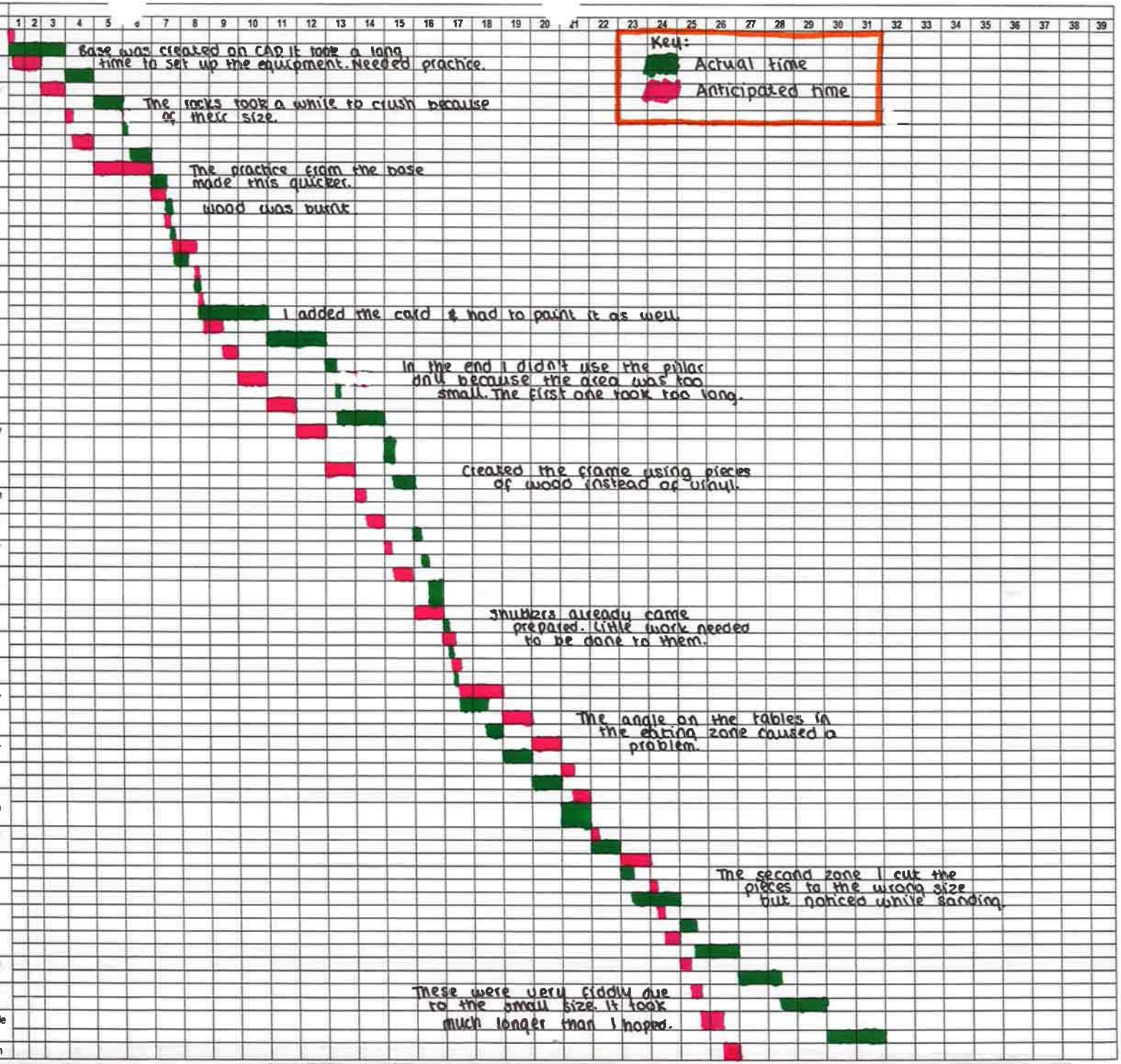
Control measures:
- If aerosols are in use they should always be accompanied by good general ventilation and should not be used in a situation where several people are constantly using them.
- Eye protection must be worn at all times.
- They should be stored in cool places as they are highly flammable.

COSHH

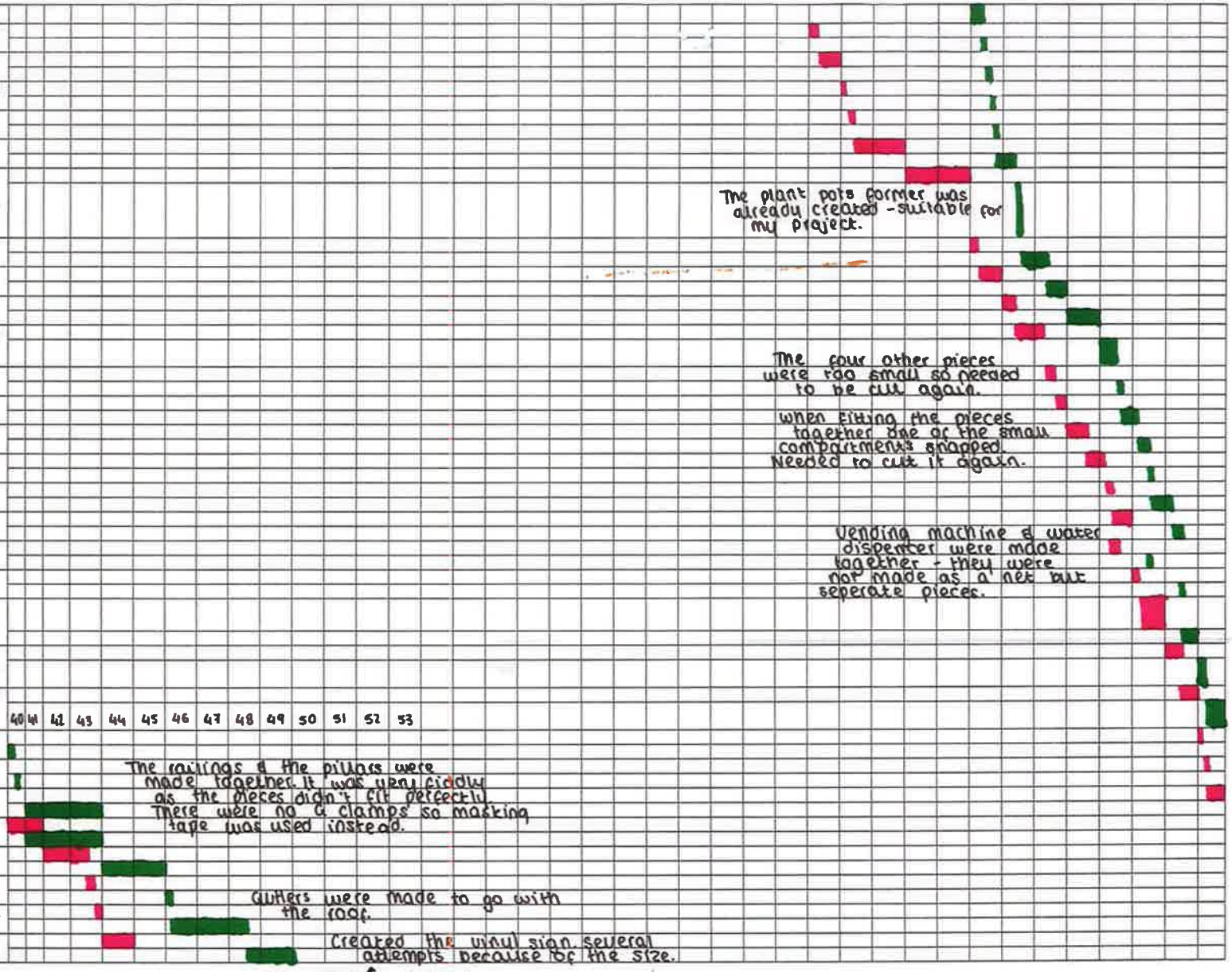
COSHH which stands for Control of Substances Hazardous to Health Regulations is a regulation which gives general requirements on employers to ensure the safety of the employees and other people from the hazards in the substances. This is done by a risk assessment, control of exposure, health surveillance and incident planning. The table below shows the materials and justification for choosing it. It is only the materials that were highlighted in the flowchart. Any other materials used for this project will be mentioned during the making sheets.

Material	Components	Justification
MDF	Base	o It is less expensive than natural timbers – instead of using expensive wood this can be used and spray painted. o Available sizes and thicknesses – perfect for the base as it is long and very thin. o There is no grain (isotropic) – it will no split. This is good for drilling the walls into the base. o There is consistent strength in all directions – the walls need to be bolted to the base in all directions.
Plywood	Bookcase, Café Chairs	o It has resistance to cracking, shrinking, twisting o It has a high degree of strength o It has a grain – it is shown when the coffee tables are made which is perfect for the design. o It is inexpensive
Folding Boxboard	Vending machine	o It is excellent for scoring, bending and creasing. o It does not split. o It also has an excellent printing surface – this could be used when I make the water dispenser.
Acetate	Vending machine	o It is transparent o It is excellent for cutting out using scissors or a craft knife. o Can be glued onto the vending machine using a contact adhesive. o Paper can be stuck to the acetate. o Be careful not to crease the acetate as when it is bent it creates a white line when bent back.
Sate sticks	Vending Machine, Café Chairs	o The sate sticks can be cut using a coping saw or with scissors o They can be painted. o They are very thin which is needed for a model of this scale. o The wood however splits very easily when cutting.
Copier Paper	Vending Machine	o Lightweight grade of quality paper – it has a good quality bleached surface as it provides a smooth finish for colour printing. o It's inexpensive when bought in bulk and so is perfect for using in volume production.
HIPs	Bookcase	o Can be line bended o It comes in a range of colours. o Is very thin o Can be cut using a band saw or with a craft knife. o It is inexpensive. o It can snap if it has been bent too far.
Aluminium rods	Railings	o Excellent strength to weight ratio o Extremely hard and tough. o It machines and casts well – if I was to make the railings differently. o It has a high performance in extreme temperatures – they are used as the actual railings which are good because of the extreme temperatures of Malaysia.
Epoxy wood	Café Chairs	o It can come in a range of sizes – good for making the Café Chairs o Can be sanded for a smooth finish – a gloss can be added to the epoxy wood to add an aesthetically pleasing finish. o Design can go onto the wood using the CNC machine – CAD and CAM work can be done. This means it can produce the same object repeatedly.
PVA glue	Base, Bookcase	o When the pieces of wood have been left over night and clamped it is a very strong hold. o It is inexpensive o It dries clear. o When it is drying it is flexible and so therefore can be moved to the correct place.
acrylic	Outside Plant Pot	o It is easily thermoformed – used for vacuum forming. o It has an excellent surface finish; I will keep the glossy finish however I could use sand paper to create a matte finish. o It is easily joined with Tensol cement; this may come in useful when attaching the outside plant pot to the base.
Cotton wool	Café Chairs	o It is inexpensive o It has a soft texture – perfect for padding o Can be bent and twisted to form the desired shape. o Can be cut and ripped to get the correct size.
Cotton material	Café Chairs	o It comes in a range of colours o It is inexpensive o It is easy to cut with scissors. o It is easy to sew together to form cushions. o It can be washed if it gets dirty.
Aerosol Spray Paint	Base, Bookcase, Flowerpot and Railings	o Cheap – There are a lot of different brands which can be used. Most of them give the safe effect. o Provides an even finish if done correctly – Gives a nicer surface finish than if painting by hand. o Its quicker than painting – it takes longer for paint to dry than the spray paint, o It gives a glossy finish.
Double Sided Sellotape	Vending Machine	o Transparent – Even if there is some excess material it blends in with the background. o It holds components together firmly. o A temporary adhesive – Components can be taken apart which also helps with assembling of the model.
All purpose Adhesive	Vending Machine, Café Chair	o It is inexpensive o It dries clear o It is very quick for the two materials to adhere. o It can attach any two materials together. o It is perfect for the chairs when the pieces are two small o It doesn't need to be clamped.
pebbles	Base	o They come in a range of sizes. o They come in a range of colours. o Can be crushed to get the small size. o Fish stone pebbles are perfect as they are not too expensive.

Part	Task
Base	Use a pencil and metal ruler to measure out the base on the MDF. Cut the MDF using the band saw. The metal ledge should be used to create the straight cut.
	Apply the two coats of primer (PVA and water) and then spray paint with two coats of grey paint. Remember to mask the areas of where the walls and railings will go before.
	Apply another coat of PVA glue. Place the pebbles on the PVA. Leave it to dry for a couple of hours. Add another coat of PVA to seal the pebbles on the base.
Walls and Pillars	Measure out the walls and cut out to the correct size on the band saw. Sand down all the surfaces.
	Use texture paste to create the school wall effect. After the paste has dried paint the walls apricot using a paintbrush.
Feature wall	Create feature wall on CAD and transfer it to GALAAD. Remember to check that the dimensions for the door and window are correct.
	Let the CNC cut out the MDF board to create the gap for the window and the door.
	Sand down the window and door frame using sand paper and file.
	Cover the feature wall in textured paste and create the bumpy texture using a scrap piece of plastic. After the textured paste has dried, paint the wall apricot to match the walls.
Roof	Get a large sheet of brown acrylic and mark the line needed to be bent.
	Bend the line using a line bender.
Railings	Get metal bars of aluminium and cut them down to the right size using a hacksaw. Sand down the edges using a needle file.
	File the surface of the poles down so they are flat and mark with a centre punch where the pillar drill should create the hole.
	Create the hole using the pillar drill.
	Spray paint the metal bars a dark green.
Window	Cut acetate out using a craft knife and a metal ruler (keep spare hand in the groove – away from the blade). Place cut acetate over the window frame in the feature wall. Hold it down with an all purpose adhesive.
	Using the vinyl machine create the window frame and cut it out on vinyl using the CNC router.
	Remove the vinyl from the backing paper by a process called weeding and place it onto the feature wall using sticky back paper.
Doors	. Using a pencil and ruler measure out on plywood the dimensions of the door. Cut out the strips of plywood using a band saw. Sand them down using a belt sander.
	Cut out metal poles for the door hands and get scrap pieces of metal to represent the door hinges.
	Spray paint the doors dark green to match the railings and then spray paint the door bars chrome which will prevent them from rusting. After the paint has dried attach the door bars to the door.
Shutters	Line up sate sticks in a row and weave white thread around them so they are joined up.
	Using the hot glue gun make a small ball on the end of each thread so it well be held in place.
	Tidy up the end of the sate sticks so they are even using a craft knife.
Tables (Bar Table, Bar stools, Café Table * and Coffee Table**)	Cut the pieces of plywood out using the band saw. Sand them down using the disc sander
	Cut the table legs using a coping saw. The table legs are made of sate sticks. Attach the table legs to the plywood table tops using super glue.
	*, ** Spray paint the tables brown and wait for them to dry before applying the second coat. No primer is needed as the grain is wanted to show through.
Chairs	Cut up the pieces of wood using a band saw and attach them together using super glue.
	Fold beige cotton around the piece of wood in a parcel fashion and glue it to the wood using a contact adhesive, making sure that the glue does not seep through and so can be easily seen.
	Drill small holes in the wood and attach the sate stick legs using super glue into the holes for extra support.
Sofa	Cut out pieces of MDF using the band saw and sand down the edges using the belt sander.
	Sand down one of the edges on the backing of the chair at a 10 degree angle.
	Glue all the pieces of wood together using an all purpose adhesive.
	Spray paint the sofas a dark brown colour.
	Cut pieces of cotton wool pads and wrap them with a beige cotton fabric. Sew the pieces together and attach them to the chairs using double sided chairs to create cushions.
Shoji Screen and lights	Cut sate sticks to the right length using a coping saw. (Leave the colour for the lights but for the shoji screen paint them black).
	Cut the translucence the right size so the painted sate sticks can be attached to the outside creating the frame using super glue.
	Draw out the Shoji screen using a fine line pen and use different thicknesses including an



	Italics pen to create the tree branched.
Fans	Cut the strips of plastic (black) using the plastic band saw and file down. Scrape the edges using a metal rule.
	Mark out the centre and use a needle file to create a deep dip in one of the plastic strips. Glue the other piece in place using a hot glue gun.
	Hole punch some black card and place them on top of each other. Spray paint some black dowel and stick it to the fan. Leave to dry.
Cushions	Cut pieces of cotton wool pads and magenta cotton using scissors.
	Sew the material around the cotton pads to create the cushions.
Plant pots	Create the plant pot formers from scrap pieces of wood to the correct size and using the band saw and belt sander. Attach it to a base with a screwdriver or double sided sellotape. Make sure there are draft angles to decrease the chance of webbing.
	Place the former in the platform and vacuum form over it. After it has cooled down check for any webbing.
	Paint the flower pots silver and add green feathers to create the plants.
Bookcase	Cut 10 pieces of wood the same dimensions out of plywood. Take 6 of the pieces leaving the 4 other for later.
	In the six pieces make 3 slits along the length. They must be the same dimensions in each wood otherwise the wood won't slot together. Slot the pieces together in a cross halving joint.
	Glue the remaining four pieces onto the edges to create a bookcase. Wait until they dry.
	Spray paint the bookcase white
	Cut small pieces of red plastic and line bend it so it fits into the bookcase as shelves.
Pictures	Choose pictures with the A level Art student and digitally take photos of them and upload them onto the computer.
	Print the pictures out onto glossy paper using an ink printer.
	Cut the pictures using scissors and attach them to white card. Cut around the white card using a craft knife and metal ruler.
Clock	Print the image of the clock out using the ink picture onto glossy card (try to do this at the same time as the pictures – saves paper as the images are very small)
	Cut image out and attach it to a cork protector which is the same size as the image.
Vending Machine and Water Dispenser	Measure out on card (black for the vending machine and white for the water dispenser) using a pencil and ruler to create the net. Remember to add the screen and flap for the vending machine and the tray.
	Cut acetate using a metal ruler and craft knife to create the screen. Print an image of the vending machine inside and attach the screen and image onto the inside of the black card. Create the tray inside the water dispenser. Fold the net together.
	Attach the vending machine legs on using the super glue and paint black. Attach the water bottle on the top of the water dispenser. Add the finer details like buttons for each at the very end.
Assembly	Attach the doors in the gap using super glue – keep one door ajar to give the impression of a door.
	Place the window frame over the gap and adhere it to the wall using super glue.
	Place the pillars and ails walls in place. Use PVA glue and clamp it using G clamps.
	Place the railings in place and attach them to the walls using super glue and contact adhesive (more flexible)
	Using a hammer and nails, attach the feature wall to the base. Make sure that the wood does not split and that the nails are going in straight or the angle will wreck the base.
	Glue the pictures, clock and lights to the feature wall using super glue. Measure out the distance using a ruler and pencil.
	Attach the rood to the feature wall and so it hangs off the pillars. Glue it down using contact adhesive and wait for it to dry.
	Place all the furniture inside to create the area.



Gantt Chart Notes

Photo 1

I made the base using CAD and CAM. This ensured that the **scale** and **proportion** used were correct. I also used these machines to **gain practice** when making the more intricate items later in the project. The CAD image was created on ProDesktop.

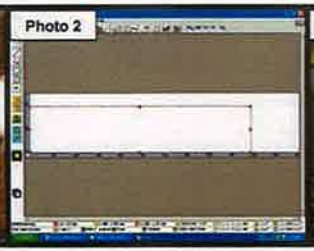


Photo 2

This is a print screen of the base on CAD software, GALAAD, which links to the CNC machine. I have moved the base to the corner of the material so less material is wasted – **sustainability**.

Photo 3

MDF was the material used for the base as it is **lightweight** and has **no grain** so there will be less chance of the wood splitting when the walls are attached. When clamping the wood in the CNC machine, I used scrap pieces of rubber wood so the MDF would not be damaged – **quality**.

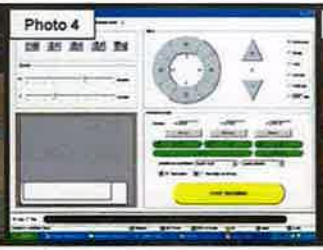


Photo 4

This is a screen shot of the controls that operate the CNC machine. It allows me to move the CNC router to the correct place. Precision is needed in this task to make sure the material is not being wasted. I chose a 5mm drill that went down a depth of 8mm.

Photo 5

When setting up the CNC machine, I made sure that the drill was cutting on the outside so it would not make the base any smaller.
SAFETY: Put down the safety guard on the machine so the dust won't go into the machines.

Photo 6

When the base was cut out, I sanded down all the surfaces as I would be spray painting the sides and needed them to be smooth so the furniture would lie flat on them - **quality**. This involved a variance of different gritted sand paper.
SAFETY: Wear a face mask to prevent breathing in dust.

Photo 7

In order to tell where the walls and railings will go, I masked off this area with masking tape. I made sure that it was correct so the base would not be seen when the walls were placed on top.

Photo 8

The MDF board has been **primed**. This will mean that the paint will not soak into the material. For the primer I used PVA and water. Two coats were needed. After the base was coated, I spray painted. I did two coats of spray paint.
SAFETY: Done in a ventilated area wearing goggles and face mask.
QUALITY: Make sure there are no drips by spraying at a distance and fast. Do not focus in one area.

Photo 9

Photo 10

Pieces of rubber wood and MDF were marked out using a **pencil** and **tri-square** to make sure that the wood was cut at a **right angle**. This will ensure that the walls will be flat on the base. The walls were marked to **scale**.

Photo 11

I used the band saw to cut the wood to the same size. In this picture I was cutting the pillars. The metal ledge was set at the right length to ensure a **straight line** and so I would cut an exact **same size piece repeatedly – quality**.
SAFETY: Keep hands away from the blades. Expose the minimum length of blade that is needed to cut the wood and wear safety goggles at all times.

Photo 12

After all the wood was cut to the correct sizes using the band saw, I applied **textured paste** to them. To create the appearance of the walls, I patted the paste with a scrap piece of plastic.

Photo 13

Using a paintbrush, I painted the all the walls **apricot**. The paint colour used has been taken from the maintenance office and is the **exact colour** used for the school. This enhanced the **realism** of the model.
QUALITY: Once the first coat is dry, do a second coat. This will cover the parts that were missed in the first coat due to the **uneven texture**.

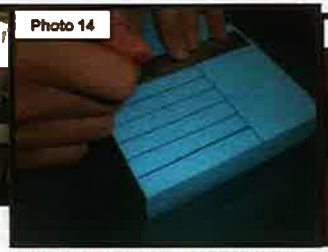


Photo 14

High density polystyrene is used for the ledge where the railings sit. This is so the railings can sit in place. To cut this I used a **craft knife** and **metal ruler**.

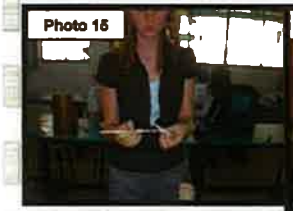


Photo 15

The railing holders were painted the same colour as the walls. This was an **addition** as in the communication sheets this small ledge was not mentioned, however in the development I did note that the railings may become a problem which I would have to overcome.

Photo 16

Using a pencil and ruler, I marked where the holes should go in the walls for the railings. The **pillar drill** was then used to create the hole. The diameter was 5mm. I drilled 18mm into the wood. This gave me some freedom to get the railings to the right length in case they have been cut too long.
SAFETY: Wear safety goggles and keep the wood tight in the clamp. Keep both hands away from the drill.
QUALITY: Make sure the drill is tightly in the pillar drill or it will not drill straight. The hole needs to be correct so the railing will sit flat.

Photo 17

The **feature wall** was created using CAD. This is a screen shot of the back wall on pro desktop. Please refer to **photos 2 to 6** for the process I used. As the drill was cutting two times faster than the previous time, it left scorch marks which needs to be sanded down. The feature wall was then given the same texture and paint colour shown in **photos 12 and 13**.

Photo 18

The **railings** were also **scaled** down to the correct size of 5mm. In the picture I am using the **metal band saw** to cut the aluminium railings which have been marked using a metal scribe.
SAFETY: Wear safety goggles, keep your hands far away from the blade and do not get distracted when the machine is on.

Photo 19

The railing edges needed to be sanded down using a **needle file** and **normal file** so they were smooth. This needed to be done as the edges were very sharp – **safety**. As I made the length of the railings 5mm longer, I could afford sanding them down a lot.

Photo 20

The 6 top bars were placed horizontally in the vice and sanded down so there was a 3mm surface which could be drilled using the pillar drill.
SAFETY: This can really strain your muscles if the action is repeated over again. Take a lot of breaks as well as look your wrist and make the elbow a pivot.

Photo 21

Photo 22

I used a centre punch, hammer and scribe to mark where the railings should go. This was very fiddly as I was working on a thin surface.
SAFETY: Try to keep your hands away from the hammer as the force of the swing could cause damage.
QUALITY: Check the centre punch as any defects on the tip could affect the finish.

Photo 23

The **pillar drill** was used to drill the holes into the bars. This needed to be **monitored carefully** as the width of the drill was 2mm. Please refer to **photo 16** for the process.

Photo 24

Photo 25

All the bars were placed in a scrap piece of polystyrene. This acted as a **jig** to keep the bars upright so they didn't fall down when they were spray painted. This also allowed the railings to have an even coat. Once the railings had dried they were turned over so the parts that were under the polystyrene could be painted.
SAFETY: Done in a ventilated area wearing goggles and face mask.
QUALITY: Make sure there are no drips by spraying at a distance and fast. Do not focus in one area.

Photo 26

Photo 27

As you can see from this image the railings have already been fit into place. Seven thin railings were fit into the holes and forced through into the high density polystyrene. They were super glued to each other. The pillars and walls had been attached to the base using PVA glue when the masking tape had been removed. As the large G clamps were being used at the time and would have left marks on the walls I had to **improvise** using **masking tape** which was **wound tightly around the base** to hold all the walls and pillars in place. I **left** it to do **dry overnight**.

Photo 28

The cushions were made from wine colour cotton. I measured the cotton using a metal ruler and biro to the **correct scale**. Using scissors to cut material, I cut along the lines to form a strip. This piece was used as a **template** to create three identical

Photo 29

Photo 30

The material was folded halfway and stitched using red thread. This was a **new process** and a **critical skill** so I could make other cushions later in the project. Stitch along two sides leaving an opening.
SAFETY: the needle is very sharp and thin so be careful when sewing and do not drop it on the floor as someone may stand on it.

Photo 31

The excess material was cut away to leave the cushion cover.

Photo 32

The cushion cover was turned inside out. As you can see from the photo it was **very small** and required a lot of patience to do. Scissors were used to help turn

Photo 34

Photo 33

By turning the cushion covers inside out it will hide the stitches to provide a **nicer finish**. Cotton wool pads were cut to the right size and pushed inside to give the cushions padding.

Photo 35

The open ends were stitched together using a needle and thread. To get all these pillows to the **same size** involved **accuracy**. As these models are very small the **tolerance level** must also be. A small mistake to our size would be large enough to be noticed on the model.

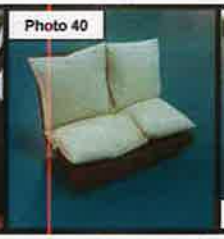
All the models, I have made have been scaled down by a scale factor of 20. I am working from the life size models and producing scaled down versions. As the tolerance levels are low all items must be measured accurately. The manufacturing of the garden lounge was time consuming due to the level of detail required.

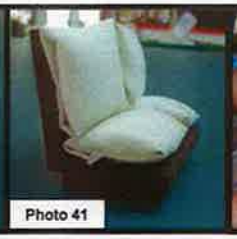
Photo Log 1

To make the sofas, I used MDF wood. I measured out the scaled down model using a pencil and ruler. A tri-square was used to create the right angles.
QUALITY: Never use a pen when marking out as if you make a mistake it is hard to erase and you could make a mistake cutting along this line.

Before I taper the backs of the seat, I must set up the belt sander. This must be done when the belt sander is switched up as if I loosen the table too much I could lose balance – safety.

When cutting the MDF please refer to photo 11. I used belt sander to sand down the edges as well as create the 10 degree angle on the back of the seat. Use the protractor on the disc sander for accuracy.
SAFETY: Keep your hands away from the spinning disc, wear goggles and make sure when sanding the wood is in the safe zone.
QUALITY: There are two levers on either side. Both of them need to be checked that they are at 10 degrees otherwise it will give an uneven tapered angle.





I used a contact adhesive to attach the sofa parts together. Before I could do this, I had to mark on the base where the two legs would go and make sure they were both equal. This was done by measuring half way and 5mm on either side of the base. After the sofa was attached together it was spray painted brown to resemble the oak finish, refer back to photo 8. Four cushions were created (two to go on each sofa). This was done in the same process from photo 28 to 35. They were stuck down with double sided sellotape to give the final product.

The bar tables, bar stools, coffee table and café chairs were made in the exact same process. Plywood was used for them. They were measured out using a metal ruler, tri – square and pencil. As there was a lot of each item, this could be done very quickly to cut the individual pieces – mass production (please refer back to photo 11).
SAFETY: Keep hands away from the blades. Expose the minimum length of blade that is needed to cut the wood and wear safety goggles at all times.

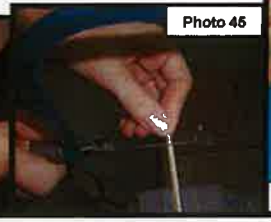
The bookcase was also made of plywood. The strips of plywood were measured out using a pencil, ruler and tri - square. To make this process each of the panels needed to be the exact same size – precision and quality.

The cardboard pieces were slid off when the table top was placed on top of the legs. This allowed the foot rest and other supportive features to be placed on. This was extremely fiddly as the supporting beams were around 7mm. They had to be stuck on with super glue which required tweezers to handle the small components.
SAFETY: Super glue can adhere any materials even skin.

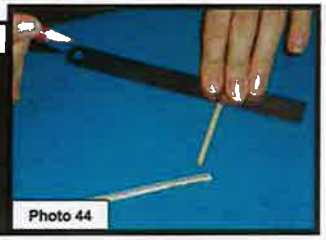
A contact adhesive was applied to the tops of the legs. The contact adhesive makes it flexible to work with.

I created a simple jig for the furniture pieces which had longer legs. I drew around the table tops and stools on cardboard. I cut around these cardboard squares using scissors. Two squares were used for each item. A hole was punctured in the same place through all cardboard squares (first was used as a template). The sate sticks were fed through these holes and got it balanced. Jig held it in the correct place.

As the coffee tables are close to the ground they don't need a jig to be made for them. I used a hot glue gun to glue the table legs to the table top. The coffee tables were then spray painted (photo8)
SAFETY: Do not leave the glue gun on. Switch it off when it is not being used. The glue gun drips so be careful with the pools of hot glue.
QUALITY: The glue may be seen from the edges so try and cover these areas up as best as possible.



The sate sticks were cut using a coping saw. I clamped the stick in the metal vice as these vices were easier to use than the wood ones. It was a quick process and made sure that I was cutting them correctly rather than cutting them with scissors, band saw or pliers.
SAFETY: Keep your hands away from the sharp blade and wear suitable footing in case the coping saw falls on your feet. Wear goggles as there have been a number of cases where the blade has snapped.
QUALITY: The wood splits when it is cut. Sand down the edges in order to take away the split ends.

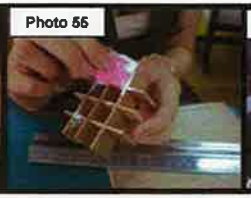


The next part of the tables and chairs was to create the legs. I had to mark out the legs using a metal ruler and sharp pencil. Before marking out the next leg I left a 2mm gap to ensure they were the same length – quality. I was very fortunate to have chosen furniture whose legs when scaled down were the diameter of the sate sticks.

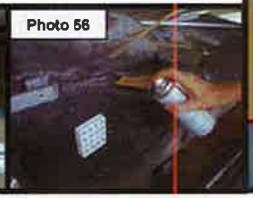
All the bookcase panels were made to the same length using the metal ledge. There were 6 of the same length used for the shelves. However, the other four were made 4mm longer than the other 6.
SAFETY: Keep hands away from the blades. Expose the minimum length of blade that is needed to cut the wood and wear safety goggles at all times.

After the panels have been cut the 6 needs to have 3 gaps taken from them using the band saw. To make sure that the gaps are in the same place every time, the first one is used as a template. This is crucial in creating the cross halving joint.

The wood fits together in the cross halving joints. All the gaps need to be sanded down using a file. The gaps only go half way into the wood to create the bookcase.



There were some bigger gaps in the wood as I needed to cut the wood more to fit them together. As the bookcase will be painted white, the textured paste was used to fill the gaps.

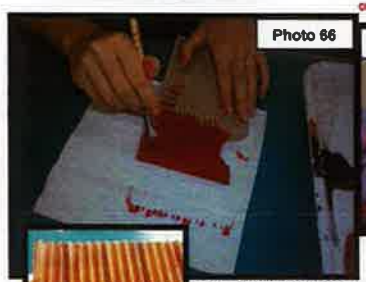


The plywood is spray painted with two coats of white paint. The inside of the bookshelf was very difficult to do as there were always drips. In the end the drips were sanded again and painted with a paintbrush.
SAFETY: Done in a ventilated area wearing goggles and face mask.
QUALITY: Do not focus in one area.

Red acrylic was used for the shelves. It was marked out with a pencil and ruler and cut out using the plastic band saw.
SAFETY: Keep hands away from the blade and always wear goggles due to the shards come off.
QUALITY: Keep the paper on to protect it from scratches.

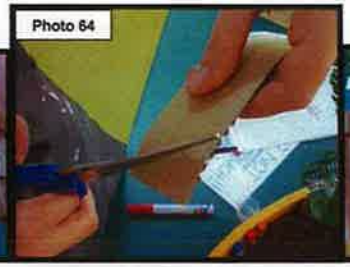
The band line was drawn on the plastic using a pencil and ruler. Do not draw on the plastic with pen as when it is being heated it will melt into the plastic. As the shelves are very small, tweezers were used so my hands were kept from the hot wire. To create the 90 degree angle it was bent along a table.

This is the final shelf – the pillar drill was used to create the hole of 2mm. Refer back to photo 16 in order to see the process of how to drill. As this was very small, I needed to strap down the shelf to a block of wood with double sided sellotape to stop it from cracking when put under pressure.

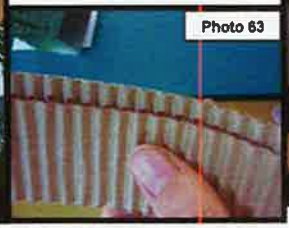


To get the colour of the roof, I mixed different colours in order to get the weathered look. This included paint colours of brown, red, orange, yellow and grey. After the paint had dried, I took a cotton bud and went down some of the tracks with black paint. I also got a wire brush and dabbed the roof to create the weathered appearance – quality.

Super glue was used to stick the cardboard together. As the strips pile on top of each other it forms the angle of the roof which is needed. All the lines matched with each other to give the effect of the roof.
SAFETY: Super glue can stick any two materials together even skin. Keep it away from fingers. If any is spilt on the desk, clear it up before another student gets harmed.

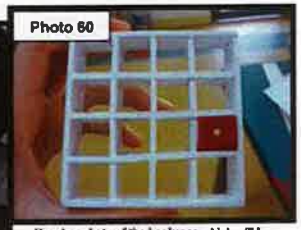


Each strip was placed where it would be on the plastic roof. It was turned around so the scrap could be marked and thrown away – most strips had been cut too long so could be re used as another strip.



To create the roof I used corrugated card. I cut strips which had a width of 40mm. On each strip there was a 10mm marking where the next strip would overlap. As you can see from this picture it was marked with a red pen.

I created the roof shape using brown HIPs. This would give the roof some structure. It has plastic covering it which will protect it from scratches. I drew on this plastic with a black marker pen. I wanted to create a cut through roof and so did a wavy line. After the roof had been cut out on the band saw I sanded it down using sand paper, files and a bobbing sander.
SAFETY: Keep hands away from the blade and always wear goggles due to the shards come off.
QUALITY: Keep the paper on to protect it from scratches.



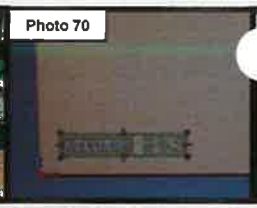
Here is a photo of the bookcase which will be placed in the sixth form lounge. It is reasonably straight however; it may need to be done again if there is enough time at the end.

The beams in the roof were created using narrow strips of Meranti wood. They added a sense of realism and support to the roof structure. There is 30mm height of MDF wood at the back to keep the angle of the roof the same as the others. I cut these pieces out using a band saw and collected the strips of Meranti from the scrap bucket from someone else's project. For the ceiling I covered the brown acrylic with white paper. This is so the client isn't under the impression that the ceiling would be shiny.
SAFETY: Keep hands away from the blades. Expose the minimum length of blade that is needed to cut the wood and wear safety goggles at all times.
QUALITY: Make sure the glue isn't shown when gluing the beams and the back of the roof.

Photo Log 2

I decided to put a **fire escape sign** above the door for **safety reasons**. This was the sign I was trying to replicate. **KELUAR** means exit in Malay. I will make this sign using the **vinyl cutter**. The sign for the scale model will be 20 x 10mm – **very small**.

I found **similar images** using **Google**. I then used Microsoft word to get the **correct size** for the scale model. **Photo 69** sows the image before it has been reduced in size. The **vinyl** was **loaded** into the router. The size of the vinyl that I used was from someone else's **recycling**. The lines on the image were **extracted**. This showed where the router would cut. **QUALITY**: Put the image in the corner – **less waste** is created. Cover the **sensors** so the cutting can begin.

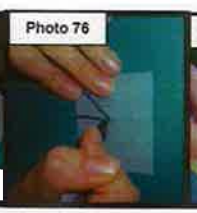


As the sign is green I decided to use **green vinyl**. The machine that I used was made by the company **Roland**. It cut the sign out in fewer than **30 seconds** which shows a **mass production process**. Once the image was cut out the **clamps** were released and the vinyl was cut into a box using the **guillotine**.

I needed to **weed** out the unwanted vinyl using a **scalpel**. It is a **sharp** and **narrow instrument** which allows everything to come off easily.
QUALITY: Take time doing this process as it is incredibly fiddly.

The sign was put on **translucent paper** using **transferable tape**. This is the final **component** above the door.

The **Shoji screens** and **lights** are made by similar processes. I cut **strips** of **transparent paper** to the right size using **scissors**.
SAFETY: Scissors are sharp. You must hold the blade when passing them to another student.



The design for the **shoji screen** was created using different **point** pens ranging from **thick** to **thin**. I searched on the **internet** for suitable **Japanese words** as well.

The **frames** for the **shoji screen** and **lights** were created using the **band saw** (**photo 11**). They were created using **sate sticks**. For the **darker wood** I **painted** the shoji screen frames black.

The images are **cut out** using a **craft knife** and **metal ruler** and then attached to card using **super glue**. Make sure when cutting with the **craft knife** that the **blade is low** and the **safety lock** is on. Keep your **fingers away** from the super glue as it can stick skin together. The card is then cut out using **scissors** and **attached** to the feature wall.

The images are **printed** out onto **glossy paper** using an **ink printer**. This is a **mass production** process and prints out high quality images.
QUALITY: Make sure there is enough ink in cartridge.

Here is **print screen image** of the art work used for the **feature wall**. The clock was created in the same way. The images were **scaled** to the right size using the rulers in **tool bar**. Images were taken using **digital camera**.

The **tapered legs** for the café tables were created at a **45 degree angle** using the **disc sander**. Each leg was used as a **template** so they were all correct.
SAFETY: Keep hands in the safe zone and away from the disc.

The **crushed pebbles** were **sprinkled** onto the **glue** and a **quality check** was done to make sure the whole base was covered. All rocks were **spread out** so there was no **overlapping**. When the **glue dried** the base was **turned upside down** to **remove excess**.

This is a **representation** of the base. I covered it in **PVA glue** using a **paintbrush** and **fingers** to make sure the **whole base** was **covered**. The **glue dries transparent** and so the grey base will still be able to be seen.

To create the **Shanghai plaster appearance** I bought some **fish pebbles**. As they would be **too big** for the scale, I **crushed** the pebbles using a **mallet**. This **took a very long time** as I needed to make all **rocks** the same **size** and **fill three cups** to cover base.

I used **recycled acetate** to create the **window**. This was cut using the **craft knife** and **metal ruler**. As acetate is difficult to cut because of its **smooth texture**, I needed to **cut slowly** to **protect** my **fingers**. Each line needed be **cut twice** to get through material.

The **pipes** for the **gutters** were cut using the **band saw** for plastic. The width of the pillars was **measured** and a **gap** was taken out.
SAFETY: Keep hands away from the **blades**. Expose the **minimum length** of blade that is needed to cut the plastic and wear safety goggles at all times.

The plastic was **filed** down starting with a **bigger file** and then using a **needle file** at the end to neaten up the edges. The gutters are then **spray painted** (**photo 8**) so they are the same colour as the railings.
SAFETY: repeated actions could cause **strain** to the muscles.

The ends of the gutters are drawn around card to create the end of them. They are coloured in with a **dark green marker pen** and stuck to the gutters using super glue. The gutters are then slotted into place and attached to the roof using **super glue**.

I bought this component. It is a column of sate sticks wound with string and tied at the bottom. It is tied tightly which allows me to cut the sate sticks using **scissors**. The string has to be cut though to cut shutters to the right lengths.

To stop the strong from unravelling I used a **hot glue gun** to hold it in place. I had to wait for 5 minutes for the hot glue gun to heat up.
SAFETY: Do not come into contact with the glue. **Switch off** the glue gun as soon as it is finished being used.

The fan plastic is cut to the correct size using the **belt sander** for plastic. Refer to **photo 87**. The plastic is then **sanded** to create smooth surfaces.
SAFETY: the repetitive movement can cause strain to the muscles.

The plastic edges are **scraped** using a **metal ruler** to take away the **uneven texture** and white marks that may be left from cutting. This is a very fast process.

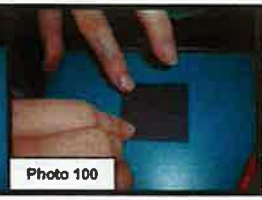
The middle of the fan is measured out and a **needle file** is used to create a **cross halving joint** so the two pieces of plastic become 4 fan blades.

To create the holder of the fan to attach it the roof, I cut up a **cotton bud** using a pair of **scissors**. The diameter of the stick is perfect.

The café seats were made in a similar way to the tables and bar stools (refer to **photos 42 to 51**). Cotton wool padding was given to the seats. The **beige material** were then cut into **strips** and folded around the seat. The **glue gun** was used to hold the material in place.

The final part of the water dispenser was added. This was a small ledge, a hot and cold button and then the water bottle on top. This was taken from a bottle top and a **blue highlighter** colour gave it the **water appearance**. These were all attached using a **contact adhesive**.

The panels of the vending machine and water dispenser were stuck together using **super glue**. The glue ran along the edges and a **quality check** was done to make sure that none could be seen on the surfaces.



I painted the small legs black to blend in with the appearance of the vending machine. I downloaded an **image from Google** of the front of the vending machine. I **cropped** and **resized** the image so it would fit into the vending machine. The **acetate** for the screen was attached first and then followed by the picture. They were held together using a **contact adhesive**.

Before attaching all the panels together, the flaps, tray and screen need to be created.
The screen was created in the same process as the window frame. The legs of the vending machine were made out of sate sticks cut by a coping saw (**photo 45**). They were attached to the base using super glue.

The water dispenser and vending machine were both made out of card. As this card didn't bend easily I had to create the panels. I measured each of the panels out using a **tri square** and **pencil**. They were then cut out using a **craft knife** and **metal rule** (refer to **photo 78**).

Using a **thick marker pen**, the rod of the **fan** is painted black to match the rest of the fan. The rod is then attached to the fan using the **hot glue gun** (photo 91). The fan was then attached to the ceiling of the room using super glue at first but due to the weight of the fan, the **hot glue gun** needed to be added to give the fan more support.

The material was pulled tightly around the chair and a **quality control** check was done to make sure that all the wood was covered by the material.

Small holes were made in the base of the chair which would make putting the chair legs in easier as the glue would have a bigger surface area to attach to. All the legs were cut to the right size using one as a **template**.

I found some formers by the **vacuum machine** that had already been created that were the right size needed for the plant pots. This former was made using ping pong balls.

The **former** was placed onto the **platen** and was lowered. A **quality check** needed to be done here to make sure the former had not moved. **Transparent HIPs** was placed on top and clamped down so there were no holes.

The plastic was heated and when there was a sufficient dip the platen was raised and the vacuum was turned on. The plastic was cooled to give the overall shape of the former.
SAFETY: Wear heat proof gloves as it is very hot. Never leave the vacuum former on when not in use as it could cause severe burns.
QUALITY: Watch out for webbing caused by untapered edges and white marks and air bubbles on the plastic caused by overheating.

I bought some fake white flowers as a component. I cut a piece of **oasis** and put it in the spray painted flower pots after they had been cut and sanded (refer to photos **8** and **87**). The flowers were **spray painted green** to resemble small bushes. The oasis holds the flowers in the correct position.

Please remember that all the models that I have made have been done to the scale 1:20. This caused this project to be very demanding as some of the processes were time consuming and required more than one attempt.
To change the inches into mm I went onto an online converter. I then divided each of these numbers by 20 and rounded each number to two decimal places due to the equipment I was using.

Photo Log 3

Testing and Evaluation

I will test 9 of my specification points as these ones can be related to my model. Other specification points will be evaluated later through visual testing.

To evaluate the model of the sixth form garden lounge that I have made I need to refer back to the design brief and specifications that was created. This is to ensure that I have thought of the best processes for the model. I have also included some 3rd party feedback from my client and sixth form students. The pictures are shown to show photographic evidence of the results of the testing.

Height of Fan

Specification point: SA4
Test: Put an ergonomic man underneath the fan. Does his head touch the fan?
Evaluation: As you can see from this photograph, the person's head does not reach the ceiling and is far away from the fan's blades. This fulfils this criterion and means that there will be no head injuries – safety has been considered.

Three Zones

Specification point: FO3
Test: This is done by a visual check. There must be a clear indication of where one zone starts and finishes.
Evaluation: The room divider separates the socialising zone from the other two. The working and eating zone is not clearly divided. The different furniture however shows the split. The working zone has a little compartment which will make the students feel more secluded. I have tried to split up the areas evenly however, working zone ended up smaller due to the fact that the Sixth Form Centre for Learning provides many areas for students to work at. If an event uses the balcony then the dining room tables can be changed into coffee tables. This will increase the size of the socialising zone.

Seating for User Group

Specification point: FU1
Test: I will count the number of seats in this design. It needs to exceed 20 seats and be no more than 30 seats to fulfil the client's requirements.
Evaluation: In the socialising zone there are 2 sofas – can accommodate 4 people. In the working zone there are 8 barstools and finally in the eating zone there are 12 seats. This means that 24 students can be accommodated in this room. There is a lot of space for students to stand so more will be able to fit in. The client gave me the minimum number so full use is made of the room. Too many people in this room would be a safety hazard.

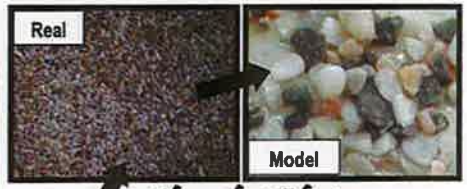
Existing Paint Colour

Specification point: FO4
Test: I have taken a picture of the walls from the real environment and compared them with the ones that I have created.
Evaluation: I used the paint that the maintenance staffs use to for paint the walls so the colour is direct replica. The texture of the walls worked really well. I created this using textured paste and using a scrap piece of plastic and padding it before it dried. The real texture is a little more fine which I could have done better but the client has been really happy on how real the model looks.

Multifunctional Seating

Specification point: FU3
Test: In each of the zones I will check that the furniture that has been chosen is different and can be used for many different purposes. This can also be tested by asking the user group and client.
Evaluation: From the photos above you can see that in the different zones there are different furniture items which are appropriate for the zone's purpose. For example, the socialising zone has comfortable chairs for students to sit on and relax but students may also want to read in this room. The working zone and eating zone has furniture which could do both purpose but as there are bar stools and tables in the sixth form centre for learning, the students will more likely work at them in the garden lounge.

Shanghai Plaster



Specification point: MC5
Test: I will evaluate the picture of the real Shanghai plaster against the model I make.
Evaluation: Making the pebbles for the Shanghai plaster was a very time consuming process as there were no rocks that I could fine that were a 20th of the real thing. I had to crush fish pebbles in order to get them to the correct size. When I sprinkled the pebbles onto the base they had to be evened out with my fingers to make sure that none of them were overlapping. This was to create the even base. As more of the rocks were angular it created an uneven base which affected some of my models.
Improvements: If I were to do this again I would use sand to create the Shanghai plaster as it would have been finer and provide a more even base.

Client Feedback

Interview conducted on the 23rd March 2015

I really like the three zones as they are distinct and the furniture for each is suitable for the purpose of that zone. The quiet zone is far away from the sixth form rooms and people will not be going through it to reach the other areas. It has been thought out extremely well. I like how the screen is moveable and can be taken away when needed. All the furniture looks like it can easily be stored when not needed. The area looks very peaceful and is needed for students to relax in when there is time.

Improvements

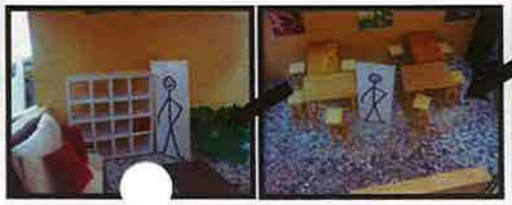
- Skylights in the roof are still an option to be considered.
- More bookcases are needed – there are 140 pupils in the sixth form and it would be nice to give each student a shelf for them to put their folders. This may make the area too crowded as this could be brought into the sixth form centre for learning.
- In the quiet zone, there should be another water dispenser, as students won't have to go to the other side of the area to get a drink.
- A fridge and microwave could be added – this has been asked for the sixth form students body so the client is aware about. This would have to be added in the eating zone.
- The cushions may be brought in at night as the residents won't get to them and cause them to mould.
- Although it was asked for toilet doors to the toilets closest to the research – they may have to be put each in but at different places – this is for safety reasons. If there is a guest speaker, they may use these rooms as one in the quiet zone.
- There could be a booking board to use the quiet area for university talks and for people who want to use the kitchen inside.
- Another source of lights need to be added in the working zone as at night it will get very dark.
- Does the window need to be tinted away – as it many cannot. Does that affect want to be looking out on the sixth formers in the sixth formers looking in?

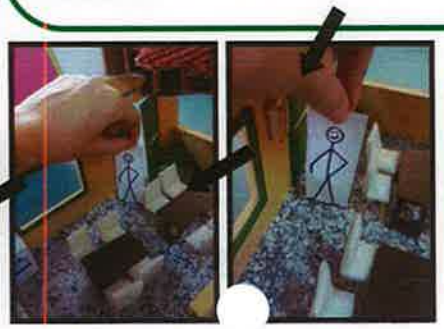
Shutters

Specification point: FU2
Test: I will blow the shutters with a small hand held fan. I will note down what happens inside.
Evaluation: The shutters did sway a lot but not enough to knock into other furniture. As the shutters are quite heavy due to the weight at the bottom, I believe that they are a good idea for protection and shelter. The shutters can be adjusted using a string which means that during the day when there is no wind or rain they can be rolled up. There is very limited wind in Malaysia. It only comes when there is rain. I like the material that the shutters are made from as they fit in with the natural environment.
Improvement: If I was to improve the shutter I would probably go for a heavier wood and have them fixed. They shutters could slide out when needed protecting the whole area.

Sufficient Room

Specification point: S2
Test: I used the ergonomic man and placed him in the space and noted down where some areas were a little narrow.
Evaluation: As you can see from the photos below the ergonomic man is able to move around the area. I have taken into consideration other sizes which is shown by the paper around the man. There is still a lot of room on either side of him. I know that more room would be preferred due to the contemporary design but the area that I was working with was extremely narrow and I believe I did a good job due to this circumstance. A lot of furniture was put into this area and it easy to move between the zones.
Improvements: To make movement better in this space I would change some of the furniture to smaller pieces, for example change the café table near the vending machine into small stools.





Safety

Specification point: SA3
Test: I will look at the safety measures along the balcony and compare them to real life.
Evaluation: In the end I did not change any of the balcony railings as I had removed the ledge which gave the walls more height. Instead I focused on if there was a fire how would the user group get out of the space. I created the sign of a fire escape using the vinyl machine. I believe that this was one of the best items created as the size of the sign was really small and involved a lot of patience. It is easy to see what the sign says and shows the icon of the man running to the door.

User Group Feedback

All the students that I interviewed were very impressed by my model and how realistic it was. A lot of the user group had been watching the progression of the model every week an had noticed the level of skill and precision that went into the model. They were amazed by the quality of the work.

- The furniture that was chosen was a big success. It is different to the furniture that is within the sixth form centre for learning as this looks more durable and expensive.
- A lot of the students said they would use this room as the common room is too noisy and working outside would be very relaxing.
- They would have liked to see a little more plants in this area because of the name.
- They really liked the working zone because although it was in the middle of the room the gateway made it seem quieter and distant.
- They would have liked to have had the working zone at the end of the room as that would be the quietest because the working zone is surrounded by two noisy areas.
- Myrthe, A2 art student, was very happy that her art work had been put in the room as she felt that when she leaves to university she will still be remembered – her legacy.
- Rachel Fairclough, head girl, was very impressed of the amount of furniture that had come from sustainable forests. She also liked the fact that the material that had been chosen to make the model had been recycled and most of furniture had been made of scraps of wood.
- The amount of furniture for the room was perfect – they felt that the area had not been overcrowded.
- A lot of students said that the area fitted in with the rest of the environment as there was a lot of Asian influence in the design.
- Some would have liked to have seen a little more from the shutters as although the testing showed that it was fine, they would have liked to have had ones that were fixed to the balcony to provide more protection.





Improvements

To enhance the quality of the model I would not use blue tack to hold the railings in place. Some of the holes were too deep and to make them shallower, blue tack was put in. In some of the holes you can see it but because it is very small it isn't noticeable. This wasn't going to be used but because of a mistake during the making, I had to recover it.

The middle roof is very l .nd so has to be attached with masking tape at the back. As the back is not being marked this is not a problem however, it does ruin the quality and performance of the piece. Next time I would use lighter materials that the feature wall would be able to hold.

When crushing the fish pebbles with a hammer it created a lot of dust which put into the cup as well as the stone so when I poured the pebbles onto the base the dust stuck to the PVA glue giving the flooring an uneven finish. If I was to repeat this process, I would use a sieve to remove all the dust so it would just leave the pebbles

The fan was squint when it was attached to the roof. This was due to the fact that the plastic blades were too heavy and kept falling off. I also stuck the fan to the ceiling using a hot glue gun to keep it attached however, the quality of this was not aesthetically pleasing. It was covered by the roof though. Next time, I would use epoxy resin which dries clear.

Although the vending machine and water dispenser were very realistic I would have liked to have made them out of a shiner material. The water dispenser was spray painted white to give it the metal affect but the vending machine looks very bland. I would also use better card that could be created into a net as gaps in the panels can be seen.

I would put both doors back into the lecture theatre to help develop this project as it is a safety issue and there needs to be a lot of fire escapes in case of an emergency. This will develop the performance of the area.

I would add more lights over the working zone as there aren't enough there and students need to be able to see what they are doing as dull light I not good for health – safety of the user group is being considered.

Photographs of Final Model

Life Cycle Assessment

Sustainability means t. are of the world for ourselves and for the future generations. All designs are looked at for their cost and benefit to try and strike a balance between them. The life cycle assessment is a way for manufactures to evaluate and assess the impact of the product from the 'cradle to grave'. This means that the product is evaluated from extraction all the way to disposal. I have shown two life cycle assessments for my product.

Plastic

The extraction of crude oil is expensive and causes environmental damage. Oil found offshore disturbs the marine ecosystem. At the depth of extraction can release poisonous gas pockets and pressure pockets which are very dangerous.

→ Refining the oil releases different chemicals into the atmosphere – air pollution. Also concerns about the waste water – the unused parts get pumped into rivers, lakes and oceans affecting different ecosystems. The noise from the manufacturing can cause health problems.

→ The generation of electrical power produces a lot of pollution. The emissions lead to acid rain, smog, global warming and health problems. There is a lot of energy being used as the machines need to be switched on, the extractors for removing dust and the air conditioners switched on to keep the environment cool. This will add to the carbon footprint of the project.

→ The model does not have a carbon footprint when it is being transported as I will carry the model upstairs to the sixth form centre for learning.

→ Most of the plastic items can be re used again as they are still in sheet form. The other items will be recycled which means they will be remelted and re used. However, burning the plastic can release toxic fumes. I will have to look at the plastics mark to identify what type of plastic it is.

MDF

The trees are removed from the forest. They are then transported to a manufacture – increase in the carbon footprint. If the trees from the forest are not sustainably managed it could lead to an increase in deforestation and destroy the environment.

→ MDF is processed by breaking down hardwood and softwood into fibres. These fibres are then combined with a resin and are then put under high temperature and pressure. This requires a lot of energy and the emissions for the binders contained in this material are hazardous.

→ When the MDF is cut using the band saw, it releases a large quantity of dust which is taken away by the extractors – ventilated area. To stop the urea formaldehyde from being released, coats the whole product as it seals it in. The volatile organic compounds will be released slowly for six months after the manufacturing stage.

→ The model does not have a carbon footprint when it is being transported as I will carry the model upstairs to the sixth form centre for learning.

→ The sofas I made from MDF can be re used by another model. The base and the feature wall can have the paint re striped and can be used for other products after the client has finished with the model. MDF is very difficult to recycle.