Mood Totems

Relaxing Lightings
Inspired by the Water Revolution

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Prologue

Project Mood Totems is inspired by the Hong Kong pro-democracy protest in 2019. Because of the suppression and inhumanity treatments by the government and police towards the protestors, many Hongkongers have been living in unusual stress and negative emotions. As a Hongkonger, I wanted to raise the awareness of that issue and to contribute to the event as a designer. Therefore, I have started the Mood Totem project. This project aims to create stress reducing lighting devices. The ideas are inspired by the "Be water" philosophy in the protest. The result is 2 lighting devices which achieve relaxation by utilizing different properties of water.

The first design, Rain Totem, is a raining desk lamp. It simulates raining and recreate the visual and sound effect of rain. According to my research, the sound of raining has soothing effect and can reduce stress. There will be further explanations in the first chapter of this document. Furthermore, lighting is combined with the raining device. The shadow of the moving water and water droplets are projected to walls. The raindrop sound, warm light and moving shadow of water turn a dark room into a relaxing place for thinking and meditating. If the user suffers from insomnia, listening to water sound will help falling asleep as well.

The second design, River Lantern, is a rotating candle holder. This design has used the property of water and fire to float and rotate a patterned plate. The candle fire projects the shadow of the plate onto walls and table surfaces. Besides the slow-moving shadow, the scent of the candle can help relaxing the user.

This folio has documented the development and making process of the Mood Totems Project. However, due to coronavirus pandemic in 2019 to 2020, the project cannot be physically completed. Therefore, the making of the physical objects has frozen in 18th March 2019. Just before the closure, the project was still in the final stage of prototyping and have just started the making process of the final pieces because of the huge amount of research and testing required. Only a little amount of the making processes of the final pieces can be expected in this folio. However, the final outcomes of the 2 designs are presented with digital renders. The renders have demonstrated the usage and expected effects of the actual products.

All images are original unless stated.

Chapter

0

Research and findings summary

In the research stage, secondary research was done to understand stress and mental illnesses and effective approaches of easing them. Primary research was done on the mechanism and technical structure of similar existing products related to this project. All researches have contributed to idea generation and development of this project. The detailed research results are documented and analysed in an edited publication research document for AD313. This chapter is a condensed summary of the research result. For the full research process and method, please refer to another document. Some important process and findings will be attached to the Appendix of this folio.

Academic research findings

(Image from SCMP)

A literature review has been written to summarise and analysis the academic journals related to the project's topic. The findings have contributed in pointing out the direction of idea generation and development. A full version of the literature review is attached to the appendix. The following is a summery of the academic research result and how the ideas may follow the research findings.

1) The patients' mental and physical health can be worsened if the patients does not receive effective treatments.

2) Currently, art therapy is one of the effective treatments for mental disorders including stress, depression,
and anxiety. However, art therapy requires professional guidance by art therapist.

3) Art therapists observe the patients' inner needs and emotions from the patients' art creation. The art activities commonly used by therapist usually contain a large amount of freedom in creation and therefore will not limit the patients' expression. One of the examples from the sources is a patient painting on masks to reveal his stress in a recovery treatment of PTSD.

4) It insists that the design in the Mood Totem project may be customisable for people to express their feelings.

5) However, for household products designed for relaxion, the products should be able to reduce stress and help relaxing without the guidance of a professional art therapist.

6) Furthermore, it is known that exposure to nature is effective in reducing stress even in virtual reality. Simply by listening to nature sound will have similar effect.

7) The effectiveness varies according to the patients' preference on the sound and sound quality.

8) In sound therapy, broadband sound and water sound is the most effective sound for stress reducing and claiming.

9) As water sound is more suitable for a household product and is more related to the theme of the project, the design may use water to achieve calming and soothing effect.

Practical review summary

(Image from The Guardian)

(Image from The Korea Times)

Ai Weiwei and Random International have been reviewed in the artist research. Both of their works aim to express messages to their audience. They have used related materials and symbolism to communicate their ideas and concepts.

Technical research

From the technical research, I have decomposed a diffuser to learn its structure and working mechanism. Afterwards, I have tried testing with simple circuits with controllable motors. With these knowledges on electronics, I can add simple circuits and electronic devices into the design. Thus, there are more possibilities in idea generation and development.

MOOD BOARD
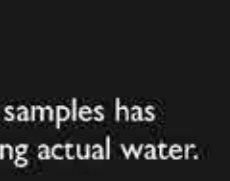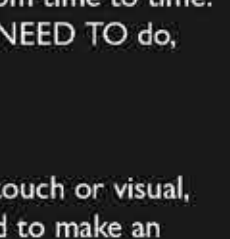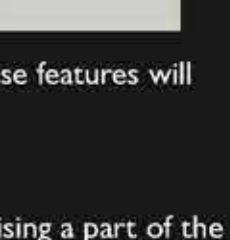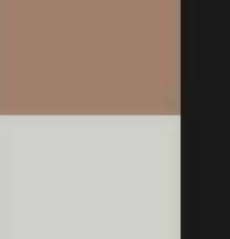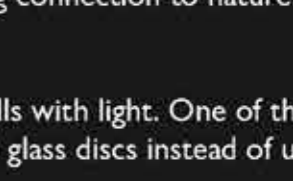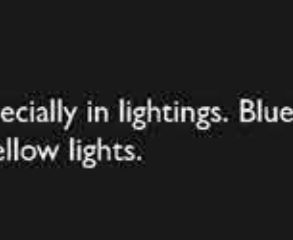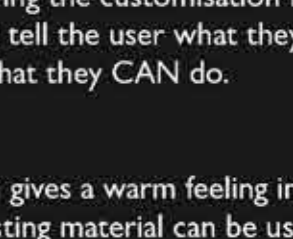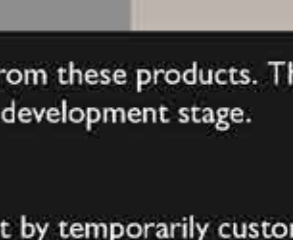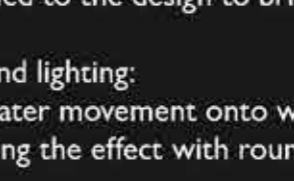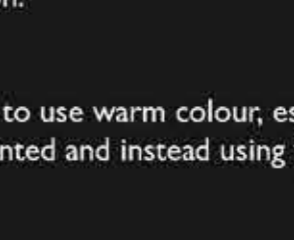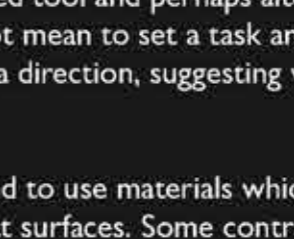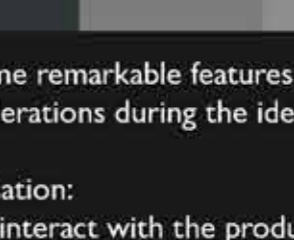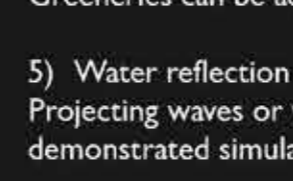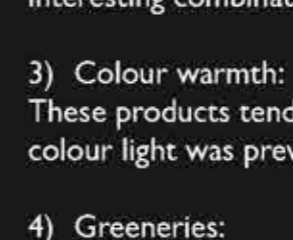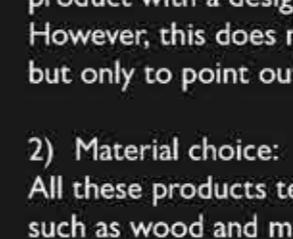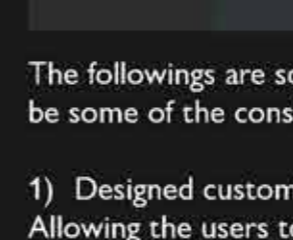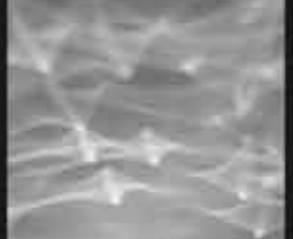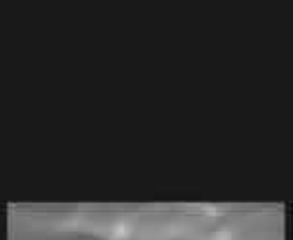
The followings are some remarkable features from these products. These features will be some of the considerations during the idea development stage.

1) Designed customisation:
Allowing the users to interact with the product by temporarily customising a part of the product with a designed tool and perhaps altering the customisation from time to time. However, this does not mean to set a task and tell the user what they NEED TO do, but only to point out a direction, suggesting what they CAN do.

2) Material choice:
All these products tend to use materials which gives a warm feeling in touch or visual, such as wood and matt surfaces. Some contrasting material can be used to make an interesting combination.

3) Colour warmth:
These products tends to use warm colour, especially in lightings. Blue-ish and cold colour light was prevented and instead using yellow lights.

4) Greeneries:
Greeneries can be added to the design to bring connection to nature.

5) Water reflection and lighting:
Projecting waves or water movement onto walls with light. One of the samples has demonstrated simulating the effect with round glass discs instead of using actual water.

Chapter

1

Technical

This chapter has been separated into 3 sub-chapters. The first sub-chapter has documented the ideation stage. Sketch models and technical experiments are criticised and reflected. The second and third sub-chapter has documented the idea development and making processes of prototypes of Rain Totem and River Lantern.

1.1

Ideation

After doing some research on mental health problems and their solutions, I have started to generate some ideas according to the findings. In this stage, the production methods and achievability are not the most concerned issue. Instead, I focused on the idea and concept first. I first sketched out the ideas roughly, then make models with simple materials, mostly paper and foam board. These models and ideas were then evaluated and criticised referring to the research.

Sketch models and sketches

Rearrangeable backflow incense burner

Introduction to concept:
- Burning backflow incense on earrangeable hexagons
- The flow of smoke changes according to the arrangement of hexagons

Sketch model material and production method:
- Handmade
- Printing paper, foam board, double sided tape

Relation to research:
- Customisable
- Relax with scent
- Visual effect of incense smoke flow, simulating water flow

Comments:
- The form or function does not change after rearranging
- The customization cannot reflect the user's thought or to express their ideas
- Material choice, using wood with burning incenses is not appropriate

Pixel image making board
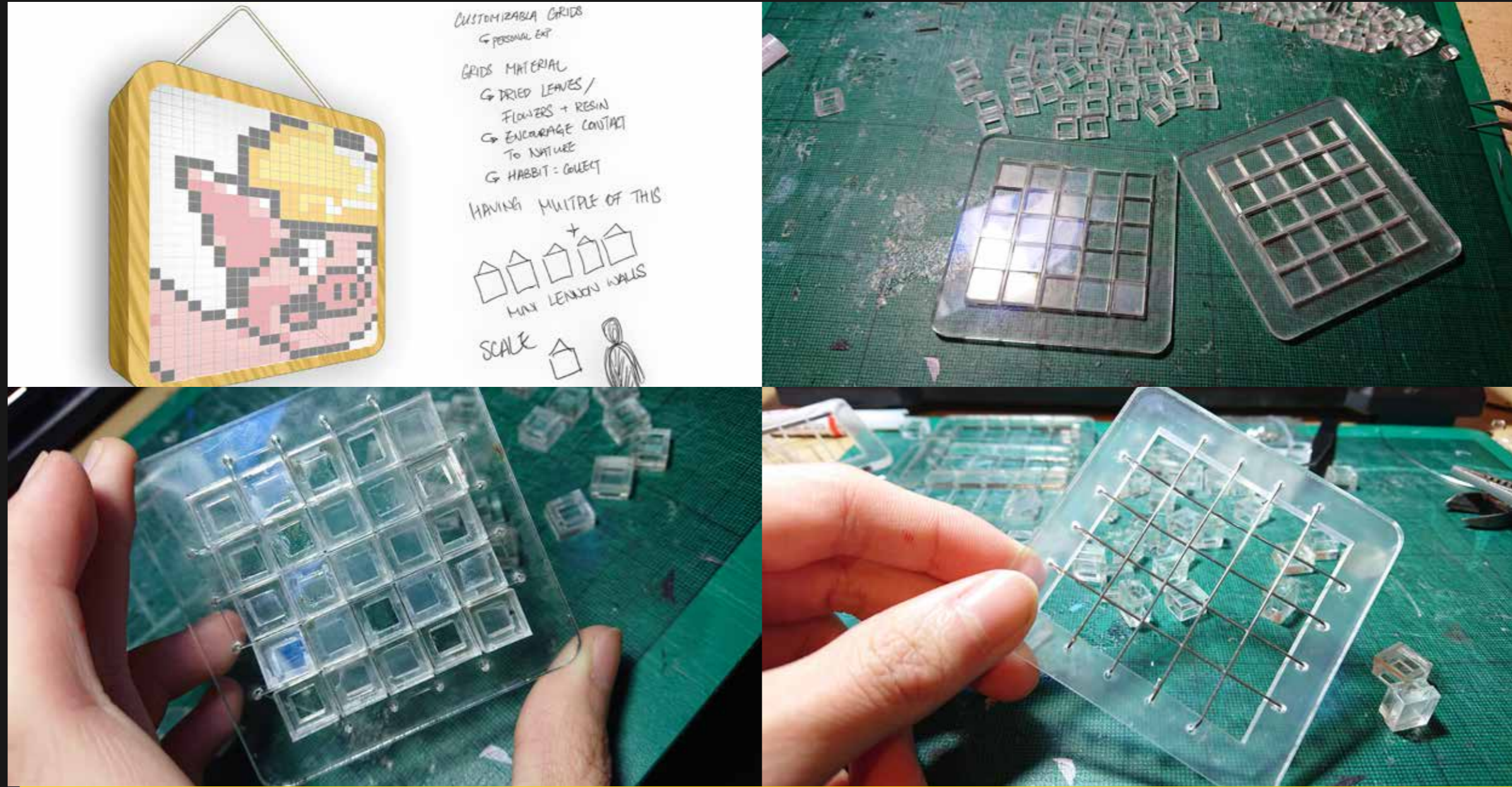
Introduction to concept:
- Colourise acrylic grids with dry pressed flowers then create pixelated images or patterns with the colour grids
- The design can be used as a light lamp or lighting decoration

Sketch model material and production method:
- Laser cutting
- Clear acrylic, steel wire

Relation to research:
- Related to theme, inspired by HK Lennon wall pixel art
- Customisable
- Include elements from nature

Comments:
- It takes many pieces to create meaningful imageries
- It requires skills and knowledge to make pixelated art
- Wires cannot secure the grids and the grids are loose

Keychain-size decorations inspired by theme

Introduction to concept:
- Inspired by the HK protest
- Experiment on lighting and projections with coloured acrylic

Sketch model material and production method:
- Laser cutting and engraving
- Hand painted
- Clear acrylic, acrylic paint

Relation to research:
- Related to theme, inspired by the HK protest
- Using lighting and projection
- Incorporating message in the piece

Comments:
- Direct expression, lack of depth
- Spoon feeding information to audience instead of provoking thoughts

Other idea sketches
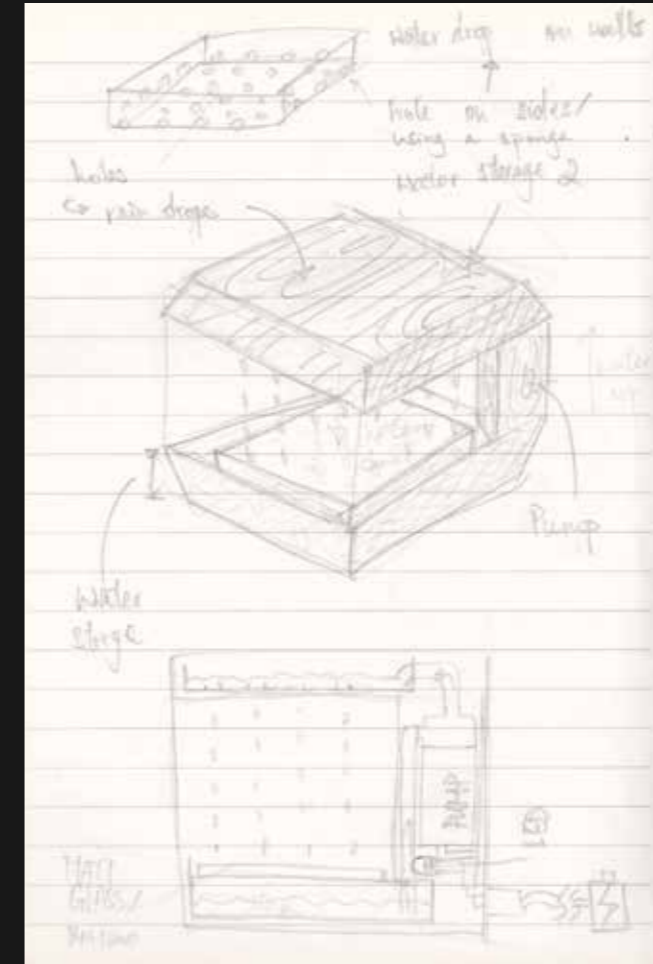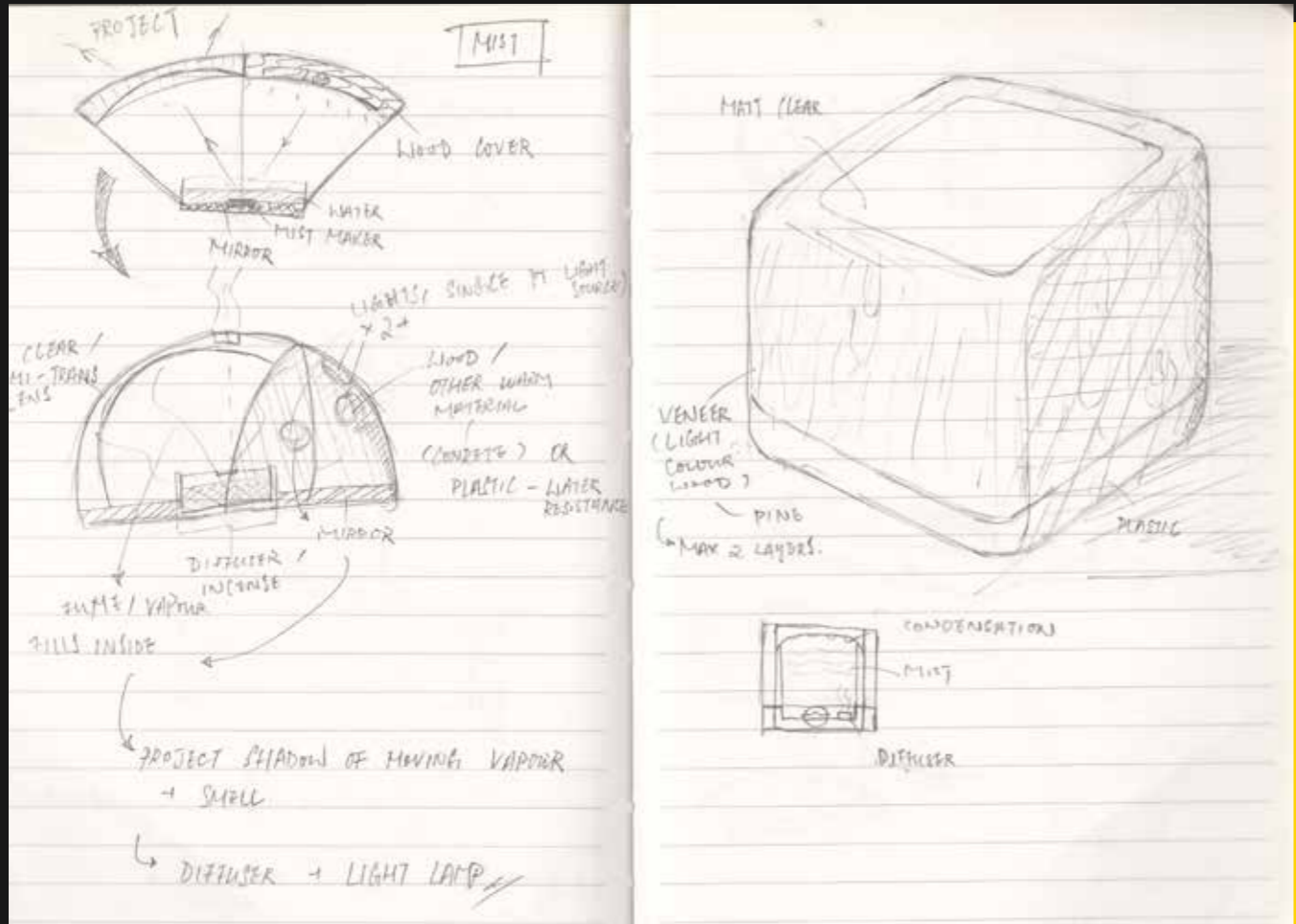
Technical tests and experiments

After generating the initial ideas, I have done some technical tests and experiments to understand to backup my development as I k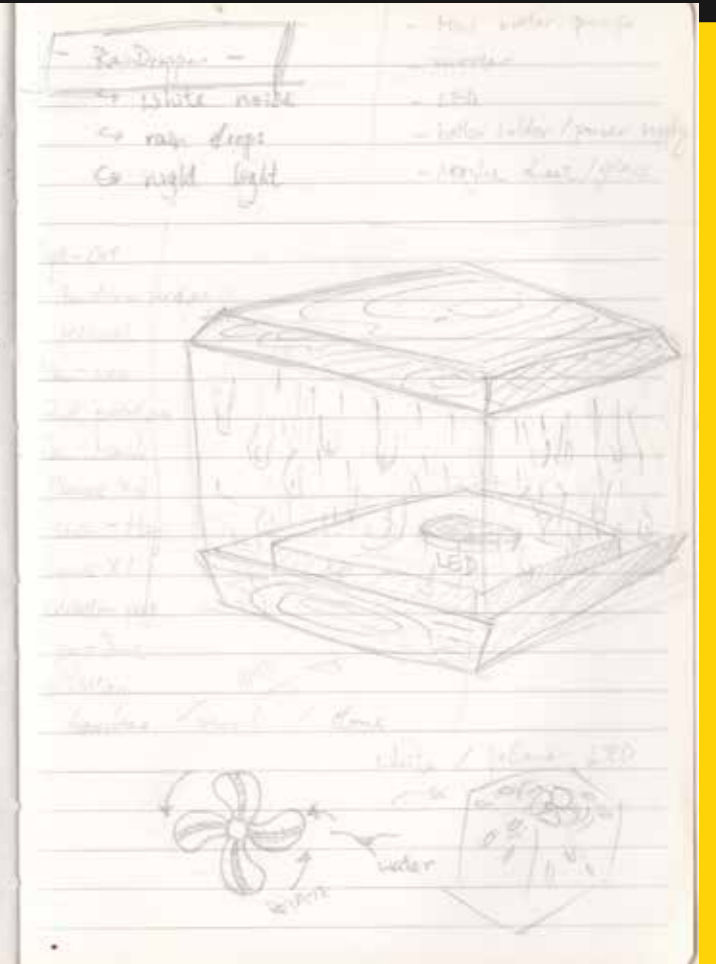now I may need to use lights and other electronics in my design. Through these experiments, I would like to know what I can use in the future design and what I may need to learn. For example, if I need a blinking light, I may need to learn programming and perhaps Arduino.
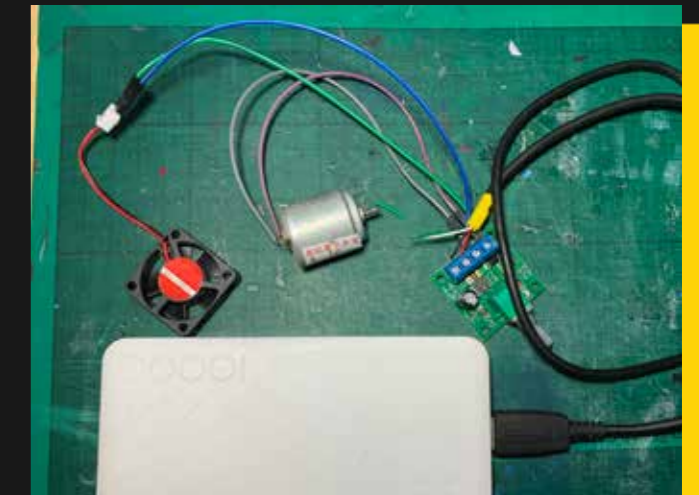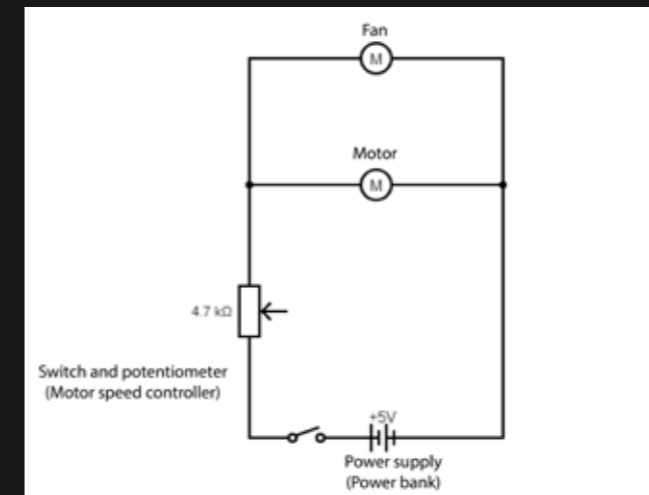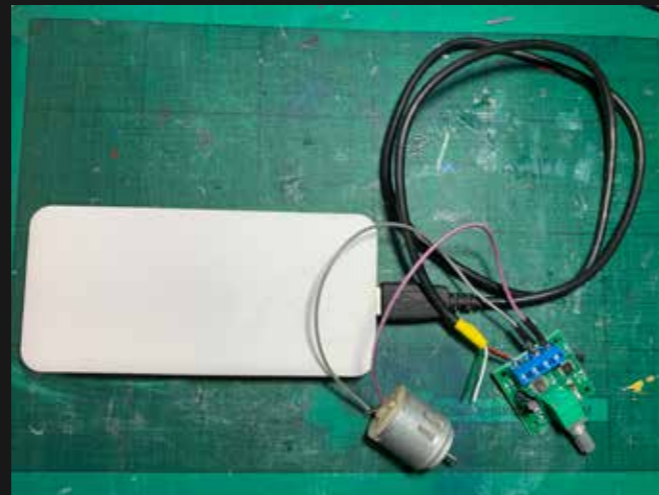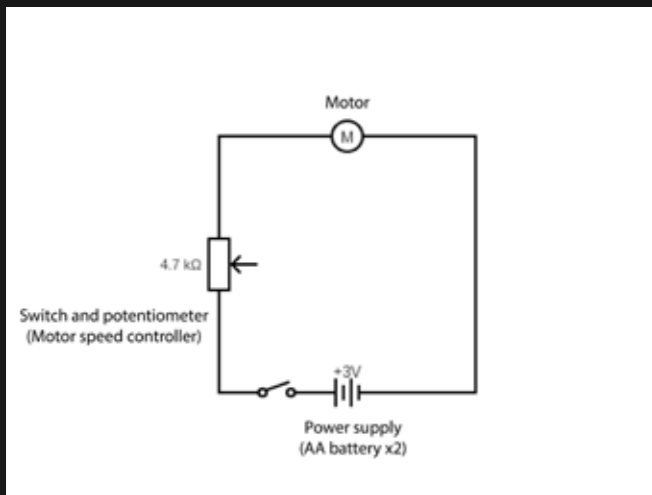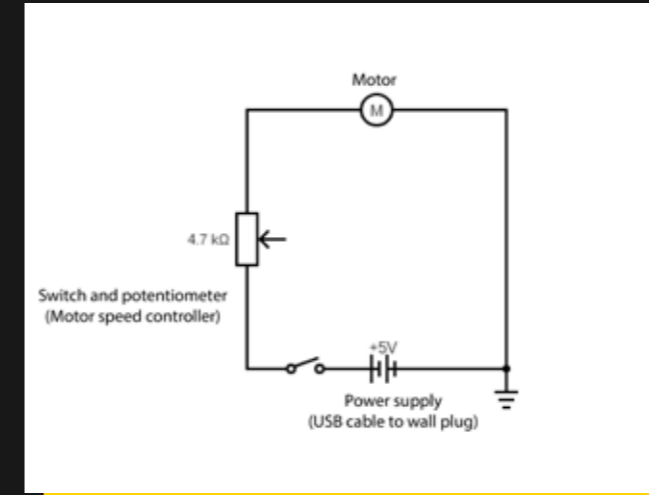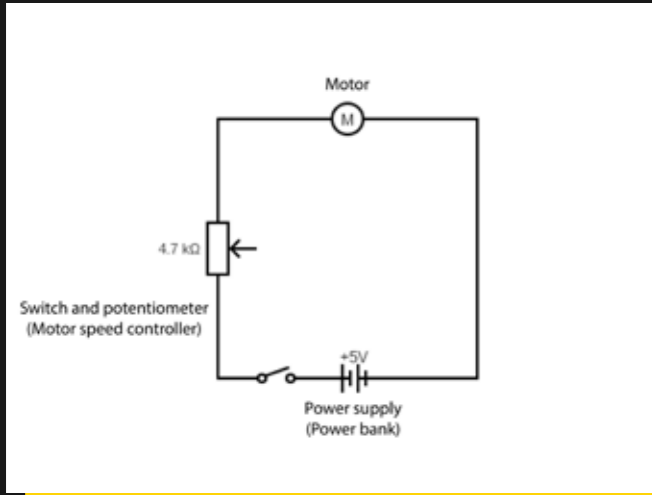
Simple electric circuits experiments

After generating the initial ideas, I have done some technical tests and experiments to understand to backup my development as I know I may need to use lights and other electronics in my design. Through these experiments, I would like to know what I can use in the future design and what I may need to learn. For example, if I need a blinking light, I may need to learn programming and perhaps Arduino.

These are a series of technical experiment on connecting multiple components in a circuit. The experiment starts with a simplest circuit connecting a battery box to a switch and a motor. Then it has developed into connecting a fan and a motor which can be powered by a mobile charger. From this experiment, I know that I can power multiple devices with almost any kind of power source in one simple circuit without using any program or code. This research has enabled me to expend the possibility in the idea development stage as I know I can make something which needs to be powered.

Idea development and progress

Before making any physical prototypes, my approach is to use computer aid design (CAD) software, Solidworks and Keyshot, to preview and examine my ideas at the very beginning of production.

First, with Solidworks, a 3D modelling software, I can create a precise 3D model of my design. When I was building the 3D model, I was also considering the making process and spotting foreseeable production difficulties. If I spot out potential difficulties in productions or errors, I can alter the design to make sure the design is achievable and feasible. This approach can greatly reduce time for production stage and prevent surprises in later stages. Furthermore, I can also generate a precise guideline for production. For some cases, I may use the 3D models for 3D printing and that reduces the time spent on making.

Then, with Keyshot, a digital rendering software, I can apply materials to the 3D models and preview the outlook of the design. Sometimes, I can choose material in this stage if the project is not a material driven project. I can also reposition parts of the 3D models and to simulate assembling the design in reality. I can confirm the production process is feasible ahead and change the design if needed. Furthermore, I can also use digital renderings for presenting and communicating ideas with clients, customers, or technicians with the digital renders.

1.2

1

.2A

Rain Totem
A raining light lamp

We used to hate rains when we were small. After growing up, we start to understand the romance, calmness, and grace of a rain. The Rain Totem is a raining desk lamp inspired by the "Be water" philosophy in the Hong Kong pro-democracy protest 2019. This product aims to achieve relaxation and to reduce stress of its user by listening to the sound of rain in soothing environment. "Be water" can be interrupted as be flexible in thoughts. The mechanism of the Rain Totem is innovative and effective in recreating a controllable rain fall in desktop scale. By selecting different power output level, the user can control the rain from a gentle shower to a heavy rainstorm according to their mood and preference. A rotatable projection lamp casts the shadow of the raindrops on walls, helping the user to relax by watching the movement of water. The main light of Rain Totem is remote-controllable. The user can dimmer and lighten the lamp, set a timer and switching the lamp on and off from a distance. The Rain Totem lightens up the darkness and gently cleanses your mind.

Rain Totem version 1 CAD model
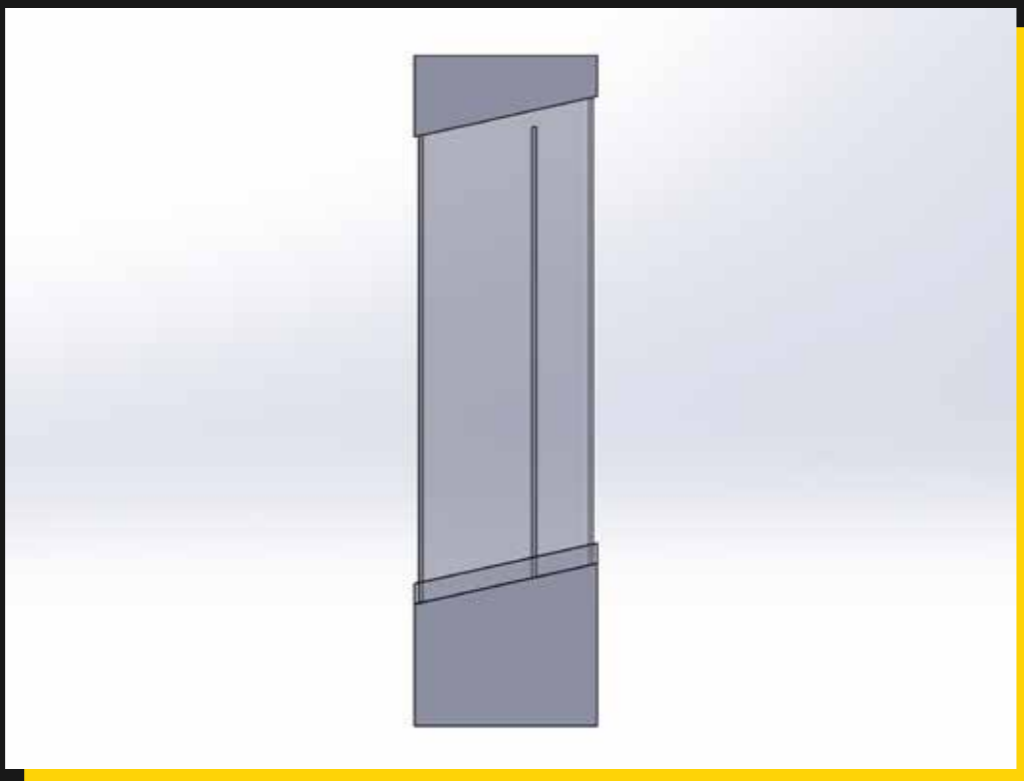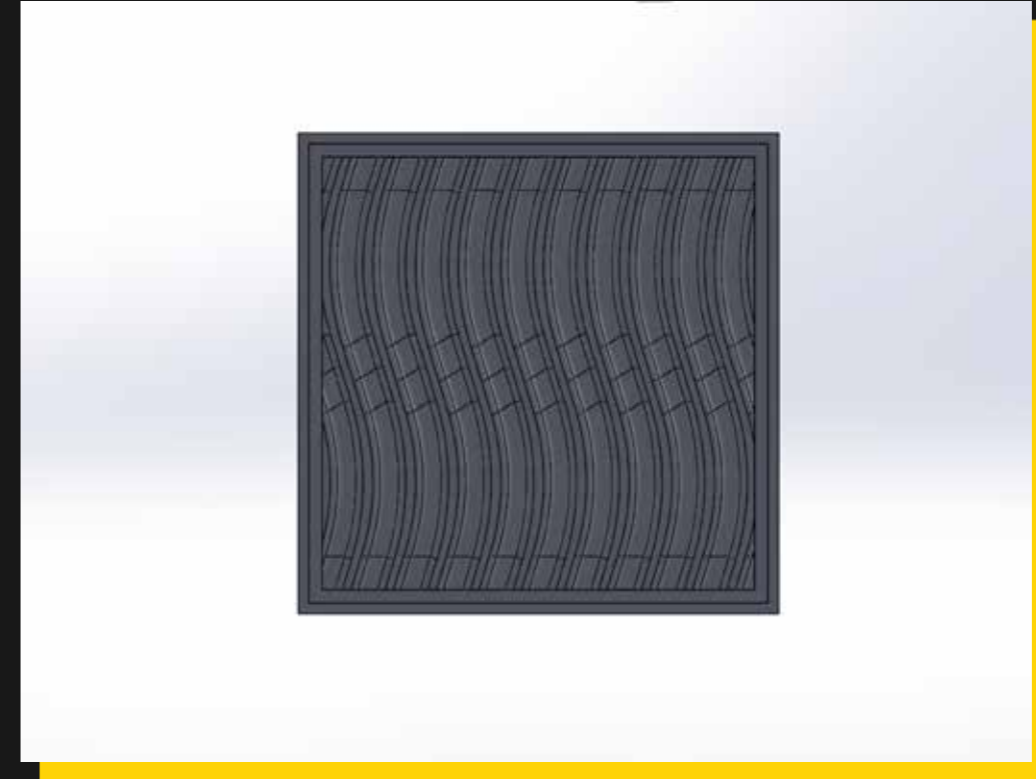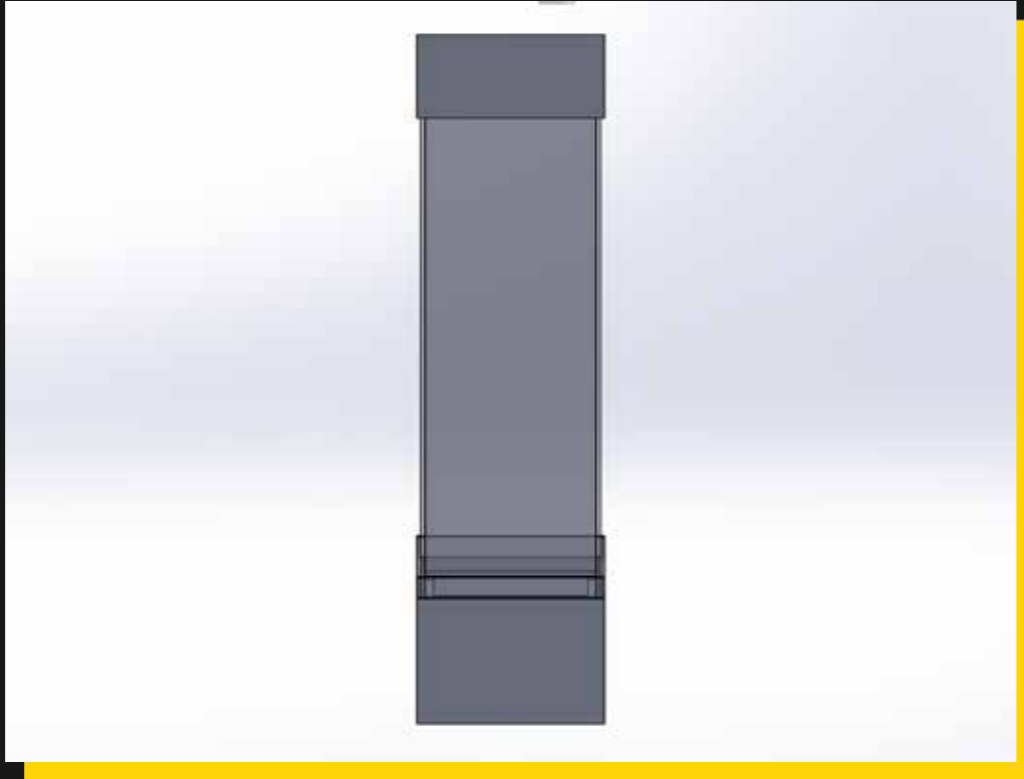
Prototype 01

Material and production method:
- Laser cut (Clear Acrylic),
  3D print (PLA),
  paper,
  water diffusing unit

Video of this prototype

About this prototype:

This prototype is made to prove the concept of indoor raining lamp. In this prototype, I tried to create water circulation by using steam. I was expecting the steam raises then it condenses on the lid of the device. When it drops down, the water goes back to the tank and circulate again. I aim to recreate the sound and visual effect of raining in a tabletop device.

This prototype is made with 3D printing and laser cutting using the 3D model built in Solidworks. I used these automatic processes to reduce time spent on making so that I can use the time on researching and generating ideas, which are more important for the early stage of the project. With the 3D model, I have used the technical drawing of that for laser cutting and have saved a lot of time of drawing the templates. However, the measurement of the diffuser unit was wrong so that the prototype was modified during the making process. Besides, I have used 3D printing to make the base and the lid of the device. The lid has patterned pits, which were designed to create randomness when the steam condenses and drop. The design is time consuming to handcraft. Therefore, I chose to make a 3D print version of that to prove to concept before spending time on making a handcrafted version of that.

However, the result did not meet my expectation. The steam made by the diffuser does not behave like hot steam or water vapour. Instead, it floated on the water surface like dry ice. As the steam did not raise, the water circulation failed in the first stage. The steam only condensed on the walls of the device and it looks a bit like raindrops on a window, which is something I aimed to achieve. There was a stream like sound created by the movement of water when the diffuser is activated, but that was not the sound I was aiming to create.

In overall, this prototype has proven that my initial idea on cycling water and recreate rain is wrong. However, the visual effect and the combination of water and light is acceptable and appropriate according to the research about relaxation and water. It seems the design is on the right track in terms of its function. Therefore, I decided to continue the raining lamp idea and I tried using another water cycling method in the next prototype.

Development
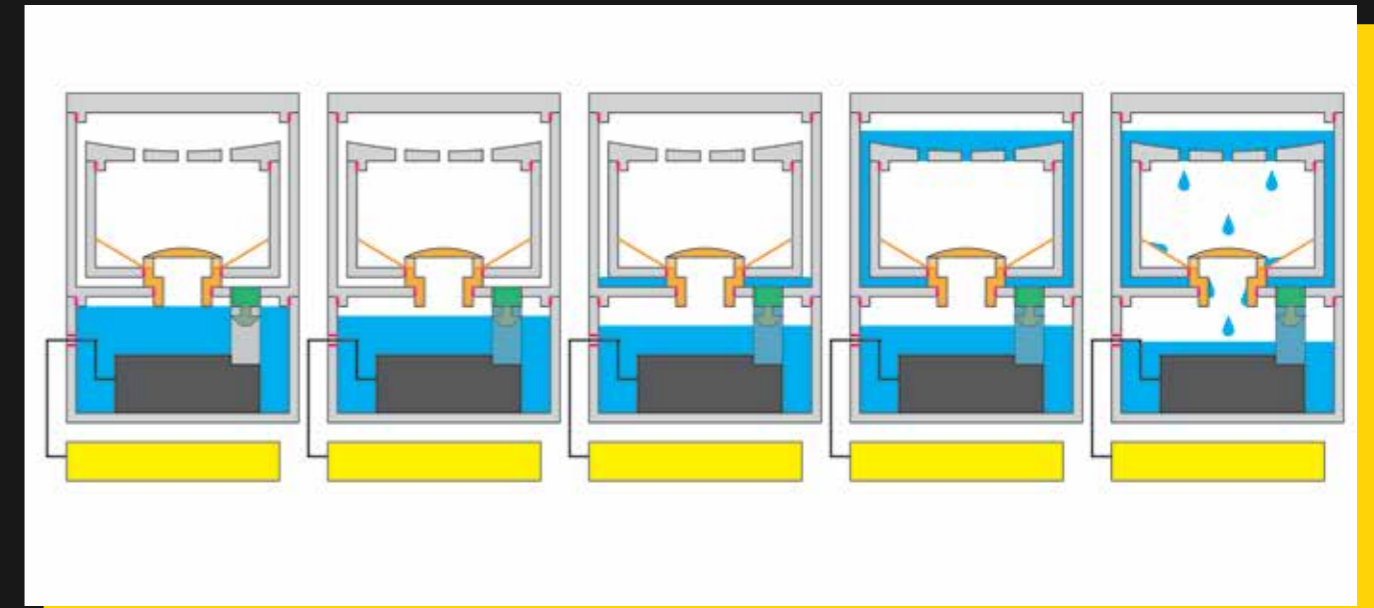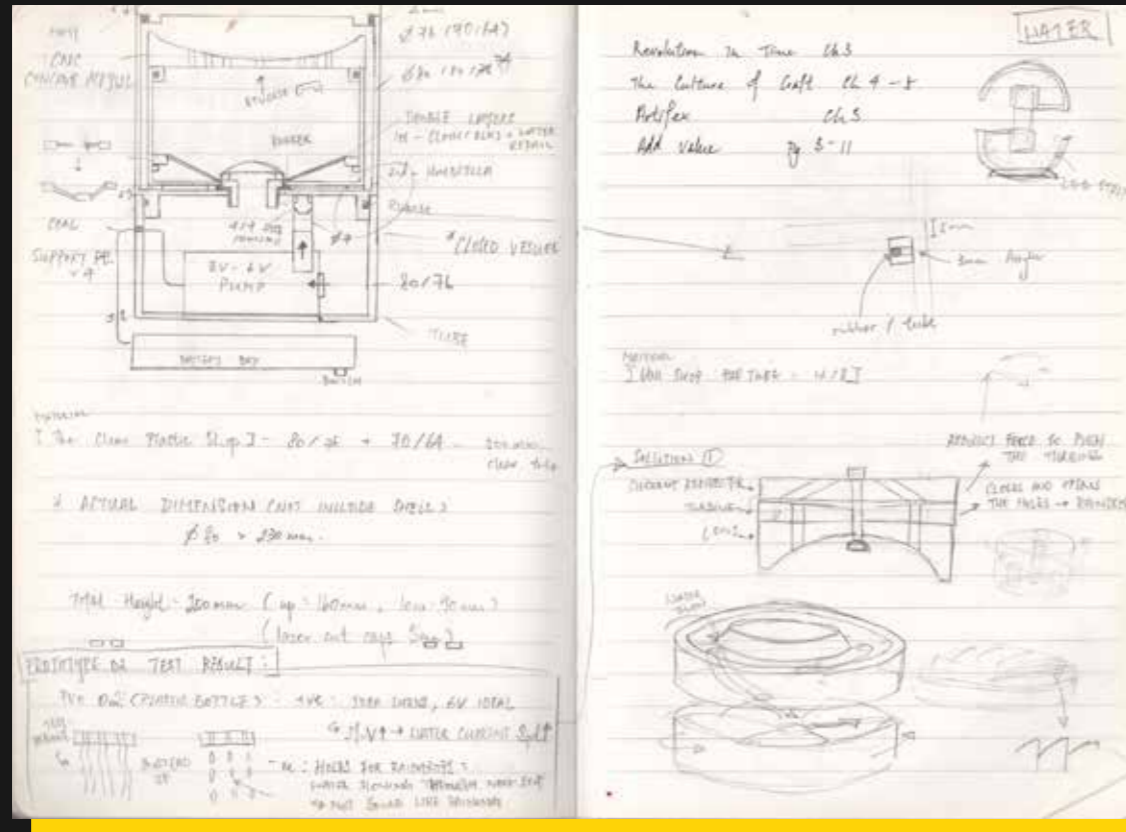
About this prototype:

After making the first prototype, I have changed the idea for cycling water and recreating rain. Instead of using a similar principle of rain in nature, I tried to use a pump and tank with little holes to recreate "rain" in small scale, just like a shower head.

This idea requires 3 parts in the design: a tank to store water in the bottom, another tank with little holes in a higher position, and a pipe to move water from a low position to a higher position. However, having a pipe in the middle of the design is not visually appealing. One way is to hide the pipe by covering it. But with this method, some area of the device will be covered and not transparent. For example, if the design is a square tank, I need to use one of the 4 sides to hide the pipe and only 3 sides are transparent. This approach has 2 major problem. First, as I want to project the moving water inside the device, having a solid cover at the back increases the difficulties of adding lights and limits the projecting direction. Second, I want the rain inside the device to be visible from all direction. In another words, I do not want a "backside" in the design.

Under these considerations, I came up with the idea of showing the pipe and make it as large as possible, using the pipe as a part of the design instead of hiding it. The result is a double wall design as shown in the sketch. When the pump is on, water fills up the space between the two layers of transparent material from the bottom. After the double-layer-pipe is filled with water, it will be hard to see the water moving inside as the walls and water are all transparent. Furthermore, the pipe filled up with water act like a magnifier because of reflection. It slightly magnifies the raindrops and diffuses the light. As the volume of the inner channel is actually very small, the water can be pumped up to the upper tank very quickly. Imagine having two party plastic cups which are identical and can be stack up. One of them is empty and the other has a little bit of water inside. If you put the empty cup onto the other one with water and try to stack them up, the water between two cups will be squeezed and split out.

To prove the new concept, I make the second prototype with simple materials. The second prototype is a function prototype with is only made for testing the mechanism. The appearance of it is totally different from how it should be, but the working mechanism is similar.
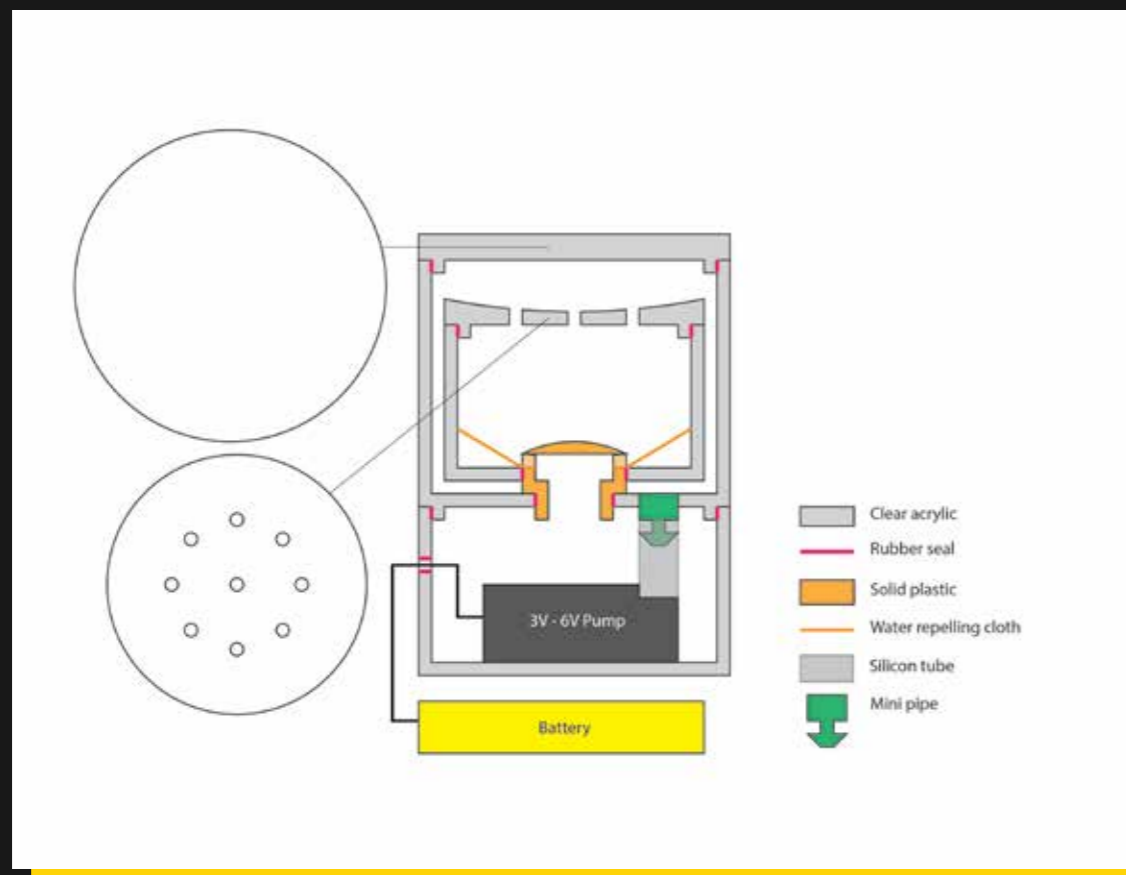
Rain Totem version 2 CAD model
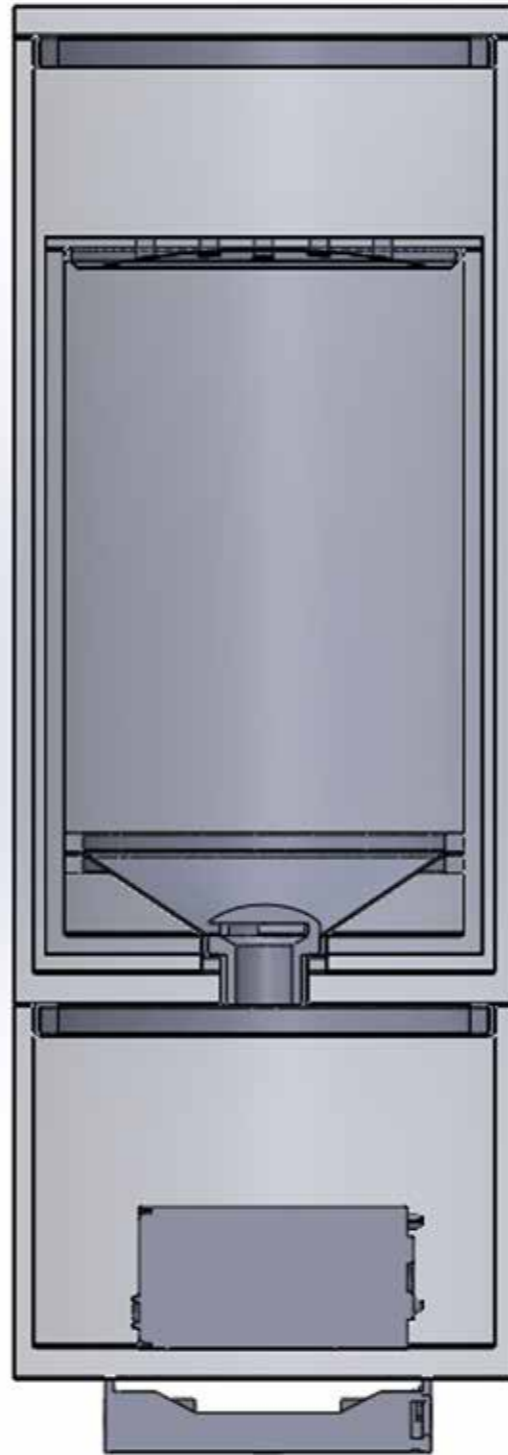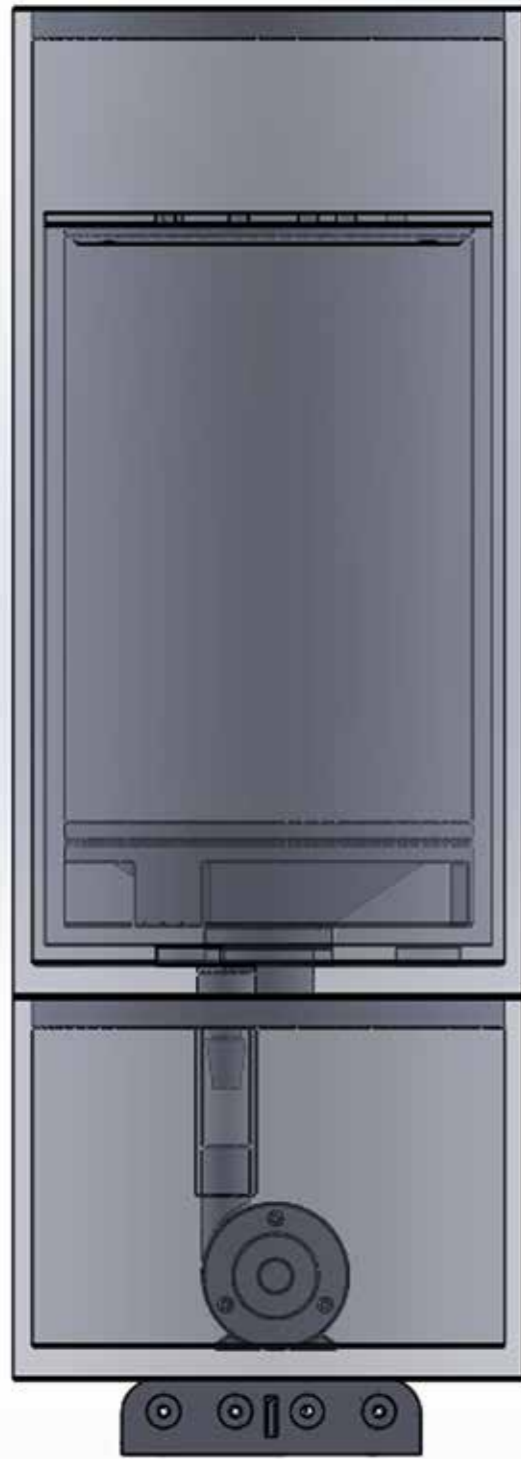
Prototype 02

Material and production method:
- Plastic measuring cups,
  bottles,
  plastic sheet from files,
  pump,
  mini pipe,
  battery and battery box,
  tape
- handmade
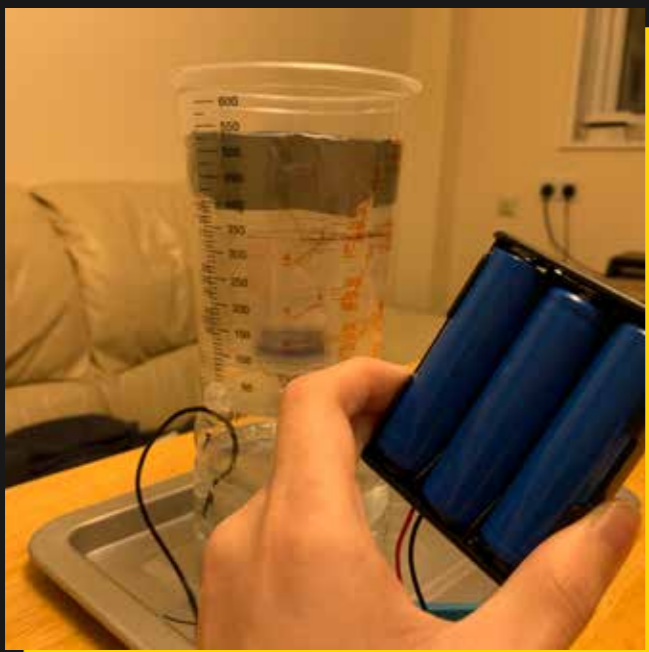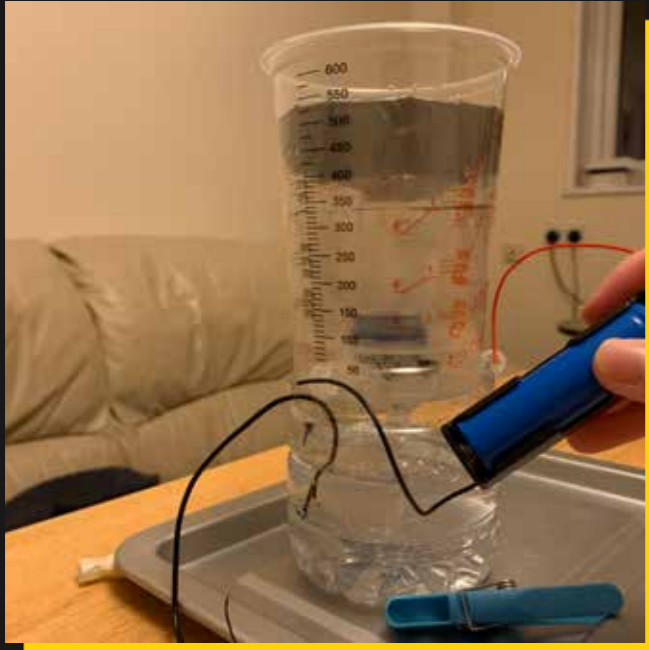
About this prototype:

Before building this prototype, I have also built a 3D model with Solidworks first, just like the previous prototype. With a more complex design like this, it is easier to think and double check the design with a 3D model as there are more information on a 3D model than 2D diagrams. I can notice problems more easily. In this case, such as to check the joints between different parts and the channels for water to flow. However, for this prototype, I chose to make it by hands and very simple material even I have a 3D model ready for printing. It is because I want the prototype to be transparent. Even nowadays domestic 3D printers can print transparent material, the result of that is not ideal if I want to see the interior very clearly unless I spend a lot of time finishing it up. Also, I can quickly modify the prototype if I encounter simple problems that can be fixed.

This prototype is made according to the diagram. Although the form is different, the mechanism is almost the same. In general, the concept has been proven to be feasible. The water circulation worked as I expected it to even the prototype is roughly made. When using the proper material, the effect should be much better, and the water circulation will be more stable. Furthermore, I have tried powering the prototype with a higher voltage. One of that blue battery (18650 battery) is 3.7 volts. I have tried using from 1 to 3 of those battery and found that 3.7V is the most suitable speed for the water flow at that time. 2 batteries (7.4V) is slightly too fast. The middle between 3.7V and 7.4V should be the most ideal. It implies that I may need to use a motor speed controller in the next prototype and the final piece.
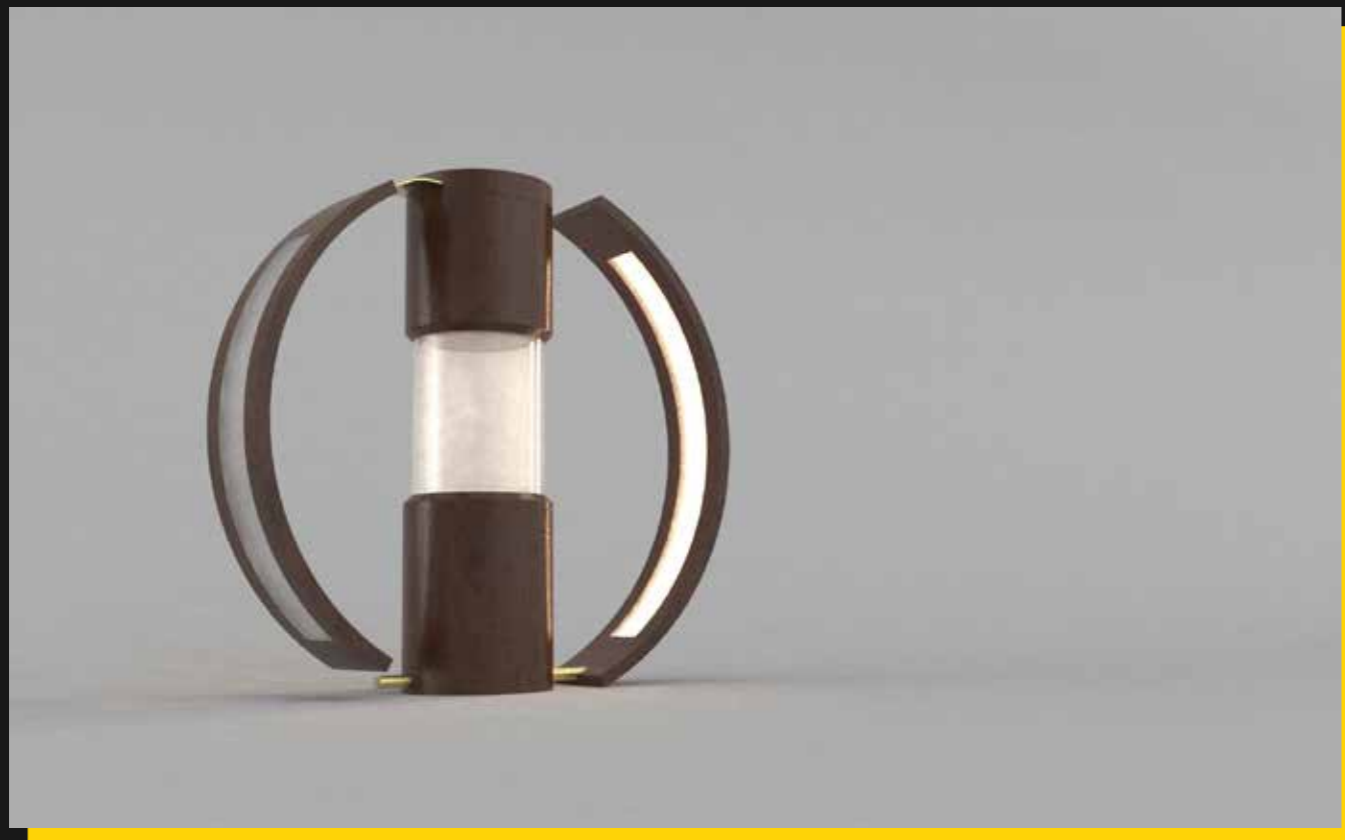
About this prototype:

After knowing that the mechanism works. I start working on the shell of the device. Before, I focused only on the function of the device and not the appearance. It is because if I made a shell for it, but the device won't work, the time will be wasted. In this stage, the design of the Rain Totem started to get in shape. The above is a Keyshot digital rendering of it. The mechanism is hidden with a wooden shell, showing only the part where the "rain" is dropping. I have added rotatable two arms to the body. A LED light is installed on the outer arm which will be switched on with the pump. It is used for projecting the shadow of water. A piece of matt clear acrylic is installed to the inner arm to diffuse the light. The projection will not be cased when the diffuser is used.

Prototype 01
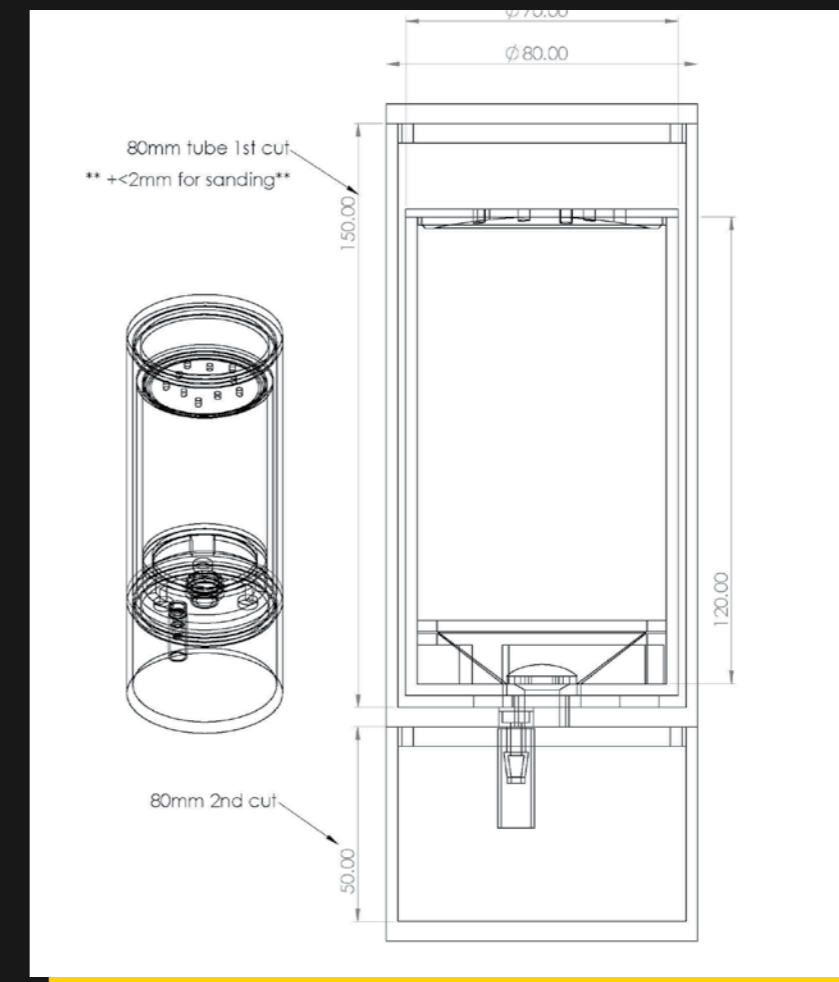
Material and production method:
- Circular parts: Laser cut (Clear Acrylic)
- Concave lens lid: CNC milling (Clear Acrylic)
- Mushroom shape white part for water collection:
  3D print (PLA)
- Leak proof sealing: Silicon strip
- 3V -6V pump with silicon tube
- Mini pipe for aquarium
- Water collecting funnel: Water repealing cloth
- 3.7V 18650 battery and battery box

Video of this prototype
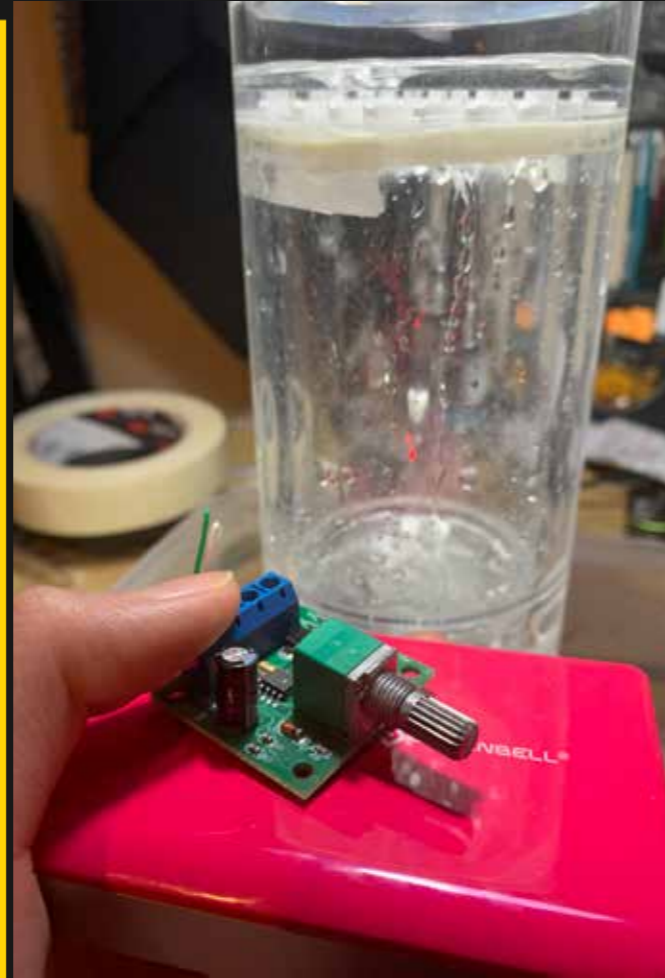
About this prototype:

This prototype has the same mechanism as the previous one but was made with actual materials which will be used in actual production. It was intended that if this prototype function perfectly, it will be used in the final piece. However, there were still some little issues that could be improved.

1)   The volume of the lower tank is not enough. This problem can be easily fixed by make the lower tank taller.

2)   The hole panel, which is the lid of the inner tube with holes to create rain drops, needs to be redesign. The current hole panel cannot create droplets of water. Instead, water flow through the holes continuously, creating some "strips" of water. Therefore, I decided to do more test on hole panels and to improve the raining effect.

3)   The current design of the funnel aims to generate sound of water hitting on an umbrella with a piece of cloth with high tension. However, it is difficult to position the cloth and apply enough tension to it. Even if it is possible, the piece of cloth is probably to small to make any sound. Therefore, I decided to change the material of that.

4)   The mushroom part is also too small to hold the cloth in place. The holes of it are also small and therefore water was flowing back too slow.

5)   Silicon strips is difficult to stay in place for sealing the joints as most adhesives are not effective holding its surface. I decided to replace silicon strips with self-adhesive rubber tape.

6)   The prototype is usually powered by 3 3.7V 18650 batteries with a speed controller. It can also be powered by 5V power bank or a USB wire to a wall plug. The common setting is with 3 18650 battery as I don't have a double slot battery box and for convivence.

Other process photos
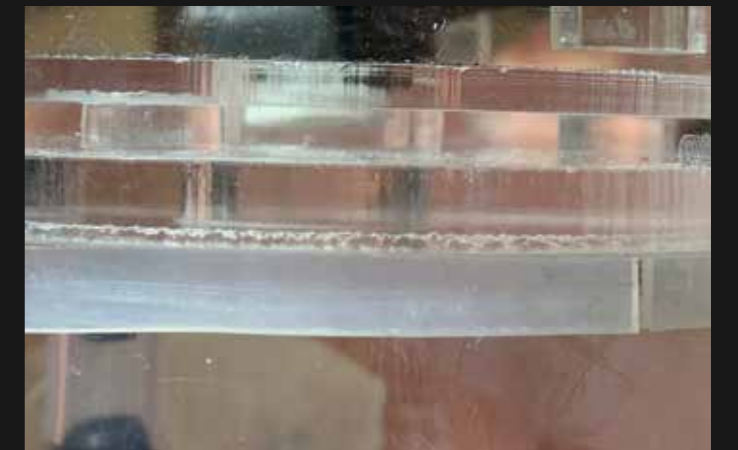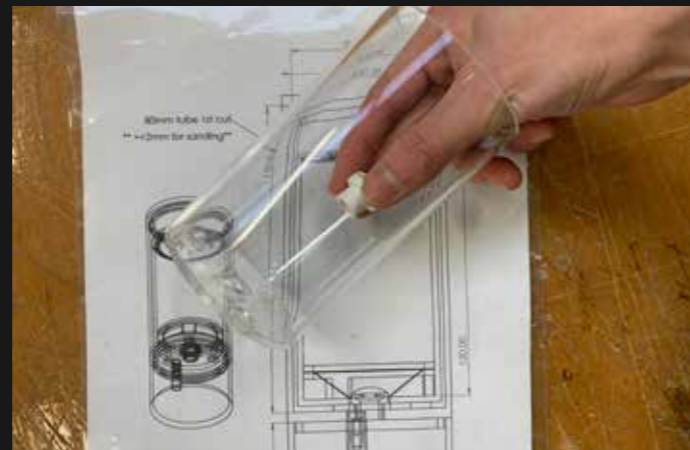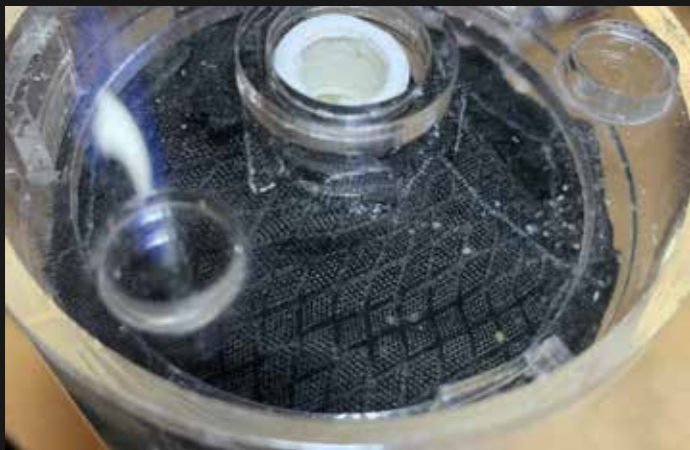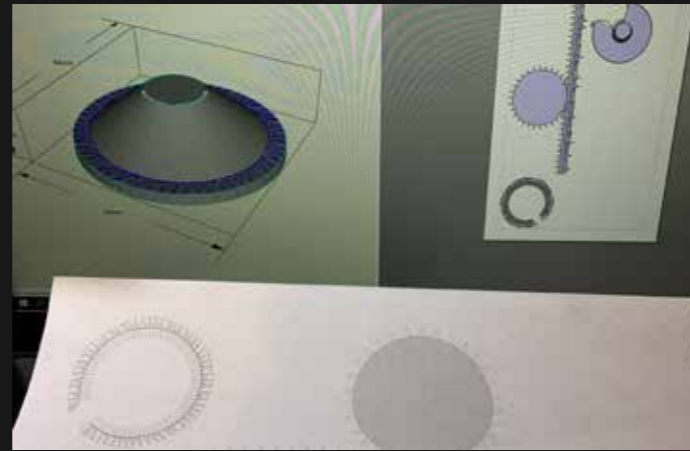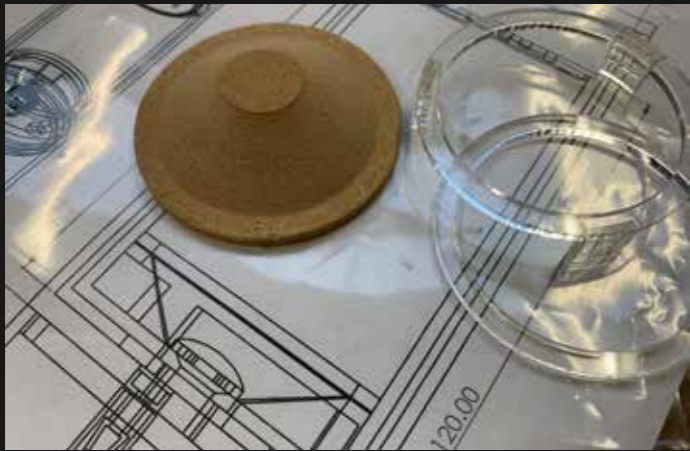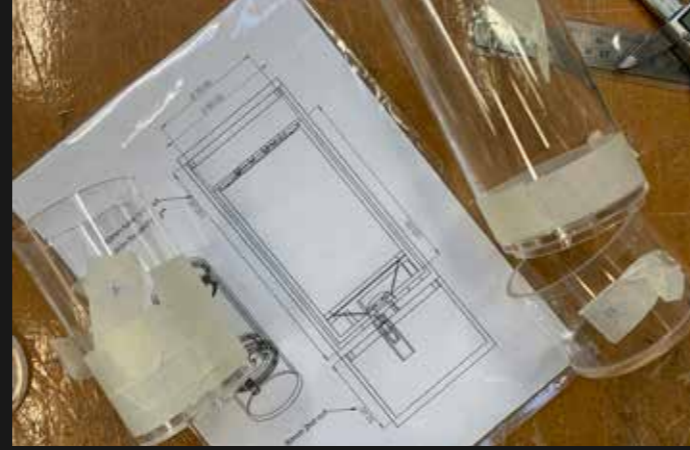
Experiment on hole panels
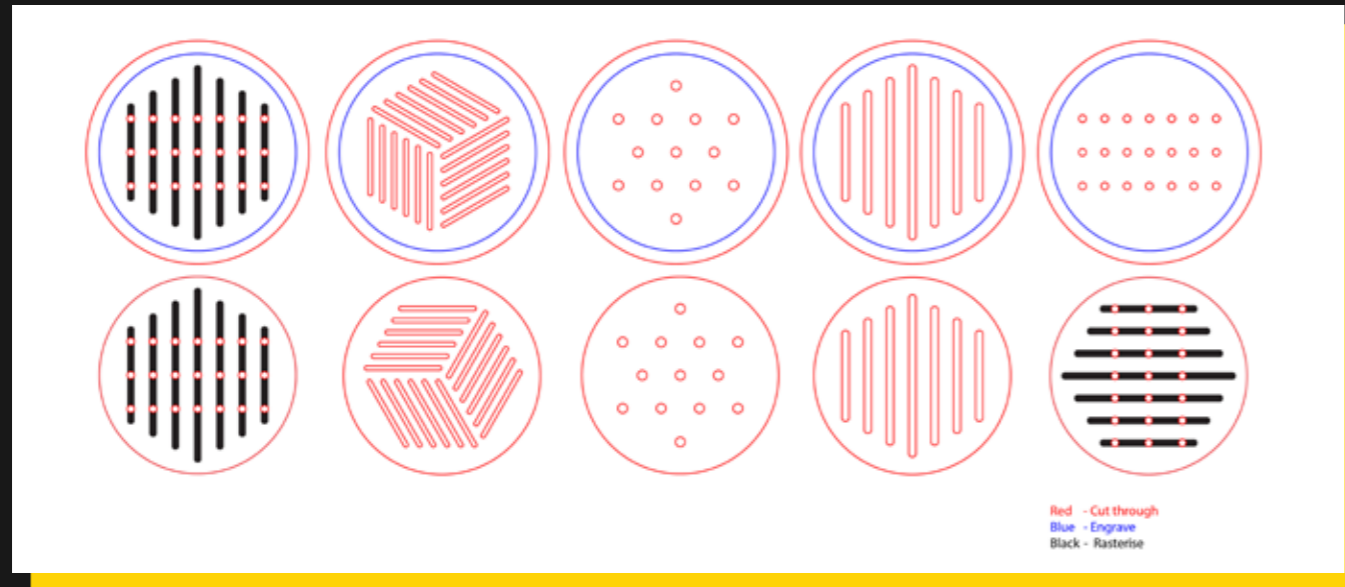
For this experiment, I used laser cut to make the panels instead of using CNC milling as the queueing time for CNC is too long and it is too expensive making test pieces. By layering up laser cut pieces, flat laser cut pieces can also form more complex structure just like a simplified version of 3D printing. When making the hole panels, I have used laser engraves to make chambers for water to move. It is beacuase laser rasterising actually removes arounf 0.5mm of the material from its surface. By stacking up two pieces of rasterised acrylic, there are space between the engraved area for water to move around.

Experiement results
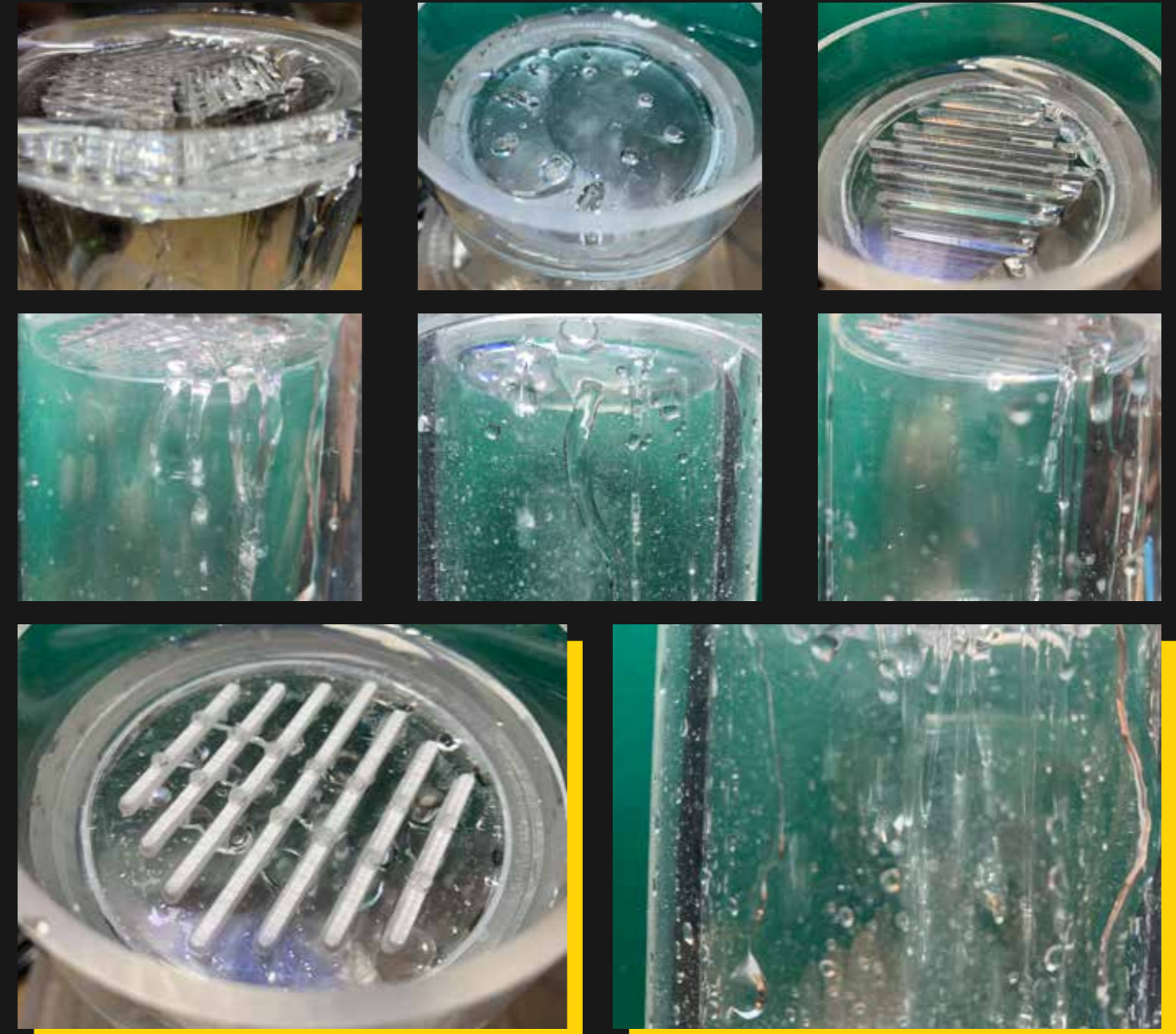
The hole panels with laser rasterised channels performed the best. It creates the most random water droplets and the visual effect looks the most similar to an actual rain. In the final piece, the hole panel will be made by CNC. Therefore, I can make that into a concave lens for light diffusion.

Experiement on water collecting funnel

Cloth is relatively too thick in a small scale for generating sound. The initail though was inspired by the prinicple of drums. However, the prototype has proven that using cloth is not feasible. Also, it is diffiuclt to get stay in the right position because it is soft. Therefore, I tried to make the funnel with vacuum formed PVC sheets. The MDF CNC milled block in the picture was originally made for as a guide to make the cloth funnel. I have used that as a positive mold for vacuum forming. I have used 2 different material for vacuum forming. The clear one is clear PVC vacuum forming sheet found in the polymer workshop. The gloss white one is HIPS brought from the material shop. Also, I have roughly made a tube to replace the mushroom-shape part which is too short and small to be used.

Experiement results

Video of this experiment

The experiment has shown that even when using the thinnest clear plastic sheet, the sound was not loud enough. One of the reasons could be the slow flow of water. The water drops cannot hit the funnel because the water was flowing too slowly and has been stored on the funnel. I tired fixing this issue by flipping the funnel up-side-down so that it could not hold water in it. That was effective in solving the problem. Therefore, the design for the water collection parts show be modified according to this experiement result.

Experiement on water collecting funnel 2

In the last experiment, I have found that the sound was not loud enough probably because of the thickness of my material choice. Therefore, I tried to use an even thinner material which is a freezer plastic bag. Instead of generating sound by hitting a tensioned surface, I attempted to generate sound by the movement of the material. The sound of rubbing or moving a freezer bag is quite similar to the sound of rain. Plus, the nag is thin and light which could generate sound when being hit by water droplets.

Experiement results

Video of this experiment

The sound is louder then before but it could be better. As the design of the water collection parts may change later, I decide to do further experiment with freezer bags later before making a decision. The video has also picked up the sound of the motor. However, in the final piece, the motor will be hidden in the wooden shell. Therefore, the noise should be absorbed.

Experiment on projection

I have put a LED remote-control lamp on the prototype to see the effect roughly. By using a remote-control lamp, the user can turn on or off the light from a range and the power of the lamp can be separated from the bump. Even when the user is sitting on the bed, they can turn the light off remotely without getting off the bed. They can also dimmer the light or set a timer to it with the remote.

I have also tested projecting the shadow of water droplets on the side with a torch. The projection is quite visible even when the upper LED lamp is set to the highest output.

Development

Some changes were made to the design according to the experiments and observations.

1) The inner arm is smaller than the outer arm. When I was rendering the previous version, I tried to rotate the arms and reposition the lamp. At that time, I realised that the inner arm needs to be smaller than the outer arm so that it does not get stuck when it rotates.

2) The volume of the lower tank has increased. By increasing the height of it, the height of the lower shell is taller than before as well.

3) The water collection parts are changed. I chose not to use a funnel but instead a convex shaped part. It prevents water from staying on it so that the flow of water can be faster. The channel connecting the two tubes is also larger to hasten water flowing back to the lower tank.

4) The hole panel will be redesigned for CNC milling referring to the test model with laser rasterised channels.

5) The final piece will be powered by a USB wire with adaptor for a wall plug, which is equal to a 5V power supply

Final production

Other process photos
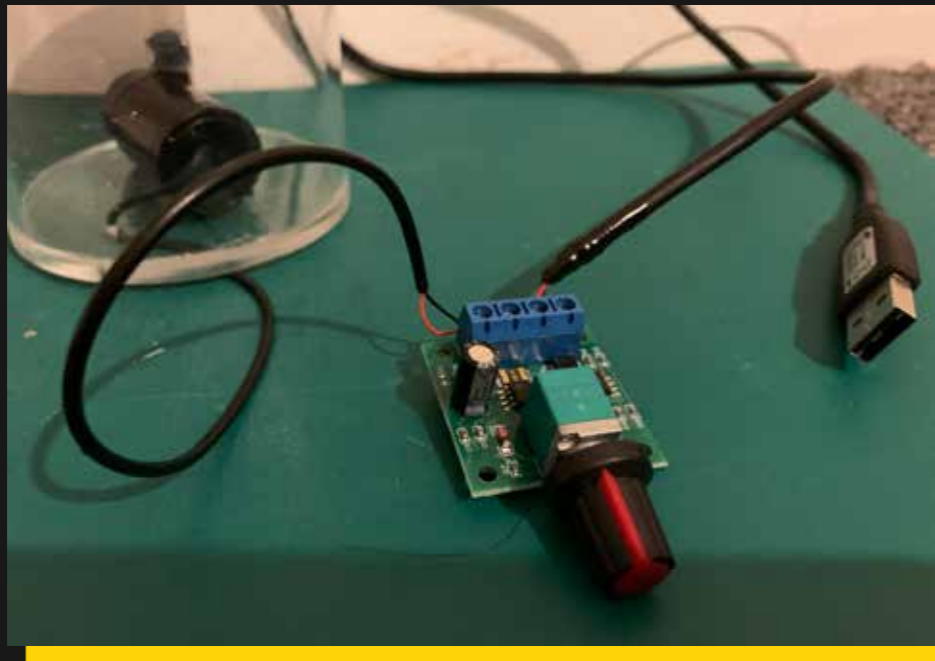
The final production has been stopped because of the coronavirus pandemic. Therefore, the final piece was half finished.

For Rain Totem, I was only managed to make most of the mechanism par, which is the clear rain tower part. The material has just arrived when the school is shut down, so I had not started the production of the shell. The making process of final mechanism part is almost the same as the third prototype. Therefore, I did not record the whole process of that. Some different processes of the making will be shown below. Also, the plan for making process and technique for the remaining parts will be shown in this chapter.
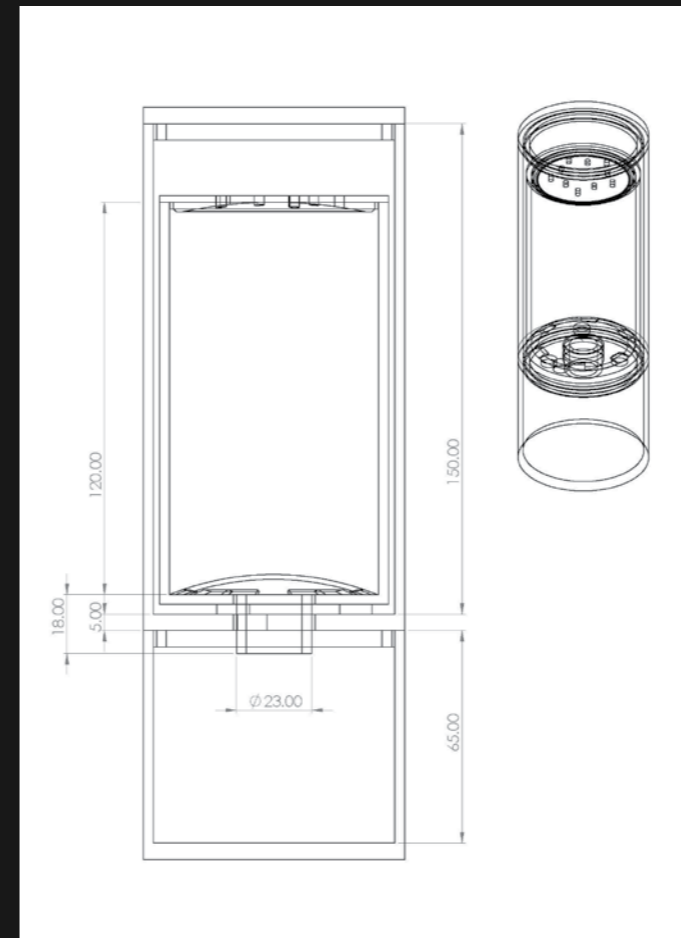
1
.2B

River Lantern
A rotating candle holder

There was an ancient Chinese saying goes like "water can float a boat, or to sink it." With a claim and peaceful mind, you manage to ride on the river quietly; when letting your rage drives your action, you struggle to move on or even risking drowning in the water. River Lantern is a candle holder which utilises the properties of water. A piece of patterned metal floats and rotates on inside it when a candle is lightened. The slowly moving shadow projected by the frame and the scent of the candle relaxes you. With a claimed mind like the lake in a windless day, you will see which way you should be sailing towards.

River Lantern version 1 CAD model
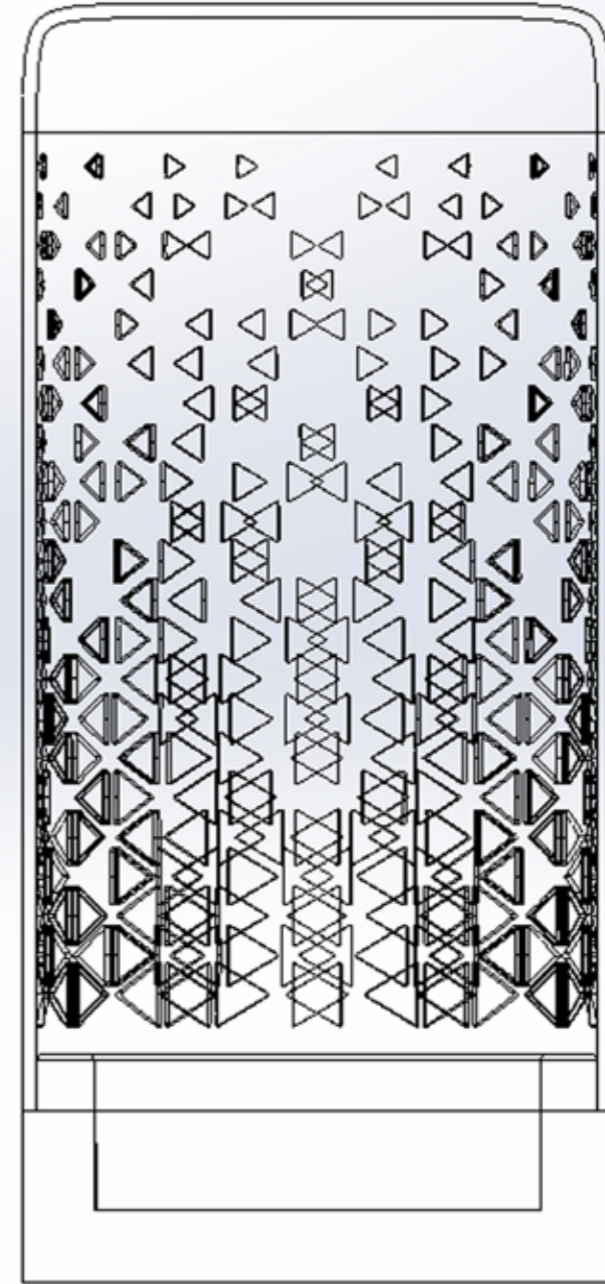
Material and production method:
- 3D printing (PLA)
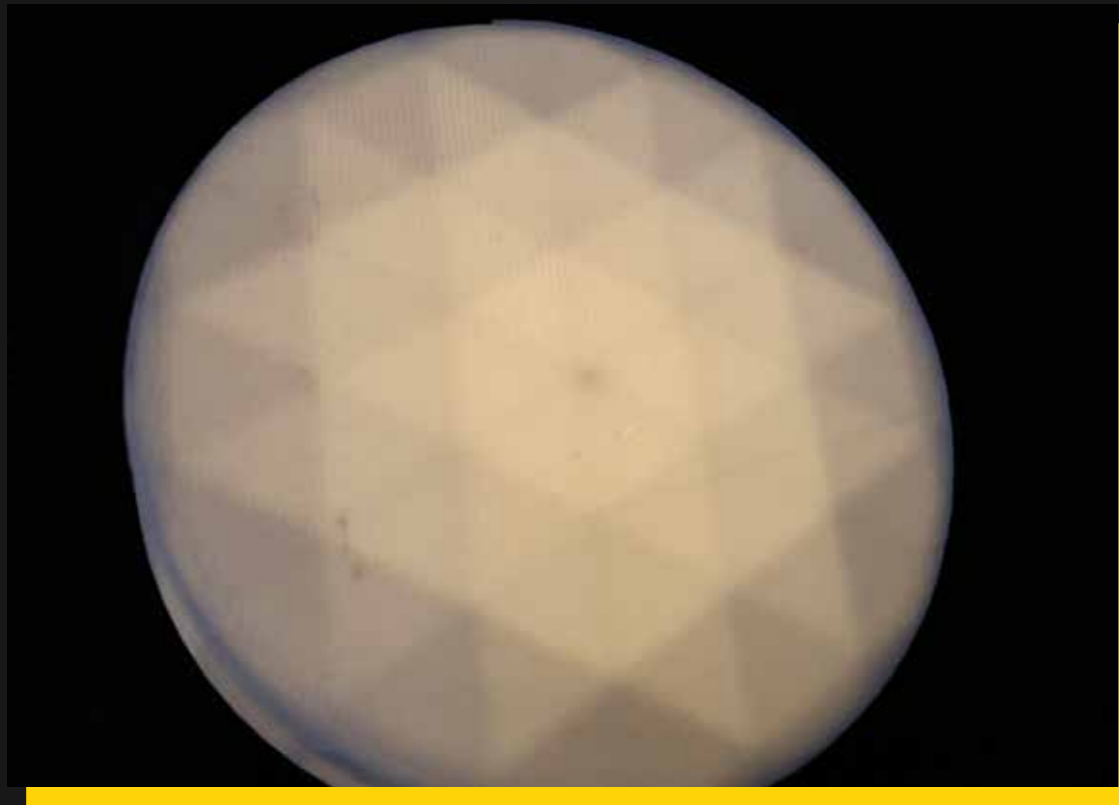
About this prototype:

The initial idea of River Lantern is to combine water vapour with lighting. The first prototype was made to prove the idea of illuminating hidden pattern inside a solid material. I have used 3D printing to make a patterned wall inside the lamp shade while keeping the outside plain to test if the patterns can be revealed. If so, I can add a mist diffuser inside to combine the shadow of moving mist and the hidden patterns.

However, when I was testing with the prototype, I was thinking that the design would be more interesting if the patterned lamp shade can rotate. By referring to the theme of this project, I have come up with the idea of rotating the part if the part can float on water. The force for rotation can be provided by the raising hot air from a candle.

Development

The idea was basically reconstructed and the form and function of it has greatly changed. But the aim of the design is also to relax the user. The design of River Lantern has shared some similarities with the Rain Totem. River Lantern also has a double walls design filled with water. A piece of patterned aluminium attached to an aluminium fan and two pieces of cork. The cork supports the aluminium parts to float and rotate on water. Inside the double walls, a candle is placed on a brace disk. When the candle burns, hot air raises and pushes the fan. This design is inspired by a rotating candle holder which uses the sample principle of hot air. The frame also projects the shadow of the rotating patterned plate. Besides the visual effect, the scent of the candle which can be chosen according by the user's preference can help achieving relaxation and stress reduction.

The first prototype was made in late February 2020. There were only around a month to develop the idea before the closure of universities and the freeze of project. Only a quick model was made to test the dimension. The concept is not yet proved to be feasible. The next prototype is planned to be made with the actual materials for production so that I needed to order glass tubes from manufacturers. It was because the weight, size, and texture of the material are essential for the design. Also, I cannot use plastic if I need a functional prototype as I need to burn a candle during testing. As a result, this idea has remained in the ideation and conceptual stage.

Construction plan

Wood finish: Wax

Plan A: Laminating Walnut Veneer
Plan B: Reduction from a Walnut block
Plan C: CNC milling

Plan A: Plasma cutting
Plan B: Hand piercing

Plan A: Deforming by heat
with a wooden former
Plan B: Vacuum forming
Plan C: CNC milled primary
then cast with resin

Plan A: Wood turning
Plan B: CNC milling

Plan A: Deforming by heat
with a wooden former
Plan B: Vacuum forming
Plan C: CNC milled primary
then cast with resin

Plan A: Wood turning
Plan B: CNC milling

Plan A: Reduction from
a Walnut block
Plan B: Wood tunning

Plan A: Hand piercing

Plan A: Laser cut parts assembled to
ready made acrylic tubes

Plan A: CNC milling

Plan A: Vacuum forming with CNC milled
primary mold

Plan A: Laser cutting

This construction plan has indicated the production processes of each parts of Rain Totem and River Lantern. The back-up plans are also included in the plan. Plan A is the most ideal process or a more commonly used process in industry while the backup plans B and C maybe less ideal in terms of appearance and functions. However, they tend to be easier processes or are more achievable according to my experience and knowledge. Therefore, the designs can be eventually completed even the first plan has failed.

Wood finish: Wax

Plan A: Laminating Walnut Veneer
Plan B: Reduction from a Walnut block
Plan C: CNC milling

Plan A: Hand piercing
Plan B: Plasma cutting

Plan A: Reduction from
a Walnut block
Plan B: Wood tunning

Plan A: Hand Piercing

Plan A: Ready made glass tubes

Plan A: Wood turning,
water prove resin
coating inside
Plan B: CNC milling
water prove resin
coating inside
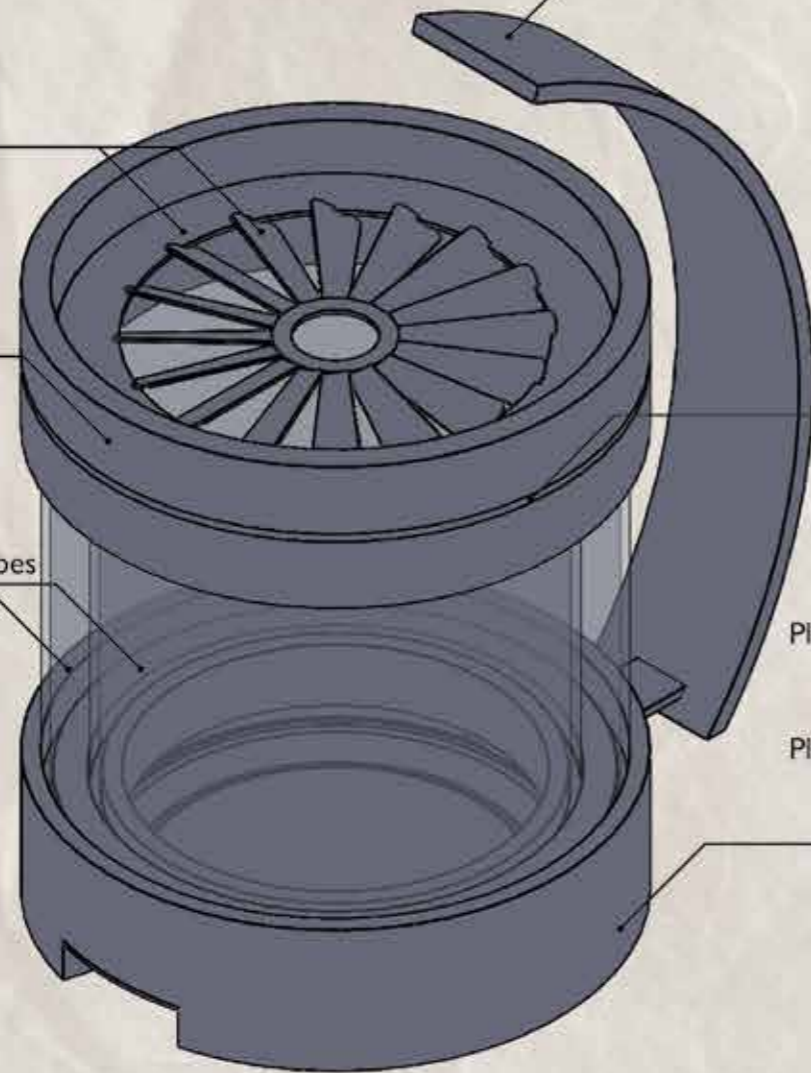
Plan A: handmade from cork sheet

Plan A: Plasma cutting

Plan A: Hand hammering
Plan B: make by parts,
hand piercing and
soldering

Plan A: Hand piercing
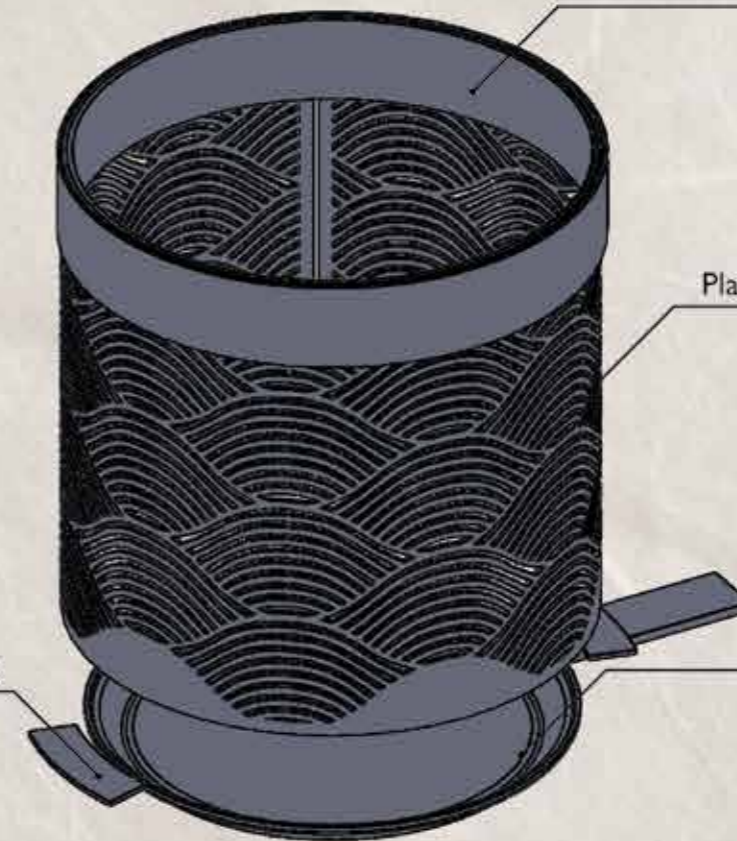
Chapter

2

Integration

This chapter will summarise the intention of each part of the designs. The relationship between the design and the research will also be indicated with labelled illustrations.

Inner arm: light diffuser

A piece of matt acrylic is sandwiched in the inner arm to diffuse light.

Hole panel

To create raindrops and to refract light for a wider illumination.

Double layer acrylic pipe

The channel of water movement.

Remote control LED

Control the brightness, switch on and off, and set a timer remotely.

Sound panel

To generate the sound of rain and hasten water collection.

Copper joint

Connection between the two acrylic tubes.

Rubber seals

Seals rings made of rubber to prevent leakage and increase friction for secure connection.

3V – 6V pump

An aquarium mini pump for creating water circulation in this device.

The lower tank

To store water for the circulation.

Knob switch

The piece of brass marks the power output level.

Motor speed controller

To control the speed of the pump and to connect other wires.

Outer arm: LED lamp strip

To project the shadow of moving water inside the lamp

1 Brass touches

In the practical research, products with plain designs has more considerations on materials. In the research, these products usually use materials with contrasting visual and sensational effects. For example, wood that gives a warm feeling and concrete that gives a cold feeling. In this case, I use walnut which is an organic material that gives a warm feeling and touches it up with brass, a cold and inorganic material.

2 Material choice: Walnut

Wood is a natural material that gives a warm feeling. Walnut is a relatively darker wood. It has a higher contrast with the light in the design.

3 Warm light

From the practice research, zen products and products for relaxation usually use warm lights. The LED used in Rain Totem is a warm light, which are light that technically has a lower Kelvin (K) value. It generally visually gives a warmer feeling instead of cool lights or blue lights that gives a colder feeling.

4 Property of water

River Lantern and Rain Totem is a series of relaxing lighting that utilising the property of water. Rain Totem uses the property of water that it is incompressible and free flowing to create the water circulation system.

5 Innovative water circulation system

The water circulation system is developed through a series of experiments and testing. Most existing water circulation system hides the pipes or unappealingly showing the system, such as circulation systems of aquariums. The main pipe in Rain Totem is generously used as the main body of the lamp and as a diffuser of light. Combining function and form in one.

6 Sound and visual effects of rain

Researches show that nature sound, including the sound of rain, has claiming effect and is effective in reducing stress. Exposure to nature also has similar effects. Rain Totem aims to achieve relaxation by recreating rain and combines it with lighting. The user can relax by listening to the sound of rain and by watching the raindrops or the projected shadow of the rain.

Removable lid

To empty and fill in water between the double layer glass.

Aluminium fan blades

Light weight and easy to process. To rotate the patterned plate.

Cork ring

To support the weight of the patterned plate using the property of water.

Double layer glass

To contain water and to float the patterned plate.

Patterned aluminim

Light weight, heat safe and easy to bend. Project wave patterns by the candle frame.

Handle of candle plate

Wooden handle to isolate heat and prevent scalding.

Leave spaces for air flow for combustion.

Elevated bottom

To catch molten candle for easy tidying.

Candle plate

Relation of design and research
- Rain Totem

① Scent of candle

Candles and incenses are commonly used even in professional therapeutic practice. In the research, many products for relaxation relates to smell and scent, such as incense burners and aroma diffusers.
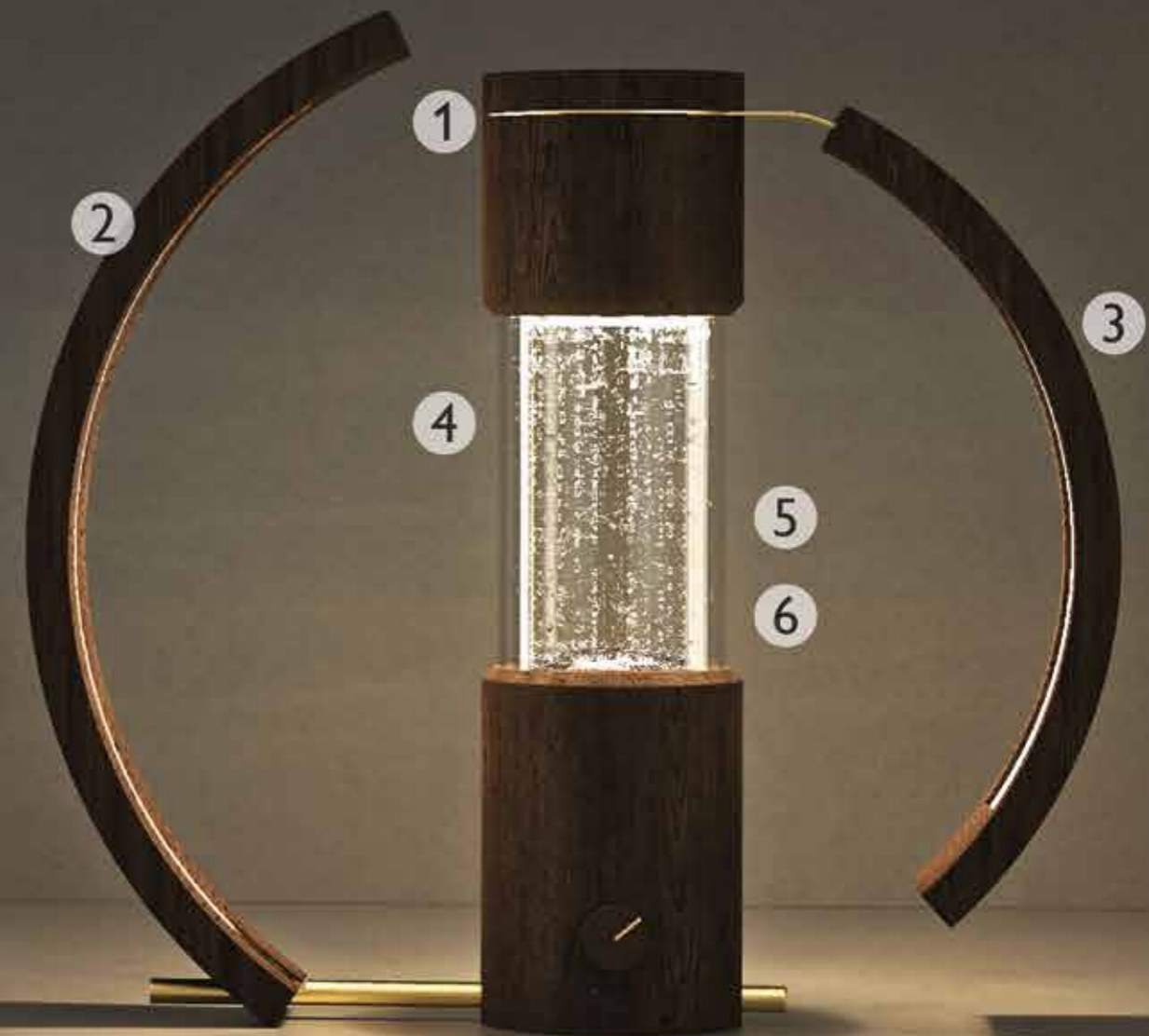
② Material choice: Walnut

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③ Brass touches

In the practical research, products with plain designs has more considerations on materials. In the research, these products usually use materials with contrasting visual and sensational effects. For example, wood that gives a warm feeling and concrete that gives a cold feeling. In this case, I use walnut which is an organic material that gives a warm feeling and touches it up with brass, a cold and inorganic material.

④ Property of water

River Lantern and Rain Totem is a series of relaxing lighting that utilising the property of water. River Lantern uses the property of liquid water to float materials which is less dense then it, such as cork.

⑤ Warm light of a burning candle

Warm light, which are light that technically has a lower Kelvin value (K). It generally visually gives a warmer feeling instead of cool lights or blue lights that gives a colder feeling. From the practice research, zen products and products for relaxation usually use warm lights.
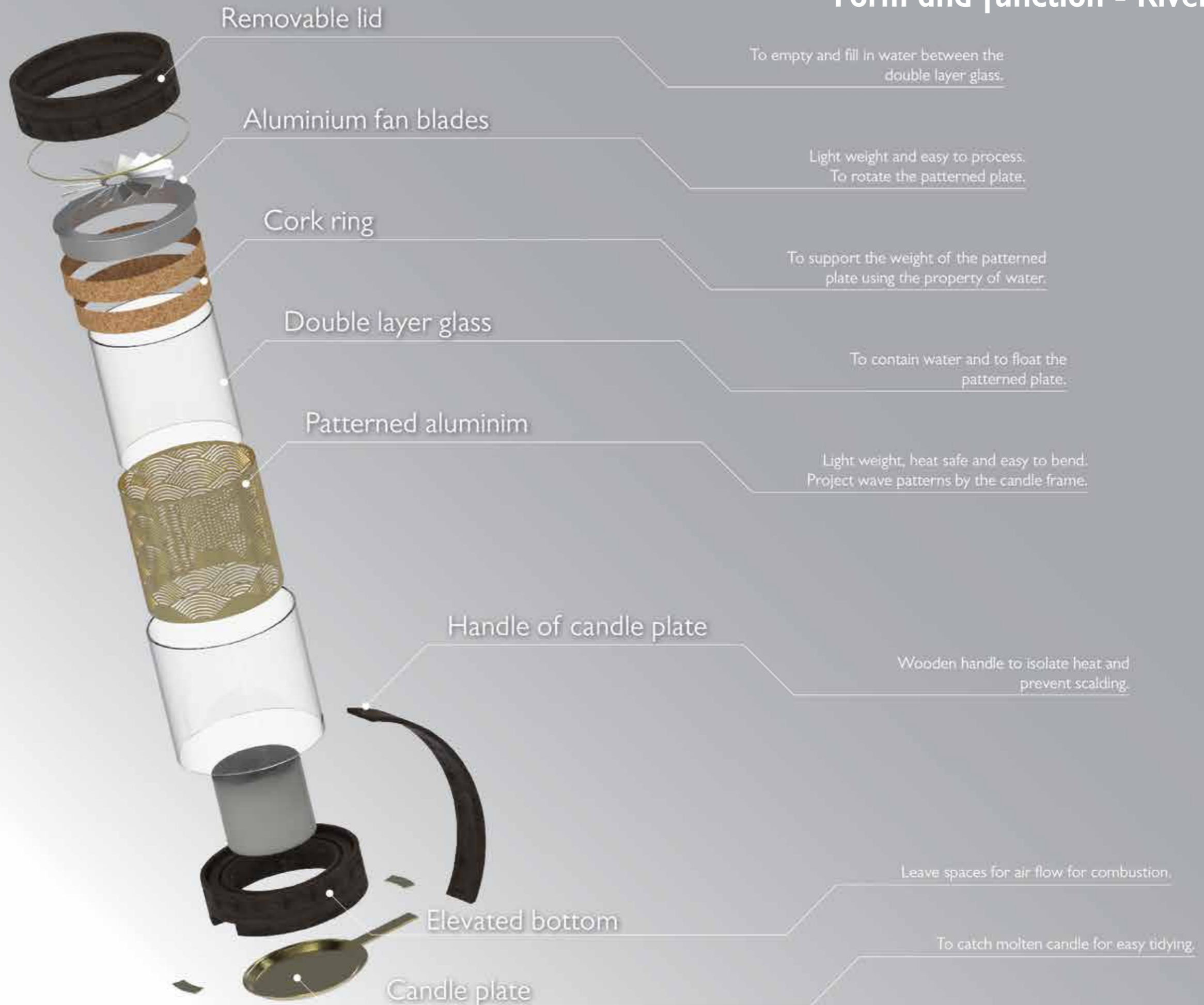
⑥ Slowly rotating wave pattern shadow

The slowly rotating wave pattern relates to moving water. Researches shows that exposure to nature can reduces stress and help relaxing. Also, vision or sound that relate to nature can trigger the effect.

Chapter

3

Organisation

This chapter has documented the organisation of the Mood Totems project through out the year. A reflection is writer to review the approach and to suggest areas to be improved.

Timeline of project

Proposition Week

Christmas vacation: trip to Hong Kong

External examiner visit

Early return to Hong Kong due to corona-virus pandemic

⚠️ UNIVERSITY SHUT DOWN

IDEA DEVELOPMENT - RIVER LANTERN

IDEA DEVELOPMENT - RAIN TOTEM

IDEATION

RESEARCH

PRODUCTION

EXHIBITION

ORIGINAL TIMELINE

REARRANGED ASSIGNMENTS (PDFs)

2019 SPET

2019 OCT

2019 NOV

2019 DEC

2020 JAN

2020 FEB

2020 MAR

2020 APR

2020 MAY

2020 JUNE

Reflection

In overall the organisation and planning of this project is suitable, sensible but it is a very tight schedule especial in the production stage.

In this project, I have spent a lot of time on researching and tackling technical problems instead on crafting or testing with materials. It was because those are the foundations of this project. The principle behind the products is essential to know before I can decide the form, functions, and material of the design. Afterwards, I need to solve technical issues for achieving the goals according to the research. Therefore, a solid base of the project must be built up from a sufficient research before material testing and crafting can be meaningful. However, due to this concern, I had less time on making and crafting test pieces and the final pieces.

To prevent failing to complete the final pieces for exhibition, I used CAD software to help the idea development stage. Instead of making physically making test models and experiments, I chose to build virtual 3D models to save time from trials and errors. Yet, the CAD processes were also to improve the design and explore from trials and errors. However, I can react to them instantly and modify the design before spending the time of making a prototype or the final pieces. As the result, most prototypes and test models were rough.

Furthermore, during research and idea development stages, I have done a little work on material testing or exploring building techniques. It was because this project is not a material-based project but conceptual-based. Comparing to testing materials, I was more interested in proving my concepts and testing ideas. Plus, the production processes I have chosen are straight forward and basic. The project did not aim to challenge a craft technique nor the material. Therefore, there were basically material test samples or tests on techniques.

So, is having rough test pieces and lacking on material tests a flaw in planning? Maybe not. I have organised this project according to the project's need in the most sensible way I could. If the project did not require those stages, then adding them into the plan would most likely be a waste of time.

One of the areas of the plan that could be better was the production stage of the project. The original plan was to start the production of the final pieces before Easter vacation. Before the vacation, I was planning to make parts which requires using the workshops. For example, the moulds for veneers lamination and wood turned parts. Then, during the vacation, I can work on handmaking processes such as lamination and piercing metal plates. This planning was to use workshop times most efficiently while leaving time consuming processes when the workshop is closed. However, this plan was actually very tight and risky. I would be just able to finish the final pieces just before the deadline and I can only bare tiny errors.

Also, the idea development stages could be shorter. As I was using a lot of automated machines such as laser cutting, 3D printing and CNC milling, the queuing time was long. Although I have planned tasks when I was queuing, sometimes the queuing time was too long that there were a few times the progress was stopped as I was waiting for prints or CNC parts. Rapid prototyping technologies are convenient and fast, but the queues were long. In some cases, for example, making prototypes in early stages, I should sacrifice perfection for speed and hand make the models instead of queuing for machines.

In conclusion, the current organisation is suitable and sensible for the project but can be improved on efficiency. In early stages, handmaking processes with easy and cheap material can replace automatic processes when preciseness is not necessary. In the middle stages, a suitable amount of material tests should be added to the plane to increase understanding to the chosen material. It can prevent undesired surprises in the production stage. The production stage should start earlier, probably 2 weeks ahead then the current plan. It allows more time for a finer final result and to leave time for fixing errors.

Chapter

4

Resolution

This chapter is the presentation of the results of the Mood Totems project. Under the affect of the corona-virus pandemic, final pieces are impossible to be finished. Therefore, digital renders were made to replace photographs. This chapter will also demonstrate further possibilities of the two products in this project.

The original version of Rain Totem has used walnut because of the warm feeling given by the material. However, the feeling of the material is subjective to the user. Therefore, versions with different combination of materials can be made so that customers have more choices.

Further possibilities
- River Lantern

According to the research results, activities allowing expression of ideas are effective in reducing stress and easing some other mental disorders such as anxiety. The examples are painting, drawing, and sometimes colouring. The extension idea of River Lantern focus on customising the product. Line drawings printed on transparent vinyl sheet. The user can colour the vinyl with permanent markers. The result is a coloured transparent film which looks like colour windows in a church. The candle fire projects the colours and patterns on the film. For users with a higher level of drawing skill. They can even create their own drawing without using premade templates. The effect of this extension idea should be similar to colouring or free drawing in enhancing mental well-being.

Literature Review

As this project focus on 3D designs which can enhance the users' mental well-being, it is important to understand the cause, symptoms and existing treatments on mental health disorders. The research began from general knowledge on the causes and symptoms of anxiety and panic disorder. Then, more research was done along the development of the project on art therapy for mental disorders. These researches aim to identify elements which are beneficial to enhancing mental well-being and therefore to endorse the idea development of the 3D designs. This literature review has summarized the most important sources throughout all the secondary research done within the whole project regardless the stage of development.

Suffering from mental disorder is different from feeling depressed or being upset by cause by some events encountered but instead, mental disorder patients' emotion can be triggered abnormally and sometimes the negative emotion is linked to more symptoms. According to Asmundson and Katz's research, medical data suggested that anxiety disorder frequently co-occur with chronic pain. It is implied that pain is more than sensation and its cause is not limited to physical but also phycological and social. Furthermore, the research indicated that the chronic pain in relation with trauma could become a cause of anxiety for anxiety disorder patients and thus forming a vicious cycle (Asmundson and Katz, 2009). From Asmundson's research, it is known that the patients' mental and physical health can be worsen if the patients does not receive effective treatments.

Within the many treatments of mental disorders, art therapy has been a relatively innovative and non-medical based treatment for different mental disorders. Beans has reported that art therapy is gaining popularity in promoting mental health through creating artwork with a vary of media such as clay or paints. Under a well-designed program with professional guidance, art therapists encourage patients to express their feeling and experience through creating artworks (Beans, 2019). Despite the effectiveness of art therapy is difficult to be studied and analyzed, case studies tend to prove that art therapy is a positive treatment for mental disorders.

Understanding that art therapy is effective in easing or even treating mental disorders, the secondary research continues in treatments on anxiety and panic disorders, as this disorder is more related to the target users of this project. Further chapters will discuss more on the target users and their needs. Albertini has documented an art therapy course for one of her anxiety disorder patients and have suggested that autogenous training can be more effective assisting with art therapy. In well-designed and well-constructed art therapy sections, art making has played the role in the comprehension and reflection-from-within process for mental patients (Albertini, 2001). Through art therapy sections, patients tend to express themselves more comfortably and confidently. Also, art making can help the patients in self-exploration and managing emotions. On the other hand, therapists can build up relationships with the patients while learning more about their feeling through their works (Albertini, 2001). From this research, it is learnt that patients can feel better if they can express their feeling through art making. Therapists can observe the patients' inner needs and feelings through their creations. It is implied that customization can be included to the 3D design. In the customizable parts, users should gain a fairly large freedom in their creation to express their thoughts and because of that, the customization should not require professional design and crafts skills but only simple actions such as hand drawing or colour filling.

Appendix

Even though art therapy is an effective treatment for mental disorders, its effectiveness requires professional guidance. This requirement cannot be achieved through a product-based approach unless it is a tool for an art therapy course. Instead, this project tends more to ease negative emotions through making or using a device without any professional help. Thus, the secondary research has moved on from art therapy to studies on treating stress related disorders and the relationship between mental health and exposure to nature. Annerstedt's research team suggested that the exposure to green environments is related to stress, mental fatigue and restoration. The researchers suggested that close connection to natural environment has a positive relation to mental health. Furthermore, exposing to natural sound have similar effect in enhancing mental health while birdsong and sound of water seem to be more effective (Annerstedt, et al., 2013). By knowing that simulated experience could have similar results of accessing to the natural environment, such as recreating the soundscape, the researcher team has conducted a series of experiment on stress measurement with visual reality (VR). They have suggested that high quality VR simulations with sound and visual effects can partly simulate the exposure to natural experience and the effect on stress level. According to the findings that VR environment can also create a similar experience as visiting nature, it seems that relaxation can be achieved by sound and visual stimulations.

To understand more about reducing stress by listening to certain sounds, more researches were done on sound therapy. Aydin and Searchfield has conducted a series of experiments on the relationship between sound therapy and stress related mental disorders. Effectiveness on using nature sounds, such as rain, stream and ocean waves, and broadband sound were compared in reducing stress measures without counselling. The results showed that both nature sounds, and broadband sound were effective in reducing most stress measures including tinnitus ratings, heart rate, salivary cortisol, and cortisone concentration. Only broadband sound was effective in lowering the participants' blood pressure (Aydin and Searchfield, 2019). Therefore, it was concluded that the interaction between stress and sound therapy is complex, but in overall, nature sounds, and broadband noise can help reducing stress.

There are similar researches on the relation between the choice, quality of sound and relaxation effectiveness. Alvarsson's research has compared the effectiveness of stress reduction by listening to different sound. The results suggested that the nature sound is generally more pleasant than urban noise or the mixture of both. In particular, Alvarson has used the sound of a fountain and tweeting birds at the average of 50dB in his experiments (Alvarsson, Wiens, and Nilsson, 2010). The research has also found that recovery of stress is faster during exposure to more pleasant sound. Therefore, the effect of sound may vary duel to personal preference (Alvarsson, Wiens, and Nilsson, 2010). After summarizing the findings of Alvarsson's, Aydin's and Searchfield's studies, the design can include sound elements. It seems that nature sound is a better choice than broadband noise in a product or craft content. Although broadband noise may be more effective in reducing stress of the users, the sound may remain users or viewer of a broken device, which some broken device, like a radio, will generate such sound. The broadband sound tends to create a negative image when it is used on a product and it does not fit into the design language. On the other hand, nature sound, especially the sound of water fits well into the theme of this project while being effective in reducing stress.

In overall, the secondary research can be concluded to the followings. Firstly, mental disorder can harm both patients' mental and physical health if it is not treated rightly. Secondly, to treat mental disorder, especially anxiety and panic disorder, art therapy and sound therapy tend a relatively innovative and positive treatment. However, art therapy requires professional guidance from art therapists. Therefore, it is not likely that art therapy approaches will be added as a feature in a design. Yet, there can be some customizable part so that the user can participate in art making activities, which can also benefit in reducing stress. Thirdly, nature sound is effective in reducing stress without professional guide. The design can generate the sound of water to enhance stress reduction effect. By adding the sound of water, not only the function of the design is improved, but also to reinforce the theme and content of the project.

Reference

Aydin, N. and Searchfield, G., (2019). Changes in tinnitus and physiological biomarkers of stress in response to short-term broadband noise and sounds of nature. Complementary Therapies in Medicine, 46, pp.62-68.

Albertini, C., (2001). Contribution of art therapy in the treatment of agoraphobia with panic disorder. American Journal of Art Therapy, Vol.40, pp.137-146

Annerstedt, M. et al., (2013). Inducing physiological stress recovery with sounds of nature in a virtual reality forest — Results from a pilot study. Physiology & Behavior, 118, pp.240-250.

Alvarsson, J., Wiens, S. and Nilsson, M., (2010). Stress Recovery during Exposure to Nature Sound and Environmental Noise. International Journal of Environmental Research and Public Health, 7(3), pp.1036-1046.

Asmundson, G. and Katz, J., (2009). Understanding the co-occurrence of anxiety disorders and chronic pain: state-of-the-art. Depression and Anxiety, 26(10), pp.888-901.

Beans, C., (2019). Science and Culture: Searching for the science behind art therapy. Proceedings of the National Academy of Sciences, 116(3), pp.707-710.