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Research Article

Ard Al-Eab. Project related to the psychological grounding technique with the help of an engineering concept.

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Coping Mechanism
Grounding Technique
Bernoulli principle
Torricelli's Law
Plastic Footprint

Abstract: *Ard Al-eab is the model to help people calm themselves. This model had a manual and required creative assembly. This model replaces their ineffective coping mechanism with a positive one, resulting from improvements in their financial and psychosocial well-being. This model is a bridge between engineering and psychology. The methodology uses using Bernoulli principle, Torricelli's law, and the grounding technique with the five senses. Eventually, the feedback has not been established yet, but this model can reduce plastic footprint by 83.5kg per year. The model needs to be improved with the establishment of quantitative and qualitative data of the user.*

1. INTRODUCTION

People stress, but they can control their own stress based on their techniques to relax. However, some of the people failed to handle their own stress. Eventually, they used unhealthy coping mechanisms such as consuming alcohol and smoking cigarettes. The issue is that it creates more corticosterone and adrenaline hormones, which increase stress toward the individual, family, and society (Abidin, 2015). Thus, new research is made, and this research is creating a model to psycho-educate people on how to engage their cognitive and coping mechanisms to improve their home economic, psychosocial, and educational surroundings.

Salem and Robenson (2025) stated that unfair income relates to depression. Plus, Maslow's hierarchy stated that people need to gain their basic needs, such as food and water, before levelling up to many levels until self-actualization (Cherry, 2025). That means if the people achieve their survival needs. They will be able to reduce their maladaptive coping mechanisms and reduce their stress, anxiety, and depression. Back to the creation model of invention, this invention is linked with the concept of the grounding technique. Grounding technique is a technique that helps a person to stay present in order to divert his or her mind from negative thinking and feeling (Raypole, 2025).

As has been mentioned that this model of invention to grounded in technique as a part of a coping mechanism. Hence, this model is also designed by using recycled materials with the application of engineering, which can be shown in Figure 1 below. To be true, the main objective of this invention is to apply the five senses of the grounding technique as a part of the coping mechanism tools to use. The secondary objective is to psychoeducate users to create a model independently in a creative way after they were given a manual through QR code, based on social media. Another secondary objective is to boost their home economy. This is because the model of an invention is also growing plants and herbs to sustain their finance and basic health needs. In addition, the last secondary objective is to reduce plastic footprint and increase their psychosocial support among individuals, friends, and family. Therefore, this model is called Ard Al-eab.

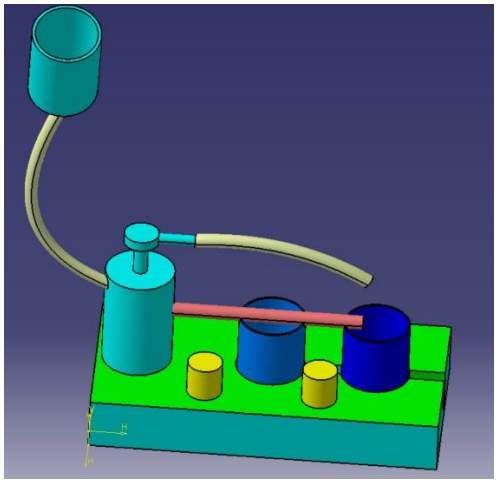

Figure 1 : The design of the project Ard Al-eab

2. LITERATURE REVIEW

Many people are facing difficulties. Plus, some of them can handle traumatic experiences even though they are facing many issues. However, they are facing many issues. Though there are a few of them that could not handle an unexpected situation. This is called a coping mechanism. Algorani and Gupta (2023) stated that a coping mechanism is a mechanism that people use to control their stress level based on their behavioural manner within a stressful environment. Eventually, some of the people used bad coping mechanisms such as repressing, avoiding, and worst of all, they like to engage in smoking and consume alcohol to reduce their stress level, even though it is bad for their health (Alforani & Gupta, 2023).

Therefore, unhealthy mechanisms may contribute to the issue of mental health and mental illness in society. Based on the research in America, 45% of the respondents show coping mechanisms such as poor sleeping hygiene, addiction to watching movies or dramas, withdrawal of self-responsibility, and self-isolation. Those mechanisms occur due to various reasons. Based on the research, cost of living, relationship issues, either friend or family and financial support are the top three issues that have an impact on Americans (77 % of Americans, 2024). That is why good coping

mechanisms need to be given to the people, such as the grounding technique. Sutton (2022) mentioned that the grounding technique helps people to handle association and anxiety. It has a lot of tools and techniques to apply, such as the five senses, the grounding chair and etc. However, this grounding technique has limitations in empirical investigation of the efficiency of scientific research (Hammond & Brown, 2025).

Therefore, human error is the factor in the lack of empirical investigation for the grounding technique. It can be shown that stress impact is due to system failure. This system failure can be attributed to social culture, design, environment, and cultural factors (Elliot, 2021). Thus, psychological and engineering practice is needed to integrate to understand human needs and limitations (Roscoe et all, 2019).

However, bridging the gap between Maslow's hierarchy and the engineering model is crucial. This is because a study by Winkelman (2015) found that engineers create perfect toilet facilities in developing countries for the women's communities in India, specifically in Rajasthan, and also South Mexico. Eventually, this toilet was rarely used because it was against the women's social norms in their region. Thus, this toilet gets attraction from men apart from the unsuitable location. Therefore, engineers take into account the physiological and safety needs of Maslow's hierarchy, but they forgot to include other hierarchy especially self-actualization. In other words, engineering needs to focus wholly upon the level of Maslow's hierarchy simultaneously. To be precise, failing to meet the needs of Maslow's hierarchy will have an impact on mental health based on the level of the hierarchy (Maslow's hierarchy, 2025).

3. METHODOLOGY

When applying the grounding technique, make sure that people stay present. Thus, the methodology for creating an invention model, such as Ard Al-eab needs a manual to build which can be referred to in the sample Appendix 1 below. However, this manual can be followed and can be changed by the user. The recycled or usable material consists of reused wire as a hose, foam as a base, a water bottle as a vase, a plastic bag as a waterproof cover, and a reused shampoo bottle as a water reservoir and dispenser pump. However, stationary tape and water plumber teflon tape will be paid as an estimation, roughly RM3 or $0.8.Plus, a hot glue gun and stick are used with the cost estimation of RM15 or $ 4.

Based on Figure 2 below, this model shows various reasons to use, such as the shampoo pump dispenser creates a sensation of touch. Beating a drum on the tin can creates a feeling of sight and hearing. Hence, smelling or testing the herbs creates the sensation of taste and scent. This sensation made people stay present from the negative thinking and mindlessness.

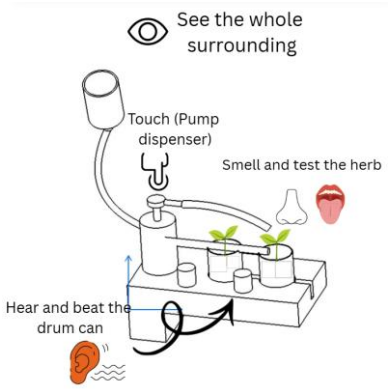

Figure 2 : The grounding technique design of the project

Based on how it works, there is information needed to know that people experience negative emotions. This emotion generated the sympathetic nervous system, which is called stress. When the sympathetic nervous system is activated, it gives a signal to the brain to fight or flight. Hence, their heart rate will increase, and the body needs more oxygen to send more blood to the necessary body (Sympathetic Nervous System , 2025).

Table 1: The relation of Components part of the model that generate the perceptions.

Sense	**Component Parts of the model**	**Perceptions**
See	The whole parts of model	Vision
Hear	Tin drum	Hearing
Feel	Shampoo's pump	Tactile
Taste	Herb	Gustation
Smell	Herb	Olfaction

Therefore, the stress needs to be reduced by applying the model of Ard Al-Eab, which can be shown in Table 1 above. This table shows how the perception created a sensation by applying the components of the model. When the user interacts with Ard Al-Eab by pushing the shampoo pump, it provides proprioceptive feedback due to the kinaesthetic tools as the user feels the resistance of the spring (De Melo et al., 2023). Consequently, this action helps the user to focus deeply on the physical components of the Ard Al-Eab. Plus, visual and tactile perceptions are also generated when the user recognizes the shape and generates perceptible physical sensations through sight and touch. Thus, the perception of hearing will be produced while the user beats the drum. Moreover, smelling and tasting the herb generates gustation and olfactory perception. Overall, these perceptions from the table 1 are relaying the nerve signal to the brain (Sight 2025). Consequently, these perceptions help increase the parasympathetic nervous system's control over the fight-or-flight response, such as reducing blood pressure, lowering heart rate, and decreasing cortisol levels (5 grounding techniques, 2025).

In terms of herbs, which can be seen from Figure 3 below as a part of gardening activities. A mint species such as Coleus Amboinicus is used as a part of medicine for cough treatment, which has been used by native Brazilians (Pinheiro et al., 2023). According to Filipe et al. (2025), this plant promotes analgesic, anti-inflammatory, and antioxidant properties for the user's benefit. Eventually, other plants can be used instead of Coleus Amboinicus because the functionality of this model is to promote grounding techniques and reduce some of the financial burden, such as cooking and medicine.

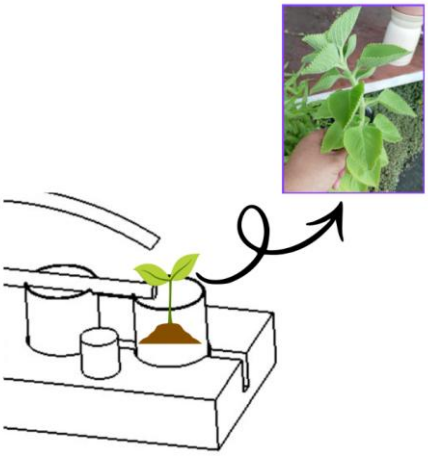

Figure 3 : Garddening activities for Coleus Amboinicus

The concept pump of the Ard Al-eab model is a reciprocating pump which has functionality of fluid mechanics (Mahmoud, n.d). Evans (2012) stated that this pump follows Bernoulli's principle, which can be shown from formula 1 below. Therefore, the movement of the fluid is based on the amount of pressure given.

$$\frac{1}{2}\rho v^2 = \rho g Z + P_{TOTAL} = CONSTANT$$

Formulae 1:Bernoulli principle (Mahmoud, n.d).

Where:

Table 2: Components of Bernoulli's principle.

Symbol Description	Description
ρ	Desnsity
v	Flow Velocity
P	Pressure
g	Acceleration based on gravity
Z	elevation

However, this model is also conscience with Torell's law when the water automatically flows out from the container due to the hole in the container, which can be shown in the Figure 4 and formula 2 below (Discharge of liquids , 2019).

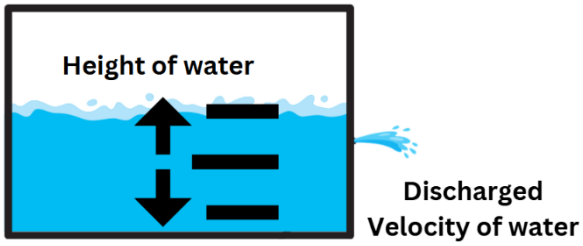

Figure 4 : Torricelli's law

$$v_d = \sqrt{v^2 + 2gh}$$

Formulae 2 : Torecell's law (Discharge of liquids , 2019).

Table 3: Components of Torricelli's law.

Symbol Description	Description
v_d	Discharged Velocity
v	Flow Velocity
P	Pressure
g	Acceleration based on gravity
h	Height between top level of water till the level of discharged velocity

On the other hand, this water container has a hose to reserve water from a shampoo bottle as a water reservoir, which can be seen in Figure 5 below. Plus, it is very efficient to save water, such as rainwater and water from air conditioning. According to research from Snidvongs et al (2020), the water in the air conditioner is distilled water and is saved to use because there is no contamination of salt and solid substances. Last but not least Plastic Footprint Calculator is used to study the number of plastic footprints reduced (Pamula,2024), which can be shown in Appendix 2 below.

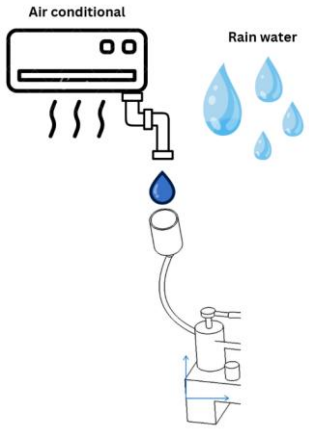

Figure 5 : Idea of water reservoir

4. FINDINGS

Even though the invention had been made, the issue of model Ard-Al-eab encountered a lack of respondents in terms of the grounding technique. This is because the model is new and not well-known by the people based on the social demographics in Malaysia. Therefore, as an initial stage of this project, the qualitative interview is needed to identify, along with promotion through social media, to identify performance of Ard AL-eab.

4.1 The issues

In addition, there will be a leak at the nozzle due to the defect of the reused material. However, the base of the foam is not affected due to covered by the plastic. Plus, the water that had been spilled is flowing through the drain shape of the base. Therefore, from Figure 6 can be seen that the spilled water will flow toward the other plant and the vases. This is an innovative technique to use the water efficiently.

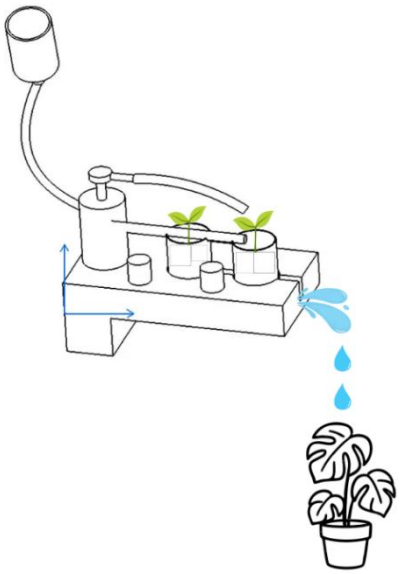

Figure 6 : Alternative way if water spilled

4.1.2 Plastic Footprint

Based on the analysis, the plastic footprint will be reused for 83.5kg per year. Thus, 6259 kg/ year lifetime will be spent per individual. (Pamula , 2024).

4.1.3 Helping Clinical and Allied Health Professional Services.

It is found that Ard-Al-eab can help clinical and allied health professionals serve the patient. This model can become a tool of psychoeducation for the patient. This is because Ard Al-eab is a communication tool between the medical staff and patients to make interventions using the grounding technique. Another reason is that the people who work in a clinical setting tend to overemphasize verbally toward the patient without reconsidering what the patient needs. Plus, this tool is used to reduce the communication gap between patients and clinical staff (Foley & Gentile, 2010). Thus, the staff can give psychoeducation to the patients practically and gain more understanding.

5. DISCUSSION

As has been stated in the findings, Ard Al-Eab needs promotion through social media and feedback from users. However, this model needs to be used with a few people as part of a prototype to identify more easily at an early stage. People may use it for the grounding technique purpose, but the quantitative and qualitative results need to be taken into account for feedback on this model. In addition, psychoeducation toward people by reading a manual and asking them to invent is part of the challenge due to their other commitments.

Furthermore, the leaking from the nozzle had already been taken into account. That is why a base wrapped by plastic is used for countermeasures. Plus, the draining line is also used for water efficiency. Therefore, it helps the user grow the herb to minimize the issue of basic needs and basic health issues.

If the people realized that model, they would roughly able to minimize 50kg of plastic used per year globally. This is because the simulation is made, and it can be predicted that people are able to minimize their plastic footprint to 83.5kg per year and 6259 kg/year lifetime, which can be shown from Appendix 2 below. Last but not least, this model is a bridging communication among the clinical staff and patients. Medical staff are capable of doing their technical field. However, it is hard to explain to patients who have no idea of the terminology regarding patient issues. However, the model of Ard Al-eab may help them to therapeutic relationship as this model is part of the toy. E.Heiden (2008) stated that patient can voice out their feeling and thoughts and identify their issue when associating the symbolic use of the models. However, the limitation of the guideline is how to use this model. Therefore, a standard of procedure needs to be made, tested, and verified with the quality and quantity method of the Ard Al-eab before the medical staff uses it in the future.

6. CONCLUSION

In conclusion, the model is ready to use, but it needs more research on qualitative and quantitative toward users at the early stage. Regarding this model will leak due to the lack of toughness of the material, it has been countermeasure, and it can be seen that this model can reduce 50kg of plastic globally. Therefore, this model is a bridge to the gap between engineering and psychological concepts. Whereas this model is a communication tool for the medical staff to build a therapeutic relationship with the patient. However, further research or a standard procedure needs to be made for the medical staff to use it in the future.

Acknowledgments: The authors would like to express gratitude to the one and only god who gave us the wisdom to create a research called Ard Al-eab, which means Play Ground in Arabic. Also, thank you to the parents, colleagues, families, and professional health clinical, management, and communities in Labuan for giving us support in our research. Even though this is our first time publishing research that links the bridge between engineering and psychology (Counselling).

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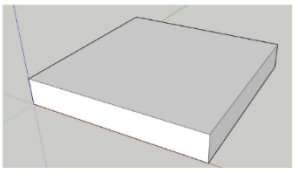
Appendix 1

This part is a sample of manual

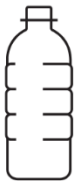
1.0.MAKING BASE

MATERIAL USE:



2 SET OF RECTANGULAR WHITE FORM

PLASTIC



3 SET OF 1.5 LITER UNUSED WATER BOTTLE

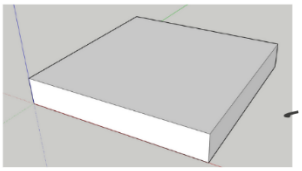
TOOL OF USE

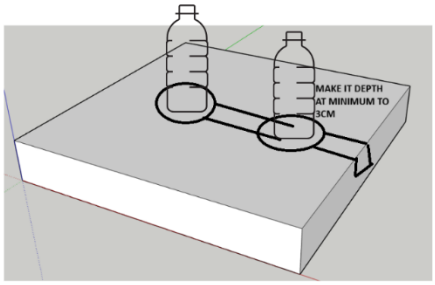
STEEL OF SPOON

MARKER PEN

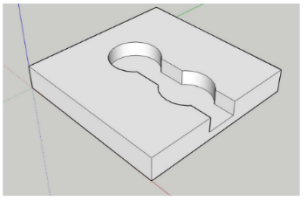
STANDARD OF PROCEDURE:

1.USE WATER BOTTLE TO MARK AND SHOVLLED IT WITH SPOON WITH DEPTH AT MINIMUM 3CM.





2.COVER THE BASE WITH PLASTIC AND STICK IT SELLOTAPE



3.MAKE SURE COVER THE BASE NEATLY

Appendix 2

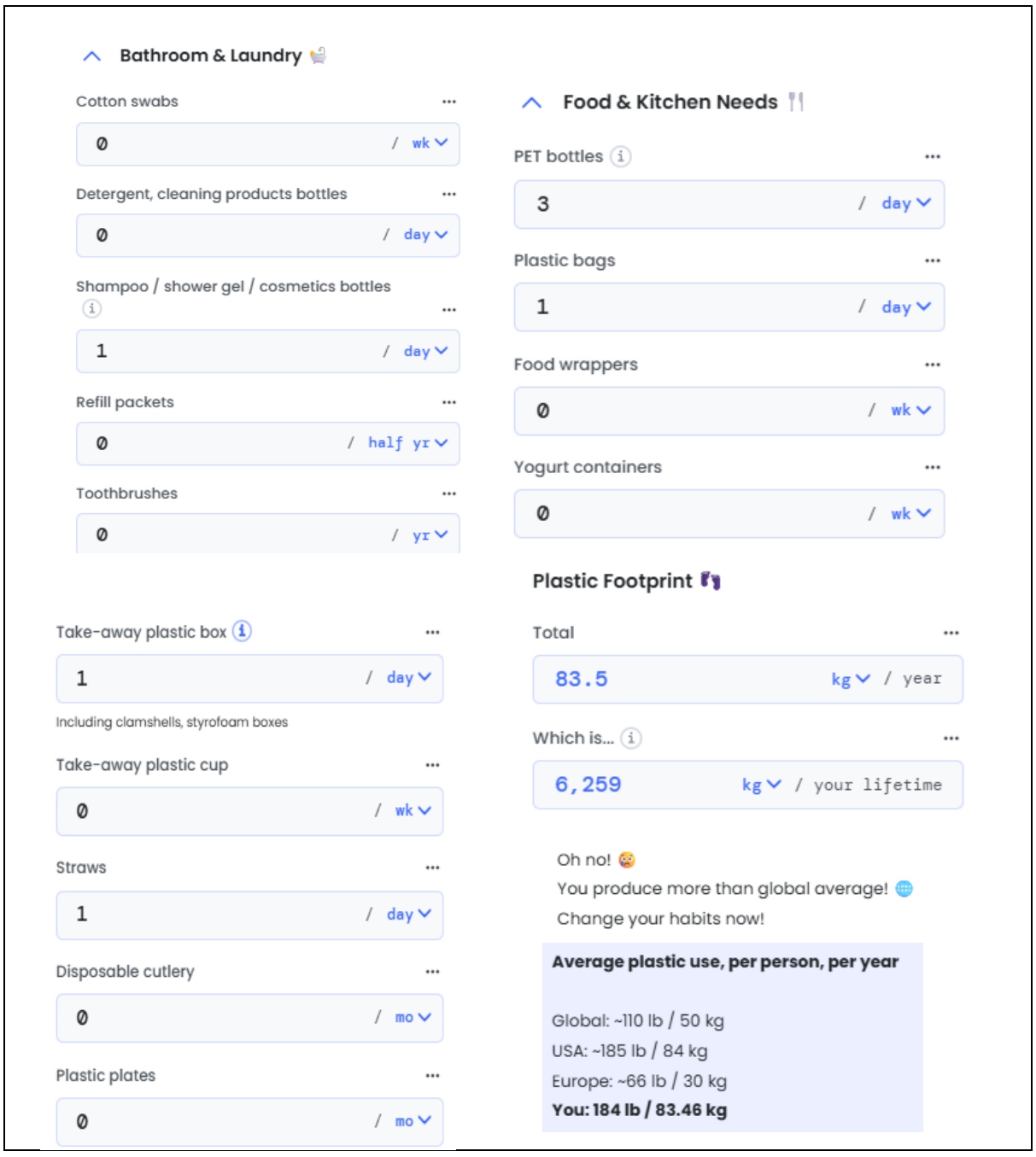


Figure 7: Plastic Footprint Calculator (Source : Plastic Footprint Calculator - Check Your Environmental Impact, 2026).