

# The Creative Design and Social Service Practice of zen\_Farm

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## Abstract

We developed "zen\_Farm" through waste recycling and makers, with the aim of guiding people to practice how to calm their minds. Utilize the concept of "Every drop of calm water makes all things green" to remind the world to cherish the natural environment and live in peace with all things. The main purpose of zen\_Farm is to emphasize the calmness and concentration of "Mind Meditation". Its special feature is that people use the stability of their heartbeats to drive the water source of zen\_Farm. In recent years, the world has gradually developed a new form of creative community that combines digital media to gather community awareness and improve the current situation of the community, which can bring new energy and stimulate new thinking in urban areas. We practically integrate zen\_Farm into social practice, including:

(1) The installation is located at Dharma Drum Mountain, the most important Buddhist unit in Taiwan. Let the Buddhist masters in the park use the concept of plant irrigation to reflect the natural environment to be sustainable and green. Guide them to finally become one with nature. (2) The installation was installed at Shakeng Elementary School in Taiwan, allowing students to renovate the campus together and irrigate the plants through their own heartbeats to create a common memory on the campus. The zen\_Farm is not only an interactive installation art work made by makers, it makes the campus of Buddhist parks and rural schools more friendly and beautiful, and it also supports the concept of environmental protection. We also hope to achieve the long-standing goal of digital art creators - "Media Transparency" through the creative design and social practice of zen\_Farm. Participating in meditation activities can connect the emotional memories of the community together and establish a shared memory in the campus.

## Keywords

Zen, Farm, Maker, Interactive Installation Art, heartbeat, Creative Community.

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# Introduction

## The Importance of Meditation for Everyone

Modern life is becoming more and more busy, and people are pursuing a better quality of life. What is a good quality of life? The World Health Organization (WHO) has published the WHOQOL assessment, a quality of life assessment developed by the WHOQOL Group in parallel with 15

international field centers <sup>1</sup>. WHOQOL includes four domains: physical health, mental state, social relations, and environmental domain. Meditation in Buddhism can make people's mental state invisibly tend to be calm and soothing through the guidance of meditation, so as to achieve a state of "relaxation" and "concentration". In addition, it can also achieve the concept of "Protecting the spiritual environment" advocated by Master Sheng Yan of the Dharma Drum Mountain.

## The Rise of Makers and FabLab

The "Maker Movement" has become an important international trend in recent years, influencing the Third Industrial Revolution. Countries around the world have integrated it into national policies and education systems, and even applied it in various fields. In 2014, President Obama of the United States announced that the future of American manufacturing would return to the domestic front, as the U.S. had comprehensively developed digital fabrication (FabLab) and maker movement education, from primary schools to universities <sup>2</sup>. With the popularity of the Maker Movement, concepts like "open science", "DIY science" or "citizen science" have continuously influenced societal development <sup>3</sup>. Integrating the concept of makers into social practice, the Maker Movement represents a form of social participation.

We synergized the "spiritual environmental protection" philosophy of Dharma Drum Mountain with "natural environmental protection" concepts. This collaboration resulted in the creation of zen\_Farm, an interactive installation art project crafted from repurposed plastic bottles, embodying the essence of maker's DIY. The unique feature of zen\_Farm is its use of a calmness index, derived from heartbeat detection, to control the irrigation of plants. The mechanism is designed such that the more tranquil the state of mind, the more water is dispensed for plant nourishment.



Figure 1: zen\_Farm at Dharma Drum Mountain © Suchu Hsu

## Impact of Social Practice and Creative Communities

Taiwan's Ministry of Education has implemented the "University Social Responsibility (USR) Program" since 2018. Promote the development of the real estate industry through the participation of university talents into the community. At the same time, students can make more contributions and care to the local society, and establish the university's social responsibility for community care. As universities increasingly focus on social engagement, students are encouraged to need a full range of learning that is not limited to the classroom. Through social practice, in addition to expanding students' learning fields, it is also the concrete practice of civic education <sup>4</sup>. Similarly, we have applied the zen\_Farm concept again in the remote Shakeng Elementary School, enabling the entire student body to paint PET bottles together, install and transform the school campus. This allows children to engage in physical activity while also performing heartbeat detection to irrigate plants, thereby fostering a state of calm and reflection.



Figure 2. zen\_Farm at Shakeng Elementary School © Suchu Hsu

We practice zen\_Farm in two communities (Dharma Drum Mountain Buddhist Park, Shakeng Elementary), hoping to achieve physical and mental tranquility (Zero), concentrate on generating energy (Energy), and become one with the natural environment (Nature) to achieving the essence of "ZEN" is in the field of life and study. In this way, the emotional memory of the community can be linked together. Use technology application and humanistic care to build a common memory and create a creative community. Expect to achieve a good quality of life in the areas of mental state, social relations, and environment assessed by WHOQOL.

## Related works

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### **Related literature on the Importance of Meditation for Everyone**

There are many scientific studies confirming meditation in ZEN. For example, Lusnig, Larissa, et al., proposed that meditation is a mental practice that can increase one's attention and calmly observe all the feelings of the moment. Let people enter a state of tranquility and achieve emotional regulation.<sup>5</sup> Tang, Yi-Yuan, et al. also proposed that the meditation practice can promote the practitioner's ability to maintain concentration through physical relaxation, breathing exercises, mental imagery, etc.<sup>6</sup> At the same time, there are also many artistic works applied to meditation and mental state, such as the interactive multimedia work "ZENetic Com-puter" created by Naoko Tosa and Seigow Matsuokam (2003),<sup>7</sup> which transforms traditional meditation content into multimedia to express The artistic conception of ZEN, and guide the viewer to learn the practice of ZEN. In addition, Hoshiyama & Hoshiyama of the University of Tokyo, Japan, also used electrocardiogram (Electrocardiography, ECG) to analyze the value of heart rate variability (HRV) changes for beginners in meditation practice.<sup>8</sup>

### **Related literature on the application of Maker and Fablab**

With the development of digital technology in recent years, digital media has also been developed internationally to promote community awareness, thereby improving the current situation of the community and bringing new energy and stimulating new thinking to the community.<sup>9</sup> Vossoughi et al. aimed at disadvantaged community students and provided suitable Fablab activities according to their needs to achieve higher social practice and educational equity.<sup>10</sup>

The "SASFAB Maker Alliance" program implemented by Hsu et al. was launched in Taiwan in 2015. It combines "Internet of Things (IoT) and "Maker/FabLab" to carry out social practice and other activities with artistic creative courses.<sup>11</sup>

### **The Impact of Social Practice USR or Creative Community**

In the Hangleton & Knoll community in the eastern part of England, Johnson & Monney collaborated with the University of Brighton to conduct community participation projects through art participatory activities. Through a participatory research approach to art, they engage researchers, artists, and community residents as partners in a "research collective," using art to explore and exchange their life experiences with each other to create a shared experience of the community.<sup>12</sup> In addition, many studies have found that the integration of group art activities into social practice can increase the cohesion and connection of the community.<sup>13</sup>

### **An example of the application of interactive installation art in community service**

Yang and Hsu developed the IoT platform in 2017 to implement the "Windflower ESPAS" project at Taipei Municipal NanMen Elementary School in Taiwan. It guides elementary school students to use their maker spirit to make Windflower objects by themselves to beautify the campus and community through artistic creation through social network actions. Windflower is a windmill during the day and a colorful lantern at night. You can watch the rotation of the windmill you made in the campus remotely through the mobile phone, and you can also change the light color of the remote Windflower through the app, so that everyone's emotional memory extends from the campus to the cloud.<sup>14</sup> Also a good example of social practice.

According to the above-related works, there are not many cases integrating "meditation," "maker," "interactive installation art" and "social practice" at the same time. This study takes this as the research goal and proposes to take ZEN as the theme, applying zen\_Farm's creative design practice in two communities.

# Creative Interactive Design of zen\_Farm

We explain the overall creative interactive design of zen\_Farm, including the device interaction design of water cycle, the device modeling design of heartbeat sensing, and the calculation logic of heartbeat sensing.

## Interactive Design of Water Circulation Device

The installation design of zen\_Farm is based on a simple "matrix arrangement" and emphasizes the "Mind Meditation" focus on the psychological level. It uses the method of recycling PET bottles and water circulation to build an automatic circulation irrigation system to implement the environmental protection and green energy proposition (Figure 3). According to the size and height of the space, there are 10 rows of 7 PET bottles installed in each row, with a total of 70 PET bottles. After cleaning the recycled PET bottles one by one, we dig holes according to the needs of the device to facilitate the growth of plants. We use the original structure of the bottle cap to design the various components required for the water cycle, and finally connect the head and tail of each bottle. Finally, use the air pipe to connect all the bottles and complete the water circulation structure through the pump.

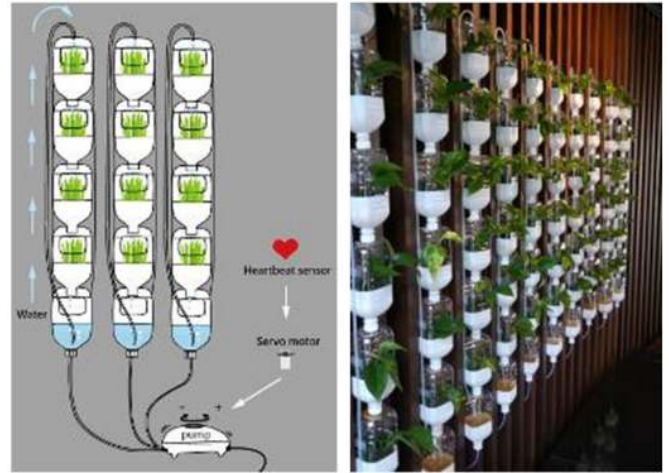


Figure 3: zen\_Farm's bottling and water circulation irrigation system © Suchu Hsu

## Styling Design of Heartbeat Sensor Device

We set up a heartbeat console with a height of 100 cm next to the water circulation system, with a palm-shaped operating area and LED lights above (Figure 4). Taking the Dharma Drum application as an example, we use the Dharma Drum palm-shaped logo to visually guide the participants to place the left palm on the palm-shaped operating area, and embed a heartbeat sensor in the position of the index finger to facilitate detection. The stability of the participants' heart rate was measured. In the lower right of the operation area, the LED light signal shows the result of the heartbeat stability (Figure 5), and it is supplemented by a sound to guide the participant to start and end the heartbeat detection. The pedestal of the device includes three pneumatic pumps, a set of heartbeat sensing modules, a control chip module, a sound effect playback module, and a sound effect speaker.

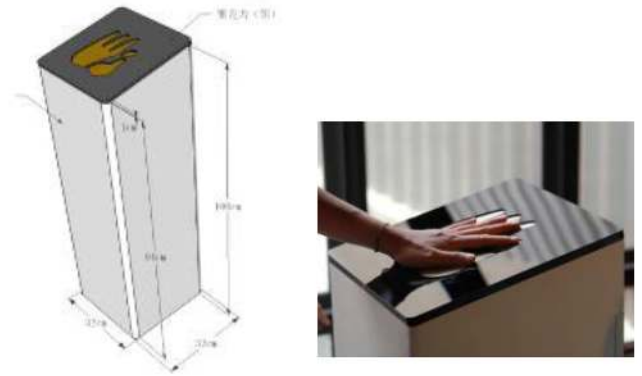


Figure 4 (left): Heartbeat Sensing Pedestal © Suchu Hsu Figure 5(right): Heartbeat Sensing Panel © Suchu Hsu

## Heartbeat Sensing Calculation Logic Description

The basic logic of heartbeat sensing is to measure the stability of the participant's heartbeat within one minute as the irrigation index of the water circulation irrigation system, and display the level of stability with LED lights. After the participants put their hands on the heartbeat sensor (Figure 6), the sensor stability is adjusted and calibrated for the first five seconds. If the finger is kept pressed steadily until the calibration is completed, the electronic control chip will drive the sound module to play a sound. After a short "wooden fish sound", the system begins to collect the value of the heartbeat stability. The total length of the sensing time is 60 seconds, and the value of every 15 seconds is used as a paragraph to calculate the sum of the differences in heartbeats between every 15 seconds as an indicator of stability. After the heartbeat stability calculation is completed, the electronic control chip will drive the sound module to play two short "wooden fish" sounds, indicating that the heartbeat detection has been completed, and remind the participant to leave the sensor on the pedestal with his left hand. Then the

system will count the participants' heartbeat stability and display the different stability levels from 1 to 10 with LED lights. The higher the value, the more stable it is. A higher stable heartbeat value will control the pump to provide proportionally more water to irrigate the plants. Conversely, lower values provide less water for irrigation. If the finger leaves the sensor in the middle of the sensing period or the measurement method is incorrect, the system will return to the initial state and wait for the data to stabilize before remeasurement (Figure 7).



Figure 6: Heartbeat sensor and Led light of 1~10 level

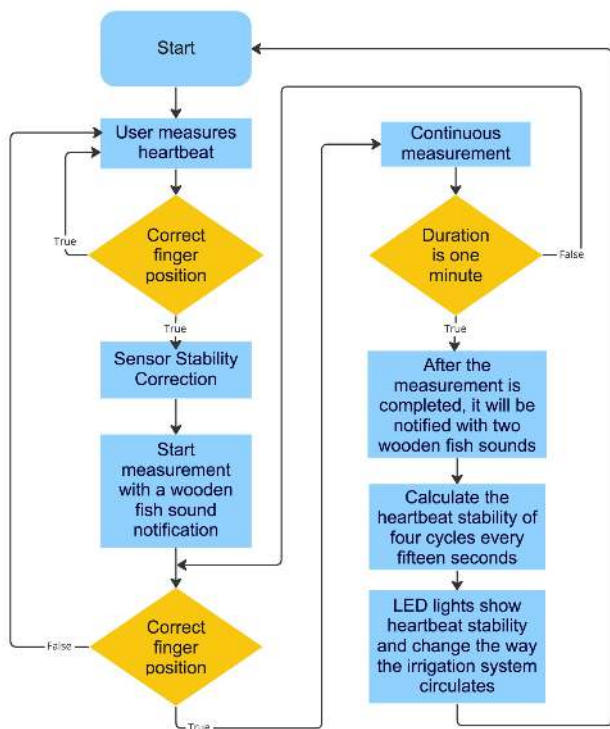


Figure 7: Flowchart of Heartbeat Sensing Calculation © Suchu Hsu

## Social Service Practice of zen\_Farm

### Social Practice in Dharma Drum Mountain Buddhist Park

Dharma Drum Mountain Buddhist Park is the most important Buddhist research unit and meditation place in Taiwan. In 2012, we built zen\_Farm in Dharma Drum Mountain as a public art. Its appearance is minimalist in line with the spirit of ZEN. The Master can do "Mind Meditation" exercises at any time in the park and use the index of calmness to irrigate the Zen Heart farm plants, as shown in Figure 8.

In the past, the meditation process was mostly guided slowly by the master through scriptures or oral speech.<sup>15</sup> Through zen\_Farm, it is easier for community members who have no experience in meditation to practice "Mind Meditation," and through the connection of heartbeat, water circulation and irrigation plants, it is easier for community members to understand the importance of "Mind Meditation". Participants experience a reduction in distraction from thinking and an increase in concentration.<sup>16</sup> Guide them to experience the Zen meaning of "Every drop of calm water makes all things green."



Figure 8: Dharma Drum Mountain Master doing mind meditation practice at zen\_Farm © Suchu Hsu

### Practice at Shaking Elementary School

Shaking Elementary School in Hsinchu County, Taiwan is a rural primary school with only 27 students because most of the students go to big cities to study. In 2022, we will extend zen\_Farm to the campus of Shaking Elementary School. We encourage students to work together to make zen\_Farm by DIY. The overall installation uses rich color backgrounds. We guided the students to draw each bottle by themselves (Figure 9), and after completing the device, they could do the

## Conclusion

"Mind Meditation" concentration exercise through the heartbeat sensor device (Figure 10). We hope to implement the idea of environmental protection and green energy and build an indoor automatic circulation irrigation system by integrating recycled plastic bottles and water circulation through pneumatic pumps. In the past, meditation focused on the self-cultivation of the individual mind and inner consciousness. We hope that with the aid of technology and the concept of USR, we can strengthen the learning resources of rural education through technology media. In addition to the construction of technology and hardware, we also hope to lead the students of rural schools to create their own imagination more bravely and develop a better future from a spiritual level.

We hope that through this research, students in rural schools can be more cohesive in school-centered community development. Students can apply what they have learned to develop the character of the community. As mentioned by Vuorikari et al., Makers can not only solve real problems involving daily life, but also students can learn and develop new skills and establish new meanings.<sup>17</sup> It allows disadvantaged or remote communities to combine local culture and resources through the "Maker Movement" to combine school and community participation, which can inspire better creativity and future development in the community.<sup>18</sup>



Figure 9. Students draw a recycling bottle © Suchu Hsu



Figure 10. Students participate in meditation practice through heartbeat sensor device © Suchu Hsu

Social practice can be studied from a variety of different topics, and in this dissertation we study from the perspective of art and creative design. Through the zen\_Farm interactive installation art combined with discarded bottles and the spirit of maker, we have integrated into two different communities, including the "Dharma Drum Mountain Buddhist Park" and the "Shakeng Elementary School" in a remote village. In the "Dharma Drum Mountain Buddhist Park", zen\_Farm is not only an interactive installation art work produced by makers, but also makes it easier for people entering the park to understand the participation process of "ZEN" and "Mind Meditation". We practice the concept of "Environmental Protection" combined with the concept of "Natural Environmental Protection" by realizing the relationship between the psychological state and the natural environment.

At Shakeng Elementary School in a rural area, we integrated heartbeat sensor module, ultrasonic sensor module, pump power system, etc. with interactive media technology into zen\_Farm's meditation application. In the process of meditation, the most important thing is to calm down the state of mind to achieve spiritual protection. Through this concept, we guide students in remote schools to learn how to use the stability of their heartbeats to irrigate the plants in the bottle in the process of calming their minds. The paintings on these self-created installations are rich in the life memories of each student. This installation art is also actually installed on the campus of Shakeng Elementary School. Every day, students can use their own state of mind to irrigate their own creations, and share their heartbeats to share the common memory of each other's life. In this way, we guide students from remote villages to re-examine the relationship between themselves, their friends, and the natural environment. We try to enhance the cohesion of the community through the application of technology and humanistic awareness.

This research uses zen\_Farm's creative design and social practice to achieve the long-standing goal of digital art creators—"media transparency." Participating members are able to link the emotional memories of the community together by participating in the meditation practice. It makes Buddhist campuses and rural campuses friendly and aesthetically pleasing and has an inspiring effect on environmental protection. At the same time, it also builds a shared memory for the creative community.

In the future, we will try to apply this model to different community fields, such as community farms, K12 educational institutions, etc. Through social service practice, university social responsibility and other cooperative methods. This will strengthen the connection between communities and local students, jointly creating a quality of life that aligns with the WHOQOL standards proposed by the WHO.

## Acknowledgements

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