



Art Therapy Mindfulness -Design of an Emotional Interaction Installation Based on Painting Psychotherapy

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Abstract. Painting therapy is an effective psychotherapeutic method for diagnosing and treating people with psychological disorders through the medium of art, having a deep practice base and application worldwide. Among them, mandala painting, as the main method of painting psychotherapy, is derived from Jung's theory of selfhood. With its powerful self-integration function, It aids in improving self-awareness and reducing tension, anxiety, and internal conflicts. Worldwide, teenage mental health issues are becoming increasingly serious, while many nations lack proper mental health treatments and support infrastructure. I studied and evaluated a group of secondary school kids in China as an illustration, and I created "Art Therapy Mindfulness," an interactive audio-visual device for stress release based on Arduino programming technology and mandala painting philosophy. The installation can help secondary school students achieve art therapy by participating in art interaction to help solve their daily emotional problems such as anxiety and stress.

Keywords: painting psychotherapy · adolescent mental health · mandala painting · Arduino

1 The Concept and Application of Painting Psychotherapy

1.1 Painting Therapy

Painting therapy is a psychotherapy approach that uses the artistic medium, the creative process, and the patient's feedback to show the other person's unconscious emotional issues; this information is then used to diagnose and treat the patient. It originated in the early 20th century when Jaspers and other scholars explored the relationship between psychiatric illness and painting based on the work of psychiatric artist van Gogh and others. The theoretical basis of drawing therapy is mainly the projection principle and Freud's psychoanalytic doctrine. Visual and verbal belong to different cognitive systems within the human brain, and single-talk therapy has limitations in eliminating psychological disorders, while drawing is a projective technique, the most direct way for human beings to express their inner emotions and subconscious. Robin believes that most human thinking and memories are visual, and traumatic experiences or negative

emotions may be repressed and confined; Freud often uses the patient's drawings to analyze their hidden traumas and energies. The work of art is referred to by Lev Vygotsky in "The Psychology of Art" as the collection of aesthetic symbols that arouse human emotions. Witch doctors and shamans used various visual components and imagery to evoke patients' emotions and physical functions for therapeutic purposes as early as primitive society [1]. In the current period, Pagon employs painting therapy to assist hospitalized adolescents in resolving their inner problems and achieving self-healing. Many studies have shown that painting therapy is a scientifically effective psychological approach [2].

1.2 Mandala Painting

The term "mandala," which derives from Buddhist practice, refers to the spiritual significance of a geometric shape with a rigid structure that combines a square and a circle. Initially meant to focus on nature and to clear one's thoughts. The protective structure from the outside in serves the function of taking the mind into meditation for the practitioner [3]. The psychologist Jung introduced mandalas into psychotherapy based on their ability to transform the mind and pioneered the theory of selfhood. According to Jung, the Self serves as the subconscious personality's focal point and is the main archetype of the collective unconscious. All archetypes are unified, arranged, and put in proper order by it. The process by which a person externalizes the internal processes through the use of mandala painting therapy is based on the notion of the Self. The mandala pattern is structured towards the center, which helps the painter maintain coherence and attention while also arousing their inner selves. The colors are mainly complementary, with red, yellow, and blue as the basic colors, symbolizing positivity, warmth, and serenity respectively. The most important feature of mandala painting is to move from disorder to order, and in the process of creation, the painter is inspired to improvise by using points, lines, and surfaces to create rhythmic patterns. In this process, the mandala activates the integration function of the self, which has five stages: protection, cohesion, integration, order, and transcendence. It reconstructs the patient's inner opposites, stabilizes order and balance, and helps to sustain physical and mental health by easing anxiety and rebuilding the self.

2 Adolescent Mental Health Issues

2.1 Global Status of Adolescent Psychological Problems

Adolescents are the age group transitioning from childhood to adulthood. During this critical time of growth and development, adolescents experience rising pressure in all spheres—from the intense academic competition, and mounting parental expectations, to the fast-shifting socioeconomic environment. Because of their lack of self-awareness, sensitivity to outside influences, and frail psychological defenses, adolescents are the most vulnerable to mental health issues. The rate of juvenile suicide worldwide has increased recently. According to the World Health Organization survey, about 14% of people aged 10–19 years worldwide suffer from mental disorders, as shown in Table 1, accounting for 13% of the global disease burden in this age group [4].

Table 1. Estimated prevalence and number of adolescents aged 10–19 with mental disorders globally, 2018.

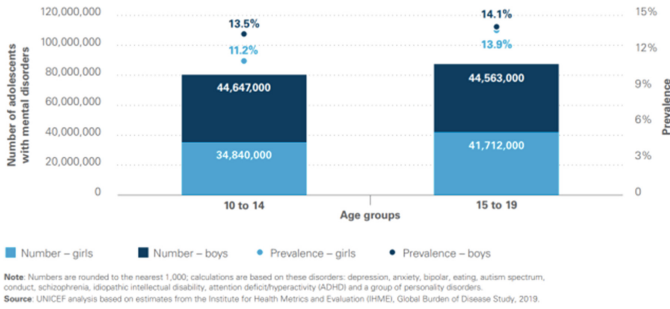
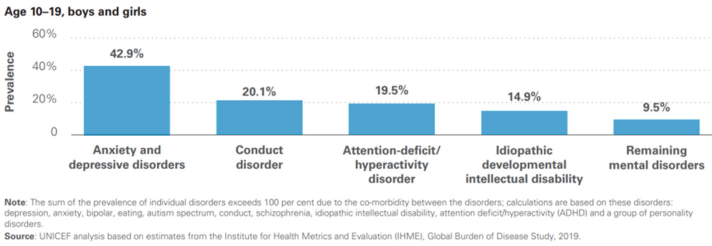


Table 2. Among girls and boys aged 10–19 with mental disorders, prevalence of anxiety, depression and other disorders, 2019.



Back in 2019 WHO and UNICEF jointly released data showing that about 20% of adolescents worldwide have mental health problems, and about 16% of injuries and illnesses in the 10–19-year-old group are triggered by mental health problems. And among specific disorders, anxiety and depression account for about 40%, as shown in Table 2.

2.2 Research and Analysis of Psychological Problems of Chinese Adolescents

According to the China National Mental Health Development Report (2019 ~ 2020), the proportion of primary and secondary school students with depressive symptoms nationwide has exceeded 24%, with severe depression accounting for 7.4%. In addition, depression and related psychological problems become more prominent as the grade level rises, with a depression detection rate of 30%-40% at the secondary school level, representing the greatest percentage. According to a survey by the China Youth Research Network, secondary school students’ stress is primarily caused by academics, families, and interpersonal relationships. In addition, the competition for admission to higher education puts pressure on secondary school students, which over time results in insomnia and anxiety. Teenagers’ personality development is significantly impacted by psychological issues, which, if ignored and handled, will have a lifelong impact. However, the

current construction and medical expenditures of countries on mental health services are far from meeting the psychological needs of today's youth [6].

In recent years, China has actively called for strengthening aesthetic education, cultivating students' aesthetic senses through artistic immersion, and encouraging the overall development of teenagers' moral, intellectual, physical, aesthetic, and personal development. Various secondary schools have been improving and strengthening the construction of relevant school counseling rooms, but there are still some problems in practice that need to be solved: 1. The lack of qualified psychologists makes it difficult to use expensive hardware equipment that is essentially useless; 2. Some locations have not constructed counseling rooms due to the regional disparity in economic and educational resources and the high cost of relevant hardware and software equipment; 3. The heavy academic load at the secondary school level has led to a lack of attention to the construction and operation of counseling rooms; 4. Many schools promote mental health education superficially, but not in practice, etc.

3 Design Concept of the Installation “ARt Therapy Mindfulness”

3.1 Creation Purpose

Based on the high cost and low application rate of professional equipment in secondary school counseling rooms, as well as the heavy tasks and time constraints of secondary school students. Combining the application of the concepts of painting therapy and mandala painting, I designed a simple interactive stress relief device to be placed in the counseling room of a secondary school. Students can use their leisure time for simple and interesting interactions to engage in art therapy and meet the goals of releasing emotions, reducing stress, and enjoying their bodies and minds by using programmed animation in place of spending a lot of time drawing.

3.2 Process and Principle

1. The pressurized toy serves as the trigger point for the device, which uses Arduino and Processing programming technologies. The pressure sensor gadget inside the toy is activated when students squeeze it, and four pressure levels are distinguished according to the amount of physical force used, from little to large in increasing stages. The specific process is as follows: the sensor is transferred to the voltage conversion module to output the pressure value, while the Arduino serial monitor detects the pressure size in real time, passing the corresponding signal to the processing according to the pressure size level. The processing accepts the signal and triggers different levels of code effects, i.e., generating different numbers of bubbles, the higher the pressure, the more bubbles, and vice versa, the fewer bubbles.
2. Different numbers of bubbles are clustered into 4 different circular art paintings, and different levels of pressure assessment feedback phrases are presented on top of the images.

3. The circle painting is further transformed into the corresponding mandala pattern motion.

Throughout the interactive session, four separate animation effects are equipped with four different frequencies of music, playing a layered release of pressure, soothing the emotions of the auxiliary role.

3.3 Connotation

Four kinds of artistic animation and music are presented according to four different pressure levels. The animation is divided into static circular art painting in the early stage and mandala pattern kinetic effect in the later stage, the early stage painting form refers to the works of Van Gogh, Monet, and other masters, borrowing the color scheme, composition, and emotional expression of the masters from the masterpieces. The content contains scenes such as starry sky, fields and ponds, which are wide and quiet and help to ease the emotions and soothe the mind; The compositional tension of the picture form and the intensity of the colors rise gradually from weak to strong following the pressure level. The first stage of the animation represents the outward manifestation of emotions and the release of stress, and the later stage is transformed into corresponding mandala structures of different forms, and the mandala structure patterns are further derived into animation effects with a regular rhythm, in which the students are guided to repair and integrate and reconstruct themselves. From irregularity to rule, from cohesive integration to free dispersal, and from chaos to order, assisting students in developing self-awareness and reducing stressful feelings.

3.4 Creative Points

1. The device draws on the principle of stress relievers to guide students to vent their stress through physical pinching. The pinch toy is in the shape of a cat's paw, using the healing properties of cats and the comfortable touch of a cat's paw to enhance the sense of intimacy, thereby bringing the psychological distance closer and increasing the appeal.
2. The presentation that presses out bubbles is captivating and engaging, which appeals to teenagers' psychological traits of curiosity and a desire to explore new and exciting things. The amount of bubbles produced suggests the stress level of students, and different feedback words are given according to the assessment, which acts as a reminder and reassurance.
3. The laborious painting process is converted into an easy-to-use and enjoyable audio-visual language through the intuitive and vivid language of computer technology.

3.5 Programming Implementation

See Table 3.

Table 3. Arduino and Processing code excerpt.

<pre> 1. Arduino excerpt void loop() { long Fdata = getPressValue(sensorPin); //read the pressure level DEBUGSerial.print("F = "); DEBUGSerial.print(Fdata); DEBUGSerial.println(" g,"); delay(300); if(Fdata >= 20 && Fdata <= 1500){ Serial.println("A"); delay(12000); }else if(Fdata >= 1501 && Fdata <= 3000){ Serial.println("B"); delay(12000); }else if(Fdata >= 3001 && Fdata <= 4500){ Serial.println("C"); delay(12000); }else if(Fdata >= 4501 && Fdata <= 6000){ Serial.println("D"); delay(12000); }else{ Serial.println(" "); } </pre>	<pre> 2. processing excerpt final float PARTICLE_SPEED = 0.57; // bubble speed for(int i=0;i<600;i++){ Particle pz = new Particle(); pz.pos.x = random(width); pz.pos.y = random(height); pz.radius = 15; pz.setTarget(width/2, height/2); //add 600 bubbles particles.add(pz); } } void movie event (Movie m) { m.read(); } void draw() { background(240); //background noStroke(); fill(180, 180, 255); //color for(int i =0; i <particles.size(); i++) { Particle p = (Particle)particles.get(i); p.move(); ellipse(p.pos.x, p.pos.y, p.radius, p.radius); if(dist(p.pos.x, p.pos.y,width/2,height/2)<20){ particles.remove(i); } // Remove bubbles when all bubbles converge to the center and the distance to the center is less than 20) </pre>
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4 Summary

The “Art Therapy Mindfulness” emotional interactive device combines art and technology, using programming techniques to give traditional painting psychotherapy a new form of expression. This results in a simple, affordable method of psychotherapy that offers more support for secondary school students’ increasingly varied psychological needs. In today’s culture, the development of computer language technology is ongoing, and subtle shifts are also occurring in how individuals produce things and live their lives. The advancement of human-computer interface technology has given us more alternatives, convenience, and creative freedom than ever before. With the trend of multidisciplinary cross-fertilization development, art, technology and human social development will be more closely integrated to create more innovative and valuable interactive products.

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