Relations of Techniques and the Mental States in Ceramics Making:

Participants' Mood Change Caused by Ceramic Art Workshops

陶芸における技法と心的状態の関係

陶芸アートワークショップにおける参加者の気分変化

Pornpan Sutas

Department of Social System Engineering, Design Course

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Abstract

Introduction

The therapeutic potential of ceramic making has been recognized and integrated into psychotherapy and occupational therapy for decades. Making ceramics is a well-known choice as a hobby to improve mental health and for psychological treatment worldwide. However, a limited number of pottery techniques are used in verified interventions, and the relationships between the making processes and therapeutic efficacy are less observed. In addition, many pottery therapies are not developed as art activities by professional ceramicists that give people opportunities to enjoy and improve their mental conditions in everyday life. The diverse techniques inspired the author to study the relationships between ceramic-making and mental states to validate therapeutic values in art activities, which helps guide the providers to tailor appropriate ceramic workshops through logical methods. The study was positioned in the ceramics field as a participatory art that utilizes ceramic processes conducted by a professional ceramicist to influence participants' positive mental and social activities. This study examined relationships between ceramic techniques and mental state transitions before and after attending the workshops to design practical therapeutic ceramic programs that validated workshop efficiency from the professional potter's point of view. First, the study classified the relationships between techniques and mental states. Then, verified the theory through workshop experiments considering making processes, finished products, and maker's mood change.

Moreover, the study considered the universal approach. Clients and location settings followed the participatory art concept. Therefore, the program is not limited to workshops but includes public art exhibitions.

The methodology was separated into two main parts: classify and verify. Classify, the study started the preliminary investigation of the author's previous projects to review the connections between modeling characters, ceramic techniques, and mental states. Then, the production techniques were classified to organize the workshop benefits, which were applied

to the experiment workshops design and development. After finishing the development of the ceramic workshops, laboratory trials were conducted to validate the performance of the workshops and develop an appropriate evaluation method. Next, the actual workshops were conducted at a hospital to verify the hypothesis with a different group of subjects and environment. Finally, the study considered the next step of the ceramic workshop design to promote universal ceramic art activities through public art exhibitions.

Classifying relationships between ceramic techniques and mental states:

As a professional ceramicist who has practiced various techniques, the author investigated relationships between techniques and her mental state toward 33 previous projects made between 2009-2019 to develop appropriate ceramic workshop design strategies using cluster and principal component analysis. The projects were observed by the technique's checklist and perceptions of project ratings. The techniques checklist includes six forming methods and eight decorative techniques limited to the writer's experiences. Then the data was classified using the cluster and principal component analysis on correlation.

The three clusters show two main categories: ceramic products and ceramic arts. The three clusters were named, considering the main components of the group: the industrial craft, the decorative ceramics product, and the ceramics arts. Industrial craft production aims to reach the qualities and time limit of the order by using handmade skills that need practice, concentration, and discipline. Wheel throwing dominates the technique selection that shows throwing supported handmade mass production. Decorative ceramics product production is the graphic decoration on the pre-made functional product's surface.

Therefore, shaping skills were less concentrated on, which affected freedom of creativity through two-dimensional images. Slip casting was utilized to repeat pre-made forming in functional products. Thus, using a pre-made form might help increase creativity in ceramics activities without concerning participants' shaping skills. The last group shows a variety of art forms. Successful ceramic art pieces are a type of work that can reflect the

maker's internal images as much as they can be, and they should form the shape naturally without any preconceptions of what the finished product will become. For these reasons, ceramic art combines skills, observation, and experiments. It can influence releasing emotions by connecting feelings with experimental processes.

The results suggested that techniques and goals relate to the perception of making, including Perceptual/Affective levels of information processing, freedom of making, creativity, and skills mastering. Therefore, the study hypothesized that diverse techniques should improve participants' moods differently.

Technique classification relies on the Handmade/Equipment axis and Intuitive/Logical axis utilizing the introduction of ceramic processes to create a design approach. Six forming techniques and eight decoration techniques observed in the previous chapter were organized following the two-axis framework. The hands point indicates the techniques that engage with using hands. In contrast, the equipment point represents the techniques involving manipulating tools and machines. The intuitive point represents a feeling, senses, and freedom to create. The logical point represents logical thinking and sequential operation.

Furthermore, holding ceramics activities engage with more elements besides only object making. Three key features affect the entire process, the materials, the workspace, and the production techniques. The strategy suggests three keys to workshop design: setting, selecting, and developing. First, setting therapeutic outcomes, participants' conditions, and limitations of location, tools, or materials. Then, choosing proper techniques from the classifications that influence the therapeutic processes and eliminate methods upon the workshop's conditions. Later, developing the procedure for the new workshop.

Specifying therapeutic results support the provider scope creation methods. Procedures that require planning like slab building may influence logical thinking. Hand building opens the mind for sensation and creation. In addition, the mold method can support the limitations of participants' abilities.

Development of verification method: the relations between making processes, finished products, and maker's mood change:

The laboratory experiments were conducted at the Fukui University of Technology to examine the validity of the developed technique and appropriate evaluation method. The experiment comprised 2 phases of workshops. First, the clay balls technique with food wrap protection was conducted at the student workshop. The subjects were students of the design department. The task required participants to pick up the clay balls using tongs and then arrange them in a plaster mold. Then, cover the clay with plastic wrap and press them firmly. The plastic wrap was used as dirt protection to eliminate a washing area from the workspace. Technically, participants could arrange and fill clay balls into the mold without complicated instruction, and they could create graphics while forming 3D works without any prior skills. Using food wrap maintains the sense of touching clay and protects hands from dirt, but it is not easy to manipulate. Therefore, the cleanliness solution needs to be improved.

Phase two investigated the participant's mood changes, various techniques were conducted at the design studio. The subjects were Fukui University of Technology members, including students and officers. The workshop prepared two technique options adapted from technique developments in the previous chapter: Hand Pressing and Stamping. The Hand Pressing section assigned participants to pick up clay from the plastic box then press a piece of clay into a mold freely by hand until the mold was filled. The Stamping section used stamping tools as a substitute for Hand Pressing. Participants were assigned to put various clays in the mold and push them firmly with stamping tools. According to the protection problems from a previous workshop, plastic wrap was substituted for gloves. It was an appropriate solution that allowed workshops to be conducted in an office-like, clean environment.

Investigations evaluated the relationships between techniques, participants' mood change, and modeling characters using integrated quantitative and qualitative analysis methods comprising three main surveys. POMS mood evaluation was used for the

psychological test. The Co-occurrence network of words was examined through the write-up mentions. Lastly, the cluster and principal component analyses were utilized to investigate the works' characteristics. The laboratory experiments significantly improved university members' moods after the workshop mentioned. The POMS T scores transited to positive in the overall results. The results prove that the clay ball method, which had problems with plastic wrap, performed the lowest compared with Hand Pressing and Stamping shown in the p-values of POMS transitions. However, the mood changes between Hand Pressing and Stamping were not significantly different.

Accordingly, the evaluation approach focused on the modeling features of artworks to investigate participants' mood change differences in modeling characters. The data was collected from semantic differential questionnaires rated by five experts, including art and design professionals. The semantic differential questions include nine polar adjectives selected from the hierarchical approach to the SD method for the three-dimensional objects. Due to the ceramic works being three-dimensional objects, the SD method observed the works' elements on both the front and back sides. One subject's data include the value of back and front side evaluation.

The cluster and principal component analyses displayed on the graph show that the collection distributed three works on two principal components. They were named considering the main components of the group on two axes, the Abstract-Concrete axis, and the Low-High Contrast between both sides' axis: the concrete, the continued structure, and the abstract. The POMS results indicate significant mental improvement differences relying on three characteristics, concrete, continued structure, and abstract. Participants who created continuous shaping structures showed significant POMS decreasing in Tension-Anxiety, Depression-Dejection, Anger-Hostility, Fatigue, and Confusion, while the Vigor was increased. However, the abstract group did not have a significant negative mood decrease. In addition, the continued structure shows significant Anger-Hostility decreasing lower than the concrete

and the abstract. Lastly, the continued structure shows important Vigor and Fatigue improvement compared with the concrete group.

Furthermore, the quantitative content analysis observed participants' perception of making, collected by write-up examination after finishing the POMS post-test. The concrete group mentioned the expectation of results, the finished product. The continued structure participants, which showed the greatest emotional change, were not concerned about the successful results but focused on making moments. Finally, the abstract group showed that participants focused on mastering the skills themselves rather than what the final product would become. Additionally, the co-occurrence network of words did not present any significant comments about planning.

In summary, the evaluation approach focused on the modeling features of artworks was the most efficient method to comprehend mood change. The most appropriate evaluation method in the study was utilization of POMS psychological evaluation with modeling characteristics classification. According to the low emotional improvement in the abstract group, slip trialing was incorporated into the next workshop and was anticipated to influence the abstract expression.

Finally, the study applied the developed ceramics process and evaluation method to verify the workshop efficacy in a hospital environment. Overall, POMS results indicated that hospital workshops significantly decreased participants' Tension-Anxiety, Depression-Dejection, Anger-Hostility, and Fatigue. Hand pressing significantly reduced participants' Depression-Dejection and Fatigue better than the Stamping technique. However, mood change distinctions between Hand Pressing-Slip Trailing or Stamping-Slip Trailing were insignificant. In addition, character classification was also employed to understand the character of methods that encouraged mental improvement in ceramic workshops. Participants' products were classified into three groups, concrete, repetitive structure, and abstract. The repetitive structure group significantly improved emotion in Tension-Anxiety,

Depression-Dejection, Anger-Hostility, Fatigue, and Confusion. Also, Confusion significantly decreased in the repetitive structure compared with the abstract group.

Regarding the major technique in the groups, 53% of the repetitive structure works were made by the Stamping method, and Slip Trailing created 65% of the abstract character. In contrast, half of the concrete group was made by Hand Pressing, and the other half was created by Stamping. The result indicated that utilizing only technique comparison was insufficient to explain relationships between the entire process and mental improvement. Nevertheless, analyzing the artworks' characters revealed actions associated with therapeutic outcomes. Unfortunately, the write-up mentioned after finishing the workshop could not collect enough words to analyze the significant co-occurrence network. Thus, analysis of covariance was utilized to examine actions and perceptions while making that correlation with enjoyment. The workshop's operation opinion questionnaires were created to observe the participants' perception of their activities after the ceramic works. They included eight questions that reflect eight keywords found in the last experiments' text mining results, including Expression, Imagine, Freedom, Hands, Expectation, Concentration, Enjoy, and Preciseness. The model exhibited that freedom and concentration have a 69% impact on enjoyment, and hand movement indirectly correlates with enjoyment. Accordingly, the repetitive structure group rated the highest freedom and concentration and significantly higher freedom rates than the abstract.

In brief, the Stamping technique made the hospital participants enjoy the workshops associated with repetitive modeling characters and showed the correlation between freedom and concentration engaged with hand movement. The finding indicated that selecting appropriate techniques that match the modeling characteristics could effectively achieve workshops' therapeutic outcomes, shown in the case of Stamping and repetitive structure.

In addition, the workshops were not limited to the making processes but continued by holding an exhibition to push the program into participatory art. The show presented a new aspect of ceramic activities that easily connected participants' works to people in the

community. The workshops were held in partnership between the community, artist, and hospital. Ceramic workshops with exhibitions present social art activity's potential in the study through a participatory art activity that benefits social cooperation that connects people with a touchable ceramic art activity.

Conclusion

This study developed ceramic art workshops and evaluated the relationship between the technique and participants' mood changes. The evaluation found that focusing on characters in assembling art pieces helped researchers develop the appropriate ceramic workshop methods by capturing the mental transitions that appeared during the making process. Verification could support workshop efficiency, which helps us accurately explain the application of ceramics to society in the future with analytical proof. Ceramic workshops under the participatory art concept encourage ceramic making out of the traditional studio, making the special art medium more accessible in general. Finally, the study presented the possibility of exhibiting the participants' creations, which therapists do not usually take into consideration, and developing them as participatory art from the professional potter point of view.

Preface

Ceramics have helped me maintain my mental health for over ten years through various forms and functions such as meditation, expressive art, problem-solving, and creativity. We cannot deny that negative emotions and stress surround us, whether in work or personal life. Therefore, people are looking for solutions to cope with them. Art and craft are the popular medium used to release negative feelings, this is well known to the public and proven by professionals. Unfortunately, ceramics are generally categorized as an unusual medium due to their complicated process and has less psychological verification than other illustrated art.

This study is a starter idea for applying ceramic manners to art activities to promote mental health. It is intended to be informative and universal for both professionals in ceramics and providers from other fields. The two main purposes are to organize ceramics processes based on mental effects and verify the applied system through the logical method. Ceramics contains complex procedures that transform the simple clay material into rock-like objects. Hence, this mysterious fashion sets a limit to the ability of ceramics to be used both by ceramicists and psychologists in terms of art activities. Ceramicists may struggle to adapt the intense studio method for other activities besides skill training. Also, therapists may have limited techniques to customize processes for patients' specific needs due to their limited ceramic knowledge. The diverse ceramics techniques inspired me to use my extensive experience making ceramics into an activity more utilizable as an art medium and to improve mental health. Additionally, another goal is to let people experience psychological benefits through this amazing material, as I do.

The ceramic world comprises a paradox concept in that is versatile to create through two and three dimensions but must adhere strictly to the fundamental rules to create the finished fired clay product. Therefore, it is hard to explain in a concise manner. Many techniques can be mixed and adapted, which present flexibility. But the conditions of transforming clay and raw materials into ceramics effect every detail in processes that require technical comprehension. This concept makes ceramicists cling to a specific method they

mastered, whether it be the traditional ways or personal inventions, and it involves their strict instruction when guiding someone to make a pot. On the other hand, health care providers out of the field are limited because of lacking pottery skills. In terms of art activity management, organization, simplification, and verification would connect ceramics to the outside world through logical thinking and could be utilized to make ceramic activities more universal.

My experiences show me that ceramics is a material that we can use in ways more than just fired clay, depending on which part we pick up. This study is the start of research to prove that several diverse techniques may affect mental states in many ways. Using the appropriate method can change different workshops' performances. My previous experiences with many kinds of art since I was a child gave me several perspectives on art and mental state. But nothing compares to ceramics, the combination of art, science, nature, and technology. I started ceramics when I was in college, majoring in art education. After graduating, I became intensely involved in ceramics until I built up my professional career utilizing several ceramic processes, ranging from handmade to modern manufacturing. My experiences are somewhat limited to Thai and Japanese societies, but I recognize that global published studies about ceramic activities are still rare. Especially studies from a ceramicists' view based on analytical method. Hence, it might be a problem for ceramicists to connect with people outside the field, and these limits ceramics use as a creative channel for mental health. This study provides analytic case studies and basic studio ceramic approaches, guides for ceramicists looking for alternative analysis methods, and suggestions for other providers searching for the essential ceramic introduction and developed processes. I hope this study will be the starting point for connecting health providers interested in ceramic workshops and promote their involvement from several areas to enhance the use of the activities more widely and effectively.

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Dedication

This dissertation is dedicated to the memory of my grandfather, Sawat Sutas, the wise man who never stopped giving the best educational support to his grandchildren. I also dedicate this work to my father, Pansak Sutas. He encouraged me to pursue my dreams and ignited my enthusiasm to improve myself for the benefit of my own and others. Also, my two amazing ceramic teachers, Dr. Krisaya Luenganantakul and Mr. Wasinburee Supanichvoraparch, who supported and inspired me to continue my career as a ceramicist from the start to the present.

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List of abbreviations

The following names and terms have been used in full the first time they occur. After that, the abbreviations have been used unless referring to material in the references.

POMS	The profile of mood states
T-A	Tension-Anxiety
D	Depression-Dejection
A-H	Anger-Hostility
V	Vigor
F	Fatigue
C	Confusion
ETC	Expressive Therapies Continuum
SD	Semantic Differential
SEM	The structural equation modeling

Chapter1: Introduction and Study Positioning

1.1 Overview

This dissertation presents an emotional design study using ceramic art activities to influence positive feelings through various actions and thinking processes by working in ceramics. The investigation was primarily through the relationships of three observation elements. Ceramic production techniques finished works' characters, and makers' mental states, from the professional ceramicist's (the author's) experiences to the workshop participants' outcomes. The observation was closely focused on the character of works in which participants created the distinctions of emotional improvement among the characters and the utilized making processes. Quantitative data analysis was employed to verify the qualitative evidence of the experiments. The division classified the characters of ceramic works in the study by the cluster and principal component analysis using semantic differential ratings by professionals in the art and design field. Afterward, the distinctions of participants' emotional improvements and production techniques in each works' characters were observed using the short form of the profile mood states. These were considered to verify the relationships of the three elements in ceramics workshops for mental improvement. Findings have specific suggestions for adaptive ceramic workshops design and future research.

Despite the ceramic mass productions, ceramics making has been used in wide areas from individual to professionals, hobby, healthcare, or education to promote creativity and mental health, or as instruction tools. However, investigating ceramic activity performance through logical analysis is required.

The previous studies show that ceramic activities involve art and craft considered in both linear and integrated ways. Ceramicists' research centers on production, which engages with skills, technology, and archaeology. In education, ceramics are manipulated as instructional tools from arts to science. Also, they are involved with skills mastered in upper

teaching and lifelong learning. In comparison, several psychological studies employed ceramics interventions in their treatments.

Interestingly, the studies rarely indicate the details of positive feelings caused by diverse ceramic techniques in general. However, previous studies showed that ceramics are good for mental health but lack techniques and processes explaining this, even though several methods perform differently. Due to the inferences, it is not easy to verify ceramic benefits to the target clients as creative art mediums.

Along this author’s pottery journey, working with many techniques to create artwork and pottery and participating in the ceramic design for mass production, the author has considered that making ceramics is the key to joy rather than focusing on a finished product. The product is the reflection of the actions. Despite mastering skills, defining how the process affects feelings is necessary to help providers accurately organize the activity. The diversity of ceramics techniques should be manipulated more efficiently. Moreover, it should be verified analytically to make a clear connection with the providers from different professional areas.

Ceramics are made by one of the simplest materials in human invention history but transforming clay into rock-like objects requires several complicated processes. It seems tricky for the beginner, but a challenge during difficult tasks could elevate the sense of accomplishment. Positive feelings rise in these moments. Hence, a ceramic activity is often used by therapists and educators. The problem is that comprehensive ceramics knowledge requirements might hinder incompetent providers from accomplishing the workshop goal (Nan, J.K.M. And Ho, R.T.H, 2017). Therefore, professional potters are requested to support the ceramics intervention (Pérez, 2018).

On the other hand, ceramic designers or professional potters tend to cling to the traditional process that might limit participants' actions. Indeed, practical art workshops need to be well designed to give satisfying outcomes caused by participating moments. However, the image of ceramics making strongly related to the finished product makes potters

concerned about creating a nice complete product more than focusing on what participants would obtain from making ceramics. Previous studies show the positive results of using ceramics activities in different techniques and conditions even though employed techniques and processes are not often described clearly. For example, wheel throwing, which is unlikely to succeed on the first try, was used without explaining the ratio between participants' actions and professionals' hand support (Doric-Henry, 1997). Even though ceramics products are difficult to complete without a studio professional, letting expert hands help attendees' work might block rich creation. Hence, this workshop’s design strategy is the solution to give balance.

Brief observations show big gaps in ceramics activities for mental health studies, lacking clarification and verified evidence. Few studies indicated the distinction of mental benefits among various ceramic techniques, making ceramic activity efficiency unclear. Moreover, they lack logical proof. Therefore, it might cause the use of ceramic activities in this way to be limited. Ceramic activities studied by ceramicists are mostly based on a descriptive methodology. On the other hand, science-based studies are investigated outside the professional ceramicist community. Unfortunately, lacking skills causes limitation of artworks' values and creative choices.

1.2 Existing research into ceramic activities and mental health: A review of the literature

1.2.1 Introduction

Considering documents about ceramics related to mental states, two groups of users were categorized, individual and healthcare provider. In the first case, ceramics making is used as a hobby involved with self-improvement benefits. Meanwhile, the healthcare community manipulates ceramics as an art medium in psychological treatments. Much anecdotal evidence addresses that making ceramics benefits mental health and has become a peaceful hobby. The following reviews show that profound study on this topic is needed.

Ceramics is an ancient technology that humans keep producing by hand, parallel to ceramics technology in mass production. Handmade ceramics are valued worldwide. Previous studies indicate that ceramics activities positively impact a kinesthetic level to an affective level. However, it is not enough to describe how ceramics intervention affects participants' feelings. Some stories indicated that pottery connects with the focus that affects mindfulness. Some show that hand making a pot as a hobby makes people feel good and escape from their daily lives' chaotic environment. Many anecdotes mentioned that making pottery can improve mental health and well-being. Also, various healthcare facilities promote their programs by including ceramics workshops commonly seen in their advertising. The healthcare community states that pottery is good for mental health, even though analytical studies in ceramics activities are scarce. Indeed, the healthcare society has known that participating with clay is good for physical rehabilitation and mental healing. It is not a new idea when talking about clay in this area, and it seems obvious that people might feel good after engaging in clay work. Clay allows participants to release their emotions through simple tasks such as squeezing clay, smearing mud, or sculpting freedom without thinking about the firing process. This action in clay activities is present now. However, ceramics are not only about clay. Ceramics comprise detailing methods that integrate art, craft, and science. An environment of ceramics making is surrounded by methodical procedures that tend to limit pure expression in the sense of art. According to the complex processes of ceramics, technical training, studio facilities, and organization cooperation are necessary for workshop providers. Hence, ceramics making was limited to a small group of high-potential providers or special treatment.

1.2.2 Researching the mental health impact of ceramics making

Ceramics as a Creative Leisure

Ceramics re-emerged as a trendy hobby in the United States and the United Kingdom to remedy the overwhelming digital world. US Vogue magazine has described pottery as the new yoga, and it has become the current mindfulness trend in Silicon Valley (Mechling, 2017).

Making a pot helps people avoid the constant monitoring of digital devices. Indeed, it is impossible to look at a screen while making a pot. Also, it is good for social media detox that brings a maker to the pure sensation of real life. Ceramics do not provide only aesthetic qualities. People connect with a functional product they can use in their daily lives rather than a painting (Godwin, 2019). Therefore, new ceramics studios were established around big cities such as New York and London. While Japanese pottery is commonly mentioned in western ceramics communities, pottery classes seem not to be spotlighted in Japan's hobby ranking and are still declining in interest (Communications, 2020). In Japan, the pottery class strongly relates to elder activities. It requires time and investment more than other leisure activities. So, participants often are well-financed retired people. However, pottery has been increasing in popularity since around 2019 in the one-day workshop rather than the long class membership.

The pottery program is an outlet that gives audiences a chance to express themselves creatively. Coping and unexpected results encourage the creative effort to deal with ceramics processes and enjoy making more than focusing on the perfect final product. It also provides opportunities to create a concrete object in a distinct way separate from the normal life (M. Rebecca Genoe, Toni Liechty, 2017). Doing hobbies gives researchers opportunities to get out of their work and break from struggling with their findings. Pottery is an option for those who do not get into sports. It links to physical and mental well-being. Especially to find satisfaction in completing something, even if it is small. Pottery is one activity that the maker must spend time on. It brings them to meditation by processing an awake sense of accomplishment. Satisfaction by accomplishing something in a hobby can release the stress that they do not know how to go out from research topics (Rosen, 2018).

Ceramic Intervention in Healthcare

In recent decades the medical community recognized the transformative potential of art rather than the past. Art therapy is increasingly integrated into mental health programs. In the past, pottery was utilized as a craft skill in occupational therapy. The arts-and-crafts

movement influenced the early occupational treatment and did not consider the therapeutic workshop. It was used to prepare patients to go back to society through occupation skills that focus on the quality of craftsmanship. However, the previous study shows that the professional practice environment could overwhelm patients (Levine, 1987).

Nowadays, pottery investigation and associated activity in medical settings are increasing in the United States, related to art and healthcare study growth. However, pottery investigation and related activities in medical settings are not generally compared with non-firing clay works and other visual art techniques such as drawing or painting (Committee, 2009). As mentioned before, even pottery is not a popular hobby in Japan, ceramic activities involve Japanese occupational therapy, usually used in psychological treatment, and be added to the occupational therapy curriculum. According to the Center for Morita Therapy of Jikei University's treatment program, ceramic art is included in inpatient treatment to improve their mood and symptoms as a light occupational work (森田療法センター, n.d.). Interestingly, Ibaraki Prefectural University of Health Sciences wrapped up ceramics practice class operated individually since 1995 into handicraft practice class with other occupations in 2013 [塩原直美, 2018]. Information emphasizes that ceramics are restricted in the healthcare area.

The definition of pottery in previous studies is unclear. Some studies defined pottery as visual art, and some defined it as a craft; also, they indicated significant therapeutic potentials differently. Pottery techniques, tools, and materials are mentioned briefly or not at all—however, many anecdotal pottery activity articles are associated with psychological and physical therapy. The reports involving ceramic artists were examined under the descriptive method, while scientific observations were also limited in the health care community (Heather L. Stuckey and Jeremy Nobel, 2010).

For example, the article presents the efficiency of engaging in ceramic sculpting benefits increasing self-concept, self-expression, and healthy habits routines in an artist who

is a juvenile rheumatoid arthritis patient. Hand-build helped him communicate his emotion and experience on deep levels through visual art. However, the article did not show the validation of the ceramic activities through the analytical method (Bathje, 2014).

Pérez investigated the impact of a pottery workshop as a creative arts program in Spanish dementia patients, which engages with a feeling of well-being and improves their mood state. He suggested that the pottery workshop session had a very positive significant effect on mood in non-pharmacological therapy. The pottery workshop works to supplement the pharmacological treatment for people with dementia (Pérez, 2018). At the elderly nursing home, Lee Doric-Henry produced an eight-session pottery class that employed the eastern throwing technique to improve nursing home residents' psychological well-being. Following the intervention, the participating group showed significantly improved self-esteem and reduced depression and anxiety (Doric-Henry, 1997). In Japan, Nakamura and colleges investigate pottery therapy's effect through heart rate variability analysis in college students with mental health problems. The examinations were conducted in the university health care center. Statistically significant results show the positive effect of pottery therapy differences between the experimental and control group (Nakamura, S., Sonezaki, S., Hayashida, Y., & Sato, T., 2017). Jang and Choi examined how pottery group therapy affects low SES adolescents' ego-resilience despite pottery activities in medical environments. Experience in pottery making contributed to expressing emotions and social communication improvement. The study indicates significant psychological improvement caused by making pottery through scientific analysis methodology (Heejeong Jang and Sunnam Choi, 2012). However, details of making processes were not explained. Moreover, some art therapy interventions employed ceramics shaping method or materials but did not finish the processes until firing; for example, adapting structured tasks and the goal of pinched pots to the moods' enhancement observation (Elizabeth R. Kimport, Steven J. Robbins, 2012) also using slip clay in the restorative material study that enables sensory, behavioral, emotional, and motor regulation (Mordechai (Miki) Klein and Dafna Regev, 2020).

Interestingly, previous studies used the studio pottery technique that requires the staff's support while making. Further, pottery interventions in the healthcare environment were conducted in a particular space divided from the main clinic or potter's studios. This evidence shows that the traditional studio technique might be an obstacle in ceramic workshops providing inconsistent with Moon's study. Ceramics need more attention to the procedure, which might be an obstacle for both providers and participants (Moon, 2010). In other words, ceramics workshops require special knowledge that is not trained for general medical staff. A special workspace is also necessary.

According to the mentioned limitations, gaps in ceramics workshop research leave obscure interpretations of why humans feel good when participating in pottery. Also, information that directly addresses the ceramics workshop efficiency is unusual. Hence, the study integrated relevant knowledge and the author's experiences to design research procedures and experiments to reveal relationships between good feeling and ceramic making through a logical research methodology. Also, it suggests alternative processes to make workshops more adaptable to the target clients.

1.2.3 The distinction between ceramic and clay work activities

Ceramic

Ceramic is a clay base material that becomes hard when baked at high temperatures of about 700-1300 degrees Celsius, depending on the clay type. Ceramic describes any clay form fired in a kiln then changed to a rock-like hard body (Peterson, 1996) (Quinn, 2007). Humans have been using ceramics practices for a long time. Before the historical era, humans learned to shape a lump of clay and bake them to make their containers, utensils, and worship tools. They were found in civilizations across the world. Also, they bring the past culture through itself to the future in rich forms and contents no matter whether they have passed disaster or war (Muller, 2007). Pottery is often defined as ceramic wares, including utensils, tableware, or containers made of clay and baked. Artisans who usually produce ceramic wares

are also called a potter. Nowadays, ceramics are continuing to be used in various terms and situations. They are still around us as in the past but are increasing in functions and different production techniques.

Mass-produced ceramic innovation has improved far from its original point, and handmade ceramics have remained throughout history. People around the world can buy cheap commercial ceramic wares that are produced from high technology processing, travel by airplane that comprises of ceramic parts in the jet engine, enjoy a cup of tea that is made from a potter, impress with ceramic sculptures in the gallery or sit down in front of a potter wheel in the rental studio to release their stress through the lump of clay. Therefore, ceramic is a fascinating choice for art and craft workshops.

However, special skill and facilities requirements can be obstacles for a workshop provider who lacks knowledge and experience in ceramics. This study also introduces the fundamentals of ceramic processing that affect the whole image of ceramic workshop design to support the providers in the field to apply the theory to their project.

Clay works

This review aims to clarify the distinctions between natural clay-based activities between un-fired clay and ceramic activity. Clay work activities are the closest to ceramic making in the therapy world regarding the primary material. However, there are differences inside the process that make a hugely different result between un-fired clay and ceramics. Technically, clay in the ceramics process based on natural clays develops into functional clay bodies known as potters' clay. Potters' clay bodies require abilities of plasticity that can sculpt and fire. For ceramic objects to be successfully fired, clay works must be hollowed entirely, with the wall never too thick or too thin. Pieces thicker than 12 millimeters are often blown apart during the firing process. Also, very thin ceramic risks breaking while moving (Henley, 2002). The process separates ceramics from clay works, including each detail in the various forming and decorating techniques, described later in the next chapter. The big distinction

between typical clay works and ceramics is that a maker can immediately see the result after acting with clay then accept it. In contrast, the last stage of ceramics work appears after being fired. The maker needs a plan and forethought. Therefore, some studies categorized ceramics as a craft; thus, procedures need attention.

Studying clay works intervention relates to the first sensation stage when one participates with natural clay. Clay products have a long history with the human community. Not only to be a functional product but also related to the mental and spiritual spheres. Clay is a versatile material often used in education and art therapy. Clay was suggested to provide visceral, sensual, and physical investment. Previous studies indicated that clay work activity was more effective than visual art to reduce depression and improve daily functioning, general mental health, and holistic body-mind-spirit well-being (Nan, J.K.M. And Ho, R.T.H, 2017). Clay products are multi-dimensional objects with weight, depth, and texture, which convey a sense of reality and substance. Moreover, clay absorbs and memorizes makers' actions by undoing or redoing various techniques. Clay provides wirer action more than painting, from gentle touch to aggressive (Michal Sholt and Tami Gavron, 2006).

Clay work is the ideal method for motor function and strong expression of its material character (Hamid Nazari, Alireza Saadatjoo, Shahnaz Tabiee, 2018). As little children, tactile contact is the first mode of communication for humans. During the early stage of life, babies are limited to oral and skin contact communication. Non-verbal communication through touch is the window to the unconscious to express pure feeling without linguistic layers (Michal Sholt and Tami Gavron, 2006). Clay gives the freedom to do this. It is easy to understand and has a wide range of actions. Therefore, it is used in wide fields of participants' age and mental health problems. Nevertheless, there is plenty of research on clay works in hospitals, but there are few studies engaging natural clay. Moreover, the type of clay that they use was not mentioned.

Clay is a media that stimulate self-awareness, reduces anxiety, and develops social skills efficiency from kids to elders. Capability using somatic and emotional symptoms

treatments. It was used for psychiatric patients admitted to a day hospital to offer alternative treatment and comprehensive care for mental health. The finding indicates that clay supports the release of tension and emotional conflict absorbed by physical action, the first sensation. Freedom and spontaneous creation come out during participating with clay. Like previous studies, clay provides an avenue for patients to express their internal content symbolically (non-verbal), brings up hidden information, and recalls past events. It guides patients back to reality by releasing repressed emotions (Aquiléia Helena de Morais, Simone Roecker, Denise Albieri Jodas Salvagioni, Gabrielle Jacklin Eler, 2014). However, some patients feel bad about handling clay because it can be dirty, and they lack the relevant skills. It is indicated that clay work could have a negative result in some situations depending on personal preferences (Aquiléia Helena de Morais, Márcia Aparecida Nazário Dalécio, and Shirley Vizmann, 2014).

In the same vein, Rahmani uses clay as a creative expression tool to reduce anxiety and develop social skills in pre-school students. The results show a significant difference in anxiety scores of the control group and the experimental group (Parisa Rahmania, Naeimeh Moheb, 2010). Unfortunately, the study does not identify the clay that was used. Most of all, clay is selected as a medium that is best to manipulate with both hands. Therefore, it suits a program that prefers improving emotional symptoms through basic action by active kinetic level without cognitive thinking due to significant positive outcomes in somatic and emotional symptoms contribute to the squeezing clay in Parkinson patients (Deborah Elkis-Abuhoff, Robert Goldblatt, Morgan Gaydos, Samantha Corrato, 2008).

1.2.4 Ceramic workshops definitions

In this study, *workshops* define the activity provided to give an audience a particular experience through a well-designed structure. Participants are invited to gather and take experiences about the subject at the given place and time together. The word workshop ‘workshop’ can be used as a noun and verb. As a noun, it refers to a place or performing practical work. As a verb, ‘to workshop’ is used to describe the action of working something done. However, workshops are often used as both a noun and a verb within collaborative and

participatory research. So, it can be combined with *workshops* as a making space and as a practical session in the creative area across diverse types of experience and knowledge (Helen Graham, Katie Hill, Tessa Holland and Steve Pool, 2015). According to the description, this research employed ‘workshop’ to refer to an experience that includes place and process.

1.3 Study positioning

According to previous studies, the gaps in the ceramics study field pointed to ceramicist researchers focusing on skills and techniques studying based on quantitative analysis. At the same time, therapists and educators investigate based on logic but lack technical ceramic knowledge. The studies on art activities for mental improvement suggested that the relations between techniques and mental effects were not investigated. Hence, the factor of ceramic activity efficiency is unclear. Thus, it might affect ceramics is not used as a common art activity as the other visual arts.

The study intended to fill knowledge gaps around non-clinical art activities that focus on mental improvement integrated creative expressive theories, hands-on experience, and ceramic production knowledge to create workshops centered around participants' positive experiences (Figure 1.1.) The main idea was set on participatory art to promote universal use in the ceramics field of studies. The experiment workshops were held to verify the theory through analytical examination. The experiment's scope was set to minimum requirements of clients as much as possible to emphasize the universality. Hence, the subject's prior experiences and ages were not limited. The location was also not fixed, which means that an art studio environment was not required. However, the processes were under professional production control. Experiments examine participants' mental state in ceramics making through controlled forming techniques following an organized framework.

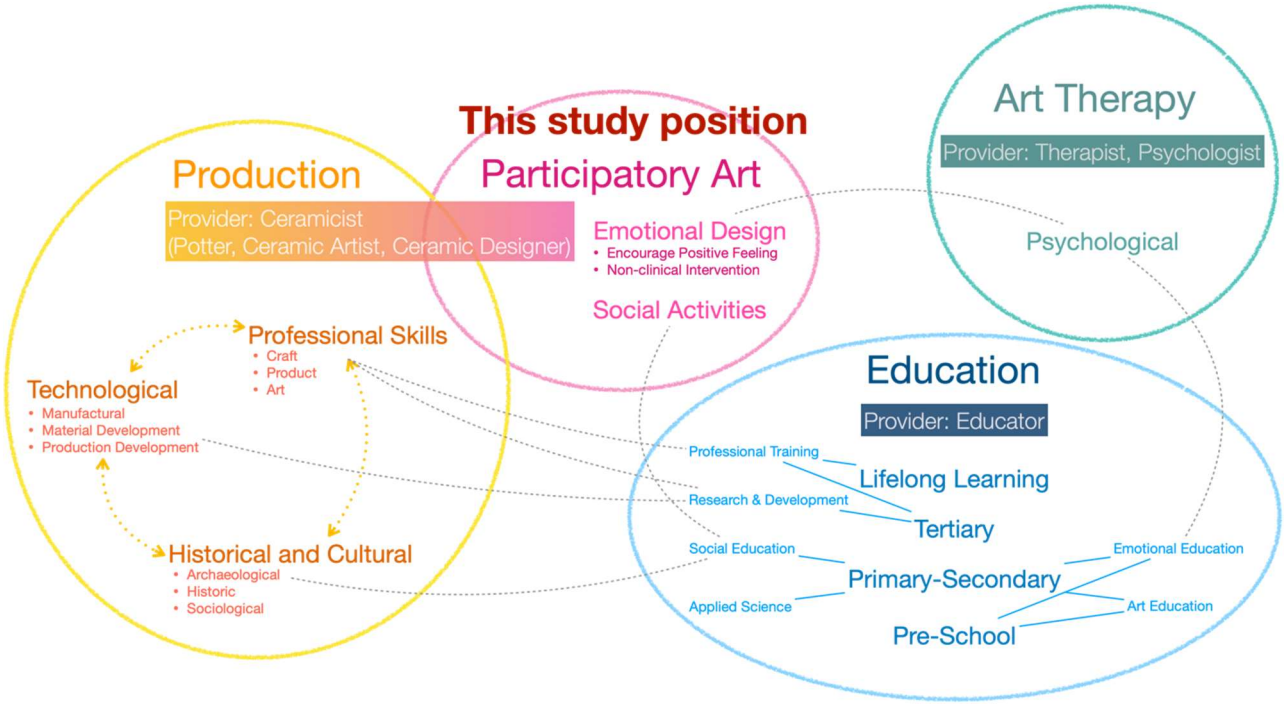


Figure 1.1 The study position

1.4 Research Aims and Methods

This study examined relationships between ceramic techniques and mental state transitions before and after attending the workshops to design practical therapeutic ceramic programs and evaluation methods that validated workshops efficiency from the professional potter's point of view. The methodology was separated into two main parts: classify and verify.

A. Classify relationships between ceramic techniques and mental states.
B. Verify the theory through workshop experiments, considering making processes, finished products, and maker's moods change.

The first phase comprises a preliminary investigation and technique classification conducted to systematize the workshop's design strategy. The preliminary investigation reviewed connections between product characters, ceramic techniques, and mental states through the artist's project case studies (the author's previous projects). Following that, ceramic techniques have been organized to rely on features that involve physical actions and

creative processes. The workshop's design strategy adapted technique classification in the choosing and development processes for the target participants.

The second phase developed evaluation methods to analyze relationships between mental states and ceramic techniques through the experimental workshops. The appropriate evaluation method and making procedures were utilized in the actual workshops to verify the theory. The participatory art concept influenced the final workshops due to presenting the universal approach of ceramics as a creative medium for mental therapy. Moreover, the last chapter suggests an example of connecting the activity with the community through a public art exhibition.

The investigation methods were divided into two big parts following the aims:

A. Systematize relationships between ceramic techniques and mental states

Chapter 2: Considering connections between finished works, used techniques and artist's mental states using cluster and principal component analysis

Chapter 3: Ceramic techniques and processes review and classification for workshop design strategy

Chapter 4: Applying approach into workshops design and development including technical tests

B. Verify the relations between ceramic techniques, finished products, and the maker's mood change

Chapter 5: Validate therapeutic effects in developed ceramic methods and evaluation method developments

Chapter 6: Relationships of finished works, used techniques, and participant's mental states verification: the hospital workshop case study

Chapter 6: Consider the next step of the ceramic workshop design to promote universal ceramic art activities through the public art exhibition.

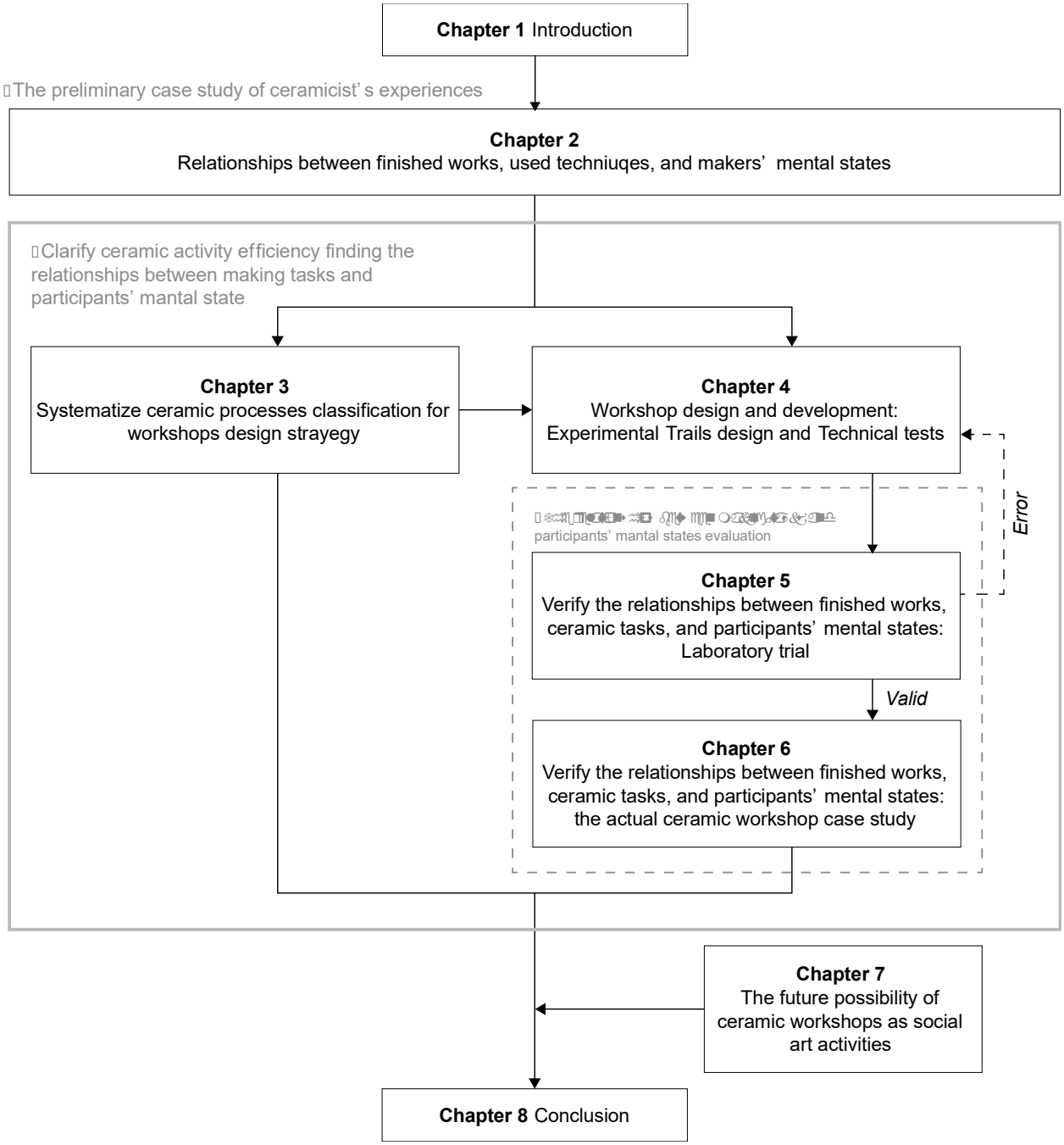


Figure 1. 1.2 Thesis flow chart

1.5 Chapter structure

Chapter 1: Introduction and Study Positioning

The chapter provides reviews of the present state of ceramics activity studies focusing on ceramics interventions related to mental effects, for example, ceramics as creative leisure, ceramic intervention in healthcare, and related topics. The literature review points out the necessity of validating the mental effect caused by ceramic making. The major point to note is that the relations between ceramic techniques and makers' feelings were not thoroughly investigated. This topic was picked up to be the main purpose of the study. Moreover, the definitions of clay work and workshops were explained to clarify the terms used in the study.

Chapter 2: Considering Relationships between Finished Works, Techniques, and the Mental States: Ceramicist's Experience Case Study

The author believes that different techniques affect the maker's mental states in separate ways. Chapter 2 is the door to the mental study in ceramics making. Considerations started from investigating the ceramicist's experience, the author. The exam exposes relationships between the author's mental states and ceramic processes by considering past projects, including works' characteristics, used techniques, production purposes, and feelings of making. The data were analyzed by plotting the cluster variation on the principal component analysis to classify techniques and mental states relations. The results presented the purposes of works and the feelings of making grouped techniques to the classification. Hence, studying the characteristics of the making methods should help workshop providers design accurate ceramic workshops for target clients.

Chapter 3: Ceramics Methods Classification and Design Strategy

According to chapter two, the results suggested the benefit of techniques classification due to ceramic works being created by several techniques, which are unique in their process and actions—chapter three reviews details of the techniques that have been analyzed in chapter two. Technique classification divided ceramic methods into two groups: forming and

decoration. Then, they were classified by types of actions and thinking processes, such as those related by handmade processes or those operated by equipment that relies on planning or intuition.

Holding ceramics activities engages with more elements besides object making. Hence, the design strategy was invented associated with the fundamentals of ceramic processes, including materials and workspace, besides the production techniques. Then, it was applied to the workshop's development, which would be employed in the experiments. Therefore, the fundamental ceramic process and work environment are also introduced in the chapter to prepare basic perceptions of ceramic making, which affect the entire process.

Chapter 4: Ceramic Workshops Design and Development

The chapter includes experimental trials design and technical tests. Workshops were designed and developed to create the stimulation test to examine relationships between techniques and mental states. The design developed the most basic therapeutic ceramic program that suits various locations without prior experience or skill training and also added shape control to scope the observation among different actions in selected methods. Also, technical tests were conducted to examine the production success, such as forming possibility and firing results.

The stimulation condition includes the location, the clients, and the inspected outcome, all of these were put into the design framework then we created the workshops processes. According to the scope, minimum requirements were placed into the design framework. Even inexperienced members could participate in the workshops, enjoy making ceramics, and get their finished works. Regarding the location, the processes should be flexible enough to conduct even in a non-studio environment.

Chapter 5: Ceramic Workshop Performance and Evaluation Method Development

The experiments applied the developed ceramic methods from the previous chapter to workshops. The trials contained the participant's psychological evaluation method

development and informed possibility and materials tests held at the university. Assignment comparison was included to evaluate participants' mood changes in different making techniques. The subjects were students and university staff. The location is the design department workspace, an office-like environment.

Analytical measurement was manipulated and intended to push the study clearer and verified beyond the descriptive studies in the field by applying effective engineering analysis methods. Evaluation development utilized three instruments to examine the relationships of three main factors. Participants' mood changes before and after the workshops were evaluated using the profile of mood states (POMS). The co-occurrence network of words (Text mining) supported the psychological test by revealing participants' thinking processes through verbal expression. POMS and text mining results taken together showed the difference in mental transitions among different production methods. In case the cognitive effects were not significantly different between the techniques, the cluster and principal component analyses classify the work's characters to consider the difference in mental transitions among the modeling style, using the semantic definition method (SD) rated by professionals in the related field. Appropriate ceramic processes and evaluation methods were employed in the actual workshops to validate the methodology.

Chapter 6: Verification of Relations between making processes, finished products, and participants' mood changes in the hospital workshops

This section presents the developed ceramics process and evaluation method verification in the hospital environment. The workshops program was improved and further developed to conduct in a hospital setting. Fukui-ken Saiseikai Hospital gave an opportunity for the laboratory to create a ceramic art program for mood improvements, which is an appropriate case study set in a stressful public situation. It also opens the door to diverse people in the community to release negative emotions and emphasizes using developed processes in a completely non-studio environment.

The evaluation method and instruments were developed based on the previous experiments. In addition, the co-occurrence network of words showed the keywords that point out cognitive and affective features associated with ceramic workshops engagement. In this way, participants' perceptions of workshops questionaries after engaging in the workshops and after receiving finished works were created based on selected keywords to observe the primary mental effect factors in ceramic art workshops, especially enjoyment. Structural equation modeling was utilized to evaluate correlations and effects among the keywords.

The finding validated relationships between modeling characteristics, actions in ceramic techniques, participants' mental improvement, and appropriate evaluation methods.

Chapter 7: The future possibility of ceramic workshops as social art activities

In addition to verifying the design of the ceramic workshop, the study considered the next step of the ceramic activity approaches under the participatory concept. The structure of the workshops was not limited to the attendees' hand-making process but also included the finished workshop product being returned. Workshops were designed with the cooperation of the local community, which showed the partnership operation and reinforced connecting ceramics to people.

After firing, participants' works were exhibited to complete a participatory art concept exhibition at the hospital. The presentation elevated participants' creation in a more professional point of view but targeted general clients. The exhibition was intended to be the bridge that connects personal therapeutic outcomes to society.

1.6 Conclusion

The magic of fired clay makes ceramics fascinating. According to its charm, ceramics is promoted in healthcare and education. Ceramic activity is an attractive idea for creative art and craft, but it is also troublesome and difficult to apply for an inexperienced user. Therefore, it has limited use and study compared with other art and craft activities. It would be better to balance techniques and outcomes to make ceramics used in wider areas and participants' levels, not just for someone who wants to master artisanship but open for everyone who wants to explore themselves through pottery.

Ceramic has a unique paradox characteristic. It needs both art and science knowledge. Clay, the primary material, is versatile, but firing conditions control processes. Professional potters can express themselves through ceramic works because they understand both limitations and possibilities through their extensive experience. On the other hand, the beginner might be stuck with failure results that make them frustrated. This problem is critical to the ceramic activity provider.

Investigating how ceramic works logically is necessary to encourage using ceramic in any activities efficiently. So, what makes participants feel good when making a pot? Are they using it as an artistic expression like sculpting clay or spending time focusing on tasks that bring them out of the messy reality of the world as a type of meditation? Finding this out would guide us to design the practical potter class or ceramics workshop for various purposes, such as releasing stress in a workspace, improving negative feelings in a hospital environment, or increasing motivation in studying. In this way, we can build a balance between positive emotions and success in fired products.

Chapter2: Considering Relationships between Finished Works, Techniques, and Mental States: Ceramicist's Experience Case Study

2.1 Introduction

The big problem in ceramics making studies for mental health is that the correlation between creative methods and positive feelings was not reported, even though ceramicists know that different techniques have their own characteristics. Studying professional experiences is an intensive way to survey mental effects in ceramics practices. Hence, this study starts by considering the author's previous works concentrating on relationships between the purpose of the projects, production methods, and perception of each production.

About ten years of ceramic experience studying various techniques and experiencing different production environments inspired the author to think that making processes are no less fascinating than the finished product. Therefore, moving the focus from craft training to pottery engaging experiences should promote ceramics as a universal art therapy medium rather than limiting it to an alternative material. The author uses ceramic as an art medium, a mediation tool, a product material, and an expressive avenue for different purposes. Different techniques contribute differently to physical movements, thinking processes, and mental states. For these reasons, the relations between mental states and actions during engagement with pottery need to be clarified to build a standard of comprehension in applying ceramic activities in mental healthcare.

Indeed, hand-building does not fit every customer. Also, it is impossible to make a cup by wheel-throwing for the first time without a professional's support. There are many anxieties around a professional ceramicist instructor or a workshop provider because they can predict the quality of finished work by the making process. They can detect if something is going to be wrong by participants' movements. And they tend to stop clients immediately before the failure happens rather than let them face the general rookie mistake by giving clients professional hand support. Ceramic making has three crucial elements that connect each

other, the maker's perception, the actions, and the works. Providing help while making or touching up participants' work can interrupt participants' experiences. Technique classification is not only for therapeutic medium selections in making processes but also for controlling appropriate methods that support target participants in creating ceramics by themselves.

This chapter is the starting point to investigate the relationships between finished work, the techniques, and maker mental states, which were applied to the primary analysis method throughout the study. Three factors represent the ceramic-making elements that were considered: finished works, production techniques, and perception of making. Finished work is the objective outcome that hints back to the actions and feelings. The production techniques are the medium that transforms the maker's internal image or feeling into the object. And maker mental states reflect one's perception of the creation.

2.2 Categorized finished work

Analyzing this ceramicist's previous works was the preliminary study for revealing connections between the potter and the works themselves. This study focuses on techniques, purposes, and feelings that the maker had during production to highlight making experiences rather than finished products. Positive emotions can occur through both freedom and obstacles overcome. During the process, potters must face obstacles that might build their strong resilience to pass every task without giving up and achieving their goals. The feeling of accomplishing a specific task serves as satisfaction and builds resilience skills in real life, making them ready to face problems and flexibly cope with them. Also, freedom might not mean liberation from the rules, but it may be when they are strong enough to control and make their own decisions.

The preliminary study observes correlations between techniques and perception of making in the author's works to classify the ceramics experience. Thirty-three selected projects were included from the year the author started studying pottery and ceramics art to the present, 2009-2019. The collections are shown in appendix 1. They have a variety of

techniques representing skill levels as well as variations of finished products. Projects were collected sequentially by year, observing utilized forming and decorating methods. Methodology details are described in Chapter three: Ceramics Methods Classification and Design Strategy. In addition, pieces of work from the same collection produced by the same technique were grouped into the same subject.

2.2.1 Data collection and analysis

The author created the techniques and artist's perceptions checklist to observe the relationships between the perception of production and specific techniques through her previous works. Then, generated the cluster and principal component analysis by JMP software to classify the finished work's characters. The technique checklist combines techniques that were applied in previous projects, including six forming methods and eight decorative techniques. The artist's perceptions checklist includes the purpose of production, and the artist's perspective of the creation, such as production centered on skill or creativity.

First, the technique checklist collected the data by inserting every used technique in the project. In one project, it is possible to combine several methods. Techniques utilized in the project were value=1, and techniques that were not used in the project were value=0. The six forming techniques are listed as Hand Building, Slab, Wheel Throwing, Press Mold, Jigger-Jolly, and Slip Casting. The eight decorative techniques are listed as Glazing, Brush Glazing, Printing, Painting, Slip, Carving, Relief, and Nerikomi.

Next, the artist's perceptions checklist used five rating scales to collect four factors involved with the purpose of works and perception of the productions following the list below:

Functional-Nonfunctional: This factor represents making purpose. The functional product is designed to serve practical uses over affective expression. A well-considered design is required before production. Also, the method needs precise techniques and processes to achieve the order. In this study, nonfunctional objects were art forms that perform as an expressive artistic medium. It mirrors the artist's feelings, which are too complicated to

communicate through words alone; instead, they are transferred to symbolic or art elements. Some products might include both functional and artistic components in different ratios.

Skill-Creativity: This factor represents the fact that the product requires attention to skills or opens more creative spaces based on the artist's opinion. Certainly, mastering each technique requires skill and practice. While comprehending the method, the beginner pays attention to being the master by training the same movement repeatedly. Therefore, beginner potters' work might look similar because they focus on building essential skills before stepping up further to move spontaneously, get rid of skill anxiety, and release their creativity. This takes time. Especially at the mass production level, accuracy is necessary for quality control, including the industrial craft. Also, it is not easy to express exactly feelings or messages through an artwork while worrying about skill limitations. However, plaster mold or instant process would help decrease skill requirements to some degree.

No freedom-Freedom: Freedom in the making process reflects either flexibility in expressing feelings through the product or adaptability to details with less concern. According to the skill factor, freedom might relate to skill and creativity. Enough talent would allow creators to expose, reach, and accurately express their internal communication freely. Therefore, the freedom factor was added to investigate the correlation.

Cognitive-Symbolic: This part is about the creator's perspective through the production processes. The factor employs the most sophisticated information processing and image information of the Expressive Therapies Continuum (ETC) theory, the Cognitive/Symbolic level. Cognitive factors represent information processing that is crucial for analytical and sequential operation. Cognitive thought associates planning and problem-solving, which influences functions in functional ceramic works. On the opposite side, the Symbolic side allows access to intuitive functions that helps makers access emotions that they could not declare through verbal language. Symbolics is usually used in art to connect one's internal emotions that are difficult to speak to the outside world or as a tool that transfers complex feeling into the object (Hinz, 2009).

The experiences were rated on five scales, from one to five. For example, in ‘Functional-Nonfunctional,’ the product made for functional purposes will be rated=1, although the ceramics art will be rated=5. So, the product in between will be rated from two to four. Data is evaluated by cluster analysis and principal component analysis on correlation using JMP software to consider relationships of the characteristics, dominant techniques, and the author’s perceptions in each group.

Subject No.	Forming						Decoration								Perception of productions			
	Hand Building	Slab	Wheel	Press Mold	Jigger	Slip Casting	Glazing	Brush Glazing	Masking	Painting	Slip	Carving	Relief	Nerikomi	Functional-Nonfunctional	Skill-Creativity	No Freedom Freedom	Cognitive - Symbolic
1			√				√								2	1	3	1
2	√							√							5	4	2	2
3	√											√			5	1	2	1
4	√	√		√			√	√		√		√	√		5	4	4	5
5										√					1	5	4	4
28		√					√							√	1	4	4	3
29			√				√			√					1	3	2	2
30		√					√							√	1	1	1	1
31			√				√								1	1	2	1
32						√					√				2	4	4	1
33	√			√										√	2	4	3	2

Figure 2.1 The example of raw data index

2.2.2 Result

Figure 2.2 shows the number of clusters related to the Scree plot elbow point that classified 33 projects into three groups, A1, A2, and B. Group A1 has 11 projects, while Group A2 incorporates 12 projects, and Group B has 10 projects. Table 2.1 provides data about the number of techniques used in the projects in three clusters. Group A1's major techniques were forming by wheel throwing and decorating by standard glazing. Group A2 was mainly made by slip casting with standard glazing combined painting. Group B's primary was Hand Building products decorated by brush glazing.

Next, the artist's perceptions checklist has been considered based on the 3 cluster distributions (Figure 2.3.) Group A1 and A2 are produced for functional purpose influenced cognitive rating while Group B is the only class that opposite on the symbolic axis. Group A1 is the strongest skill and not-freedom rating. Group A2 and B show creativity influences. Group A2 is the only group that shows a freedom rating, while Group A is the opposite, and Group B presents neutral.

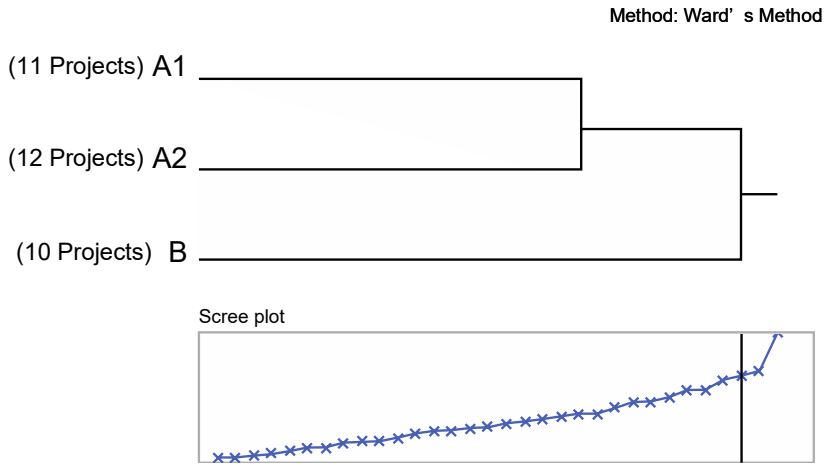


Figure 2.2 Hierarchical Clustering Dendrogram

Table 2.1 The used techniques are divided into four cluster groups

	Number of projects	Forming Techniques						Decoration Techniques							
		Hand Building	Slab	Wheel	Press Mold	Jigger	Slip Casting	Glazing	Brush Glazing	Printing	Painting	Slip	Carving	Relief	Nerikomi
Group A1	11	2	0	*9	0	2	0	*11	0	1	3	0	1	1	0
Group A2	12	1	2	1	1	0	*6	*8	0	1	6	3	1	0	3
Group B	10	*10	4	0	5	0	0	6	*8	0	2	0	5	2	0
Total	33	13	6	10	6	2	6	25	8	2	11	3	7	3	3

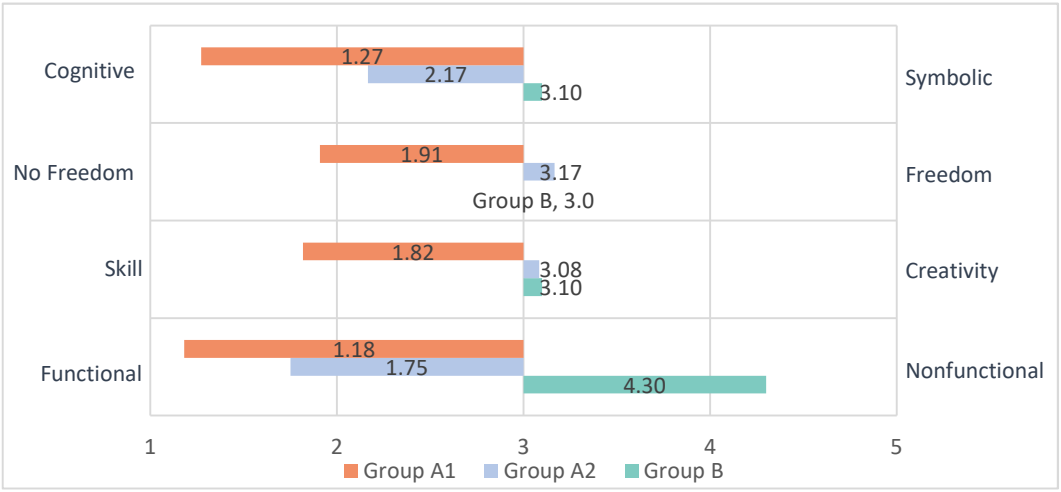


Figure 2.3 The artist's perceptions rating results separated by three groups

The principal component analysis (Figure 2.4) shows contribution rate 1 is 25.1% and contribution rate 2 is 13.2% The X-axis is considered "Product-Artwork," The left side shows functional products while the right side presents art objects. At the same time, the Y-axis represents "Fixed Design-Flexible Design." Works that show on the top side of the axis employed delicate decoration techniques requiring precision and careful skills such as painting. On the opposite side, works present more simple decoration techniques such as single-color glazing or non-glazed product. The subjects' number refers to the project number shown in appendix 1.

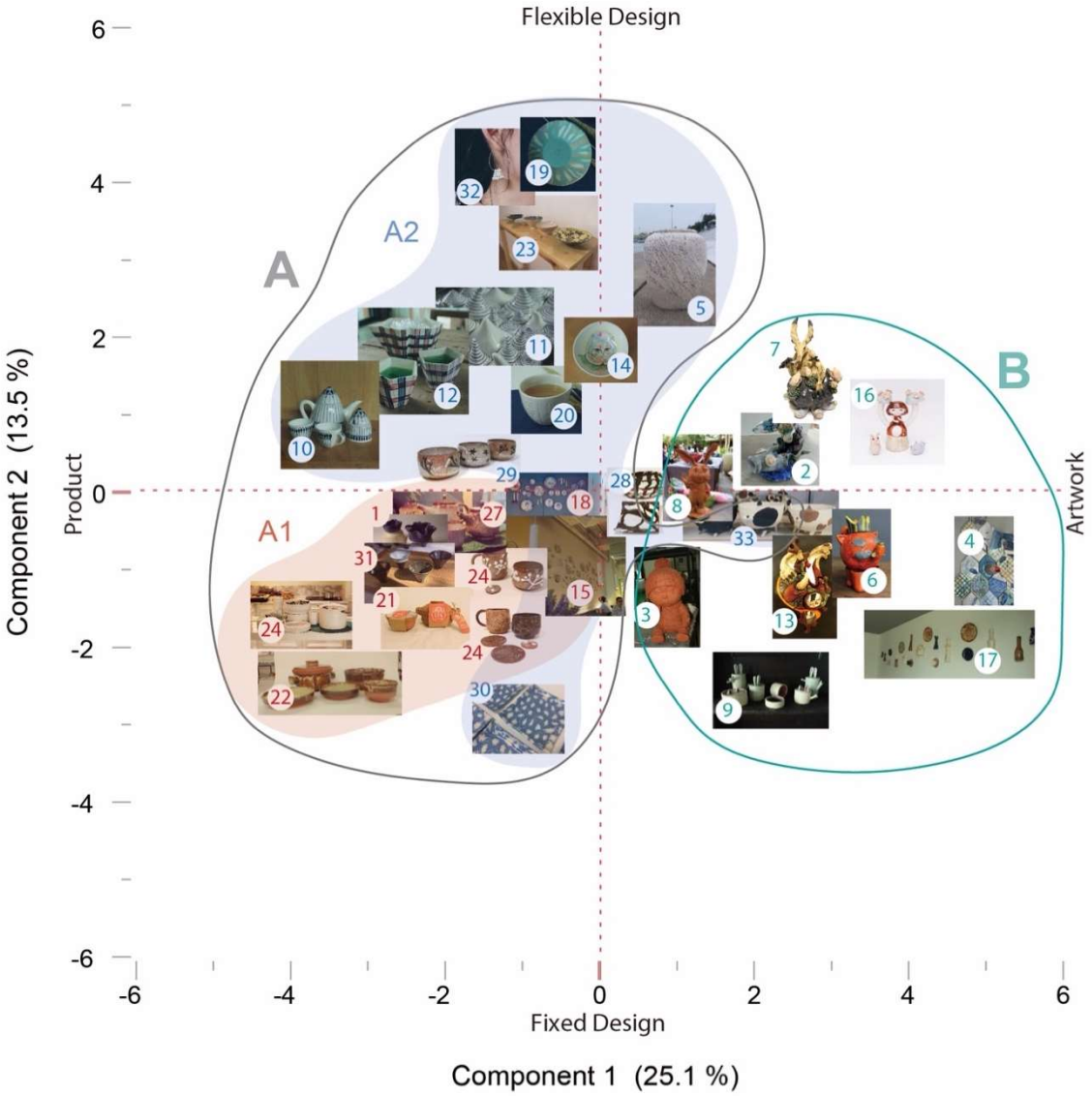


Figure 2.4 The Principal Component Analysis on Correlation of the author's previous works grouped by Cluster Analysis

Overall, group A1's primary techniques were wheel throwing and glazing included other industrial techniques such as Jigger/Jolley. Group A2 gathered slip casting products with glazing and painting being the main decorations. Last, Group B's dominant forming technique was Hand Building with several decoration techniques such as Glazing, Brush Glazing,

Carving, and others. The total shows the author likes to utilize Hand Building and Wheel Throwing for forming and most of the projects were decorated by Glazing.

The results are considered in detail and show the groups' representative products separate by the group following the list:

Group A1 shows a high ratio of wheel throwing works; all of them are decorated by standard glazing. However, they include two works mixed with Wheel Throwing and Hand Building and two pieces made by Jigger-Jolly, while another forming technique was not included in the order. Over standard Glazing, Printing, Painting, Carving, and Relief are combined. The experiences rating showed high rates of functional, skill, lack of freedom, and cognitive aspects.

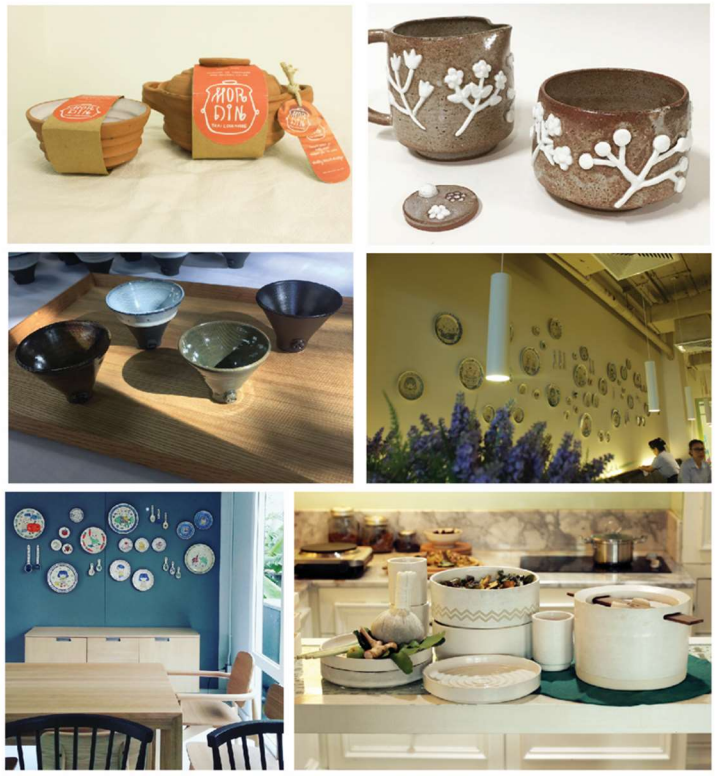


Figure 2.5 The representative of the author's previous products of group A1

Group A2 presents 12 works formed by Slip Casting and two by Wheel Throwing, including one work built by other artisans then decorated by the author. Also, six works combined painting with clear glaze decoration. However, slip trailing, printing, and carving was sequentially ranked. The experiences degree displays high functional rating, deviations pointed to creativity rating more than skill, highly rated on freedom, and deviated cognitive points rather than symbolic rating.

Figure 2.6 The representative of the author's previous products of group A2

Lastly, in *Group B,* ten projects were all made by Hand Building, followed by five pieces made by Press Mold and two by Slap Building. Brush Glazing was the most popular and shown in only this group; 8 works were included. Followed by six works where standard glazing was applied. Delicate decorations were included, such as Carving, Painting, and Relief. The experiences chart displays a high functional rating, creativity rated slightly above skill, lack of freedom and freedom was in between, and deviated steeply up to symbolic rather than cognitive.

Figure 2.7 The representative the author’s previous products of group B

2.3 Discussion of the four characteristics of works

The results indicate that the author's previous works were associated with functional purpose more than artworks. Technique combination appeared in several subjects. The high functional rating relates to skill, not freedom, and cognitive rating representing the ceramics as a functional product. On the other hand, non-functional rating obviously represented artworks related to creativity, and the symbolic rating during the freedom rate does not differ. First, the results are discussed following the cluster division to investigate each group's characteristics. The groups were named following the main character involve with the purpose of production, utilized technique and the author’s perception. The main techniques were considered in detail with emphasis on the likelihood that those specific techniques influence the potter’s perception of the project.

2.3.1 Group A1: The Industrial Craft

The industrial craft described using handmade skills to manufacture ceramic products. Therefore, to produce products in large amounts with the same quality requires a high-skill level artisan. According to the technique checklist, wheel throwing shows the group's largest amount while a little hand building and jigger appear. For smaller details, hand-building was used in forming extra parts, such as the cup's handle, so it would not be stated. Likewise, even the jigger is like wheel throwing, using spinning action to form a product. However, the technique requires a heavy machine and advanced plaster mold-making skills usually applied in big manufacturing, which is of little relevance to handmade processes. Hence, wheel throwing was picked up to be the main consideration of Group A.

The most popular forming method in industrial craft is wheel throwing. This technique can produce various cylinder forms, which is the base form of most vessels and tableware. However, wheel throwing mastering needs time to practice. According to the technique checklist and experiences rating, wheel throwing relates to function, skill, not freedom, and cognitive aspects. The results indicate that the artist chose wheel throwing to produce products based on cylinder forms that remain handcrafted, reproduce similar pieces, and minimize production time. Because the products were made to a customer's order or under the functional design, the condition makes the creator focus on cognition. Then, the boundary of the designed plan also limits the feeling of freedom while centering on the skill that brings processes to an achievement goal. In terms of decoration, the artist chose the standard glazing method as the main method. Printing, Painting, Carving, and Relief appear on the list, and they were finished by the standard glazing. The results reflect that to finish products by glazing relates to practical usability. For this reason, the processes tend to center on functional form rather than decoration.

Moreover, Nerikomi technique is included. Nerikomi is a special technique that combines forming process with decoration. Instead of decorating by painting patterns, glaze, or other surface decoration after forming a shape of the product patterns, Nerikomi attaches

different clay colors to make a pattern in a clay wall, not just on a surface. Details of the method are explained in section three: ceramics technique and material. Nerikomi usually starts from clay slabs that strongly relate to the slab building method, as shown on the checklist. Therefore, the press mold forming, associated with slab building, also appears in the result. At the same time, Hand Building was taken into the list as an extra part such as a foot, or handle. As mentioned before, the technique produces a pattern from clay color combinations. Thus, clear glazing or non-glazing are mainly used.

Wheel Throwing might suit the long program aiming to elevate attention span more than explore creativity because the method needs a strong focus to achieve the finished product. In contrast, wheel throwing could frustrate beginner audiences who expect to participate with clay in a short time, express their emotions in a short space of time or attend a ceramics program lasting only a couple of hours. In the same way as meditation, it takes time to be strong enough to take everything in control. Concentration helps makers to be peaceful.

2.3.2 Group A2: The Decorative Ceramics Product

Decorative products represent the item finished with aesthetic elements besides functional elements. Ceramic products usually use decoration techniques that do not interrupt their useability such as Painting, Low Relief, Curving, and Glazing to fashion a sense of esthetic by elevating the fine details of a normal form. According to the results, the main technique of the group points to slip casting, which is used in mass production, meanwhile some Wheel Throwing products appeared. Also, Painting with standard glazing shows a high rate on the list, followed by Slipware, Carving, and Printing. In addition, the artist made prototypes and plaster molds by herself, but she let the factory staff cast clay work. Thus, despite mold making, the artist can focus on decorating without worrying about the forming processes. Therefore, we take decoration as the main consideration in this group.

According to the technique checklist and experiences rating, centering on decoration processes show a relation with creativity and the highest rating on freedom even the products designed on functional purpose that relate with perceptual than affective. For example, in a factory process environment, slip casting might help creators express their creativity through decoration. As mentioned before, forming the same object for a big amount by hand is pressure in the ceramics process. On the other hand, the molding method helps the forming process smoother, and it might involve freedom. However, painting in ceramics is similar to painting on paper. The difference is that the color would change after firing. Therefore, painting is not an interesting choice for the program that requires tactile participation from clay but drawing and painting represented two dimensions perceptual should be considered.

2.3.3 Group B: The Ceramics Art

The last cluster assembles the ceramic art projects produced by hand building methods. Ceramics art describes art objects made through the ceramic's material and process. The process must build the hollow object by pottery of the clay body then decorate with either glaze or ceramics supplies. Hence, the ceramics art process is different from a typical solid sculpture.

Hand building is the main forming technique in the group, follow by press mold and slab building. First, Hand building is the earliest method that humankind has used to build their pot from the past, and it still works in the present. The forming method needs just the maker's hands as the best basic tools and other tools are optional. Also, the artist used hand-building because it opens the free space of creation through its nature. However, ceramics processes are not open to complete freedom. Even when making art objects, the key principles of ceramics making are still necessary. Properly making a hollow form and decorating prevents cracking, explosions, and other bad things during the firing process. It is basic but requires enough knowledge and experience to reach the goal or go beyond the line. Next, the artist used press molding to help her create a repetition form collection, and large scale works. The press mold can decrease process time by using it to copy a core part. Then an artist can spend

more time arranging work or doing experimentation on their project. Press mold does not require strict adherence to the rules or heavy machine-like other mold forming processes. The creator allows using a plasticity state of clay to press it into the mold then leaves it for a while. After that, we get a copy of the pieces, but it may be difficult to control the thickness and it might leave some scratches. Therefore, press molding is used in artworks more than in industrial products. Lastly, slab building, the technique requires practice and experience, same as the hand building and wheel throwing, but it is used for a different purpose. Clay slabs are suitable for a geometric form that needs a flat surface base and sharp edges or some shape that plays with clay sheet.

In terms of decoration, brush glazing is the main method, followed by standard glazing, carving, painting, and relief. Using a brush to apply glaze to the surface gives freedom to a creator to paint different colors on details instead of dipping, which is a standard coloring method. Underglaze painting with clear glaze is also used. However, a clear glaze does not have a dramatic effect on the surface. Therefore, brush glazing is preferred in ceramic art processes to allow color and surface variation. Carving and relief are usually applied to add a depth dynamic to the surface. These are regularly shown on non-glazed and decorative products. This manufacturing method shows ‘Un-functional,' which separates artworks from products and encourages 'Affective' rate more than 'Perceptual.' The conflict condition of affective expression under the ceramic rules is shown as the 'No Freedom-Freedom' rate remains neutral. However, the purpose of expressing a personal message and emotions associates with 'Creativity' over 'Skill.'

The four clusters show that purpose, which reflects the finished product’s image, affects technique selection and the artist’s thinking process, especially the forming techniques. Indeed, the handmade method connects the person with clay, but it takes time to build skills. Hence, creativity and freedom might be distracted by focusing on skills during a traditional making process. Therefore, traditional ceramic production might not fit an activity that needs full freedom of expression and short workshops.

2.4 Conclusion

Ceramics making affects the author's mental state through both logical processes and expressive art mediums. This observation was considered based on the author's ceramics infatuation, which gives her a positive bias to this material. Therefore, rating negative words such as 'No freedom' does not involve limited positive feelings but represents different channels that can influence constructive emotions. The purpose of producing might determine the techniques and mindset of the production, but the making process drives good feelings. Logical processes involve perceptual functions related to a functional product, the origin of pottery. Creativity and freedom of expression are influenced depending on the technique’s fluidity and challenges. Therefore, pleasure in ceramics making is not limited to releasing emotions but also problem-solving. For instance, the strict manners of throwing require concentration that encourages focus and calm. Hand building challenges the maker to sculpture images under the rules of fired clay while expressing internal emotions.

For these reasons, the study considers that the diversity of thinking processes in ceramic making can benefit ceramic workshops design more accurately by capturing the actions that drive clients' emotions toward the goal. Hence, an organized library of characteristic techniques is necessary to systemize a ceramic activities design strategy that is adaptable in various situations.

Finding

The classification found four groups of products’ characteristics that show the association concerning the purpose of works, technique selection, and maker’s perceptions of the productions following the list below. The classification shows the features of each works’ characteristics that can apply to the appropriate ceramic workshops design.

The industrial craft: The production aims to reach the qualities and time limit of the order by using handmade skills that need practice, concentration, and discipline. The technique that supports handmade mass production dominates the technique selection in the

wheel throwing group. For instance, wheel throwing manners could be appropriate for contemplation and self-control activities. Nerikomi, the technique that manipulates colored clay to make patterns in clay structure, dominated the perception of production. The process is arranging different clay colors into a clay wall before shaping instead of surface decorating. In this case careful planning and a set image are necessary to achieve the expected final work. The process could be applied to promote logical thinking and sequential operation through ceramics activities.

The decorative ceramics product: The main production is the graphic decoration on the pre-made functional product's surface. Therefore, the concern of shaping skills was reduced, which affects freedom of creativity through two-dimensional images. Slip casting was utilized to repeat pre-made forming in functional products. Therefore, using a pre-made form might help increase creativity in ceramics activities without concerning participants' shaping skills.

Ceramic art: The group shows a variety of art forms made following ceramic manners. Successful ceramic art pieces are works that can reflect the maker's internal image as much as it can be, such as maintaining the shape toward gravity, no cracks or explosions, and without any preconceptions. For these reasons, ceramic art is a high level of production that combines skills, observation, and experiments. Ceramic art can influence releasing emotions by creating the connection of feelings exploration with experimental processes.

Chapter3: Ceramics Methods Classification and Design Strategy

3.1 Introduction

The chapter organizes technique collection to be used in the workshop design framework for the experiment. The previous chapter indicates that different character of works relates to specific technique choices that affect the artist's perception of productions. It supports the primary idea that different techniques should influence makers in different ways. However, holding ceramics activities engage with more elements besides only object making. Equipment and material affect the process boundaries that influence makers' emotions. Figure 3.1 shows three main elements that engage the whole process, the materials, the workspace, and the production techniques. Changing one element effects the whole process. Therefore, workshop providers should consider three primary elements to tailor the program for the target clients.

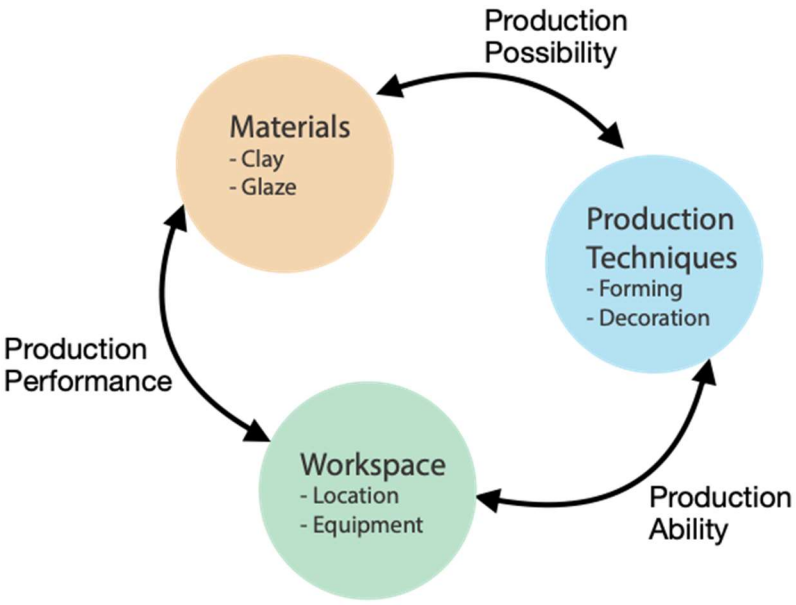


Figure 3.1 The relationships of three main elements in ceramic processing

The materials also relate to specific production techniques. For instance, some clay might be difficult to be shaped by Hand Building but easy to throw on the wheel or it may give different finished looks in the different firing atmospheres. Some techniques need special

facilities, and some require just skillful hands. These basic benefits and limitations were considered to classify the production techniques Hence, they affect each other and suggest that the workshop production possibility also might affect participants' mental benefits.

Each technique that appears in chapter two was narrowed down in details about productions' benefits and limitations. Then, they were classified relying on two perceptions, handmade-equipment, and intuitive-logic to clarify the main character of each technique.

3.2 Ceramic Processing

Ceramic process has a long period for production. It takes approximately ten days to one month from shaping to finish firing. The basic knowledge of processing can guide providers to capture part of the ceramic experience and put it in their workshop design. Ceramic making is more than just forming clay then firing it, ceramics is a scientific craft. A chemical transformation changes the raw materials to a different looking finish after it is baked at a high temperature.

There is a great deal of unpredictability and mystery around clay in a kiln, when works transform at 800-1300 degrees Celsius for the individual studio potter. It is a temperature that can melt glass. Therefore, it is impossible to observe works in the kiln while firing through the glass window like an oven in a kitchen. Further, during firing processes, works become bright flames like a fireball; the maker cannot expect the exact result until the finished look appears after the temperature cools down. This is the mystery of ceramics, and it is fascinating.

Clay is not a typical art media. Clay works require a very specific technique, more so than two dimensions art forms. Especially, Clay works that need firing require special equipment and space (Nan, J.K.M. And Ho, R.T.H, 2017). Even though pottery clay is made from natural clay, ceramics are separated from usual clay work by its special processes and finishing. Especially the firing process. Before and after firing in the ceramic process, an object can be totally different, especially in terms of the color and surface. There are several types of clay that are using in ceramics. All have different characters, such as color, surface,

shrinkage firing temperature, and firing time. A basic understanding of clay characters will help the maker choose a suitable clay for their work. Many potters develop their clay recipes to match their clay characteristics. Therefore, scientific knowledge is required before they will make an actual pot.

It needs a special forming technique to create successful pottery or any ceramic-made objects to pass these special conditions. Ceramics works must be hollowed entirely, with the wall never reaching more than approximately 12-15 millimeters. Pieces that are thicker than 12 millimeters often blow apart during the firing process, as do solid objects (Henley, 2002). Pottery has been born from container shapes that have a naturally hollow or open shape. After various cultural evolutions, ceramic objects' shape range has increased, including balls, dolls, or other complex shapes. However, it must be hollow and contain at least one big enough hole somewhere on the work to let heat-pressure flow around the clay work. This prevents cracking and breaking. Just a little bubble space in a clay wall can cause damages too. According to the increasing design and demand, humans have invented numerous ways to shape ceramic works. Although handmade ceramics from several cultures are no longer made.

The basic ceramics processes begin from clay preparing then forming, then drying and finally firing. However, the process could be extended depending on the finished look. Some works require firing 2-3 times. Some decoration techniques must be finished before glazing, glass-like coating, and some require applying after glazing and have to be baked again after that (Penny Simpson and Kanji Sodeoka, 1979) The fundamental pottery processes are outlined in Figure 3.2. Regardless of whether studio or mass-produced, ceramic processing provides several choices that providers can pick up from the part of the whole process. Participants can experience either arts or science depending on the selected tasks. Our aim is to study relations of techniques and mental state in ceramics making through ceramic art, the workshops scope includes the creation, forming, clay decoration, underglaze decoration, and glazing. Three decoration techniques were considered in the same class in the group classified as the Glazing and Decoration technique.

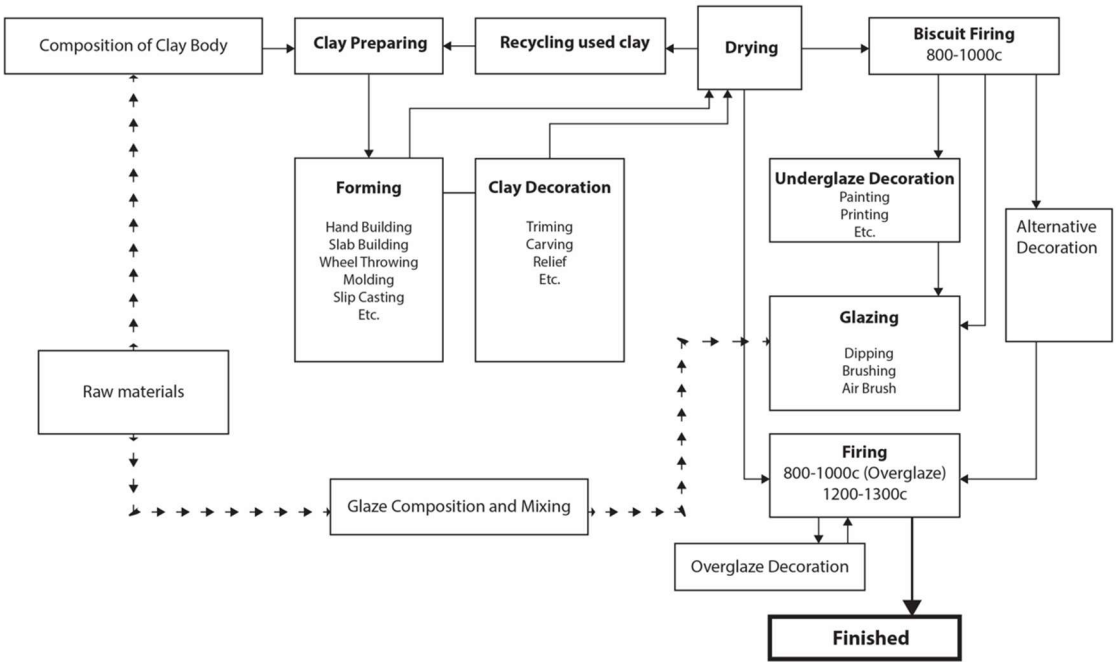


Figure 3.2 The ceramics processing chart

3.3 Clay in Ceramics

The basic understanding of the working method helps all creators determine the most suitable clay body (Taylor, 2011). Most of the clay in ceramics is mixed clay call *clay body*. It is composed of non-clay elements in different formulas for different purposes and expected finishes (Peterson, 1996). In some countries, including Japan, there are many types of ready-to-use clay bodies available to the ceramicist. All have their features and limitations. Hence, clay composition understanding is not only required for providers who work in an area where ready-to-use clay is inaccessible. There are three necessary points to be concerned about in making the clay body that can adapt to the choice of clay from the market:

1. The plastic material of clay chosen for its workability and firing quality
2. The flux used for controlling density
3. The filler for reducing stickiness and shrinkage of the clay content

The plastic material, the primary clay, involves a finished look and workability that suits the selected working method. Above all, the visual and tactile look after firing effects glazes and other surface decorations. For instance, impurities in clay bodies do not affect dark opaque glaze, but it might distract from an aesthetic on blue and white painting decoration. So, if the clay is to be used without glaze, the clay color and texture are predominant (Peterson, 1996). Second, clay plasticity affects the ability to be manipulated and hold the shape. Clay is a liquid-solid in various states depends on the amount of moisture; powder, liquid, plastic, leather hard, and bone dry (Muller, 2007). We commonly manipulate clay in the plastic state when clay can bend, roll, and stretch. The plasticity shows the ability to form clay, and its shape is held without cracking, warping, or collapse.

The flux acts as temperature control. The most common flux is feldspar, used to lower the melting point of ceramic materials. Also, it can be applied to enhance translucency in a porcelain composition. The higher the temperature is, the denser, stronger, and more vitreous the fired clay. However, most of the studio kilns have temperature limitations. Therefore, the maximum kiln temperature is also of crucial concern when firing clay for a project (Peterson, 1996).

The filler is used to add strength to the building method, create texture, reduce shrinkage, or give porosity for firing. Silica is a standard filler in clay body composition. Pure grounded SiO_2 is available commercially, but there are many options for silica resources that are more common to find, such as natural sand or crushed fired pot called *grog* (Peterson, 1996). Many potters add filler to the commercial clay body to increase its strength for a big-sized production or create textures for an aesthetic that is convenient for making the original clay, rather than composing the clay body from whole raw materials.

For the areas where it is easy to find commercial clay, there are three suggestions to adapt three essential features of clay composition to select ready-to-use clay bodies from the market:

1. Set the finished look of the project
2. Know the kiln limitations
3. Set the other condition options

First, a clear image of the finished work's helps creators select clay that gives texture and color close to their expectations. We choose ready-to-use clay bodies by finished clay samples from ceramic suppliers, which should be fired at the recommended temperature. At the same time, the clay information would let creators know if the selected clay is appropriate for their firing method or not. Lastly, if specific conditions are required, such as the Raku project or a huge outdoor sculpture, it is necessary to be concerned with the extra abilities of the clay. In a studio production, finished clay looks are classified into three categories according to firing density: earthenware, stoneware, and porcelain. Density is the water absorption after firing is finished, this shows the basic characteristic of clay:

Earthenware is inexpensive, can be used for a wide range of ceramic works, and is most commonly fired at low temperatures between 1080-1120C (Taylor, 2011). Its low density makes it relatively soft, chalky, fragile, leaks liquids, and is not stain or acid resistant. Though, lightweight, and low shrinkage are its positive aspects. We may be familiar with earthenware as reddish bricks or flowerpots, but it can be white if it fits the low-density definition. According to the low shrink factors, earthenware is useful for cookware and outdoor sculpture due to its thermal shock resistance.

Stoneware is hard, scratch resistant, and impenetrable to water. It is fired between 1200-1300C with oxidation or reduction firing options (Taylor, 2011). Without glazing, it looks like stone, has a dense surface and is strong by itself with no glaze. Because of the wide range of uses and temperature, stoneware clay body is used for ceramic ware worldwide from individual potters to heavy clay-product manufactory (Peterson, 1996). A versatile firing range and atmosphere gives freedom to potters or artists to match stoneware with several glaze options or to add coloring into the clay body.

Porcelain has the lowest absorption, hardness, durability, and resistance to acid and bacteria. So, it is fired in the highest temperature range, above 1260C. However, it is the most obstinate clay body to manipulate due to being the least plastic (Peterson, 1996). Despite the troublesome processes, it gives a white and translucent look. Therefore, porcelain is used by high-class tableware production and professional artists.

Indeed, there is no commercial clay body that fits every project perfectly. The option is to select a base clay body and then add filler or colorant to custom clay for the project.

3.4 Studio Equipment and Facilities

There is no fixed rule for a ceramic studio. It is simple to set up if there is a space with access to electricity and water. However, the studio is a workspace that houses clay tools and equipment that can get dirty and be a health hazard. For these reasons, the environment affects workshop efficiency. The workshops that have location issues should consider the workshop process that matches the workspace that contains the greatest participant benefit. Even though there are a lot of requirements in the ceramics production environment, the processes are flexible to be adapted. Muller suggests that the studio size and planning depend on works style, quantity, and frequency of use. Hands are the important tools for forming. Many potters do their work by hands and a few wooden tools (Muller, 2007). Furthermore, the necessary tools include a kiln, durable worktable, drying space, and storage. A pottery wheel or a lathe is the option depends on forming technique. Three safety and environmental issues that must be considered carefully before building ceramics production are fire, air, and water.

Fire

First, the firing process is indispensable in ceramics; also, a kiln is an essential and pricey tool. Before detailing each kiln, it is required to know the firing atmosphere. Peterson explains it clearly in her *The Craft and Art of Clay Book,* recommended to read for those who have not participated in the ceramics field. Atmospheres in the kiln are as important as temperatures in fired clay work. It causes color changing in clay and glazes. The same oxide

can become distinct colors in oxidation and reduction atmospheres. Not every kiln can fire both atmospheres. Kilns can be divided into three main power sources, a wood-fired kiln, a gas kiln, and an electric kiln.

Wood-fired kilns are an ancient ceramics technology, which is still developed and used. Reduction occurs naturally in a wood-fired kiln because when the wood combusts, the initial igniting of gases causes the reduction atmosphere (Muller, 2007). During firing, fly ash in the chamber creates natural wood ash on the work's surface that is flashes of rich earth tone color. The wood firing process is demanding and labor-intensive from the start, and it can take up to a week for one firing period. According to Taylor, the kiln must be located outdoors with a shelter and a wood storage area (Taylor, 2011). Also, it requires a team of experienced and dedicated people to operate.

Figure 3.3 “Maeda Gama” The private wood-fired amateur potter in Fukui, Left-During firing process Right-After finished firing

*Gas kiln*s are popular among modern pottery production. It is used in industry as well as art schools due to the flexibility of atmosphere control. So, they give the experiment opportunity to potters. It can be oxidized, neutral, or reduced. Moreover, gas is a controllable and clean fuel compared to wood-fired also the most cost-efficient of all kiln types. Also, firing a gas kiln can finish faster than wood fired. However, operating a gas kiln needs a degree of skill and knowledge, even though there is a modern gas kiln that an automated system (Taylor,

2011). Last, the safety fuel system and chimney come with the kiln structure, which causes it to require well-built construction to locate.

Figure 3.4 The gas kiln section of Tao Hong Tai Ceramics Factory, Thailand, *Left-preparing products before loading in the kiln Right-loading out finished products*

Electric kilns are firing powered by electricity, which produces radiant heat instead of combustion (Peterson, 1996) (Taylor, 2011). They are designed for indoor use and are usually operated by computer control. Therefore, they fire in oxidation naturally, are easy to use, give predictable results, despite alternative atmosphere firing limits. An electric kiln is an excellent choice for closed spaces such as a home studio or school because the computer firing program would operate automatically, let a potter be free hands to do other jobs, or leave it to work during the night.

Each kiln type gives different firing results and supports diverse ways of production. Setting the outcomes image is the main factor in deciding a kiln. If a potter focuses on the earthy look and enjoys an unpredictable natural ash glaze, the wood-fired is the most suitable. Additionally, finding the space to build one's kiln is important, but joining a potter group that usually works with wood-fired is an option. On the other hand, an indoor workspace is limited, and controllable results are preferred, so the electric kiln is the best. Alternatively, various atmosphere firing experiments are needed, frequently using is planned, space is not the obstacle, so the gas kiln is perfect.

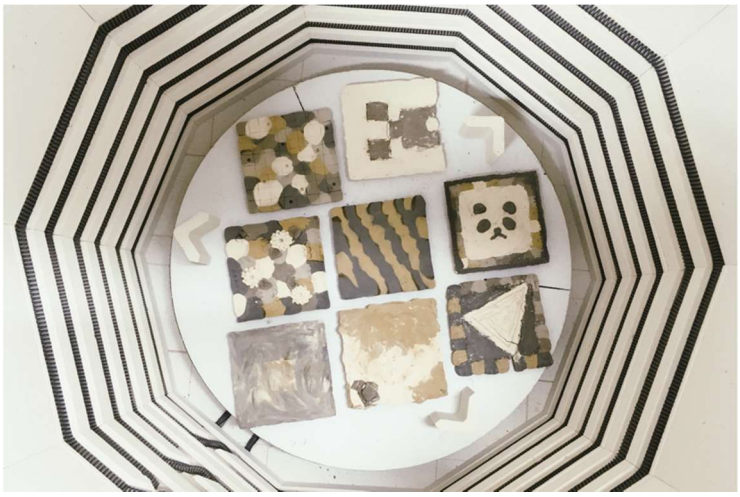


Figure 3.5 Fukui University of Technology's electric kiln

Air

Ventilation is often overlooked, but it is important for many reasons, the most crucial is for health. There are plenty of health hazards occurred in ceramic processes. One of the most serious issues comes from dust in a studio. Raw materials are often supplied in powder form with cautious instruction, so people usually pay attention by wearing protectors while using them. Nevertheless, dust from clay is the most neglected. Clay in the form of dust is fine silica particles, a harmful substance if inhaled (Taylor, 2011). A prolonged exposure cause silicosis disease. Therefore, clay dirt should be wet cleaned or by a vacuum cleaner. Raw materials should be stored securely in proper containers, such as a plastic box with a lid. However, working with clay in a wet environment also easy to grow fungus, which affects health. Moreover, circulating fresh air helps clay works dry properly.

During firing, carbon monoxide or glaze fumes can be produced by organic components and certain minerals. Those fumes are health hazards. Thus, practical ventilation systems and self-protection policies minimize the risk to potters and others. To ventilate during firing operation is a strict rule to be followed. Peterson (1996) indicated that open-air ventilation is better than closed air systems, operated by fans, flues, and air recirculation. That is much better to be able to give a natural airflow in the studio. Muller (2007) described her first studio on The Potter's Studio Handbook that her wet workspace was in the basement, but her kiln

was in the garage because her basement did not have venting systems then she protects herself by place the kiln in more airflow area.

Water

Water is used in ceramic processes from start to finish. It is composed of the clay body, glaze until painting materials, applied processes such as wheel throwing or slip casting. As well, used for cleaning. Running water is convenient and might be necessary for large production, especially in glazing processes. Many pottery studios do not have running water, but the important is managing leftover clay and glaze.

The studio draining system management does not only benefit potter's facilities but also benefits the environment. Dumping leftover clay and glaze in water, called slurry, into a sink after cleaning can clog plumbing. Moreover, some toxic ingredients or strong alkaline minerals in the glaze damage soil qualities and pollute water. Muller (2007) suggested a slurry cleaning tip, do not immediately dump the clay water but rinse tools in a water bucket instead, then let the clay or glaze settle to the bottom. After that, decant the clean water. The slurry can be recycled. In addition, leftover mixed glazes usually do not recycle. After pouring the clean water, let the glazed powdery dry, then put it in bisque firing before throwing away is an eco-idea.

Due to the qualifications, building the studio might not be worthy for a hobby or beginner. Especially in Japan nowadays, living in a compact space is growing up. Due to the strict rules that are impossible to put a kiln in an apartment, let alone pack ceramics equipment and clay storage in a tiny space. Therefore, a professional studio subscription is a good deal for an amateur potter. However, the idea that processes must stick to the studio facilities could limit ceramics activity growth.

3.5 Production Techniques

The techniques were reviewed to consider the actions that makers must face in the processes, necessary equipment, and boundaries of products, which show relationships with clay and facilities.

The production techniques or the creation methods are the processes about making ceramic objects including forming techniques and decoration techniques. The creation period is the most intimate period between maker and object. According to the last chapter, the observations show that different techniques produce various characters of work and affect makers' perception differently.

3.5.1 Forming Techniques

Studio technique knowledge is essential for applying the ceramic method in design or art activities. Also, it helps clients to render their ideas into reality based on the processes. This research divides ceramic methods into two main sections, forming techniques and decorative techniques—furthermore, the study is limited to the techniques that the author has experienced.

First, the forming techniques, building ceramic works. As mentioned before, forming ceramic works is a unique method. Clay cannot be fired when it is a solid mass. Therefore, hollow form is the rule, an even wall thickness is considered, and careful joining method is suggested. Ceramics has a strong relation with container form, and it could trick the maker who wants to apply fired clay to their sculpture work. No matter how close the sculpture is designed, it must be hollowed with a hole for airflow. Hollowing out the clay can be done by plenty of techniques, from hand-building to mold casting that is explained following the list below.

Hand Building

Building clay by hand without any extra equipment is an ancient process. The common hand building techniques are pinching, coiling, and slab, described on several potter's handbooks. Three techniques relate to shaping clay by hand. It could be compressing, stacking, and jointing clay pieces to hollow out works while shaping. Hand Building is always mentioned as it is the simplest ceramic forming technique, which is utilized to introduce ceramic techniques.

However, this study separates the slab method from Hand Building based on the author's experiences, as working with clay slabs requires different conceptual skills. Pinching and coiling can be mixed when creating sculpture forms and is not limited by the size of the work. The rolling and pinching up coil method is used worldwide (Peterson, 1996). For instance, *Tebineri* the standard Japanese pottery coil-pinch technique, the huge water jar made in Thailand, or big sculpture works of ceramic artists around the world (Figure 3.6.)

Figure 3.6 Hand-building method, Left- The Tao Hong Tai factory's craftsman making huge water jar by coil-pinch method, Thailand, Right- Sam Chill Park, Korean ceramic artist, shaping his organic form sculpture

In addition, the main part can be built by stacked coiling to produce a strong and stable core, then assembled with small parts, which are faster and more easily made by pinching. The author also applies coil-pinch methods to her sculpture work. Therefore, we will have the

study groups pinching and coiling together and using the hand-building method and keep the slab method independent of the evaluation.

Pinching is the simplest and the most connected with the maker. Clay is manipulated into shape in one's hand by compressing with fingers, sometimes supported by palm. It shows strong and pure connections with materials and makers. Henley (2002) often uses the technique as the introductory ceramic experience for clients and art therapy students. He credited Berensohn (1972), who mentioned that the most direct contact with the clay in the pinching process is associated with meditative and spiritual connection influenced by immediate action when manipulating clay in one's hand. The clay amount for this technique should comfortably fit in the palm. Creating cylinder forms can start by poking a thumb into the center of the clay ball. Then by fixing the thumb to the hole, pinching a wall, and rotating the ball slightly after one pinch. The clay ball will grow to a pot-like shape by repetitive pinching. This technique is suited to making small pieces due to the limit of the amount of clay that can be held in one go. However, a pinch of clay can be formed separately to make multiple parts or grow the bigger shape by joining together later.

Coiling means building up walls with a series of clay ropes called *coils*. It is also a universal ceramic technique, yet it demands precision, skill, and time (Peterson, 1996). The technique is popular among ceramic artists. It shows the potential to develop clay freely from basic vessels to organic forms. Quinn (2007), coiling is a very intuitive process widely used for sculpture because it allows makers to improvise as the object grows. Coils can be made by rolling by hand or extrusion with a machine. Muller (2007) recommended practicing coil building before starting work on a potter's wheel or other building techniques as it gives a clear sense of the conditions of clay, plasticity, structural strength, jointing method, compression, and clay consistency. It prepares the maker to understand the ceramic works process and clay characters. Building works by this method start from the bottom, the base of the work, then stack coils to the top as high as desired. The most important is luting, which is a critical jointing method in the ceramics process. The seams between coils are the weakest area and

are vulnerable to cracking. Makers should make sure the joints are well attached. The proper jointing method can be crosshatching and attaching with clay slip, pressing, and smoothing the seams between coils, applying pressure, and scoring while feeding a coil to the wall, this is called coil-pinching.

Figure 3.7 The author with hand-building method, Left- The author shaping her graduate sculpture project, Right- The finished sculpture

There is no size and form limit in Hand Building techniques if the makers learn to respect and use them properly. Clay in the plastic stage is the best for coiling. Thus, it is easy to transform, which means it is at risk of collapse and cracks if it is overweight or overstretched upon the structure. For large scale making, the maker should stop placing new coils then leave the clay to set harder before continuing bigger or higher. The timing depends on the types of clay and shapes. Therefore, the maker should learn to predict and observe while making. Practice is critical.

Slab Building

Clay is rolled into flat clay sheets, called *slabs.* This technique gives the maker a strong feeling of construction. The process allows makers to construct angular forms or more organic curvy shapes with large flat surfaces depending on the clay's stiffness. Moreover, makers can

take the potential of the large flat surface to play with textures creation before they are assembled, such as stamps, rolling over a textured surface, or printing (Quinn, 2007).

Thinking in a slab process is like working with cardboard. Clay slabs are formed on a leather-hard stage or shaping EVA foam sheets when slabs are slightly soft. The decision on the shape before building is related to clay moisture control. It should be firm enough to support itself against gravity, but soft enough to bend. Also beware not to leave it too dry if the maker intends to bend it because it would risk cracking or breaking apart. Cores or supporters can be applied to support the soft walls. For example, wrapping a slab around a cylinder form made of paper. Jointing slabs also apply the ceramic luting principle, plus lining a thin coil on seems to reinforce the joints.

To sum up, slab building encourages systematic thinking more than pinching and coiling cause its construction process. It is not open for improvisation but requires a high level of design and management compared to other hand building techniques.

Figure 3.8 Young Soo Kim, Korean ceramic artist, is demonstrating slab building technique at Sanamchandra Clay Work 2016, the international ceramics symposium hosted by Department of Ceramic, Silpakorn University, Thailand. His work shows the sharp edge rectangle sculpture with the cracked surface from clay stretching.

Wheel Throwing

The image people associate with ceramics most is wheel throwing, and it is one of the most popular ceramic processes. However, its popularity belies the level of skill required. The

processes seem easy and flowing when looking at a professional performing. The images can give beginners an unrealistic expectation of their ability. The truth is that it is all about dedication, skill, and practice to become a competent thrower. Like a professional athlete or musician. There are no shortcuts, but practice makes perfect. A very skilled thrower can

Figure 3.9 Hu Xiao Peng, a Chinese ceramic artist, is demonstrating advanced Wheel Throwing techniques at Sanamchandra Clay Work 2016, the international ceramics symposium hosted by the Department of Ceramic, Silpakorn University, Thailand, Pictured by Venich Suwanmoli

repeatedly throw identical objects consistently. Quinn (2007), Taylor (2011), the character of thrown objects presents rotating lines that remind the maker's hand action of clay on the wheel, rich in craft esthetic (Figure 3.9.)

Throwing relies on the principle of centrifugal force. There are three big steps in manufacture: clay preparation, throwing, and finishing, called trimming. Spiral wedging practice is recommended as clay preparation for those who want to start with throwing. It is the most satisfactory method to remove air pockets and make a lump of homogeneous clay (Peterson, 1996). Lacking wedging skills can cause several throwing problems, such as air bubbles in the wall, a lumpy wall, or cracked marks because of inconsistency. Next, the

throwing method has three small but crucial steps: centering, opening the base, and pulling the wall up. Last, Trimming is a finishing process that involves getting off excess clay with a sharp-edged tool. The method must be done when the clay is firm, the leather-hard stage, to give a clean cut. *The Potter's Studio Handbook* by Kristin Müller is recommended to read for more information. Her clear and detailed explanation covers all processes that beginners must know.

Nevertheless, reading books or studying from video clips might not be enough. For beginners, the recommendation is to apply to the wheel throwing class instructed by professional potters. The instructor will give personalized advice that comes from observing students' movements. Therefore, it can help students improve faster. Alternatively, many studios provide an hour hands-on throwing workshop that gives clients experiences of making pottery on a wheel in a forming method. The event ignites clients' excitement of the pottery world, but you should keep in mind that it does not mean it accurately conveys the thrower's ability.

Lastly, Taylor (2011) states that the potter wheel is just a piece of equipment in the studio. It can be adapted using beyond making an only symmetrical round shape functional wares. For instance, thrown cylinder walls can be cut and used as slab or mold making, using the wheel as a substitute for plaster turning to make prototypes (Figure 3.10.)

Figure 3.10 The author is making clay prototype of bowl on the wheel before the mold making process.

The forthcoming three forming techniques that are explained rely on plaster molds. Working with clay associated with a mold is a modern method that is influenced by manufacturing processes. Casting and mold-making are complex studies that could be separate subjects entirely. This study presents three mold methods that the author has employed: press mold, jigger/jolly, and slip casting without details of mold making. Molds are used in ceramics as supporters and formers. They are made from a porous material to move moisture from the clay, commonly gypsum plaster. Low-fired bisque also can be used for a simple press-molded.

In the manufacturing line, molders and casters work separately. The molders work on prototypes and mold making, usually trained from the institute or the college. Good primary casting skills are required, but a fast performance is not necessary. Meanwhile, the casters place clay sheets or pour liquid clay into the mold. Speed and accuracy are needed. It is a skilled labor work, and the factory regularly trains them.

Press Mold

This method is a conjunction between hand building and manufacturing processes. Also, it is the most versatile mold that studio potters, ceramic artists and architectural manufacturers use. The principle is to press plastic clay into the mold, trim the excess clay, let the plaster absorb moisture until it becomes leather-hard, and release the work from the mold.

Clay can be a slab covering the entire surface of the mold or a combination of clay pieces. There are two main types of the press mold. First, the clay would be pressed into an internal profile, named slump mold. Second, the clay would be laid over a form rather than pushed inside called hump mold.

Press mold allows the maker greater control during construction, and it suits forms or sizes that might be difficult to throw or slip cast (Taylor, 2011). It is also useful in architectural application products, which require some generous thickness rather than fine thin walls. The

author uses press mold in ceramic art projects to reproduce the core of art sculptures. The processes allow the development of ideas into works by putting something in or cutting something out, playing with the work with more relaxation and less time than hand-building in the same over the same period (Figure 3.11.)

Figure 3.11 The Raku pottery art collection of the author that made by press mold method show that the artist repeated identical main shape and create details variations among the series

Due to the press mold's supportive ability, it is also useful for education or therapy sessions. Although using molds can obstruct a rich clay quality in therapeutic purposes, the press mold's positive feature is that it supports disabled clients to enjoy forming clay with less stress while maintaining hand movement features (Henley, 2002).

Jigger and Jolley

These processes evolved press molds into industrial manufacturing. Quinn (2007), the jigger and jolly is a semiautomatic machine that employs plaster mold, plastic clay, and profiling blades to force the clay into a shape. Jolley involves forming clay into a drop-out mold, like slump mold. However, the method works on rotated mold, fixed on a spinning head, and plastic clay is pressed by profiling blades secured with a machine arm, which controls the internal profile instead of pushing the clay by hand. Jigger also works on the same principle but the opposite profile's side. The mold on a spinning head shapes the internal profile, while the blade cuts excess clay to correct the external outline.

Figure 3.12 The author with Jigger-Jolley method, Left-Jolley method operation works with rotate plaster mold and shaping blade, Right- The Thai medicine tolls collection of the author made by Jigger-Jolley method

Slip Casting

Slip is liquid clay, and slip casting means pouring casting slip into a plaster mold to shape a product. It is the most popular among ceramic design industries because of its accuracy and ability to cast identical objects repeatedly. Slip casting can give a super thin-wall result that makes the translucent finish in bone china and porcelain. It also allows for lightweight products.

Figure 3.13 The three dimensions tiles collection of the author made by slip casting method

The mold would be filled with clay slip. The plaster will absorb water, leaving behind the clay shell. Then drain excess clay slip, leave the clay skin set, and remove the piece as

soon as it is stiff. The casting can be repeated three times daily per one mold, and about 100 times before a new one must be replaced (Peterson, 1996). Slip is mentioned before concerning the luting method. However, the casting slip is not a potter's clay melted in water. It requires a particular recipe, mixing method, well-controlled storage to keep slip consistency, and viscosity that affects casting quality.

3.5.2 Glazing and Decorative Techniques

There are several ways to decorate ceramic works, as is the same in all typical art and crafts: coloring, texture application, graphics, also mixed techniques. Glazing might be the most familiar finishing in ceramics, but some cultures have never finished their works with glaze. The Native Americans burnish the clay to a smooth finish and seal the pot's surface. Unglazed wares in Japan are called *Yakishime*. This rich earthy finished look is also popular among sculptors. Even without glaze, the firing method of using high temperatures is the same as glaze firing. This is recommended to increase durability.

Figure 3.14 Example of unglazed sculpture, Left-The unglazed Buddha sculpture of Naidee Changmoh (Thai ceramic artist), Right- “The rabbit boy,” sculpture of the author

Glazing

Glazing is the most scientific topic in ceramics. It can be explained briefly as a glass coating fused to the ceramic surface. The purpose of a glaze is to seal a surface, decorate, increase durability, make pottery easy to clean, and provide acid and bacteria resistance. Depending on the formula, a glaze can be matte or glossy; transparent or opaque; rough or smooth, also colored (Taylor, 2011) (Peterson, 1996). Making glaze is a complex study and requires experiments and research. It is about chemistry. Even though there are ready-to-use glazes available from pottery suppliers, carefully following instructions is highly recommended.

A glaze is applied as a liquid, a mixture of powdered materials and water, to bisque ware. High porous bisques quickly absorb water then leave behind a layer of powder on the surface. Most importantly, the results after firing are always unlike the powder look. For instance, white power might be a clear glaze, a white matte glaze, an opaque runny glaze, or even a white decorative slip. Therefore, fired test pieces and a glaze library are very important. Dipping and pouring are commonly used methods to apply glaze on pottery. It is the most accessible way to get a glaze to work evenly. For large-scale pieces, spraying is an effective method. However, it needs a spray-booth unit, including a ventilation booth, a compressor, and a gravity-feed spray gun.

The painting method can also be used, but it is not a good choice if a patchy pattern is not desired. On the other hand, brush marks can give some esthetic depending on the maker's presentation. The author likes to paint glaze on her ceramic sculptures because it provides excitement over the control, the expressive art potential (Figure 3.15.) Therefore, the artist experience analysis in section two divides the glaze painting method from the group.

Figure 3.15 Example of brushed glazing method, work of the author. The work shows a combination of different glaze on the details of color, texture, and space.

Slip

Slip is very useful in ceramic processes. It is a liquid form of clay widely used and very necessary for luting. It creates fine-quality casting and is versatile for decorating. Slips can be colored either by using a natural color clay base or by adding pigments. For example, Kaolin gives a white look, high Iron Oxide clay provides reddish, and ceramic pigments present another color palette. Like glaze, color slip is slightly different after fired, so testing is necessary. Like painting color, slip can be applied in several ways: brush, sponging, scratching, printing, and marbling. However, this study focuses on *Trailing,* which the author most often adapts to her works, and puts the method into the artist experience analysis in chapter three.

Slip Trailing works by feeding slip through the nozzle by pressure from squeezing a rubber bulb. The slip can be trialed in lines or dots. Slip lines show a relief pattern, which can adjust to a low or high definition depending on the slip thickness. The slip decoration needs skill and practice to get used to the tool and method. Mistakes during work can happen at any

time, and it is not easy to fix, even for a professional. It is better to master the skill and learn to let it flow simultaneously.

Figure 3.16 Example of slip decoration: The work shows the pattern of clay colors that exited from poring the grayish slip clay into the plaster mold, then continuing the slip casting method with the porcelain clay body.

Printing

Printing is the technique that transfers graphics to the works' surface. This can be applied both in raw clay state and in bisque ware in ceramic processes. Application of graphics or surface decoration on plastic clay is made by transferring stamp tools to any surface on the soft clay. The technique provides the repetitive abilities of pattern making or surface experiment when soft clay is transformed by surface pressure.

On the bisque ware, glaze or color can be transferred by resisting marks and also by stamp tools and ceramic stickers in industrial production. Masking is the decorative method to resist areas and layer up the slip or glaze. A resistor can be wax, latex, paper, or even masking tape. It allows makers to create overlaps of pattern and color. Wax and latex are commonly applied by painting, giving organic and rustic results. Paper and tape present sharp edge effects that suit graphic design.

Printing tends to involve planning and image because printing is associated with manipulating existing things to create visual decorations. Also, it benefits makers who are uncomfortable drawing from nothing but prefer to create by arranging.

Figure 3.17 Example of printing decoration, masking graphic on the bisque ware is the one of printing decoration

Painting

There are two main painting techniques in ceramics: underglaze painting and overglaze painting. Underglaze pigments are usually mixed with water and painted onto bisque ware, then coated with transparent glaze. The most famous underglaze painting is cobalt blue decoration, influenced by Chinese Blue and White Porcelain Wares. It is called Sometsuke in Japanese, and the blue pigment is called Gosu, which comprises cobalt and manganese (Penny Simpson and Kanji Sodeoka, 1979). There are diverse shades of blue pigment around the world. Following the ceramics coloring principle, it can be applied with brushes, sponges, or stamps, and the colors change after firing. Experimentation can help a creator imagine the result while painting spontaneously. Other metallic pigments can also be used. Copper oxide gives green color in an oxidation atmosphere, but it becomes red in a reduction atmosphere. Iron oxide gives reddish-brown color, which presents a rustic and natural esthetic. Nowadays, chemically manufactured pigments are also available. These

include a wide range of color palettes that did not exist in the past, such as pink, yellow, orange, bright red, purple, and more. However, only Gosu and some other high-quality artificial pigments can be diluted with water to make a gradient. Meanwhile, other metallic colorants are hard to control.

Figure 3.18 Example of blue and white painting underglaze painting

Overglaze pigments are painted onto glazed non-porous surfaces. They are mixed with an oil-based medium such as pure gum spirits or Balsam to give a level of adhesion (Penny Simpson and Kanji Sodeoka, 1979). In ceramics, every method must be fired to finish, and this includes overglaze. The temperature varies about 800-1000 degrees Celsius. Metallic lusters are also categorized in overglaze decoration. Commonly they are gold and silver. Luster is a toxic and delicate pigment, and safety procedures must be strictly followed.

Painting might suit clients familiar with two-dimensional activities rather than those comfortable with physical actions because it involves visual senses. However, the color change after firing contains the tentative sense of ceramics, which a typical painting cannot show.

Carving

Carving involves peeling, scratching, putting out excess clay for shaping or decoration. Carving in this study does not include trimming in pottery shape finishing processes, such as bowl foot trimming. Texturing is often used in sculpture work; carving is an accessible and effective way of detailing the surface (Figure 3.19). Putting clay in and carving it out are interactive methods undertaken during the sculpting processes. In functional pottery, carving allows the maker to create and explore a harmony of texture. Above all, workpieces should be carved when on a leather-hard stage to prevent the form from collapsing.

Figure 3.19 Example of carving decoration

Relief

Relief is attaching the layers of clay ornament on the work surface when it is still leather-hard. It is also known as *Sprigging*. It is a traditional technique used to decorate small clay relief plaques (called sprigs) to the pottery body (Quinn, 2007). Sprigs can be made by press mold or hand sculpting. Relief techniques also appear in Japanese pottery called *Haritsuge* (Penny Simpson and Kanji Sodeoka, 1979). They can be attached in various colors if they have related shrinkage properties to the main body. Sprigging is a delicate job. It needs focus and accuracy to finish each element cleanly and well.

Figure 3.20 Example of relief decoration, Left-The works of the author from 2016 collection, Right-Delicate sprigging technique of Josiah Wedgwood and Sons Ltd.

Nerikomi

The technique uses different colored clay combined to make patterns or striated marks. The clay combination can be done before or during forming. It is also known as *Agate Ware* in English, although *Nerikomi* is more familiar because of the fabulous pattern design that they work with. In other words, Agateware presents marbled patterns (Figure 3.21.), while Nerikomi shows the complex graphics made by combining layers of colored clay, slicing, and rearranging over again and again (Figure 3.22.) The patterned clay that is sliced in a slab form makes Nerikomi naturally related to slab building. Multitasking forces makers to think and manage during the entire process. It is about design and management rather than sensation.

Figure 3.21 A Rare Staffordshire Agateware Pecten Shell Teapot and Cover with lamprey fish handle and bird spout, Michelle Erickson. *https://haughtongallery.co.uk/portfolio/a-rare-staffordshire-agateware-pecten-shell-teapot-and-cover/*

Figure 3.22 Nerikomi technique by Japanese potter, 長江哲男

3.6 Technique Classification

Techniques reviewed in the chapter were plotted in the two-axis classification; handmade equipment and intuition-logic. This division is an example of the classification method used in this study. However, providers can apply this method with other characteristics that suit the workshops' conditions. Forming methods and decorative techniques were classified in the same diagram. The design strategy will apply this classification to technique selection and elimination. Figure 3.23 shows the techniques classification separated by color. Forming methods are shown in brown circles and decorative techniques are presented in green circles.

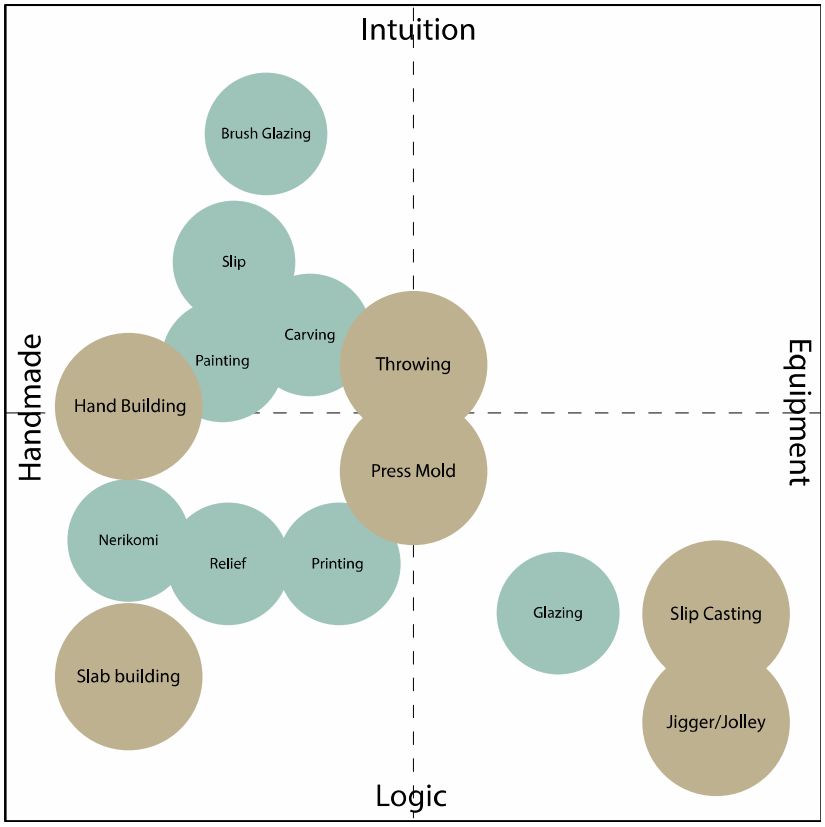


Figure 3.23 Technique's classification

Forming techniques were classified into two main groups: handmade techniques and the method that manipulates the mold. However, some handmade techniques associate

equipment rather than bare hands also some of the castings are still open for hand actions. Therefore, it might be better not to make a clear line between handmade and molds; instead, we should classify from handmade to equipment manipulation. Moreover, each group can level the techniques from intuition to logic. In the case of handmade, pinching and coiling provide high sensibility and freedom that mostly rely on intuition. Meanwhile, Wheel Throwing needs mastery skills that involve both intuition and logic. In terms of mold use, press mold gives the most adaptation ability though slip casting requires precision, which relies on logical planning.

Decorative techniques were classified on the same diagram. Fluid and flexible techniques represent intuitively related to artistic purposes. For instance, brush glazing and slip are fluid due to materials that are quite difficult to control. Therefore, its suites decoration action that relies on flow. Meanwhile, delicate decorations need planning and are associated with manipulating tool skills such as carving and relief. Also, decoration for design purposes involves logical thinking processes. Painting is a versatile technique that is adaptable to every aspect depending on visual looks. However, it is the most less connected to participating with clay.

In addition, systematic ceramic production influences logical thinking, exploring experience, focusing, and enjoyment. The fixed procedures affect imagination even though the technique that had low centering on forming shows improvement in creativity shown in the decorative ceramic products group from the previous observation. Therefore, plaster mold should help the creator decrease anxiety in shaping and spend more creativity on decorations. It shows a possibility of designing positive experiences in ceramic workshops by cutting out the processes that could affect negative feelings and then highlighting the methods that could influence pleasure. However, the selected method should act on workshops' conditions and purpose.

Ceramics making might look difficult, frustrating, and mysterious in common, but it is attractive at the same time. Indeed, to be a master in something takes time and self-sacrifice.

However, for the customer who wants to get just an experience, the traditional training seems unnecessary.

3.7 Workshop Design Strategy

The strategy suggests three keys to workshop design: setting, selecting, and developing. First, setting therapeutic outcomes, participants' conditions, and limitations of Location, tools, or materials. Second, choosing proper techniques from the classification that influence the therapeutic processes and eliminate methods upon the workshop's conditions. Last, developing the procedure for the new workshop.

Three key strategies associate with three elements in ceramics processes, including techniques, materials, and workspace. Setting therapeutic outcomes scopes actions in making methods that achieve the mental benefit. Controlled actions limited primary technique choices. In addition, participants' conditions, limitations of Location, and equipment scope the limitation of method possibility. After method selection and elimination, providers can develop and integrate selected methods to devise original ceramic processes for the targets. Appropriate methods should influence rich therapy objectives by supporting participants to create works by themselves or frame clear boundaries of engaging tasks in case of using complicated methods. Task boundaries also help providers evaluate workshops' efficiency more exclusively and accurately. For instance, using Wheel Throwing encourages relaxation by meditation through calm and continuous action with clay on the wheel. Providers should desire clear states of making in inexperienced participants because Wheel Throwing combines skillful methods that take time to practice. In this case, we can scope engaging tasks only in the forming section to let participants feel clay on a spinning wheel. Hence centering and trimming methods should be clearly described that they were responded to instructors.

Clay is the main material in ceramic processes. Some religions might have clay-type limitations that affect forming abilities in specific methods. For these problems, providers should consider developing clay formulas for the techniques or adapting techniques processes

to be suited to clay bodies. However, the intended therapeutic actions and thinking processes should be contained.

The location can be an important issue for some settings, especially conducting workshops outside studios. As mentioned in this chapter, ceramics workspaces contain many requirements, from making space to having a firing area. However, task scoping also helps providers increase the opportunity to bring ceramic activities out of the traditional studio. The location might limit the method selection, but it also challenges workshops designer to create new procedures that push ceramic interventions beyond limitations.

This study presented ceramic workshops design development that focuses on creative processes while engaging the activities rather than only selecting appropriate methods from the list. The next chapter shows the example of the design processes employing three keys strategy plus methods integrations.

Finding

First, basic ceramics knowledge is important to determine the possibility of workshops. The limited facility and accessible materials affect the activities' selection and the period and human resources. For example, traditional handmade techniques need a particular setting and a professional instructor that should be enough to take care of clients intensively due to the hard skills such as hand-building and throwing. On the other hand, pre-made forms or molds are easier to control in terms of product quality and low intensive instruction requirements.

Clay selection, forming technique, and firing method relate to the work’s expected finished look. Some clay gives a nice texture and color that the provider prefers, but it would be improper if it showed problems during the processes. Therefore, a clay abilities test is required to ensure the success of finished works. However, clay selection might not be serious for the program that does not require final products.

According to the technique's classification, the handmade methods are flexible to create but need skills and experience. Meanwhile, the equipment zone shows mold or machine using help forming methods such as slip casting. Focusing on decoration, processes that use fluid and flexible materials relate to the intuition axis, such as brush use or slip clay decoration. Meanwhile, processes that require planning relate to the logic axis, such as printing or glazing.

Chapter4: Ceramic Workshops Design and Development

4.1 Workshop Design

This section sets the experiments to apply the technique classification from the previous chapter to the workshop's design process. The designed workshops investigate the relationships between making tasks and participants' mood development in the next section. The method includes trials design and technical tests, including performing tests and material examination.

The workshop simulation presents the adaptable workshops production that can apply to various participants and conditions. The design factors are the most basic ceramics art activity plan that does not focus on participants' prior ceramic experiences and requirements of studio equipment on the set with professional ceramicist controls of the quality of activity and art pieces. The ceramic art in the workshops is utilized to encourage positive emotion in unlimited prior ceramic skills participants. The non-art studio condition was selected to present the possibility of ceramics making in an unusual facility.

1. Purpose: Positive Emotion through forming ceramic art
2. Target Participant: Unlimited prior ceramic skills participants
3. Condition: Non-Studio facilities

First, the main purpose is to develop positive emotions through ceramic art methods rather than skill enhancement. Hence, the processes should allow target participants to release their creativity or perform their imagination with less concern for traditional ceramic processes' complex rules and strict sequences. Moreover, the forming manners should dominate the entire process to benefit the tactile material and the three-dimension, which is the main feature of clay works. Second, the workshops could hold outside the studio but finish the firing process at the studio. Thus, the clients, such as offices, schools, healthcare facilities, and the like, can conduct ceramic workshops in their place without investing in the studio facilities.

Technique classifications were applied to the technique selection then adapted to the new workshop processes, considering about three design factors follow the list:

1. Improve participant's positive emotions through forming ceramic art

The forming techniques that appeared on the hand's axis were selected to emphasize handmade actions. According to chapter 2, ceramics art involves balancing affective and cognitive. It needs both intuition and logic that is established by experience. For these reasons, the techniques on the handmade axis are best suited to the ceramic art activity. However, the surface colorings techniques, such as brush glazing and painting, were eliminated to focus on the clay material quality. Next, specifying the proper method requires more factors such as type of clients and location.

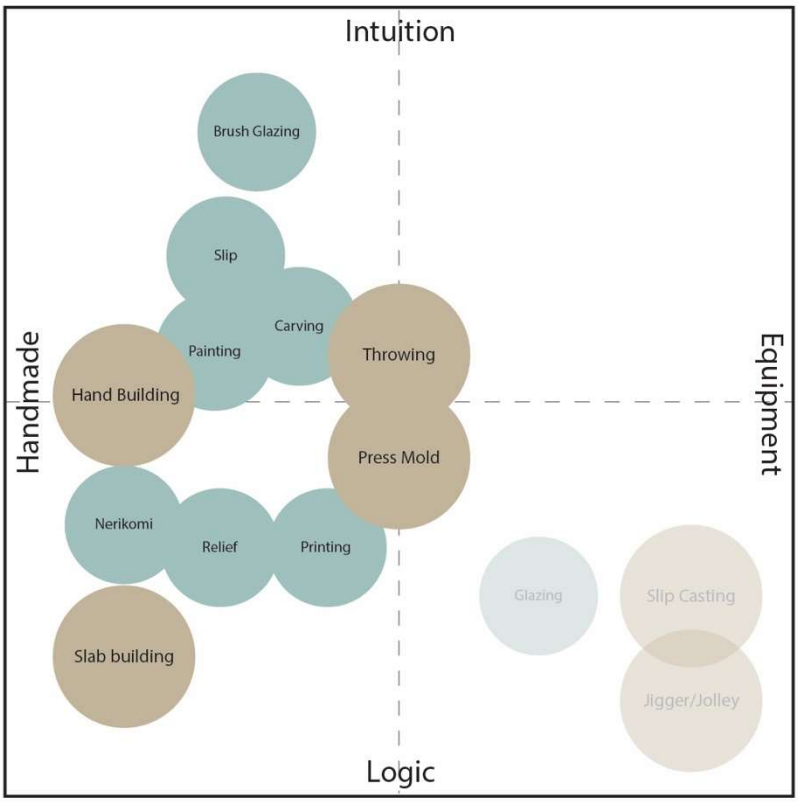


Figure 4.1 Selection of techniques that influence ceramic arts experience

2. Proper processes for any clients without prior ceramic experience requirement

The techniques that require complex instruction and manipulating skill tools were eliminated. Figure 4.2 shows selected techniques that include lack of forming supportive skill technique; the press mold, and decoration techniques that utilized clay body color and surface decoration without using skilled tools; Slip Decoration, and Printing.

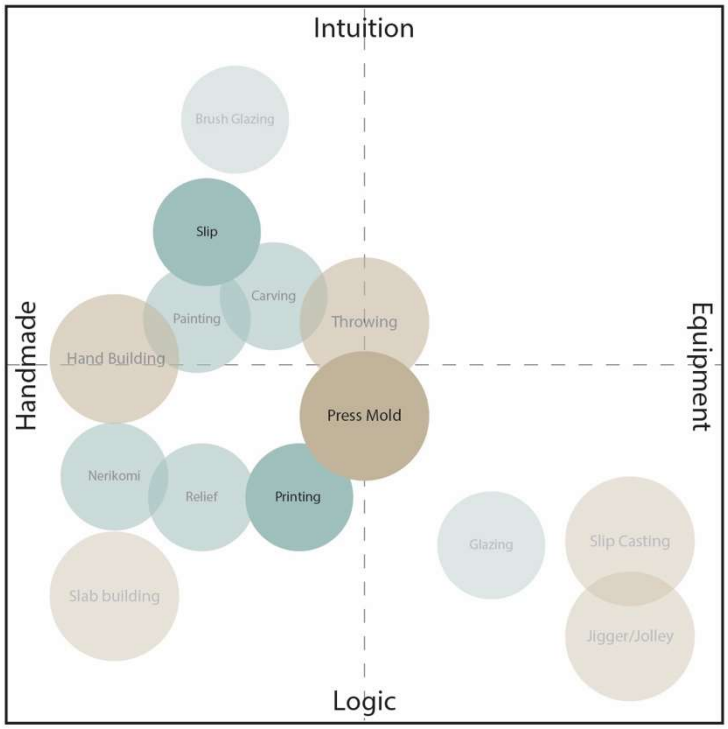


Figure 4.2 Selection of supportive techniques for inexperience

Starting by forming techniques, Hand Building and Slap Building are eliminated because Hand Building requires pure hand manipulation to form clay from nothing. Also, Slap Building requires a complex process of clay sheet construction. Hence, both techniques need careful instruction to prepare the clients to succeed in making results, which means the work should neither be broken nor collapse. For these reasons, the techniques are not appropriate for the inexperienced because they might influence problems rather than support them. Wheel Throwing is also excluded from the choice because using the technique for art is an advanced

level. In other words, at the beginning level throwing proper to the activity requires sensibility, calm, and concentration.

Printing and Slip Decoration were selected for decorative techniques because they provide color clay color decorative and surface decoration and suit the press mold method. Carving and relief were eliminated. Carving manipulates sharp carving tools, which might harm participants and also the plaster mold. Relief in the ceramic method is attaching pre-made decoration parts on the main body surface, which needs a special technique and clay adhesive to glue it together.

Press Mold forming and two decoration techniques, Slip Decoration and Printing would be integrated and developed for the workshops program. In addition, the design scopes type of printing in the design as a surface *Stamping*. It is a surface decoration usually combined with the press mold. The experiment workshop would utilize three different developed forming techniques; Hand Pressing, Stamping, and Slip Trailing, forming based on the press mold technique. Press Mold is a supportive forming technique for target clients using the open form paster mold. Stamping represents a repetitive method that involves cognitive thinking. Slip Trailing, one of the selected from Slip Decoration techniques manipulates fluid material encourages abstract expression.

Figure 4.3 provides the methods integration diagram that uses Press Mold as a shaping base to support all experience levels to shape clay in the ceramic methods, even participants who have never done ceramics before. Hand Pressing, Stamping, and Slip Trailing given variations of three different making characters encourage three different thinking and actions of making. Hand Pressing is flexible but resistive, Stamping represents repeatable and instant, and Slip Trailing conveys fluid and flows. The method combines forming and decoration techniques by adding five clay colors to the clay palette to allow participants to create two-dimensional visual creations while forming the three-dimensional works.

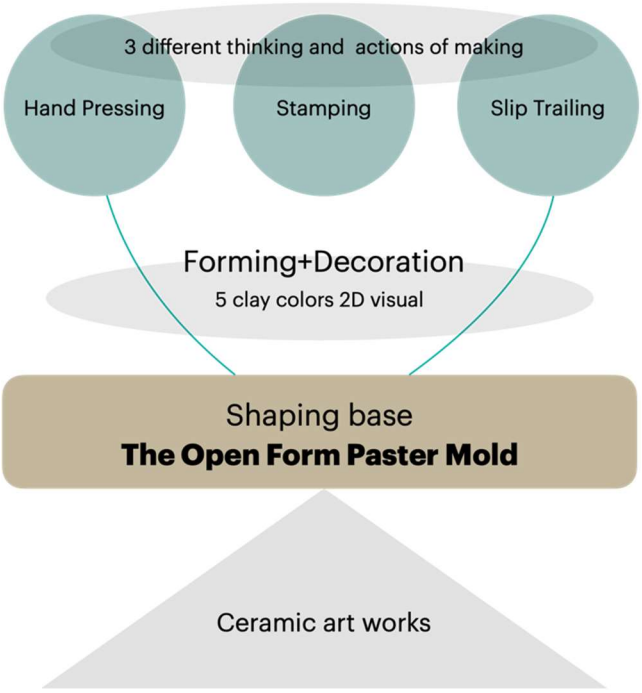


Figure 4.3 Ceramic methods integration diagram

This workshop could be held at the non-studio facilities successfully. The successful protocols relate to the very basic plan design idea include two main points:

First, the workshops do not require facilities and heavy equipment at the location. Second, they are controlling the site's cleanliness to reduce the washing area, which is the challenge of muddy material. It should protect the location and clients from clay dirt as much as possible while containing the tactile participation with clay.

The three selected techniques match the first protocol. They can operate with handy tools in a small space. Nevertheless, works should be moved from the workshop location to be fired at the ceramics studio without damage caused by transportation. Despite phycological tests, an effective workshop would consider the following list:

A. Develop workshop procedures based on press mold forming combined with slip and stamping decorations under the cleanliness control plan.

B. The procedures should support clients to finish their tasks by themselves as much as possible.
C. Mold's shape should support participants' skills and safely deliver clay work from the set back to fire at the studio.

4.2 Trial Design

The press mold supports low physical ability clients so that they can enjoy ceramic forming processes and allow makers to express their creativity through its versatile method. Also, the mold itself can protect clay works from moving from place to place. Although the Stamping technique can easily apply to the press mold method, the different actions of pushing clay by hands and through stamp tools are interesting to study. The slip decoration technique should be carefully manipulated to maintain the character of clay material rather than encourage painting-like methods. In terms of cleanliness control, it is impossible to sanitize natural-based clay, which is the potter's clay main material. Nevertheless, the design focused on preventing clients' hands and workspace from dirt that eliminates washing space.

Regarding the aim to investigate relationships of techniques and participants' emotional effects. The procedures were simplified and divided through the particular action. Therefore, the Hand Pressing, Stamping, and Slip Decoration were performed separately but manipulated to perform with the same mold shape. Also, plastic and slip clay would not be used in the same procedure. Holding ceramic activities outside the studio is a challenge. Especially the space that has strict sanitary conditions. The cleanliness control plan became crucial because clay work and dirty are inseparable. As mentioned in section three: studio equipment and facilities, clay dirt should be cleaned properly because dust clay affects health and slurry troubles facility and environment, especially washing leftover clay. Thus, the sanitation design would focus on limiting events that cause dirt to reduce all washing events. Therefore, the concept is 'beware of contacting clay directly but keep the sense of touching clay.'

The process would be taken into the preliminary experiments to investigate participants' mood changes before and after the trial. The relationships of participants' mood changes, making processes, and works' characteristics will be explained in the next chapter. This chapter presents the technical tests and developments.

4.2.1 Hand Pressing 1: Arranging color clay ball and press into the mold

First, developing the press mold method. The basic steps of press mold are picking up a piece of clay, arranging it in a mold, and pressing them firmly to stick it together while forming. The creative actions were added by giving clay color options and texture-making tools instead of filling up one type of clay into the mold. Cling film was used as a dirt protector from touching clay directly. Therefore, the difficulty of picking up a piece of clay is decreased by preparing the primary clay within little balls.

The technique test used the form of 130x130x13 millimeters square tile plaster mold. The shape and size are designed as a small blank artboard that is easy to finish in 20-45 minutes, which is not too hard for weak people. Moreover, drop mold forms could protect works from breaking during moving from long distances. Five types of clay were selected for color and texture options: White Stoneware, Red Stoneware, Coarse Stoneware, Black Pottery Clay, and Porcelain. Selected clays have a close shrinking rate beside porcelain. It means works are possible to crack around the areas between porcelain and other clays. However, the author must mix using stoneware and porcelain in her works so that they can fire acceptably. Therefore, porcelain was kept in the test for giving the most plastic touching and super white color after fired options. According to the cleanliness control, procedures and tools should protect participants from clay dirt while containing the sensibility of touching as much as possible. Plastic food wrap and tongs were selected. Food wrap was selected because it is extremely thin, flexible, and durable.

The testing tasks begin with picking up the clay balls using tongs and then freely putting them in a plaster mold until they are full the space. Overlap is also allowed. After that, cover

clay balls with plastic wrap and press them firmly into the mold. Decorating tools were also provided: daily life objects included chopsticks, plastic spoon-forks, plastic straws, bamboo skewers, and paper clips. Then, let it dry in the mold until the edges begin lifting away from the side of the mold and pop it out when the clay has firmed.

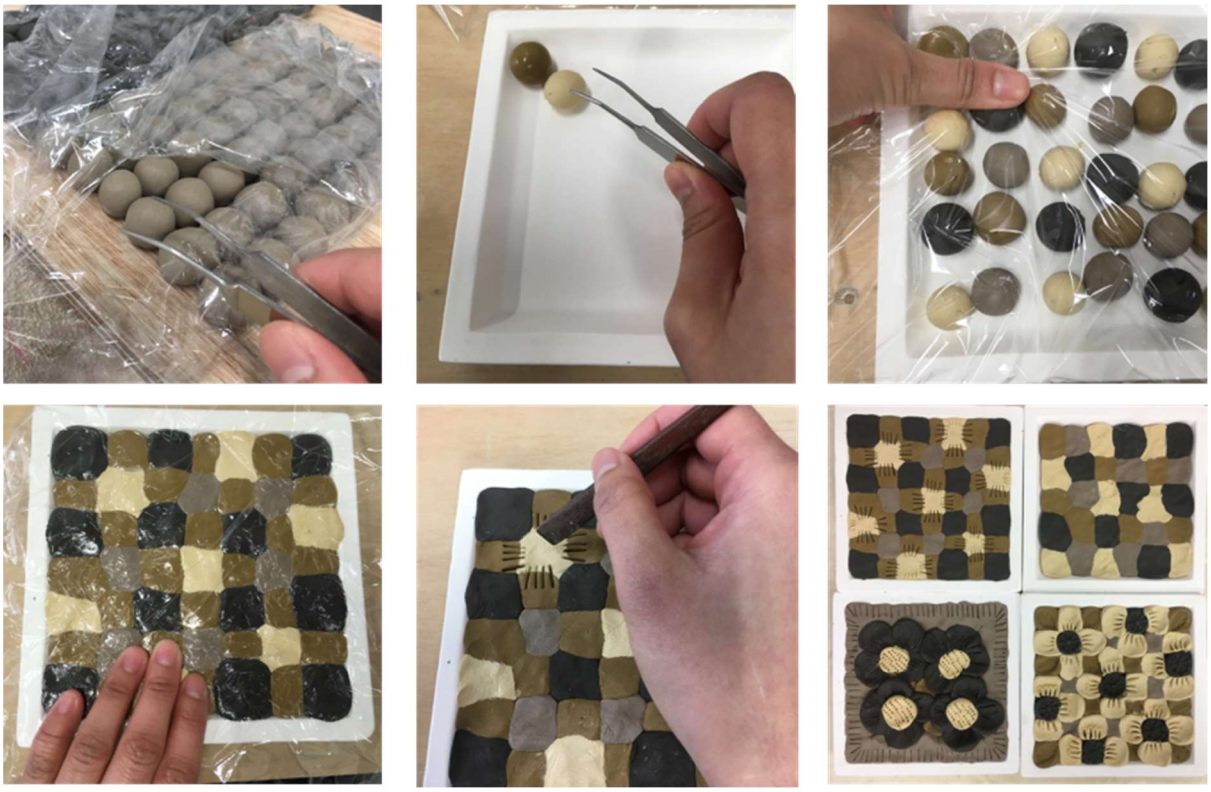


Figure 4.4 Hand pressing 1 testing tasks

The developed press mold method may help decrease the skill needed in the ceramic method through ready-to-make ideas. Thongs and cling film can prevent hands from dirt. Pushing clay through cling film gives intense senses connected with clay material such as plasticity and temperature. However, cracks appear after firing. It might cause by high shrinkage of porcelain or lacking well luting. Glazes were applied to test the choices of finished products. Figure 4.5 shows that only the F test piece was fired successfully. Clay balls were firm pressed and luted, making work form together even with different kinds of clay. The result gives the possibility to have mixed-use with the five selected clays. The A-E test pieces,

glazing was an obstacle to showing the rich clay color. Also, it might cause inexperienced clients to be confused about before and after images of ceramic processes.

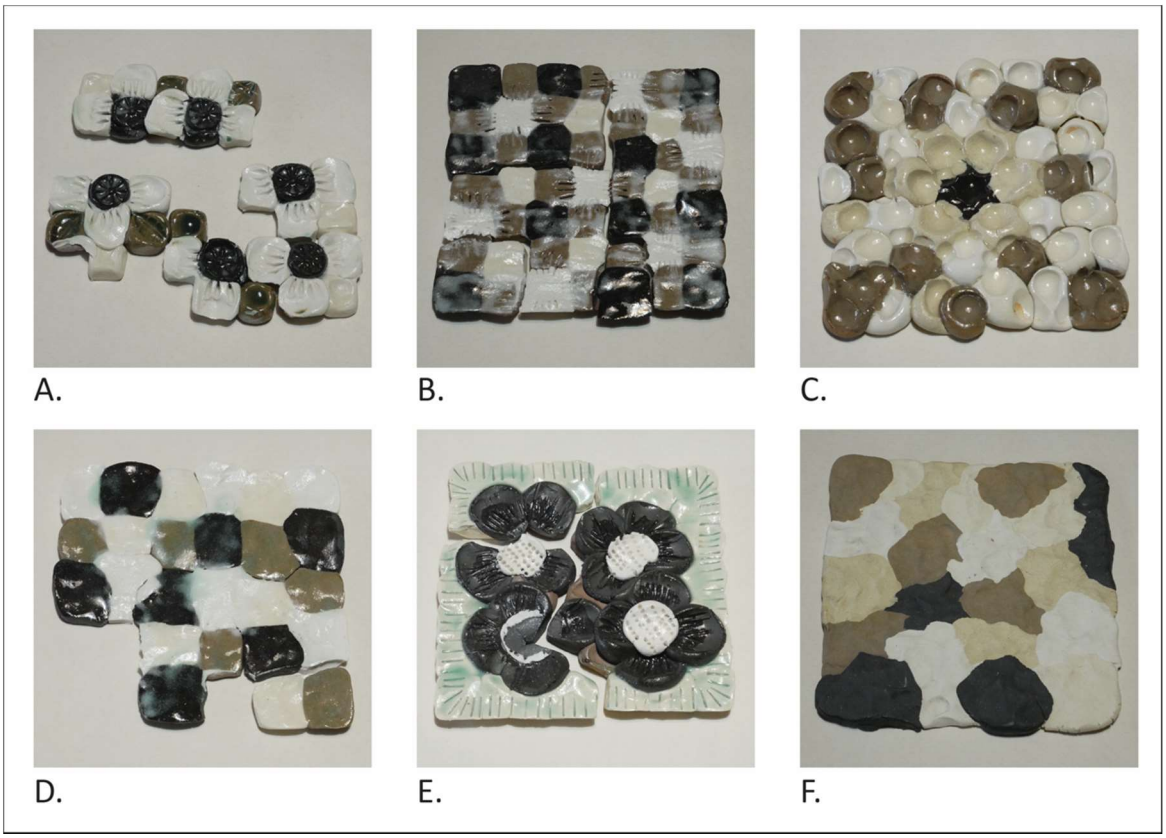


Figure 4.5 Hand Pressing 1 method works finished firing test

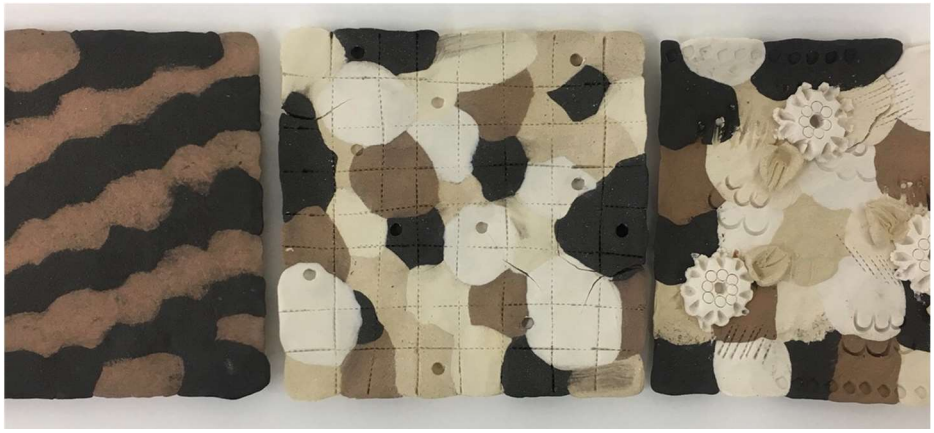


Figure 4.6 Repeating F. method firing test

The process would be taken into the first experiments with instructions considered and finished without glaze. The technical results collected by observation show that the design

student participants could shape ceramic works quickly after the short assignment, but food wrap and tongs were an obstacle against clay manipulation. The cling film gives a sensitive clay touching, but it sticks to their hands made participants feel uncomfortable. The works that combined porcelain without clay blending appear broken and cracked after being fired, proving porcelain should be eliminated from the clay palette. Carrying works from place to place was not considered because the workshop was conducted close to the ceramic studio.

Figure 4.7 The first experiments with design students show they are manipulating food wrap and tong during making

4.2.2 Hand Pressing 2: and Stamping: Developing dirt protection, assignments, mold shape

According to the first trial, results show that food wrap was a big obstacle. Therefore, in the second phase of the experiment program, nitrile gloves were used as a protector instead of food wrap. The gloves allow makers to use their hands more freely; hence, the pre-made clay balls were reduced and replaced with plastic state pottery clay in plastic boxes. Participants can pick a lump of clay small or big amount as they want, then put it to fill the mold immediately or shape clay to make graphic by color clay. Color clay palette was still added in the process except for porcelain, which caused cracks in the previous trial. The palette includes four types of Japanese potters' clay of different colors and textures (white stoneware, rough stoneware, red stoneware, black pottery clay.) The trial also increases the shape of mold from one type to four types to find the appropriate shape for the target subjects.

The four forms of plaster molds in this trial included circle plates (Type A), circle bowls (Type B), square plates (Type C), and square bowls (Type D), as presented in Figure 4.8.

Figure 4.8 Four types of plaster mold

Figure 4.9 Hand Pressing using nitrile gloves as a protector test firing

The testing tasks are picking up clay from the box and pressing it firmly into the mold until it fills its wall. However, solid form or parts are not allowed. The test results present the possibility of visual making through varieties of lines and graphics limited in the previous trial (Figure 4.9).

Figure 4.10 Stamping tools

Stamping was tested in the same manners and mold shape with the hand pressing in this trail besides the pressing action. This task assigns pressing a lump of clay to fill the mold's wall with stamp tools instead of hands. Stamp tools handmade by the author include random nature motifs such as flower-like, leaf, and others (Figure 4.10).

Figure 4.11 Piece of clay were press into the mold by stamp tools

Figure 4.11 present the possibility of surface decoration while forming clay in the mold. From the other opinion, the different mold shapes might not affect feelings caused by making. However, it should be proven by the subjects. Cracks also appeared at the joint that caused the difference in the moisture rate of the clay, which is a normal problem in ceramic processes. Keeping moisture control standards can easily solve the problem (Figure 4.12).

Figure 4.12 Stamping method test firing

As the slip decoration developed technique was not ready to be included in the workshop, the hand pressing two and Stamping trials would be taken into the second phase

experiments with the design students and staff at the design studio representing an office-like facility. The technical results collected by observation show that participants could instantly shape ceramic works after the short assignment and create the various character of works, detailed in the next chapter. The present color clay pallet can decrease break results after firing. Works were carried from the set to fire at the ceramic studio without breaking.

Figure 4.13 University staff and students are participating the second phase experimental workshop

4.2.3 Slip Decoration

The design aims to elevate the slip decorations technique further surface decorations. Hence, the concept is to manipulate slip into forming method with plaster mold while containing decorations benefits. The testing tasks are to layer apply color slip clay on the flat paster surface by brushes or slip trailers until clay thickness formed about 6 millimeters. Then, wait until the clay lifted away from the plaster surface, giving a square tile. Forming ability is tested. Slip clay should hold the form until it finishes firing without cracks and breaks.

Moreover, clay slips should be thick enough to make dots and lines. The test employed a Kaolin base slip, colored by metallic oxide: Red Iron, Rutile, Cobalt, and Chrome. It allows makers to create patterns through color combinations, as same as the hand pressing method

Figure 4.14 Slip Trailing testing tasks

The slip formula is a big problem in the adapted slip technique. The structure could not be tight together cause the formula is designed for surface decoration. Therefore, it might not be able to hold the form. However, the test showed the possibility of building clay slip to form by trailing. We hope it can give an alternative way of playing with the ceramics process and elevate our workshop upon the traditional method. For this reason, the clay body testing would be continued.

Figure 4.15 Slip Trailing testing results

The second trail thinned the same four clay bodies used in Hand Pressing and Stamping to the slip state, then tested the forming performance. The task is pouring clay slips to fill the mold. The options for makers are that they can draw lines or drop clay slip or move liquid clay by wood stick. The outcomes show that they can shape within the shallow form if the mold is filled with clay. Moreover, it shows the possibility of using the same color palette throughout the entire program, which benefits workshop harmony. The method might lose the sense of touching clay but suggest working with the liquid clay to show another material perspective.

In addition, this Slip Trailing method outcome was invented after the university experiments. Therefore, it would be applied to the last workshop program included hand pressing and Stamping in the same manner.

Figure 4.16 The second Slip Trailing testing trail and results

4.3 Conclusion

Methods support participants to forming ceramic art without prior ceramic experience concern under non-studio facilities condition. Developments created three methods that achieved three goals of production performance. Workshops could conduct under the cleanliness control plan shown in the office setting experiments, using gloves and techniques that do not require water to prevent dirt. Press Mold base support clients to finish their tasks by themselves. It is possible to safely deliver clay work from the set back to fire at the studio. Phycological results will be explained in the next chapter.

This chapter shows the technical trail that examined the production ability of developed workshop processes. Selected techniques showed that participants could create ceramic art without concern for prior ceramic skills. The observation during the experiment did not show significant differences between experienced and inexperienced members in handling the making tasks after the short instruction. The tests indicate that the plaster mold could support participants in shaping ceramics form without prior skill training. They could finish a task approximately in thirty minutes to one hour. After finishing the task, the process does not require any trimming method that would have to be done on the leather hard state, this means that works need time to dry out naturally for at least one day. Hence, the developed workshop allows participants to finish the works in a short period. Moreover, it also could reduce supporting hands from the professional ceramic staff to adjust or fix problems, while making the members work be successful along the process as much as possible, including trimming and fixing before firing. In brief, the finished works are truly made by participants.

Protecting hands from clay dirt with gloves and using plaster mold are the combination that greatly reduce washing area from the workshop location. This supports the non-studio facilities workshop condition. The glove is a dirt protector that provides hands with a freedom of movement that increases the variety of creation. The developed mold method eliminated the tasks that would involve using water such as smoothing the surface by wet sponge, this means that they did not have any slurry left at the set. It means that the provider could keep

the set clean while controlling the successful quality of finished works. The plaster mold also supports moving work from the office set to be fired at the studio safely.

In terms of technical consideration, similar clay shrinkage and moisture levels are important for the success of finished work. Also, clay studies are important for the success of slip technique finished works. Due to the process reducing clay luting between pieces of clay in Hand Pressing and Stamping methods, the prepared potter clay was softened more than usual by adding more moisture that make clay can stick together easily. Moreover, the staff emphasized participants to press clay firmly during the instruction. However, broken works occurred. The works that were too thick or too thin cause breaks and cracks.

Three developed methods, Hand Pressing, Stamping, and Slip Trailing show different work's character influence, which were hypothesized that it would affect participants mood differently:

1. Hand pressing shows the most possibility of freedom of clay manipulation under the press mold manner.
2. Stamp tools present applying the instant surface tools on the soft clay while forming in the mold shape might help people who are not comfortable creating things from the beginning.
3. Slip Trailing show the state of clay forming that might not be familiar for everyday people. Even it is difficult to control, the movement of fluid material may show an interesting participants' reaction outcome.

Chapter5: Ceramic Workshop Performance and Evaluation Method Development

5.1 Overview

The chapter applies the experiment trials developed from the previous chapter to investigate participants' mood changes caused by the workshops. The investigation involves two development points set for the actual activities through two phases of the experiment. Foremost, the experimental trials tested the technical developments parallel to Chapter 4. These issues concerned the shaping success, suitable material, cleanliness solution, and firing processes. The details and outcomes were explained in the previous chapter. However, this chapter focuses on the evaluation method development. The study utilized integrated social science evaluation techniques and psychological measurement to examine relationships between participants' work characteristics, mood changes, and verbal expression. Participants' work characteristics were analyzed by cluster and principal component analysis, which were matched by adjectives that describe the characters' values through the Semantic Differential (SD) method. Psychological measurement utilized the Profile of Mood States (POMS) shorted version to measure participants' mood transitions before and after the activities. Lastly, the quantitative content analysis analyzed the text mining of participants' verbal reflection upon the workshops collected by brief write-up comments. Relationships between works' character and mental states were considered with the ceramic technique relations suggesting workshop efficiency.

Aim

The workshop was conducted to investigate the process efficiency and creative expression abilities in the controlled trials by examining the mood change before and after the operation. The workshop employed the developed press mold technique from Chapter 4. Methods should encourage participants' positive feelings while limiting the cleanliness of the

workshop. The workshops trials include two parts, which are conducted in different assignment details and locations.

Methodology

1. Consideration of finished works, participants' mental state, and participated tasks.
2. Participants' mental states were observed before and after the workshop's operation.
3. Participants' opinions about finished products were also observed after receiving the fired ceramics.

Evaluation Instruments

As mentioned in chapter 3, participants were classified by the character of finished works then considered relationships between mental states and production techniques among the group of work's characters. The SD method was employed to consider the characteristic of workpieces. Five experts, including art and design professors and the ceramics designer, were invited to take a seven-rating scale questionnaire of fifty-five workpieces. Characteristics of works were categorized by cluster analysis and principal component analysis using JMP statistical software. Figure 5.1 shows the SD questionnaire includes nine questions that critique the visual of character in Japanese. Nine pairs of two polar adjectives in Japanese were selected.

Due to the fact that the ceramic works are three-dimension objects, the SD method observed the visual of works both front side and backside (Appendix 7.2.) Therefore, one subject's data include the value of back and front side evaluation. Nine pairs of polar adjectives were selected citing from the hierarchical approach to the SD method for the three-dimensional object [片平 建史, 武藤 和仁, 橋本 翔, 飛谷 謙介, 長田 典子, 2018].

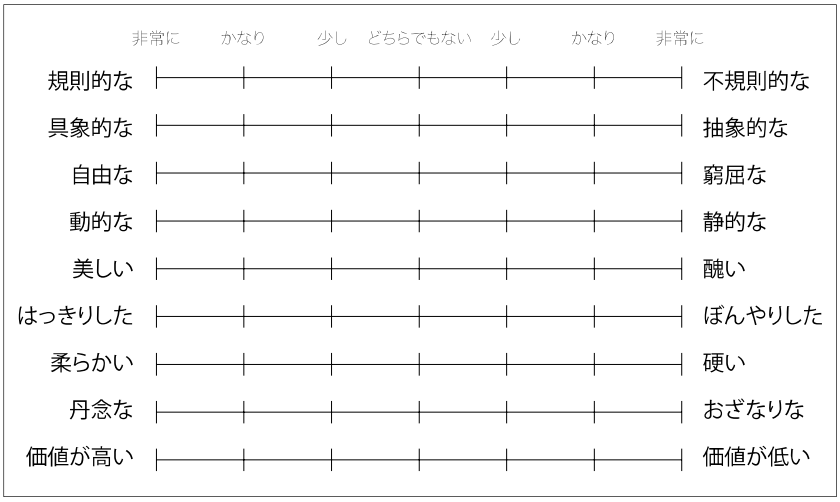


Figure 5.1 The SD seven rating scale questionnaire

With an aim to examine the participants' emotions before and after the program, the study employed a qualitative descriptive methodology supported by a quantitative evaluation. First, the qualitative evaluation observed participants' expression through a descriptive interview (a brief written description in Japanese) and art element consideration. Concerning quantitative data, the shortened version of the POMS in Japanese, a highly reliable psychological evaluation approach to measuring temporary mood and emotional stages (Yoshioka, 2015), was utilized. The results of the POMS T-scores from 30 evaluation items were obtained according to gender and age group from the gross rating based on six scales, i.e., 'Tension-Anxiety,' 'Depression- Dejection,' Anger-Hostility,' 'Vigor,' 'Fatigue,' and 'Confusion' [横山, 2006]. The POMS utilized in this study obtained a license under the authorized user, Nishio Koichi, the thesis supervisor.

In addition, participants' emotions were also investigated after they cogitated their fired works. This situation is unique, distinct from other art and craft techniques such as painting and unfired clay work. However, this study did not compare mood change between bare hand pressing and using a protector.

Participants' mood and expression were examined three times: before and after the workshop and after cogitating their fired work, based on their write-up examinations and the

shortened version of the POMS. Finished works were returned to each participant the following week or the next time they attended the workshop, and also at the time the write-up examination and the POMS were conducted. Regarding the expression element, this study also investigated the art element of pottery as non-verbal expressions. The data from the brief written description were analyzed by KH Coder (the quantitative content analysis software).

5.2 "Pressed into a Pot" Part 1: The first trial

Location, Date, and Subjects

The workshop was conducted on March 27, 2018, at the student space laboratory near the ceramic studio. Participants were eight Japanese students of the Design Department, Fukui University of Technology, Japan, ranging between 20-23 years old.

Table 5.1 The first trial's participants' information

	Gender	Age	Experienced Ceramic Making
S1	Female	21	√
S2	Female	21	X
S3	Female	21	X
S4	Male	21	X
S5	Male	23	√
S6	Female	20	X
S7	Male	21	X
S8	Male	23	X

√=have prior experience X=*have not* prior experience

Making Procedure

The workshop employed the first developed press mold technique from the last chapter. The hand pressing technique was used in the form of 130x130x13 millimeters square tile plaster mold. Five types of Japanese potters' clay of different colors and textures (white stoneware, rough stoneware, red stoneware, black pottery clay, and porcelain) were prepared in approximately 15 mm. diameter clay balls. The task required participants to pick up the clay

balls using tongs and then put them in a plaster mold freely creation of their choice. After that, they had to cover the clay with plastic wrap and press them firmly. According to the technical testing results, overlapping clay joints then firmly push or smear was highlighted in the instructions to prevent crack.

Figure 5.2 Images sequential left to right showing an assignment of the experiment workshop. Clay ball(left), a participant putting clay balls on a plaster mold(middle), and a participant pressing clay balls through food wrap cover(right).

Decorating tools were also provided, daily life objects including chopsticks, plastic spoon-forks, plastic straws, bamboo skewers, and paper clips. Participants could choose the way to manipulate their work after the instructions were given.

Figure 5.3 Decorating tools.

5.3 “Pressed into a Pot” Part 2: Variation of shapes and techniques

Location, Dates, and Subjects

Participants were Japanese members of Fukui University of Technology, Japan, between 21-48 years old. They were five male and six female university students, one female

instructor, and one male and three female officers. The details of the participants are in Table 5.2. All students and instructors were members of the Design Department. Three had some experience in pottery making at an intermediate level, and two students had beginning-level experience from primary school. The experiment was conducted from June 8 to July 25, 2018, at the design studio, an office facility on the building.

Table 5.2 The second trial's participants' information

	Occupation	**Gender**	**Age**	**Experienced Ceramic Making**
S1	Design Student	Female	21	√
S2	Design Student	Female	21	X
S3	Design Student	Female	21	X
S4	Design Student	Female	21	X
S5	Design Student	Male	21	X
S6	Design Student	Male	21	X
S7	Design Student	Male	23	√
S8	Officer	Female	38	X
S9	Officer	Female	28	X
S10	Officer	Male	29	√
S11	Officer	Female	31	X
S12	Design Instructor	Female	48	√
S13	Design Student	Male	26	X
S14	Design Student	Male	22	X
S15	Design Student	Female	22	X
S16	Design Student	Female	41	√
Total	**Design Student** 11 **Officer** 4 **Design Instructor** 1	**Male** 6 **Female** 10	**AVG** 27 **STDEV** 8.41	**Have prior experiences** 5 **Have no prior experiences** 11

*√=have prior experience √√=have intermediate level experience X=have no prior experience

Making Procedure

The workshop prepared two technique options that followed on from technique developments in the previous chapter, Hand Pressing, Stamping. Also, the four different forms of plaster molds included circle plates, circle bowls, square plates, and square bowls as presented in the last chapter.

Participants still had an opportunity to play with different clay colors and decorating tools, like the preliminary experiment, while porcelain was cut out from the choices. A flexible schedule was made available for them to avoid putting participants under pressure. Every week, there were two workshops available during 12.40-3.40 pm. The attendees could attend one or both workshops that best suited their schedules for however long they desired. In other words, they did not have to attend from the beginning to the end. The workshops were conducted in order, starting from Hand Pressing to Stamping. However, participants can finish with one type of mold, then skip to the next section and come back to do with other techniques and type whenever they want. The instruction assigned participants to select one different type of mold and technique each time. Furthermore, it is important to note that attendance was completely voluntary. The participants could also decide not to attend any of the workshops as well.

Hand Pressing

The Hand Pressing section assigned participants to pick up clay from the plastic box then press a piece of clay in a mold freely by hand until the mold is filled while wearing nitrile gloves. Also, the procedure allows participants to shape clay before putting them in a mold.

Figure 5.4 Image sequential left to right showing participants wearing gloves during a Hand Pressing task.

Stamping

The Stamping section used stamping tools as substitutes for Hand Pressing. Participants were assigned to put clays in the mold and push them firmly by stamping tools. As shown in Figure 5.5, the program provided stamping tools in various natural forms such as flowers, leaves, lines, and dots. The participants were also asked to wear nitrile gloves.

Figure 5.5 Image sequential left to right showing participants using stamping tools.

5.4 Results

5.4.1 The distinction of participants' mood changes in different techniques

First, the laboratory experiments significantly improved university members' moods after the workshop. The POMS T scores transited to a positive position in the overall results (Figure 5.6.) However, the distinction of the POMS transitions in the three techniques was insignificant.

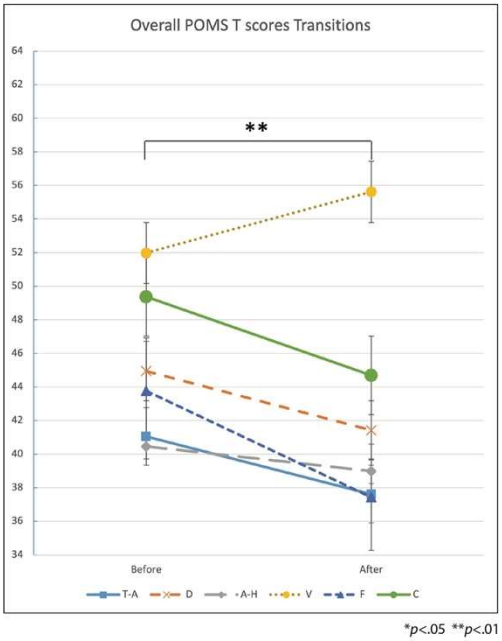


Figure 5.6 Laboratory experimental workshops participants' POMS transition before-after the workshop operations

Three methods were compared in the POMS transitions before and after workshops. The clay balls method, which is the preliminary workshop, includes 8 subjects. The Hand Pressing has 34 artworks, and the Stamping method comprises 13 subjects. According to the clay balls method was a preliminary test with small numbers of subjects and did not appear significant mood transitions in every scale, the consideration does not include the clay balls group in the comparison.

Table 5.3 provides a POMS T scores summary separated by technique. Also, the POMS T score transitions were illustrated in Figure 5.7, separated by six scales grouped by three techniques. Hand Pressing group significantly improved in all mood scales, which decreased in 'Tension-Anxiety,' Depression-Dejection,' Anger-Hostility,' 'Fatigue,' and 'Confusion,' while increased 'Vigor.' Meanwhile, the Stamping group significantly improved in 'Depression-Dejection,' 'Fatigue,' and 'Confusion,' decreasing with increasing in 'Vigor.' Hand Pressing and Stamping groups did not show significant differences in mood transitions between two techniques.

Table 5.3 Distinctions of POMS T scores Before-After the workshop operation and subtraction among three techniques and overall

		POMS T scores Mean				Welch's t-test of subtraction among techniques	
POMS Scale	Group	Before (Pre)	After (Post)	Difference	Pre-Post t-Test		
Tension-Anxiety (T-A)	Clay Balls	42.50	39.75	-2.75	0.291	C-H	0.276
	Hand Pressing	41.03	36.65	-4.38	***0.000***	C-S	0.324
	Stamping	40.23	38.85	-1.38	0.425	H-S	0.075
	All	41.05	37.62	-3.44	***0.000***		
Depression-Dejection (D)	Clay Balls	44.50	44.38	-0.13	0.922	C-H	0.026
	Hand Pressing	45.32	41.26	-4.06	0.010	C-S	0.032
	Stamping	44.23	40.00	-4.23	0.027	H-S	0.469
	All	44.95	41.42	-3.53	***0.001***		
Anger-Hostility (A-H)	Clay Balls	39.25	39.25	0.00		C-H	0.001
	Hand Pressing	40.32	38.35	-1.97	***0.002***	C-S	0.232
	Stamping	41.54	40.46	-1.08	0.465	H-S	0.286
	All	40.45	38.98	-1.47	***0.005***		
Vigor (V)	Clay Balls	54.50	57.00	2.50	0.412	C-H	0.382
	Hand Pressing	52.09	55.56	3.47	0.011	C-S	0.283
	Stamping	50.15	54.92	-4.77	0.092	H-S	0.330
	All	51.98	55.62	3.64	***0.001***		
Fatigue (F)	Clay Balls	41.38	39.13	-2.25	0.295	C-H	0.022
	Hand Pressing	44.65	36.97	-7.68	***0.000***	C-S	0.174
	Stamping	42.92	37.62	-5.31	0.053	H-S	0.211
	All	43.76	37.44	-6.33	***0.000***		
Confusion (C)	Clay Balls	51.00	49.88	-1.13	0.730	C-H	0.104
	Hand Pressing	49.56	43.79	-5.76	***0.000***	C-S	0.222
	Stamping	47.85	43.85	-4.00	0.051	H-S	0.228
	All	49.36	44.69	-4.67	***0.000***		

*Subject population: Clay Balls=C (8 artworks), Hand Pressing=H (34 artworks), Stamping=S (13 artworks)

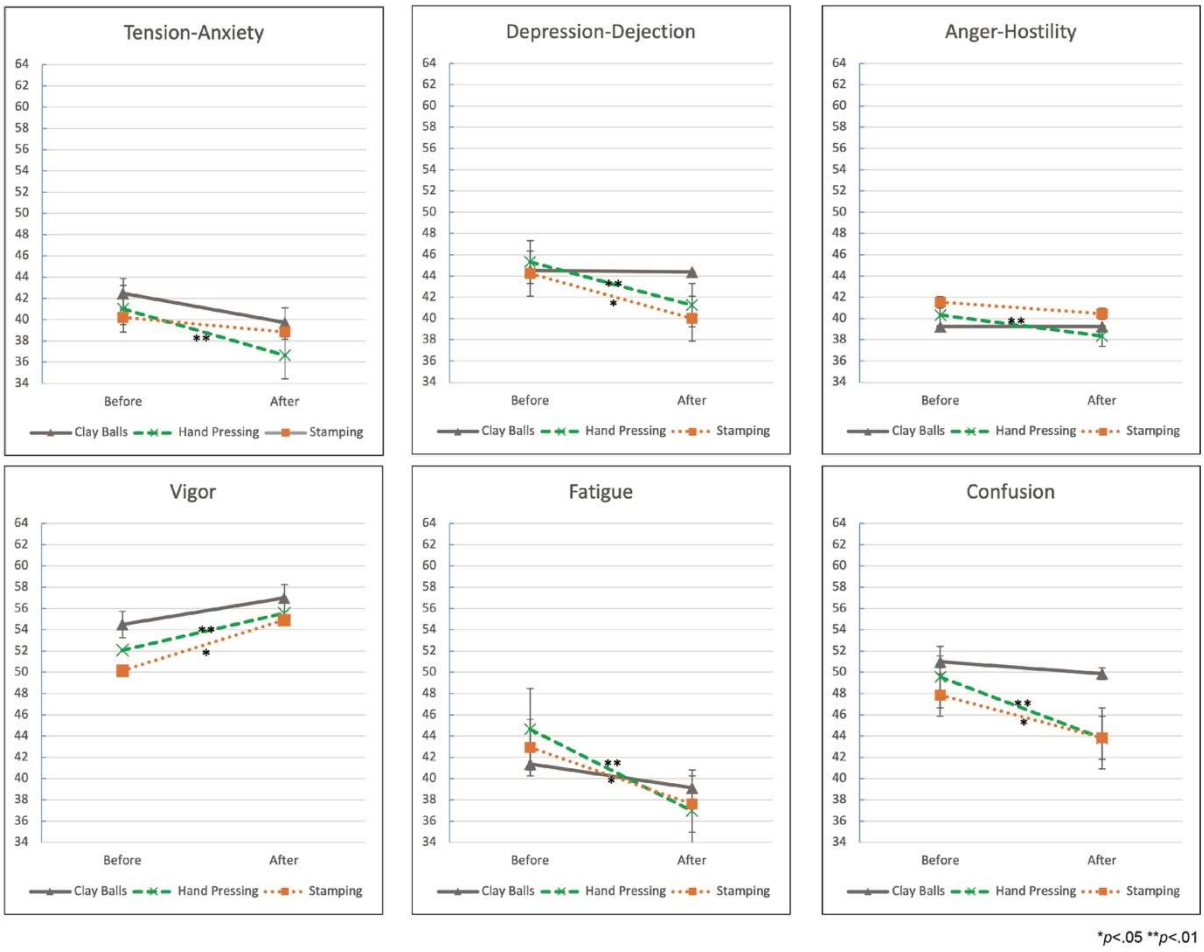


Figure 5.7 Laboratory experimental workshops participants' POMS transition before-after the workshop operation separated by six scales grouping by techniques

5.4.2 The Characteristic of Participants' Works Using Cluster Analysis and principal component analysis

According to the previous evaluation, the results did not show significant mood change differences among techniques. Hence, an investigation of POMS results differences in artworks' characters was conducted.

The SD method data collection rated by five experts was generated by JMP software running hierarchical clustering on Ward's method to classify groups of participants' works characters. Figure 5.8 shows the number of clusters related to the Scree plot elbow point that classified 55 works into three groups, L1, L2, and L3, representing the laboratory experiments.

Group L1 subjects are 22 works, while Group L2 incorporates 17 works, and Group L3 has 16 works. Table 5.4 provides data about the amount of making tasks and mold shapes utilized in three groups. Overall, there are no works from the first trial, which had problems caused by the food wrap, included in Group L2. Hand Pressing technique was highest used in every group. Also, mold Type A was chosen highest in every group.

Table 5.4 Participants' technique and mold shape selection separated following three clusters

Characteristic Groups	Number of works	1st Trial	2nd Trail						Participants' Status/work number		Experiences Status/work number	
			Techniques	Mold Shapes								
		Hand Pressing with Food Wrap	Hand Pressing	Stamping	A	B	C	D	Students	University Staff	Have prior experiences	Have not prior experiences
L1	22	3	13	6	7	4	4	4	22	0	8	14
L2	17	0	12	5	8	4	3	2	6	11	8	9
L3	16	5	9	2	5	2	2	2	14	2	4	12
Total	55	8	34	13	20	10	9	8	42	13	20	35

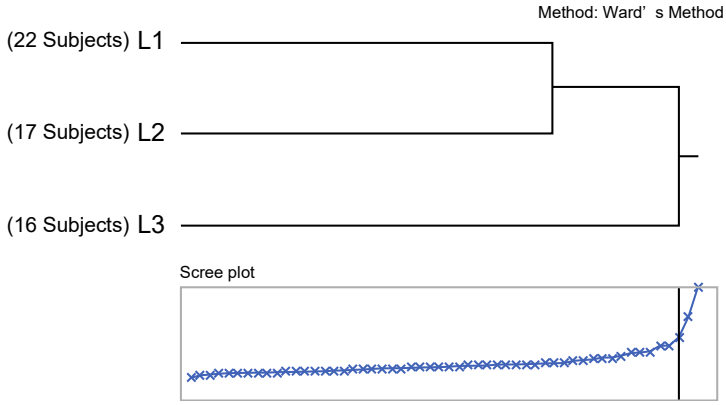


Figure 5.8 Hierarchical Clustering Dendrogram

As to the technique utilized, Group L3 includes five works from eight from the Hand Pressing with food wrap task, making this the top amount among all groups. Following closely was Group L1, with three works, while Group L2 does not include any works from the first trial. However, there is no obvious difference in Hand Pressing and Stamping selection among the

groups. The critical distinction of mold shape selection among the groups did not occur in the same vein.

The same data collection also was analyzed with the principal component on correlation using JMP software to give clearer images of the work's characteristics. Figures 5.9 and 5.10 show the principal component analysis results on two axes, and cluster grouping followed the hierarchical clustering results.

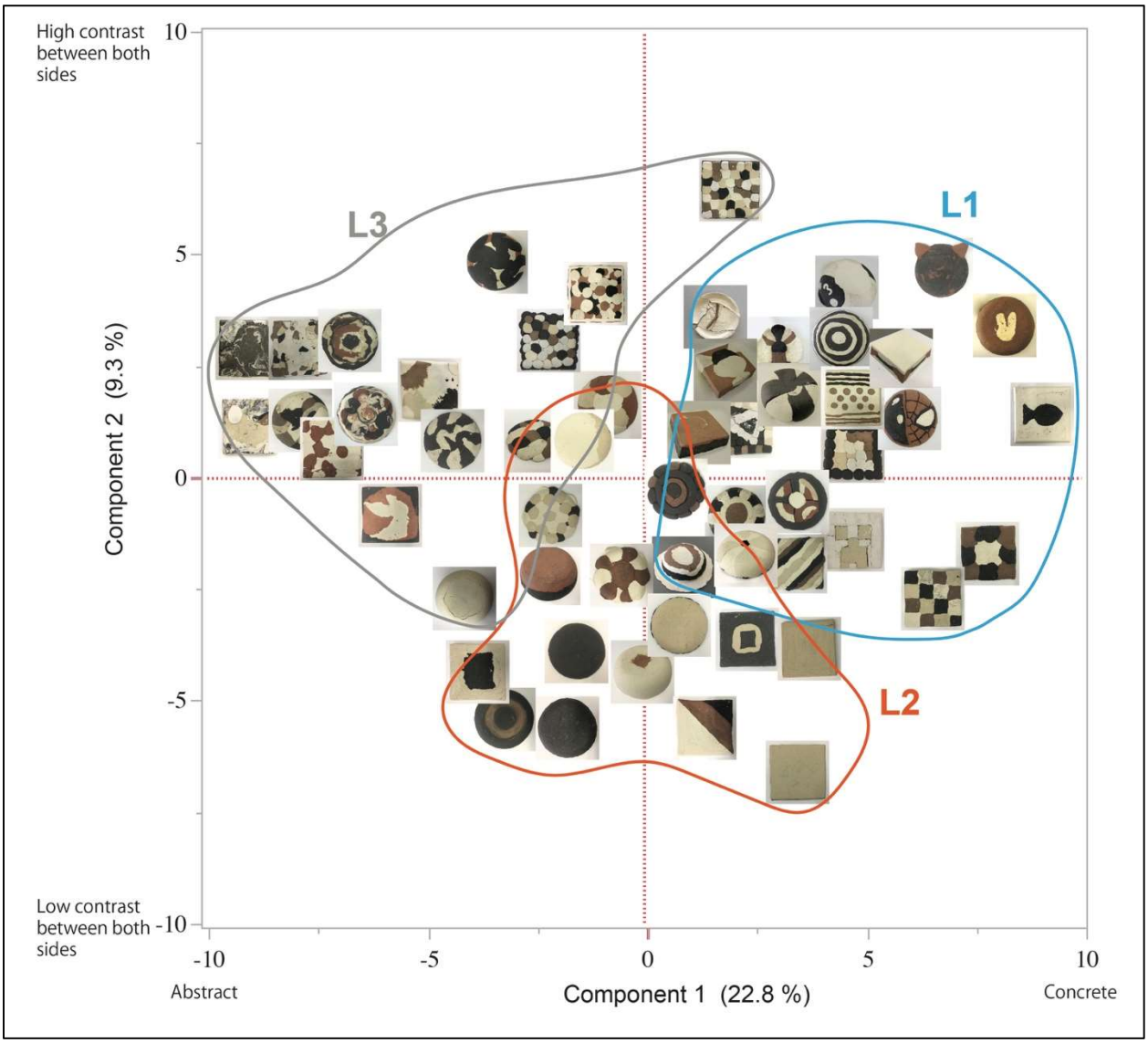


Figure 5.9 The Principal Component Analysis on Correlation of the laboratory experiments participants' works grouped by Cluster Analysis (front-side)

The results show that component 1 contribution rate is 22.8%, and component 2 contribution rate is 9.3%. Component 1 was named the Abstract-Concrete axis, and component 2 was named the Low contrast between both sides-High contrast between both sides. Three cluster analysis groups were drawn from L1 to L3 subsequently from right to left.

The characters of works were considered the art elements such as shape, graphics, colors. Moreover, elements continuation from the backside to the front side were considered to observe participants' making process. The clusters were named toward characteristic fundamental following the list:

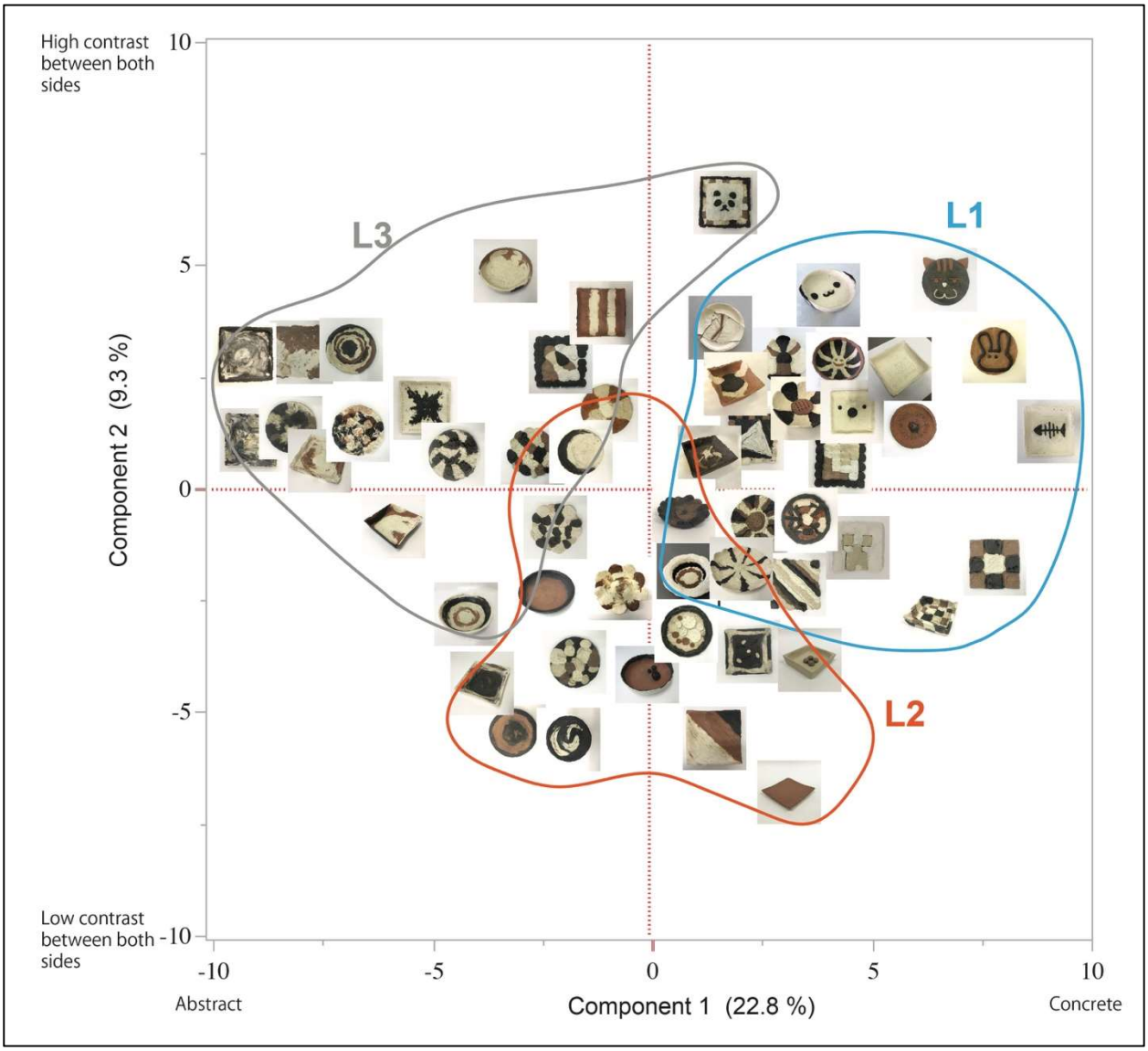


Figure 5.10 The Principal Component Analysis on Correlation of the laboratory experiments participants' works grouped by Cluster Analysis (back-side)

L1 The concrete symbol and pattern: As to the general character, works in the group present clear graphics elements that reflect the strong concrete character. They include predictable shapes and patterns such as animals-like, sun, star, flower, and geometric patterns. Turning to the continuation between both sides, most show graphic structures or symbols that connect from the backside to the front side. However, the high contrast graphic between both sides, which were made by layering different clay colors also included in the group. Instead, subject no.2 shows that participants made graphics from the start, filled over the layer with different clay colors, and created the new shapes or graphics on the top of the surface (Figure 5.11.)

Moreover, the group includes works that appear repetition pattern not only from stamp but also hand shaping. In brief, Group L1 represents the laboratory experiments' participant who created the strong concrete character and performed pattern repetition.

Figure 5.11 A sample of contrast graphic between both sides from group L1

L2 The continued structure: Overall, the group's neutral character between abstract and concrete is obvious. The works present simple color combinations and roughly random patterns. The three dimensions form pop out because the graphics are not strong in some images—most works are made by plain colors and texture or two-tone combination.

The continuation of clay structure was recognized through the clay placement structure that shows the interconnection of back-front sides, such as those appearing in subject no.3 (Figure 5.12.) Considering the clay structure, most works in the group do not have the first layered graphic as Group L1, but the clay pieces were placed into the mold side by side or

filled with one clay color. For these elements, university participants included in Group L2 did the simple character with the firm three-dimensional clay structure.

Figure 5.12 A sample of repetitive structure from group L2

L3 The Abstract with uncertain structure: Obviously, the group contains the abstract works' character considered by the explicable colors and graphic elements. Most works show mixed colors that existed by smearing the different clay color surfaces or blending the different colors of clay before putting them into the mold. The art elements are hard to define in certain ways.

Regarding subject no. 1-4 (Figure 5.13), the continuation of art element structures is rather related between both sides. The uncertain structures appear from the backside through the random clay placement, fluid lines, and organic shapes. Turning to subject no. 1-4, they present concrete graphics on the front side but show the random color clay structure on the backside, which are rather not interconnected to the front side. To sum up, participants of

Figure 5.13 A sample of contrast graphic between both sides from group L3

group L3 were those who made the abstract character without a certain making plan and randomly put clay into the mold, then layered illustrations on the top.

5.4.3 Transitions of Moods Change Classified by Three Characters

The study investigated the distinction of participants' moods transitions before and after the workshop's operations among three groups observed by POMS T scores. Table 5.5 provides data about the mean values of six POMS scales before and after participating in the workshops compared in three groups and the difference of T scores subtraction. Also, the pre-post t-Test and the difference t-Test were observed. Student's paired t-Test observed the pre-post t-test in the group on each scale with a two-tailed distribution. Meanwhile, the Welch's t-Test with a one-tailed distribution was used to determine POMS T scores difference between groups due to different underlying populations.

All in all, group L2 shows significant moods improvement on every scale. The results present significant negative transitions (p<.05) on Tension-Anxiety, Depression-Dejection, Anger-Hostility, Fatigue, and Confusion. Meanwhile, the Vigor scale grew significantly (p<.005). Figure 5.14 displays a clear image of participants' moods transitions from Table 5.5 information. Regarding group L2, the graph shows that group L1 significantly decreased on Tension-Anxiety, Depression-Dejection, Fatigue, and Confusion. Meanwhile, group L3 shows significantly improved only the Vigor scale increasing.

Table 5.5 Distinctions of POMS T scores Before-After the workshop operation and subtraction among three groups and overall

		POMS T scores Mean				Welch's t-test of subtraction among groups	
POMS Scale	Group	Before (Pre)	After (Post)	Difference	Pre-Post t-Test		
Tension-Anxiety (T-A)	L1	39.50	35.91	-3.59	***0.001***	L1 L2	0.431
	L2	40.12	36.24	-3.88	0.011	L1 L3	0.372
	L3	44.19	41.44	-2.75	0.259	L2 L3	0.340
	All	41.05	37.62	-3.44	***0.000***		
Depression-Dejection (D)	L1	42.50	39.82	-2.68	*0.027*	L1 L2	0.332
	L2	44.06	40.59	-3.47	*0.025*	L1 L3	0.255
	L3	49.25	44.50	-4.75	0.119	L2 L3	0.346
	All	44.95	41.42	-3.53	***0.001***		
Anger-Hostility (A-H)	L1	38.59	37.73	-0.86	0.172	L1 L2	*0.037*
	L2	41.29	38.12	-3.18	0.010	L1 L3	0.372
	L3	42.13	41.63	-0.50	0.596	L2 L3	*0.034*
	All	40.45	38.98	-1.47	***0.005***		
Vigor (V)	L1	59.09	60.09	1.00	0.584	L1 L2	0.012
	L2	42.76	49.76	7.00	***0.001***	L1 L3	0.144
	L3	52.00	55.69	3.69	*0.049*	L2 L3	0.096
	All	51.98	55.62	3.64	***0.001***		
Fatigue (F)	L1	40.18	36.23	-3.95	***0.002***	L1 L2	***0.003***
	L2	46.88	36.59	-10.29	***0.000***	L1 L3	0.328
	L3	45.38	40.00	-5.38	0.086	L2 L3	0.083
	All	43.76	37.44	-6.33	***0.000***		
Confusion (C)	L1	46.45	42.73	-3.73	***0.004***	L1 L2	0.064
	L2	48.06	41.41	-6.65	***0.000***	L1 L3	0.482
	L3	54.75	50.88	-3.88	0.222	L2 L3	0.210
	All	49.36	44.69	-4.67	***0.000***		

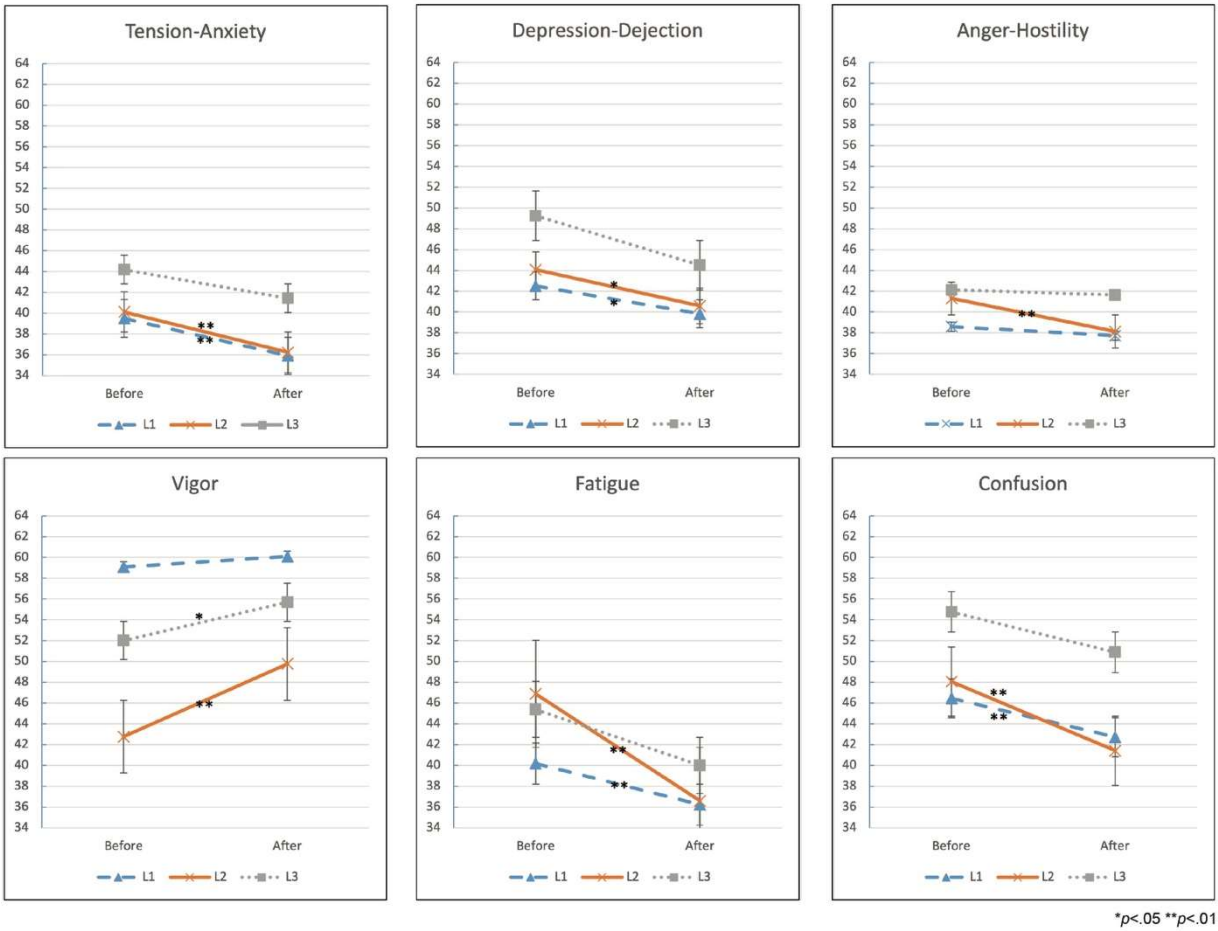


Figure 5.14 Laboratory experimental workshops participants' POMS transition before-after the workshop operation separated by six scales grouping by cluster analysis

Figure 5.15 provides the graph of mood change difference shows that participants classified in group L2 significantly Anger-Hostility decreasing (p<.05) stronger than group L1 and L3. They also show that the Fatigue impressive decreased (p<.005) and the Vigor outstanding improved (p<.01) compared with group L1.

Besides the mood improvement, group L3 participants whose works were categorized in the abstract with uncertain structure characteristics had high negative emotions before attending the workshop tasks compared with another two groups. Moreover, a significant decrease does not occur on the negative emotion scales in the group.

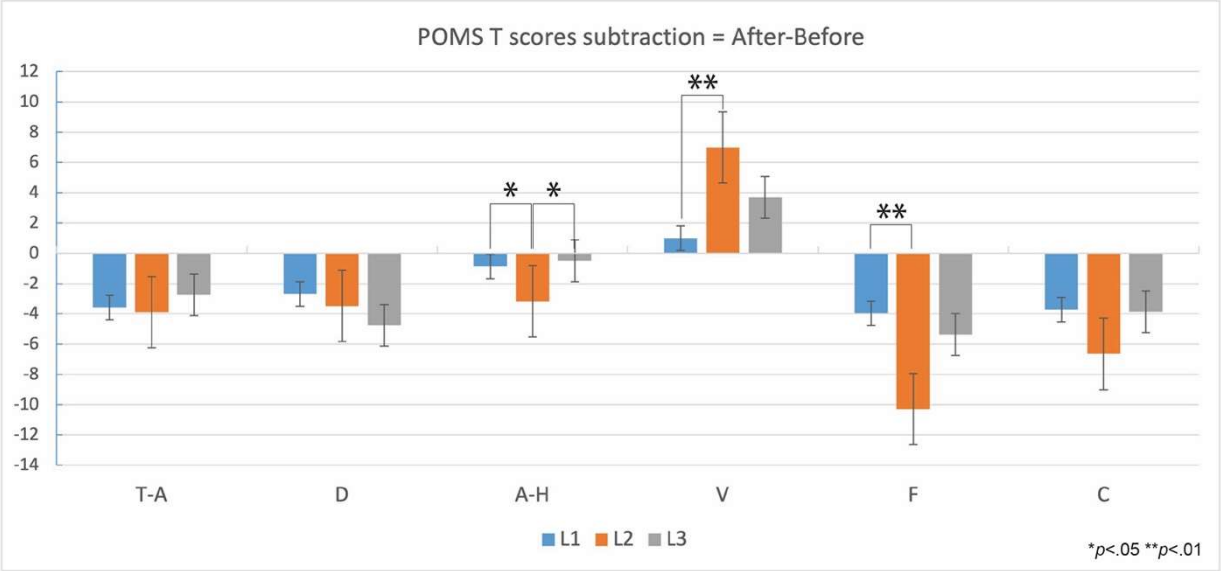


Figure 5.15 Mood change difference

5.4.4 Quantitative Content Analysis Results

Write-up examinations after workshop operation

The aim of this section was to support the results from the gross rating-based questionnaire. Data of verbal-expressions after workshops operations and after received fired works were examined by Quantitative Content Analysis using KH-coder software to visualize the co-occurrence network of words generate the graph on modularity. Jaccard was set

coefficient>=0.225, which means the network visualizes the occurrence rate between words over 0.225.

The write-up examination observed the words participants' mentions classified into three types following the works' character, this is the same as the previous evaluation. The words that show a large frequency were considered the keywords, then the words in the same modularity were observed as the critical contents prioritized by high occurrence from the keywords. Moreover, the co-occurrence network results were translated into English, and the original diagrams are shown after the modified charts.

L1 The concrete symbol and pattern: Figure 5.16-5.17 provides the co-occurrence network of words results of group L1 participants' mentions after the ceramic tasks. The keywords are '*Enjoy*,' 'to be Complete', and '*Mood.'* The '*Enjoy'* group includes Liking, Finish, and Firing. The' *Mood*' group shows the occurrence with '*Good,' 'Complete,' 'Workshops,*' and

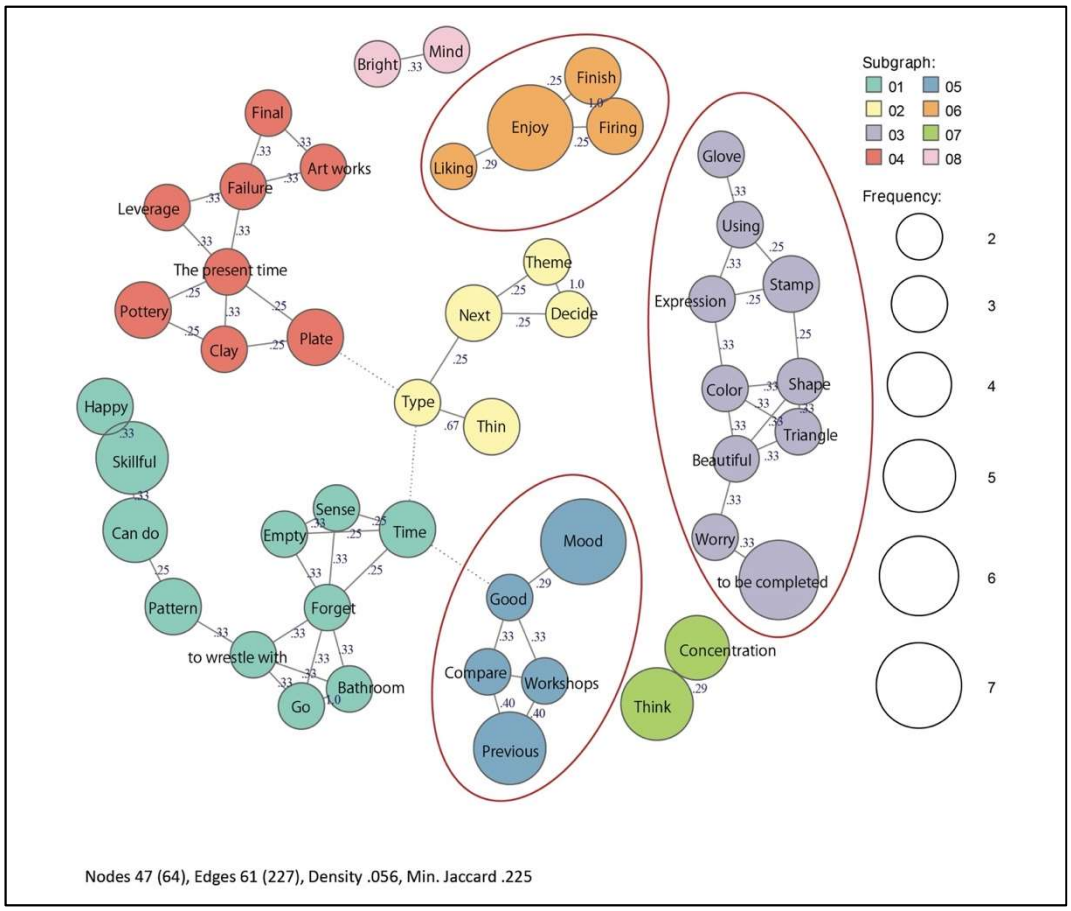


Figure 5.16 Group L1 Co-occurrence network of words after participated the workshops (English)

'*Previous.*' Meanwhile, the 'to be *Complete*' robust connects (0.33) with '*Worry*' and the words that mention the making tasks, tools, and appearances such as '*Color,' 'Shape,' Stamp, 'Using*,' and '*others.'*

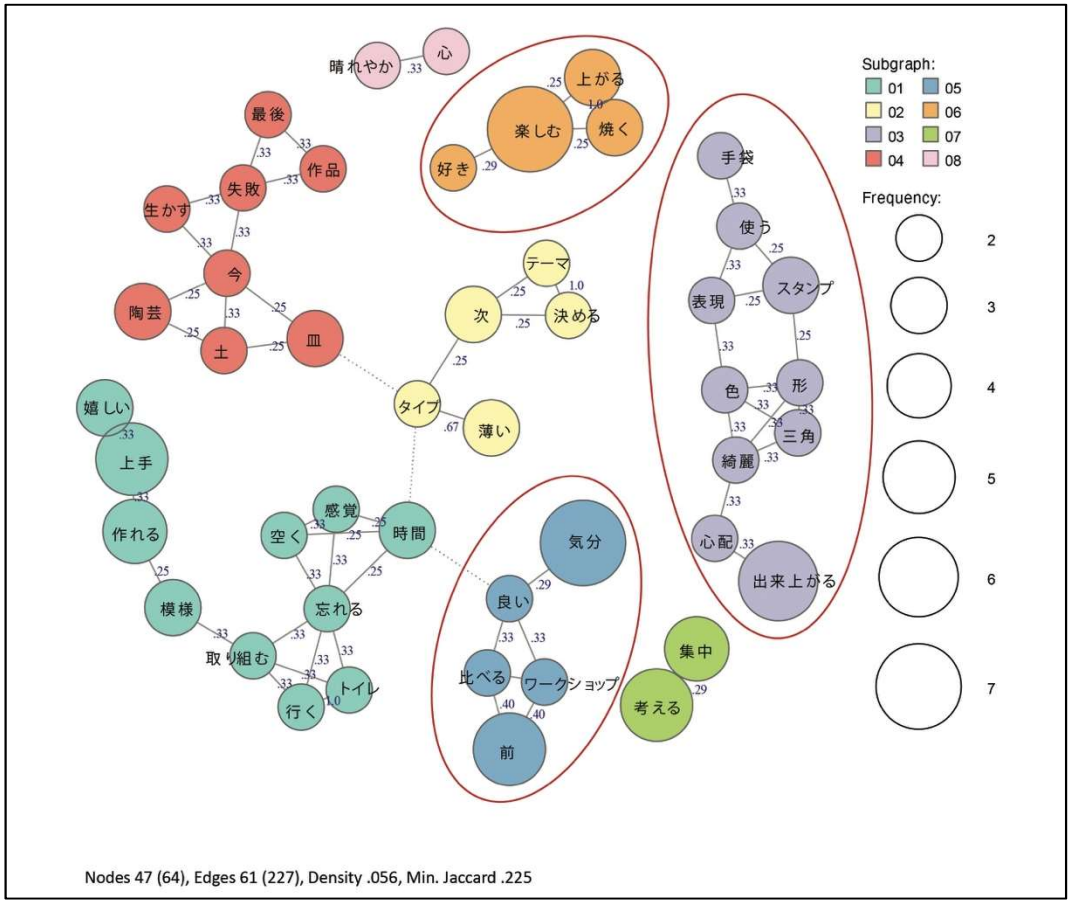


Figure 5.17 Group L1 Co-occurrence network of words after participated the workshops (Japanese)

L2 Neutral character with continued structure: Figure 5.18-5.19 presents the co-occurrence network of words of group L2 participants' mentions after the ceramic tasks that show the groups of three keywords, Making, Considering, and Stamp. '*Making'* shows co-occurrence with shape. The group of *Considering* includes Skillful and Difficult. Last, '*Stamp'* shows a 0.38 occurrence rate with '*Using'* that connects with *'First time,' and 'Beautiful' with strong* occurrence (0.50.) Moreover, the largest module presents the words that describe positive feelings.

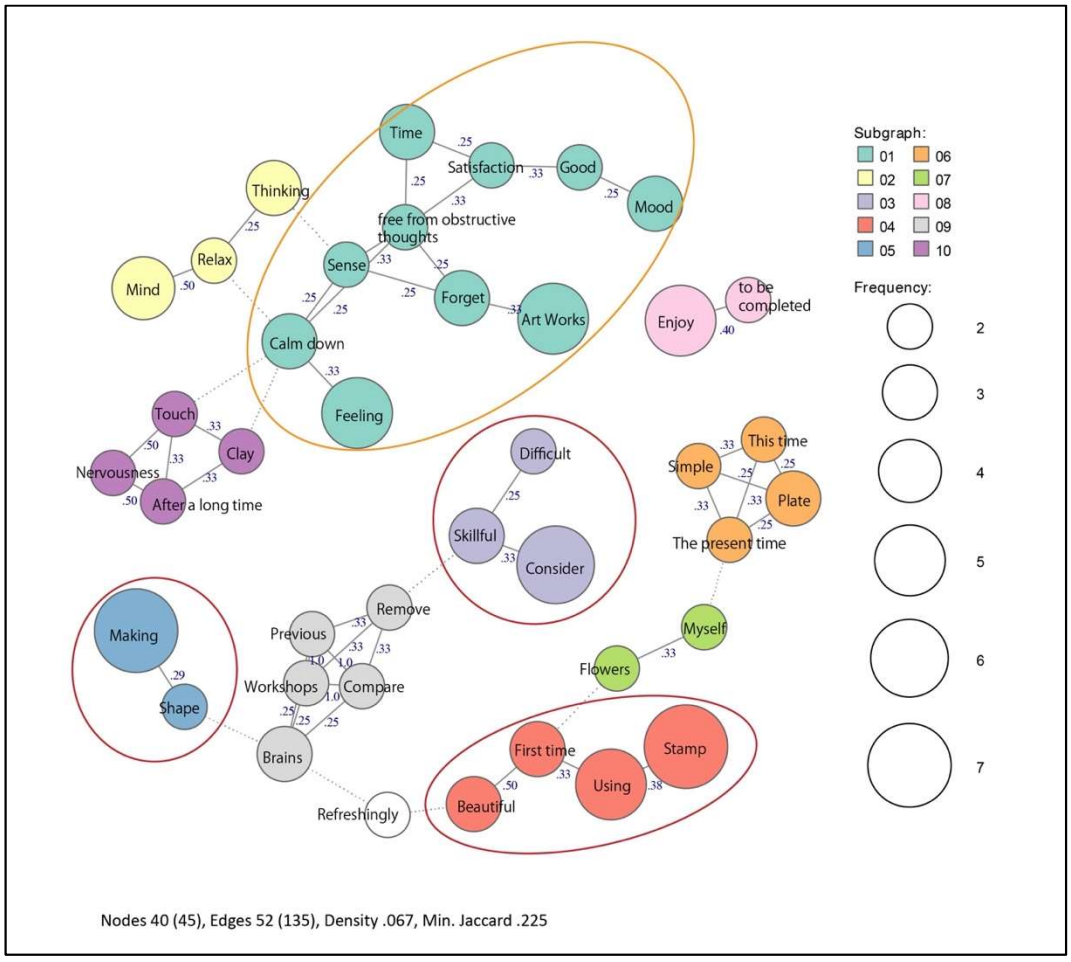


Figure 5.18 Group L2 Co-occurrence network of words after participated the workshops (English)

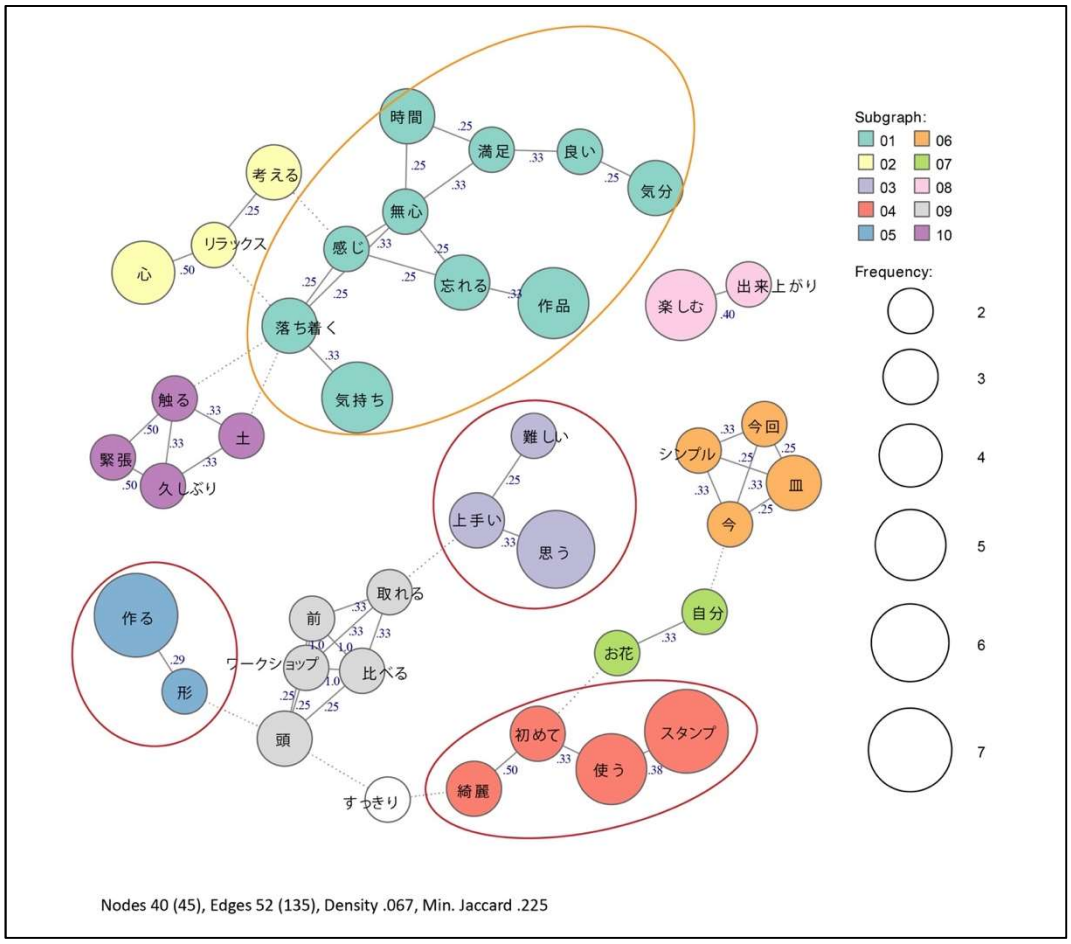


Figure 5.19 Group L2 Co-occurrence network of words after participated the workshops (Japanese)

L3 The Abstract with uncertain structure: the last diagrams present group L3 participants' co-occurrence network of words (Figure 5.20-5.21.) The keywords are *Artwork*, *Consider*, and *Myself*. The *Artwork* connects with *Look* and *Person*. '*Considering'* shows a strong occurrence rate with '*to Go'* (0.40) without important events with another module. While *'Myself'* has a strong relationship (0.50) with '*Skillful,'* which connects to *Beginning* and '*to Get used to*.'

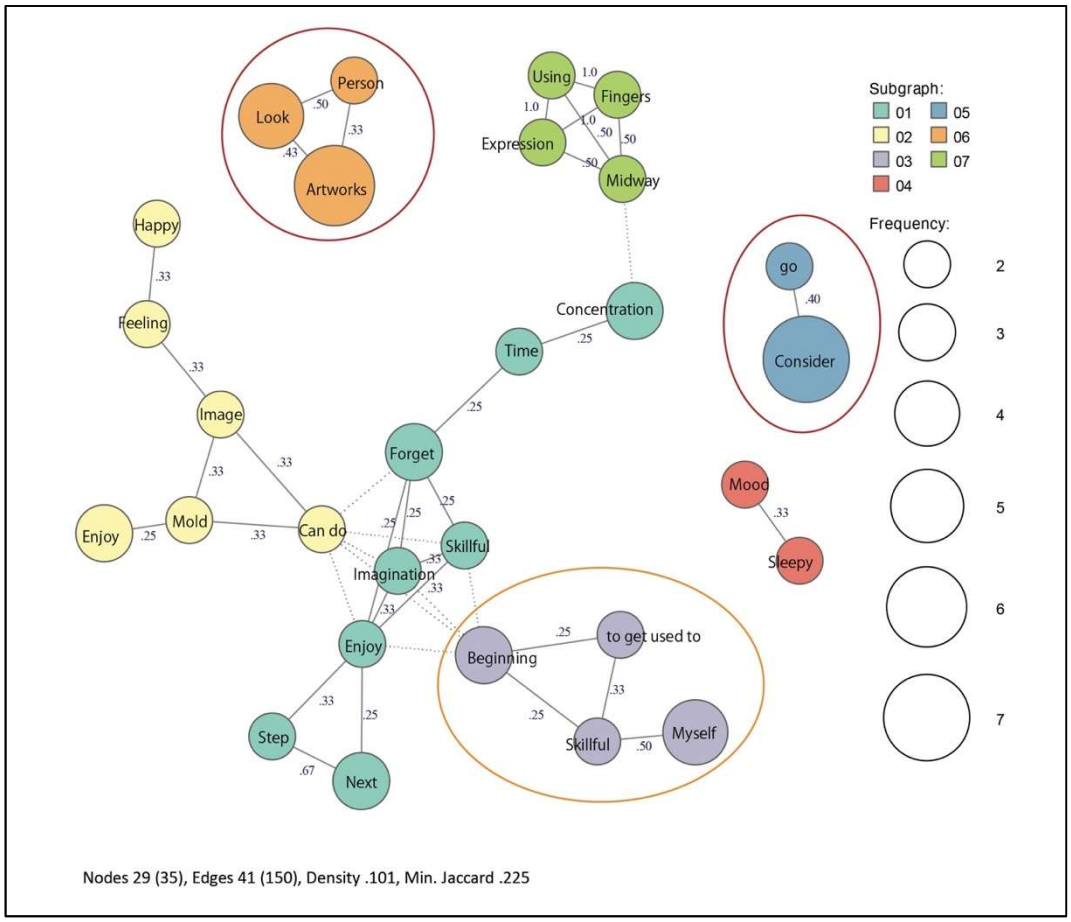


Figure 5.20 Group L3 Co-occurrence network of words after participated the workshops (Japanese)

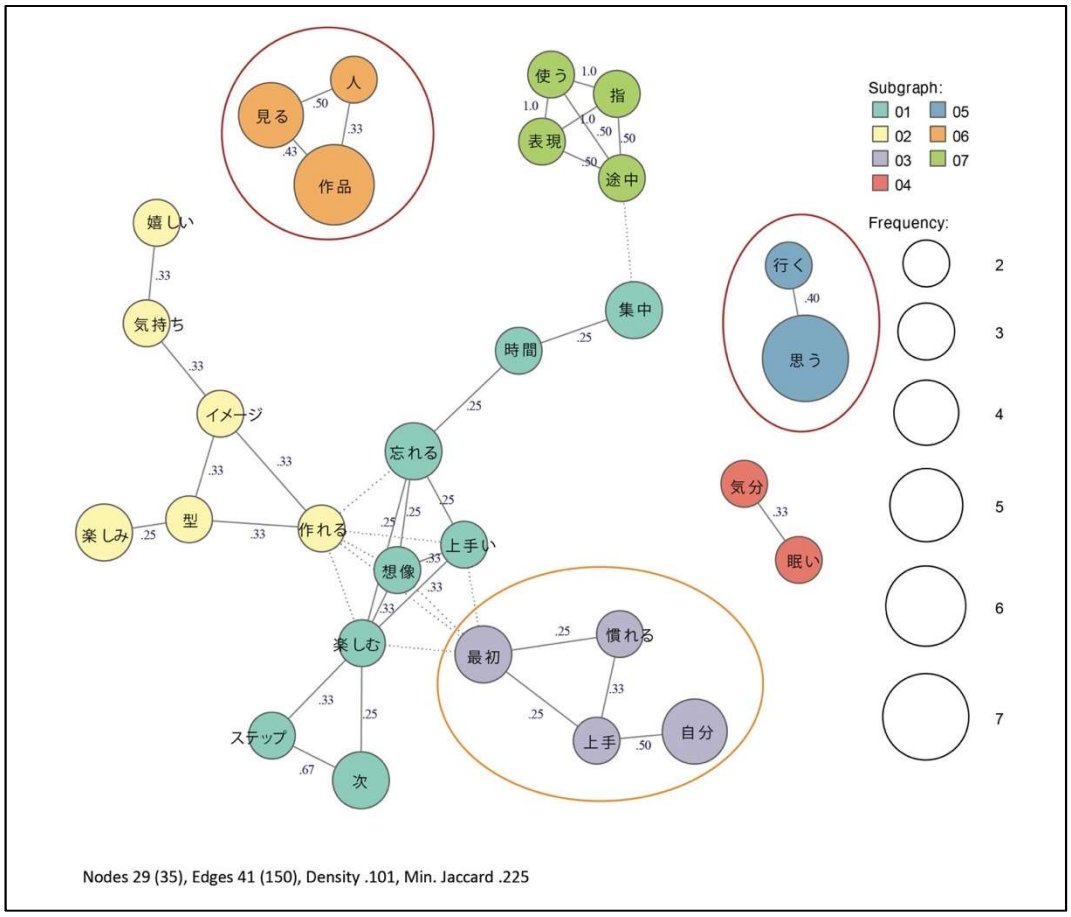


Figure 5.21 Group L3 Co-occurrence network of words after participated the workshops (English)

Write-up examinations after receiving the finished ceramic works

In addition, write-up examinations were observed again after participants received their fired works to investigate participants' perception of ceramic products, which the color and texture change completely after firing. The firing processes make ceramics different from other clay works activities because it puts a long period between making and seeing the final image. After participants saw the final finished ceramic products, comments might help providers complete participants' perception of the workshops. The survey requires attendees to look and touch their finished works while writing down their feelings, thoughts, or anything about it or the workshops. Same as the write-up examination after the workshop operation, the data were analyzed in three groups following the clustering results on the same Jaccard coefficient and consideration basis.

L1 The concrete symbol and pattern: Figure 5.22-5.23 provides the co-occurrence network of words results of group L1 participants' comments after receiving their final works. The keywords are 'Can do' and 'Break.' 'Cando' has a strong co-occurrence with 'Successful' rated 0.31 and 'Cute' on a 0.24 occurrence rate. Meanwhile, 'Break' relates with 'a Few' on 0.23 occurrence rate.

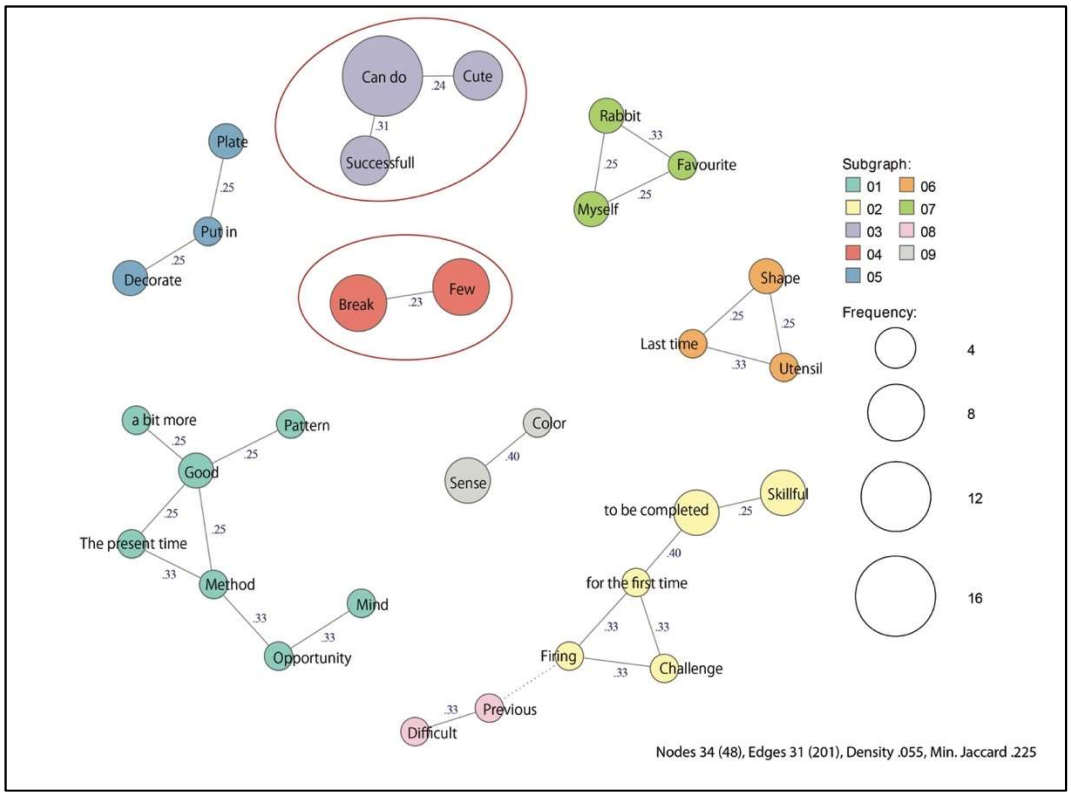


Figure 5.22 Group L1 Co-occurrence network of words after received the finished works (English)

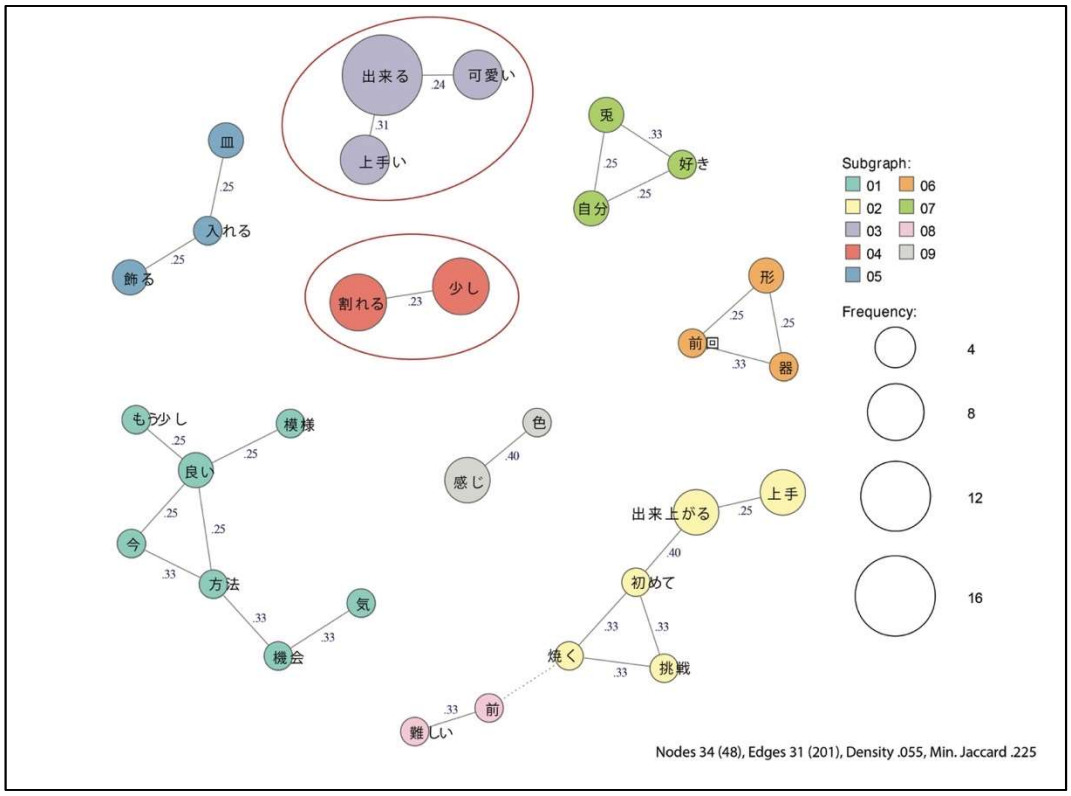


Figure 5.23 Group L1 Co-occurrence network of words after received the finish works (Japanese)

L2 Neutral character with continued structure: The keywords of group L2 network are 'Artworks,' 'Making,' and 'to be Complete' (Figure 5.24-5.25.) The 'Artwork' has a 0.26 occurrence rate with 'Making,' where both words are the group's keywords. 'To be Complete' module is the largest group of words that describe the pleasure of finishing the project, such as 'Happy,' 'successful,' and 'Completion.'

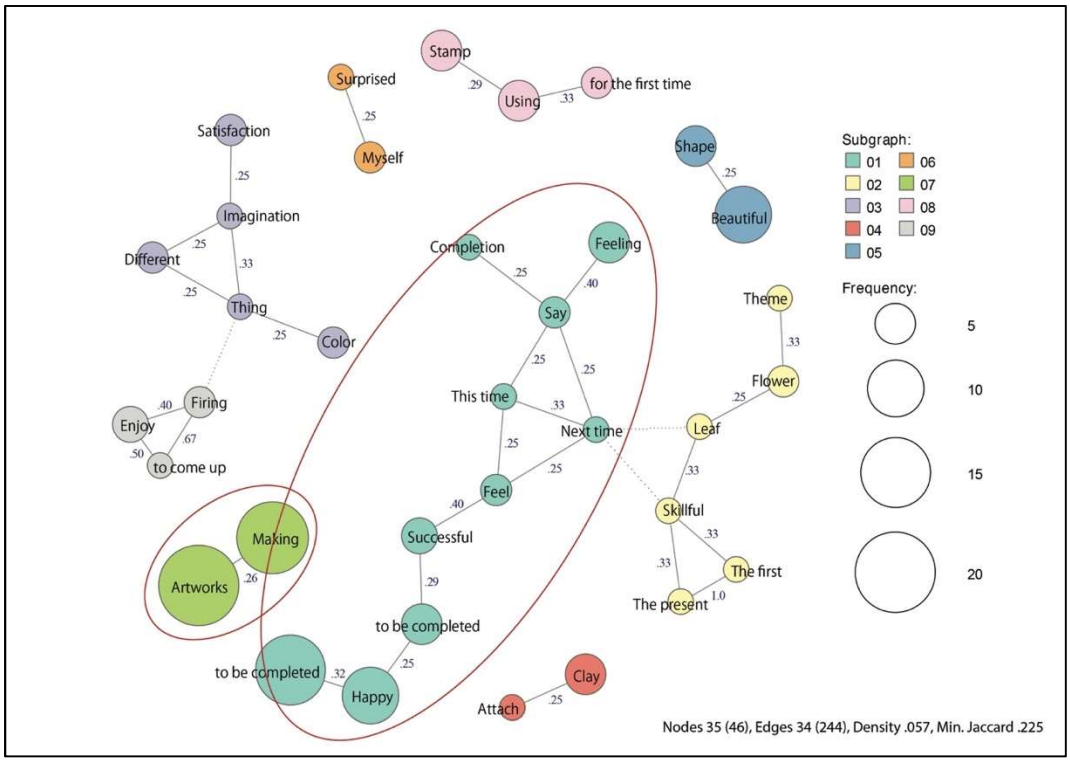


Figure 5.24 Group L2 Co-occurrence network of words after received the finish works (English)

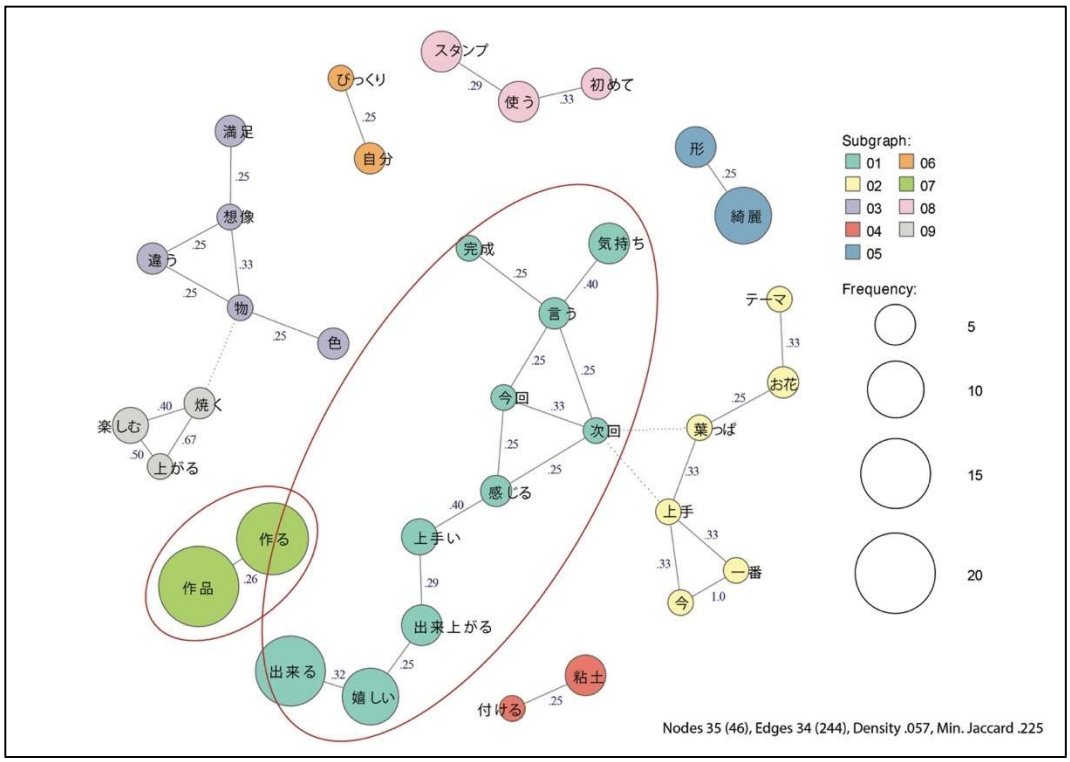


Figure 5.25 Group L2 Co-occurrence network of words after received the finish works (Japanese)

L3 The Abstract with uncertain structure: The co-occurrence network of words shown in Figures 5.26-5.27 indicates group L3 participants' comment keywords are ‘Making,’ ‘Artworks,’ ‘Completion,’ and ‘Color.’ The two keywords ‘Making,’ and ‘Artworks’ are presented in the same group with a 0.24 occurrence rate. Also, ‘Completion’ and ‘Color’ are in the same module with the words that indicate the sense of seeing the final results.

In summary, group L2 shows the most significant positive results on the POMS test following group L1, and group L3 was the last. Group L2 represents the neutral character with continued structure, which was the character that was lean on neither abstract nor concrete. In contrast, group L3, which symbolizes the abstract character with uncertain structure, did not significantly improve participants’ moods. In the qualitative data, group L2 participants mentioned positive feelings about making and using stamps even the difficulty related to skill was noted. Also, group L1 participants mentioned they felt good compared with the previous workshop, comparing the second trail with the first trail. The network shows they described enjoying looking forward to finishing and firing. But they mentioned worrying about being able

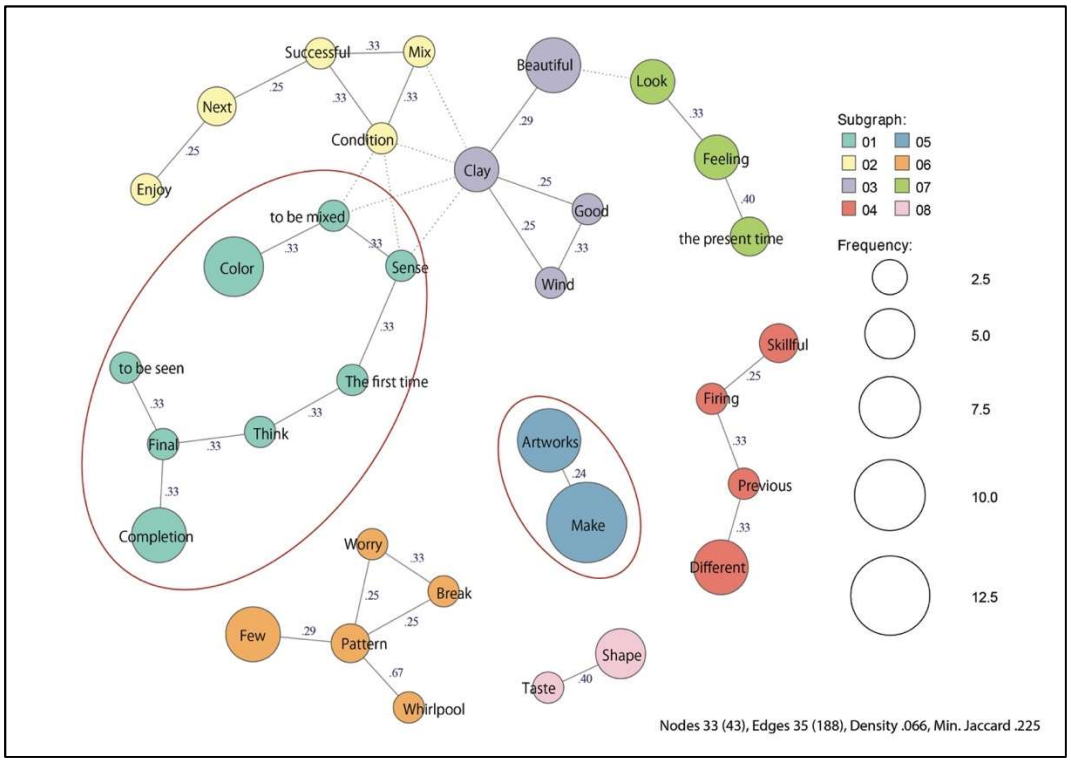


Figure 5.26 Group L3 Co-occurrence network of words after received the finish works (English)

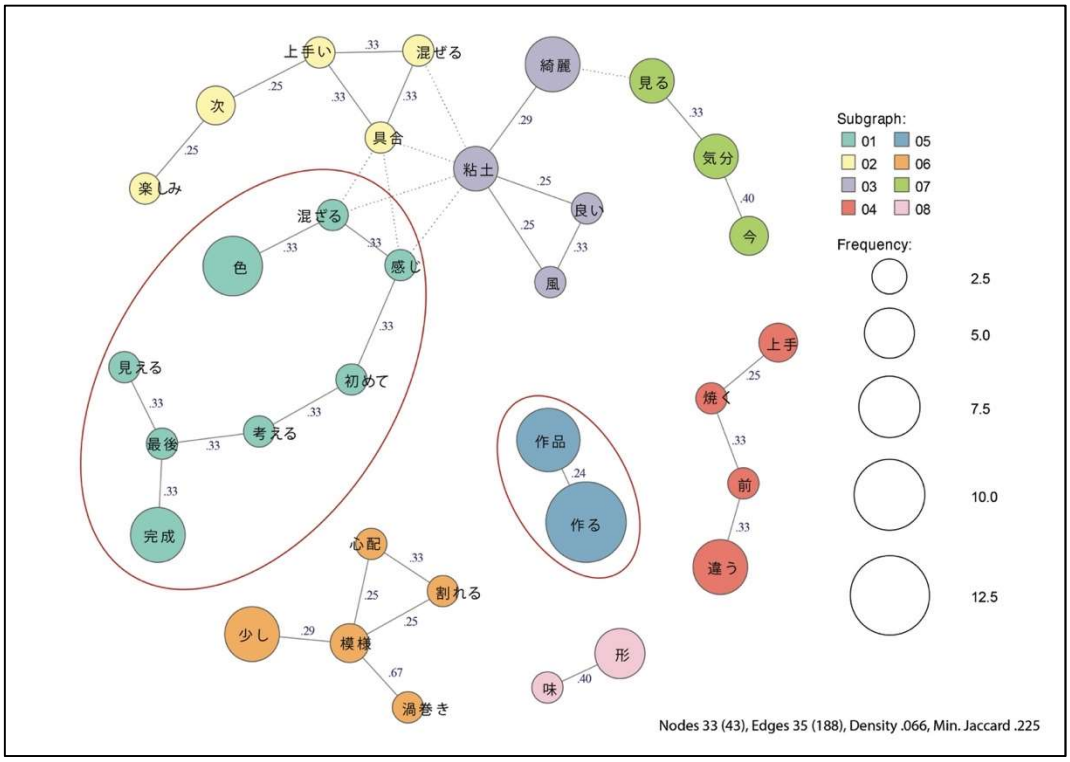


Figure 5.27 Group L3 Co-occurrence network of words after received the finish works (Japanese)

to complete the tasks. Group L3 participants focused on other person artworks and displayed wondering about how they themself could increase their skill. As to making methods, random techniques and mold shapes appeared in every characteristic. No techniques and mold shapes selection different ratio appeared among the three groups. However, subjects from the Hand Pressing with food wrap method from the first trial were not included in group L2. The perception after receiving final works, group L2 and L3 still mentioned making artworks meanwhile group L1 focused on the accomplishment and mentioned the works' damages.

5.5 Discussion

Regarding workshops performance and evaluation development, the developed ceramics method significantly improved participants' mood in overall result. Considering differences of mood changes in artworks' characters using cluster and principal component analyses gave clear comprehension of participants' mood changes caused by ceramic arts making than comparing psychological results among techniques. Especially, in experiments that have a high difference between the subject population in compared groups

Mainly on the emotions improved after the workshop operation, the study focuses on three main points among the group, the quality of mood improvement, the main characteristics, and the making methods—the discussion sequences from the best mental improvement to the least progress.

The results indicate that university participants who did the neutral character ceramics with continued structure had the most moods improvement after the operation, group L2. The character and structure, shown through the link of clay color and shape between the backside and the front side, indicate that participants group L2 had the uncomplicated image of work or did not specify the design before the start then continue the task with the same mindset until finished. These visions also appear on the text mining analysis that they lean to continue mentioning making from the start until receiving the final works. Therefore, even if they commented that it was difficult, they could feel good about the experience of making.

Moreover, L2 was the only group that mentioned the specific making task, the Stamping even the crucial distinction of techniques selection was not shown in the qualitative data, and Hand Pressing was selected the most. The POMS transition graph (Figure 5.14) shows that group L2 moods level before the workshop quite in the middle range between the L1 and L3, despite the highest Fatigue. However, the Fatigue transition was the steepest decrease too.

Group L1 was the second-place mood development quality in this experiment. Participants who made the concrete characters and pattern show that they had a specific image of finished works and figured the way to achieve those pictures. The strong graphic appeared on both sides, which means that participants focused on two visual dimensions no matter what the mold shape would be rather than putting clay into the mold and letting its shape follow the mold. In other words, group L1 represents participants who planned before making and performing the task to accomplish their designs. The POMS test presents the lowest pre-test T scores on every scale, excluding ‘Vigor’ that did not significantly improve. The mood change differences also were the smallest transition almost on every scale compared with groups L2 and L3. Moreover, the visions of planning appeared in the text mining results through mentioning around worrying about works’ appearances completion after the workshops, and by criticizing the success of the final results. Therefore, the failure results were picked up on the Co-occurrence network of words after receiving the finished works.

Last, group L3: the abstract character made by uncertain structure showed the least mental progress in this experiment. Compared with the other two, L3 participants had high negative POMS T scores level before the workshop, but the POMS test did not show significantly negative moods decreasing in the group, while only the ‘Vigor’ significantly increased after the ceramics making. Two main characters are found in the visual and forming structure, first the blended abstract visible and second the high graphic contrast between both sides. The right side of the component 1 axis shown in Figures 5.9-5.10 presents that clay was aggressively blended, smeared, mixed before being put into the mold or after being shaped. Furthermore, the left side of the L3 cluster presents works that have extremely contrasting graphics on both sides. Hence, a participant in this group did not plan specifically about the finished look before starting the making tasks but might consider visualizing something then developing their image during the making or experimenting senses of clay.

Text mining results support the vision. The keywords did not point to the making task but suggested getting better at skills and comparing one's work with others.

Regarding the relationships between methods and participants' mood improvement, the developed ceramic method could improve moods significantly in participants who tend not to expect a successful finish but enjoy the instant three-dimensions forming task and accept the difficulty without pressure. At the same time, the method worked just as well in participants who prefer making clear graphics or symbols. In contrast, the procedures seem inappropriate for attendees who choose abstract expression and open experimental processes like Hand Pressing. Regarding the subject ratio in three groups (Table 5.4), group L1 was the largest subject. Accordingly, the university members prefer to create their designs to express themselves. However, the "Press into a Pot" program's procedure did not perform the best in the group.

About the workshop performance,

5.6 Conclusion

Experiments provide preliminary verification of making tasks and mood change relationships through the determinate procedures with the university members. Investigations verified that the "Press into a Pot" program could influence participants to positive mental development even if the method desired not to allow them to touch the clay directly. This method performed the best in participants who enjoy making simples tasks rather than anticipate the satisfactory final products and have normal prior moods level before the workshop. However, the most effective group did not include a majority of design students' subjects. Therefore, the determinate procedures might not suit young adults who have prior experiences in art and design. Nevertheless, the study achieves the first step of the workshop's design goal to produce the most basic therapeutic ceramics art activity plan that opens for any level of prior experience due to the character of the most significant subjects.

The therapeutic distinction between Hand Pressing and Stamping was insignificant through analytical data. Therefore, would mainly consider the psychological effects in artworks characters for instead to exam the appropriate evaluation method for the study. However, the next experiment also keeps the technique diverse to verify the result with different subjects and conditions.

The cleanliness control solutions are still of important concern. Tools and strategies should support handcrafted activities. Thus, the food wrap as a dirt protector obstructs the creative flow that affects mood improvement. This is shown as the works made from this method were not classified in the influential group. The nitrile gloves provide flexible hand movements but do not have the same extremely thin sense of touch that the food wrap provides.

There are several limitations of this study to consider. First, the study demonstrated moods change and expressions through the pottery making in healthy adults. Moreover, the experiments were conducted at a university, and the sample size was small. It does not verify that the same workshops would be effective in other subjects. Given the conditions, the next workshop design could provide a process that allows participants to enjoy ceramics making with less obstruction and be open to diverse personal preferences. Hence, the developed making methods would continue to be used in the next experiment and add the Slip Trailing into the third task to increase the range of technique variety.

Last, despite significant evidence, mold type A was popularly chosen by participants. The deep and square molds were chosen almost equally. Accordingly, the basic shallow round shape probably attracts participants by the easiest and simple line, making inexperience feel comfortable starting with it. The other forms were selected perhaps to challenge their skill. Thus, the shallow round shape was utilized in actual workshops to limit the form factor and focus on relationships between works' character, techniques, and participants' mental state.

The actual workshop would be held at the Fukui-Ken Saiseikai Hospital to verify the workshop efficiency and include technical performance, relationships between works' characteristics, making tasks, and participants' mood change. The hospital environment was selected to represent the location that gathers negative emotion in daily life, which is not concerned about participants' social status and represent the non-studio workspace with the high cleanliness condition.

Findings

According to the same developed press mold method, works from the same techniques show the various styles of expression that rely on participants' personal preferences. Therefore, this experiment could not verify that Hand Pressing or Stamping was suitable for those specific clients.

Considering mood changes among artwork characters using cluster and principal component analyses was an appropriate evaluation method in a high difference between the subject population in compared groups, which is applied in the actual workshops evaluation.

University members who create neutral works' character showed the most significant mental improvement after the workshop. They represent the participants who enjoy doing ceramics tasks rather than focusing on the expected results through quantitative analysis.

The fixed procedure is probably not appropriate for design students who have high intentions for expression in their design, expect the successful result, have high prior negative feelings before the workshop and prefer open space to express through abstract elements.

Chapter6: Verification of Relations between making processes, finished products, and participants' mood changes in the hospital workshops

6.1 The Participatory Ceramic Program in The Hospital: Developed Processes Verification

Aim

The workshops' purposes are to verify the preliminary experiments' method in actual practice and investigate the participant's positive experience caused by pottery workshops in hospitals. Participants' experiences were examined by correlating the items' characteristics and ceramic-making techniques that encourage participants' moods and expressions under the hospital's environment. Concerning cooperative activities, the program included participatory design, which comprised the ceramics-making tasks and exhibition of participants' works.

The program intends to employ participatory design in art activity planning and explore alternative methods to conduct a hospital's Art and Design program. Using the participatory design, several hospital art programs were conducted to improve the hospital's environment and encourage human relationships in the hospital community. The design focuses on simplified pottery techniques and staff duties because participatory activities are not operated by one professional like traditional studio workshops. Moreover, the exhibition was held after the workshops to connect the circle of social: people, art, and community.

Location, Dates, and Subjects

The experiments were undertaken over three days at a workshop program called "Chokotto Tougei Time" on August 9, 13, and 14, 2019, at Fukui-Ken Saiseikai Hospital. The workshops schedule was announced by posters and medical staff around the hospital one week before workshops were operated. The workshops allowed everyone in the hospital at

the time it was being held to attend without reservation. Attendees were 43 Japanese, including inpatients, outpatients, visitors, and medical staff. They ranged between 7 to 81 years old; the average was 51 years old. They were 37% of outpatients, 22% inpatients, 22% visitors, and 20% medical staff.

The workshops were held from 1 p.m. to 4 p.m. The multipurpose spaces were provided by the hospital. One point to particularly note is that the location of the workshop space changed during the program. The Hand Pressing and Stamping sessions were conducted on August 9 and 13, 2019, at the multipurpose room, which the hospital selected. The Slip Trailing session, which was conducted on August 14, 2019, was changed from the multipurpose room to the main waiting area to increase the number of attendees.

Figure 6.1 The multipurpose room (right side), the main waiting area (left side)

Research Instruments

The study employed quantitative evaluation to examine the participants' moods and responses before and after the workshops, as was done in the previous experiment. Furthermore, the participants' reactions after they received finished works were examined as well. The questionnaire was separated into three sections. First, participants' moods change before and after the workshop's operation was observed by the moods change observation questionnaire developed from the POMS. Second, the participants' responses to their work and processes were questioned after they finished the workshops. The questionnaire results

from 8 items also obtained the gross rating based on six scales: ‘Expression,’ ‘Planning,’ ‘Freedom,’ ‘Hands Movement,’ ‘Focusing,’ and ‘Fun.’ Participant attendance and finish work questionnaire was attached in parcels delivered to the participants after the exhibition. Similarly, the questionnaire was collected in the same evaluation technique based on six scales: ‘Clear Mind,’ ‘Focusing,’ ‘Reminding,’ ‘Planning,’ ‘Satisfaction,’ and ‘Interest.’ Then, the success of the exhibition was considered in encouraging the audiences to engage in the hospital pottery workshop.

Last, the write-up examination was also included in the participants’ responses questionnaire, collected after attending the workshops and after receiving fired work. Concerning the write-up examination, attendees could optionally write down their feelings about their ceramic works and opinions of the workshops process freely in Japanese. Alternatively, workshop providers supported patients who lack reading and writing abilities to take the paper questionnaires by conducting an oral interview following the questionnaire items. After the data collection, the methodology employed a semantic differential (SD) method to measure pottery characteristics then utilized the cluster analysis to separate a group of participants’ works. We invited five experts, including art and design professors, design instructors, and designers, to take the participants’ work characteristics questionnaire to define each cluster’s fundamental components. Finally, the write-up examinations were evaluated by Quantitative Content Analysis. The results from verbal expressions were applied to support the results from gross rating-based questionnaires.

6.2 Task Assignments

In terms of ceramic experience, the study employed the developed press mold technique from the prior studies and then developed it into an actual hospital experiment. The workshop program consists of three forming techniques separated on each day. Hand Pressing and Stamping originate from the previous trails. The Slip Trailing was added after to the program to examine the effects of the liquid state of clay in pottery making. The intention being to focus on techniques investigation, all examinations used the circle plate plaster mold,

the most selected mold type in the previous experiment, to control the shape of pottery works. This study expects participants to focus on associating with clay in specific tasks, which they are assigned more than concentrating on pottery forming skills that might affect the successful qualities of finished work.

The workshops provide variations of potters' clay to give participants opportunities to create their work in two dimensions, three dimensions, or both points of view. The same clay palette with "Press into a Pot" was prepared separately from each type in plastic boxes. Except for the Slip Trailing, clay slip was contained in sauce dispensers. All participants were asked to wear nitrile gloves during the workshops to avoid touching clay directly following the hospital's hygiene request.

Hand Pressing

The Hand Pressing section investigated associating hands, soft clay, and creativities as typical visual art therapy. This section assigned participants to pick a piece of clay, then form and press them in a mold freely by hand while wearing nitrile gloves.

Stamping

The Stamping section examined interactions with concrete tasks and focus that might affect clients' moods as a crafting intervention. Like the Hand Pressing section, participants were assigned to pick a piece of clay from plastic boxes, but they had to press them in a mold by Stamping tools instead of fingers. The process allows participants to decorate their work while forming in a crafting manner.

Slip Trailing

The last section was conducted to explore correlations between liquid clay and emotional expression. Unlike other sections, participants were assigned to draw, drop, or pour clay slip by sauce dispensers into a plaster mold until the mold was filled up. The author

combined a Slip Casting method used in the ceramics industry forming process and Slip Trailing, widely used in decorative ceramics, to give an alternative way of conducting ceramic workshops. Therefore, in this section, participants could express through two-dimensional graphics while forming the object's shape.

6.3 Results

6.3.1 The distinction of participants' mood changes in different techniques

Overall, POMS results indicated that hospital workshops significantly decreased participants' Tension-Anxiety, Depression-Dejection, Anger-Hostility, and Fatigue, which are shown in Table 6.1 and illustrated in Figure 6.2. Three methods were compared in the POMS transitions before and after engaging the operations. The Hand Pressing method includes 9 subjects. The Stamping has 13 artworks, and the Slip Trailing method comprises 16 subjects.

Table 6.1 provides a POMS T scores summary separated by technique, also the POMS T score transitions were illustrated in Figure 6.3 separated by six scales grouping by three techniques. Hand Pressing group significantly decreased in 'Tension-Anxiety,' Depression-Dejection,' 'Anger-Hostility,' 'Fatigue.' Stamping group significantly improved in Tension-Anxiety,'' Anger-Hostility,' 'Fatigue' decreasing. Meanwhile, the Slip Trailing group significantly decreased in 'Anger-Hostility' and 'Fatigue.'

Some significant differences in mood transitions appeared in the techniques. Hand Pressing significantly reduced participants' Depression-Dejection and Fatigue better than the Stamping technique. However, mood changes distinctions between Hand Pressing-Slip Trailing or Stamping-Slip Trailing were insignificant. Therefore, character classification was also employed to understand the character of methods that encouraged mental improvement in ceramic workshops.

Table 6.1 Distinctions of POMS T scores Before-After the workshop operation and subtraction among three techniques and overall

		POMS T scores Mean				Welch's t-test of subtraction among techniques	
POMS Scale	Group	Before (Pre)	After (Post)	Difference	Pre-Post t-Test		
Tension-Anxiety (T-A)	Hand Pressing	46.44	39.89	-6.56	0.043	H-S	0.208
	Stamping	39.69	35.77	-3.92	0.027	H-T	0.242
	Slip Trailing	47.94	44.00	-3.94	0.129	S-T	0.498
	All	44.76	40.21	-4.55	***0.001***		
Depression-Dejection (D)	Hand Pressing	49.56	43.67	-5.89	***0.019***	H-S	0.025
	Stamping	41.46	40.31	-1.15	0.124	H-T	0.069
	Slip Trailing	46.44	44.44	-2.00	0.196	S-T	0.305
	All	45.47	42.84	-2.63	***0.003***		
Anger-Hostility (A-H)	Hand Pressing	44.22	40.56	-3.67	0.036	H-S	0.176
	Stamping	39.54	37.46	-2.08	***0.019***	H-T	0.429
	Slip Trailing	42.94	39.63	-3.31	0.022	S-T	0.210
	All	42.08	39.11	-2.97	***0.000***		
Vigor (V)	Hand Pressing	44.33	45.33	1.00	0.631	H-S	0.287
	Stamping	47.08	49.54	2.46	0.145	H-T	0.250
	Slip Trailing	49.06	52.00	2.94	0.162	S-T	0.427
	All	47.26	49.58	2.32	0.039		
Fatigue (F)	Hand Pressing	51.67	39.56	-12.11	***0.003***	H-S	***0.009***
	Stamping	40.08	36.77	-3.31	***0.018***	H-T	0.079
	Slip Trailing	45.56	39.06	-6.50	***0.017***	S-T	0.125
	All	45.13	38.39	-6.74	***0.000***		
Confusion (C)	Hand Pressing	53.33	49.00	-4.33	0.105	H-S	0.143
	Stamping	46.62	45.69	-0.92	0.653	H-T	0.131
	Slip Trailing	52.25	51.31	-0.94	0.594	S-T	0.498
	All	48.84	-1.74	0.135	48.84		

*Subject population: Hand Pressing=H (9 artworks), Stamping=S (13 artworks), Slip Trailing=T (16 artworks)

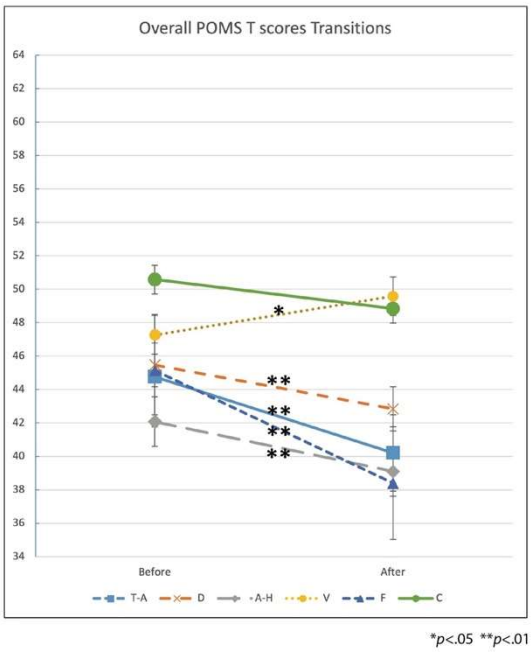


Figure 6.2 Hospital workshops participants' POMS transition before-after the workshop operations

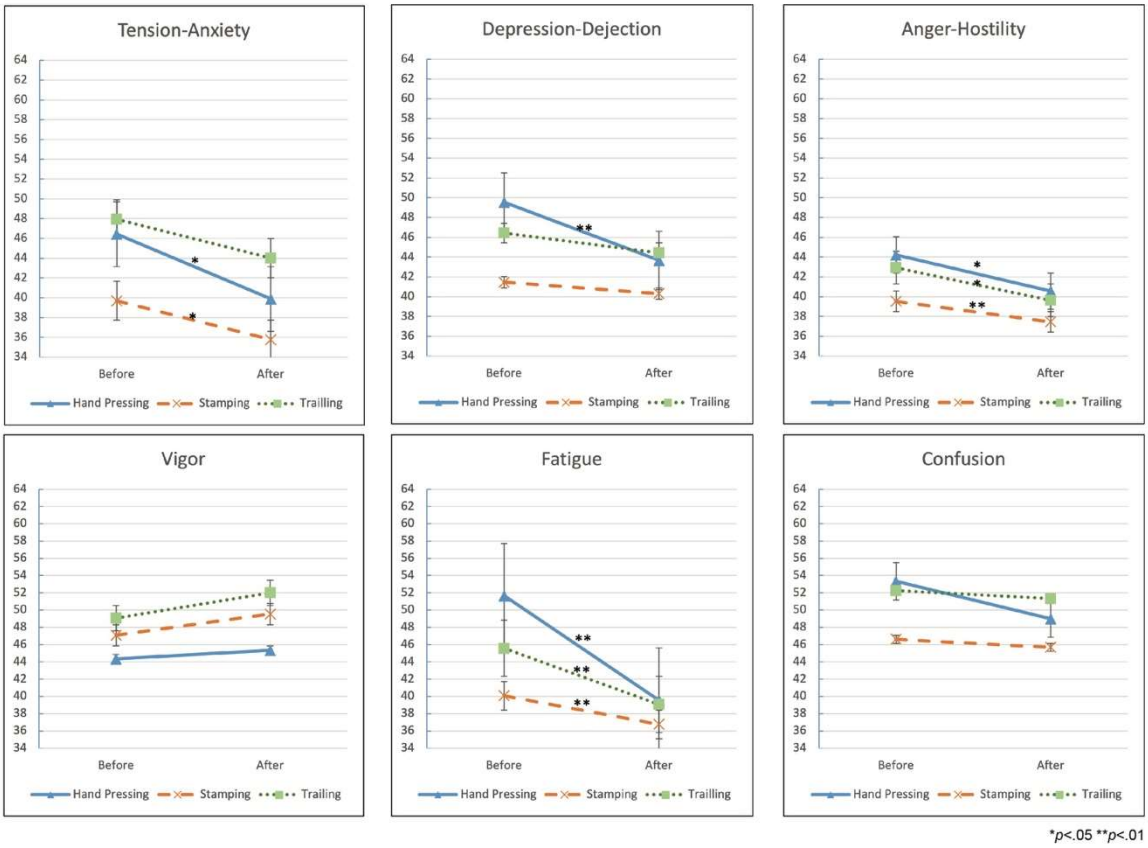


Figure 6.3 Hospital workshops participants' POMS transition before-after the workshop operation separated by six scales grouping by techniques

6.3.2 The Characteristic of Participants' Works Using Cluster Analysis

Same as the previous experiment, the SD method data collection rated by five experts was generated by JMP software running hierarchical clustering on Ward's method to classify participants' works characters. Thirty-eight subjects from 41 were investigated, three subjects were eliminated because of incomplete answering questionnaire and age under 18, which is explained in the guide in the test manual for POMS. It is recommended for use only with subjects aged 18 and older (Douglas M. McNair、 Maurice Lorr、 Leo F. Droppleman 1992.)

Figure 6.4 shows the number of clusters related to the Scree plot elbow point that classified 38 subjects into three groups, H1, H2, and H3, representing the ceramic workshops in the hospital. Group H1 incorporates eight subjects, Group H2 has 13 subjects, and Group L3 includes 17 subjects. Table 6.2 provides data about subjects' status and utilized techniques in three groups. Overall, outpatients are major participants of the workshop, and Slip Trailing was the most task the subjects entered. Group H1 does not show the crucial status and making tasks ratio. Group H2 subjects did not include inpatients but incorporated the majority of outpatient and medical staff, and the Stamping was the highest utilized technique. The last, group H3, contains the main workshop population, mainly patients. The group's major utilized technique was Slip Trailing.

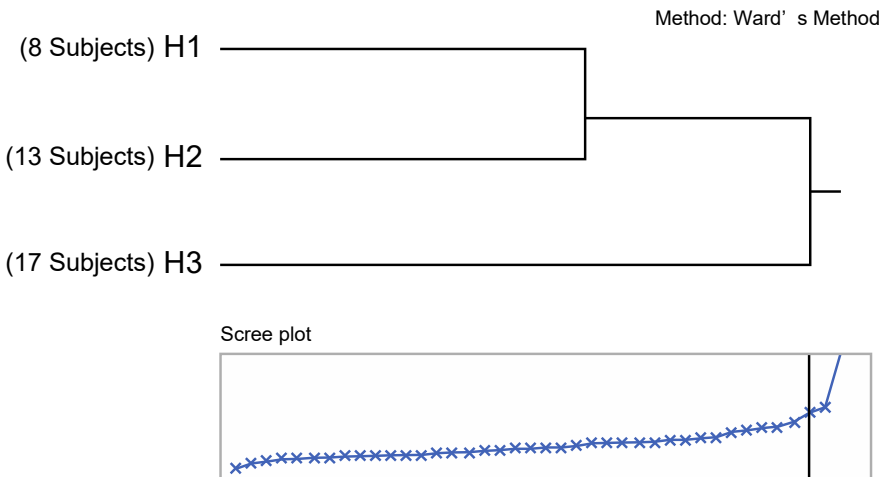


Figure 6.4 Hierarchical Clustering Dendrogram

Table 6.2 Participants' status and making tasks grouping follow cluster analysis results

Characteristic Groups	Number of subjects	Status				Techniques		
		Inpatient	Outpatient	Medical Staff	Visitor	Hand Pressing	Stamping	Slip Trailing
H1	8	2	3	2	1	4	4	0
H2	13	0	6	4	3	1	7	5
H3	17	6	5	2	4	4	2	11
Total	38	8	14	8	8	9	13	16

The same data collection method was also conducted analyzing the principal component on correlation using JMP software to give more precise images of the work's features. Figures 6.5 and 6.6 show the principal component analysis results on two axes, and cluster grouping followed the hierarchical clustering results. The results show that component 1 contribution rate is 22.7%, and component 2 contribution rate is 12.8%. Component 1 was named the Fluid-Solid axis, and component 2 was named the Systematic-Nonsystematic. Three cluster analysis groups were illustrated from H1 to H3 from right to left. As the previous analysis, the characters of works were considered the art elements such as shape, graphics, colors. Moreover, the elements continuation from the backside to the front side were considered to observe participants' making process. The clusters were named toward characteristic features following the list:

H1 Solid and Concrete: Ceramic works present solid graphics looks. Lines and shapes are firm and sharp, and strong ornaments' depths are also visible. Moreover, works from the Slip Trailing section, which influences fluidity elements, were not classified in this cluster. The simple structures are also notably presented through the relations of clay between both sides.

H2 Repetitive Structure: The main characters are delicate decoration, graphics, and repetitive patterns. Items from the Stamping section are the majority of the group. Most stamps patterns show random duplication patterns on the random clay colors. Considering the backside of works from the Stamping section, they appear duplication structures of clay placement that contribute to color elements on the front side. In contrast, the works made by

Slip Trialing show the contrast graphic between both sides. However, they show the main repetitive features on the front side.

H3 Fluid and Abstract: Color blending is the most influential art element, abstract and difficult to define. Most of the works are from the Slip Trailing section and present contrasting structures and elements between the front and back sides. According to the main technique, liquid clay influences marble graphics and fluid features caused by difficult controlled material. The others are works from the Hand Pressing and the Stamping section that are disorderly. For example, they show smear marks or unsystematic layers of different clay types.

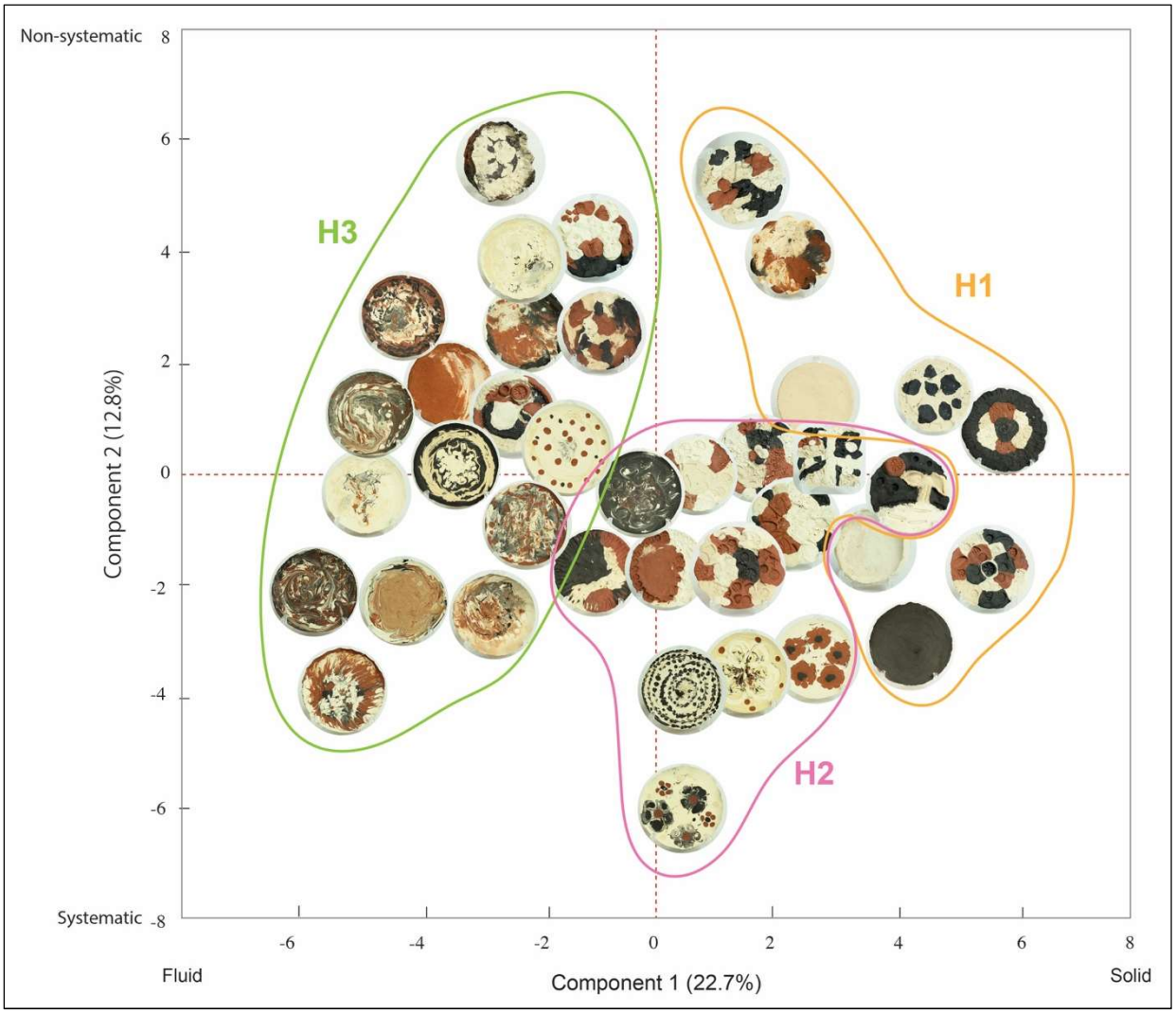


Figure 6.5 The Principal Component Analysis on Correlation of the hospital workshops participants' works grouped by Cluster Analysis (front-side)

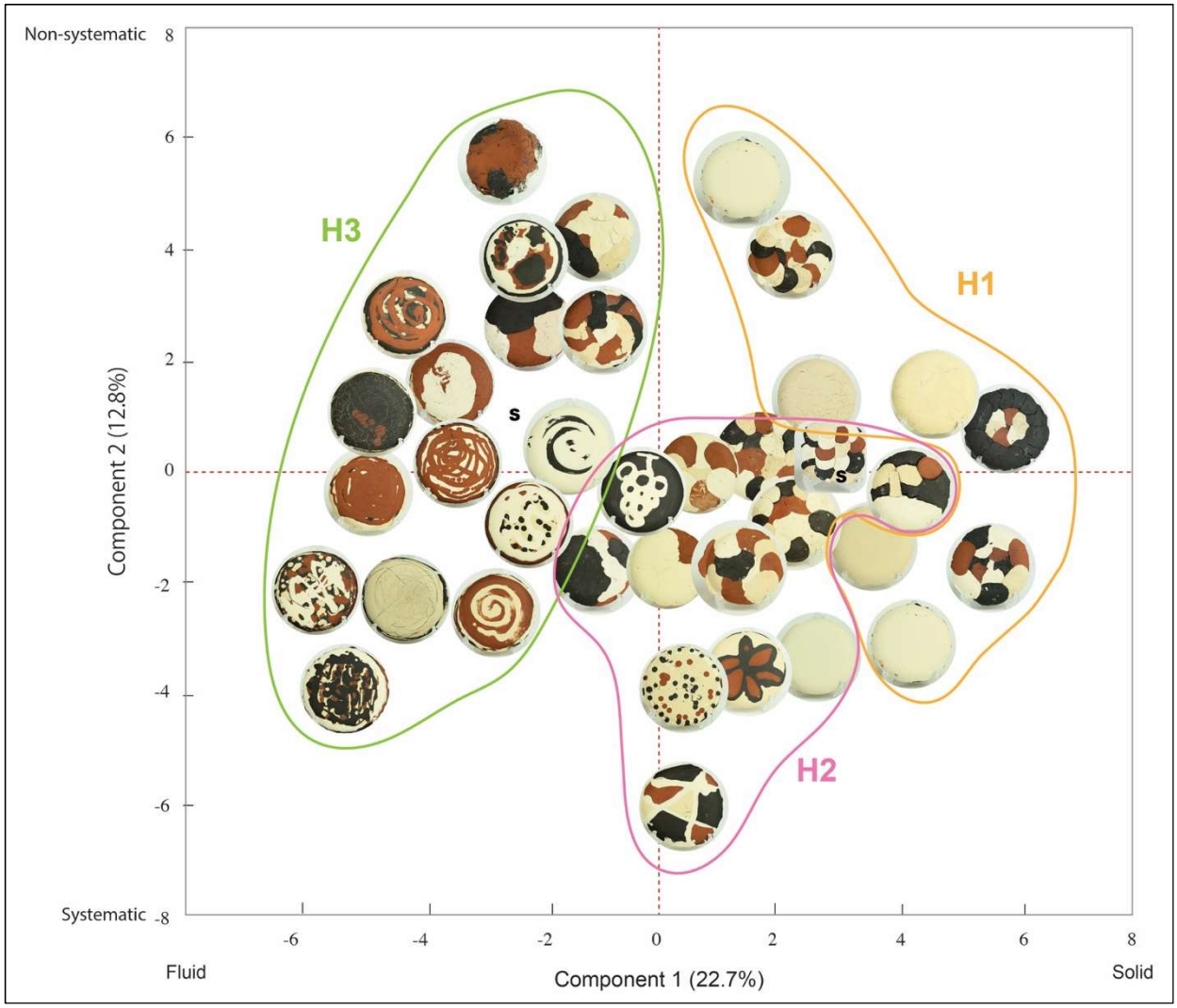


Figure 6.6 The Principal Component Analysis on Correlation of the hospital workshops participants' works grouped by Cluster Analysis (back-side)

6.3.3 Transitions of Moods Change

The study investigated the distinction of participants' moods transitions before and after the workshop's operations among three groups observed by POMS T scores the same as the previous experiment. Table 6.3 provides data about the mean values of six POMS scales before and after participating in the workshops compared in three groups and the difference of T scores subtraction. Also, the pre-post t-Test and the difference t-Test were observed. Student's paired t-Test observed the pre-post t-test in the group on each scale with a two-tailed distribution. Meanwhile, the Welch's t-Test with a one-tailed distribution was used to determine POMS T scores difference between groups due to different underlying populations.

Surprisingly, group H2, which is the repetitive structure, showing significant mood improvement on every scale, similarly to the laboratory experiment. Aside from the Vigor scale, the results present significant decreases (p<.05) on Tension-Anxiety, Depression-Dejection, Anger-Hostility, Fatigue, and Confusion. Figure 6.7 displays diagrams of participants' moods transitions from Table 6.3 information. Despite group H2, the graph shows that group H1 and H3 significantly decreased (p<.05) on Anger-Hostility and Fatigue.

Figure 6.8 provides the graph of mood change difference and shows that participants classified in group L2 showed significant Confusion decreasing (p<.05) stronger than L3. Except for the mood improvement, group H3 participants whose works were categorized in the fluid and uncertain structure characteristics had high negative emotions before attending the workshop tasks compared with another two groups. This result is also equivalent to the laboratory experiment group L2 the abstract and uncertain structure. However, they indicated a significant decrease in Anger-Hostility and Fatigue.

Table 6.3 Distinctions of POMS T scores Before-After the workshop operation and subtraction among three groups and overall

		POMS T scores Mean				Welch's t-Test of subtraction among groups	
POMS Scale	Group	Before (Pre)	After (Post)	Subtraction	Pre-Post t-Test		
Tension-Anxiety (T-A)	H1	40.00	37.38	-2.63	0.261	H1 H2	0.062
	H2	43.23	35.54	-7.69	0.006	H1 H3	0.442
	H3	48.18	45.12	-3.06	0.152	H2 H3	0.071
	All	44.76	40.21	-4.55	***0.001***		
Depression-Dejection (D)	H1	43.00	41.50	-1.50	0.170	H1 H2	0.280
	H2	42.85	40.46	-2.38	0.055	H1 H3	0.173
	H3	48.65	45.29	-3.35	0.060	H2 H3	0.316
	All	45.47	42.84	-2.63	***0.003***		
Anger-Hostility (A-H)	H1	41.75	39.25	-2.50	0.041	H1 H2	0.434
	H2	40.85	38.08	-2.77	0.047	H1 H3	0.290
	H3	43.18	39.82	-3.35	0.010	H2 H3	0.367
	All	42.08	39.11	-2.97	***0.000***		
Vigor (V)	H1	47.75	50.50	2.75	0.339	H1 H2	0.493
	H2	49.85	52.54	2.69	0.172	H1 H3	0.386
	H3	45.06	46.88	1.82	0.276	H2 H3	0.364
	All	47.26	49.58	2.32	0.039		
Fatigue (F)	H1	43.50	37.88	-5.63	0.050	H1 H2	0.395
	H2	42.92	36.38	-6.54	0.019	H1 H3	0.298
	H3	47.59	40.18	-7.41	***0.005***	H2 H3	0.397
	All	45.13	38.39	-6.74	***0.000***		
Confusion (C)	H1	48.13	46.75	-1.38	0.477	H1 H2	0.090
	H2	49.38	44.62	-4.77	0.011	H1 H3	0.256
	H3	52.65	53.06	0.41	0.836	H2 H3	*0.025*
	All	50.58	48.84	-1.74	0.135		

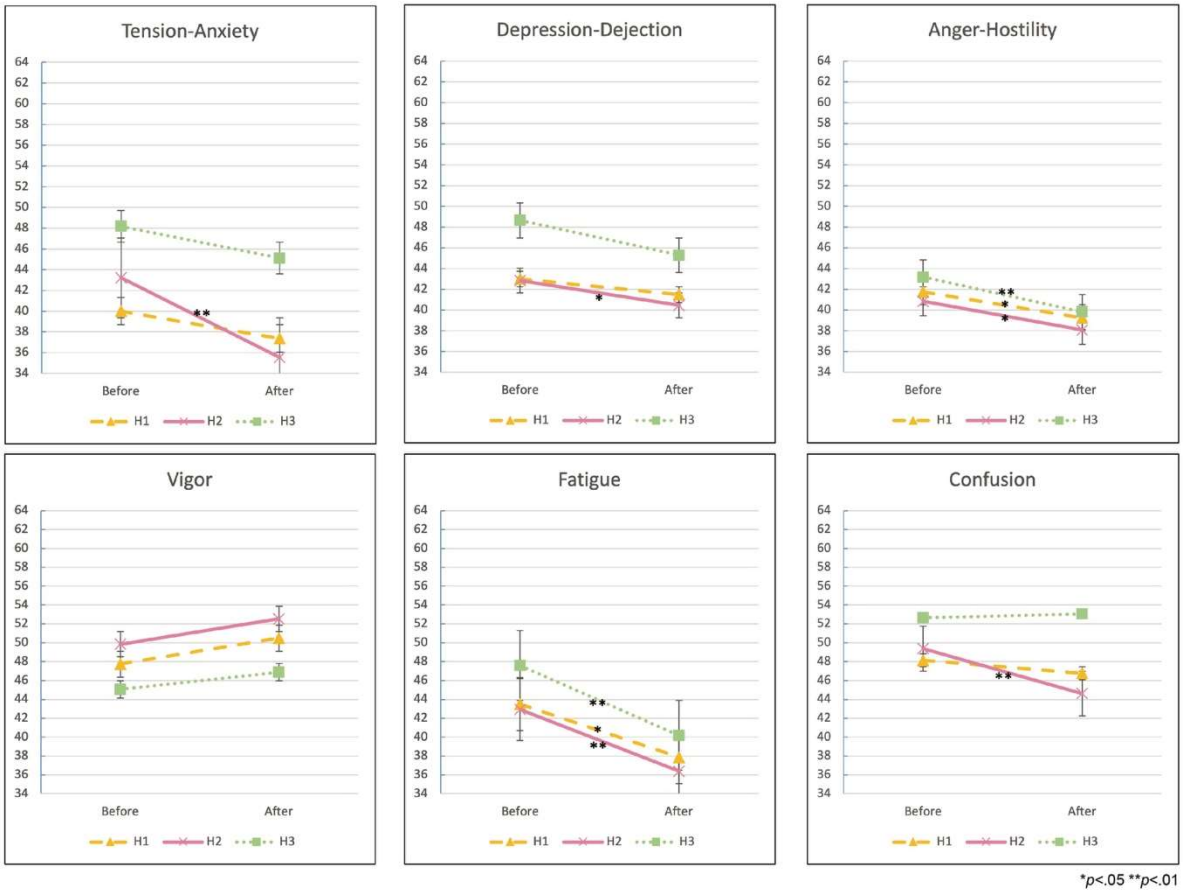


Figure 6.7 The hospital workshops participants' POMS transition before-after the workshop operation separated by six scales grouping by cluster analysis

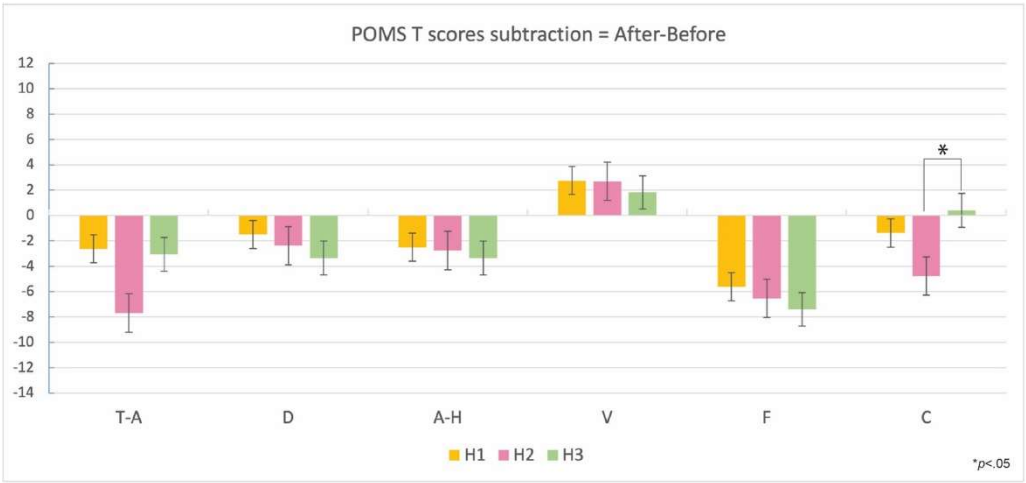


Figure 6.8 The hospital workshops participants' POMS mood change difference

Table 6.4 Summary of One-way ANOVA Analysis of Variance

One-way ANOVA Analysis of Variance						
Source	DF		Sum of Squares	Mean Square	F Ratio	p-value
Status	A-H	3	168.259	56.087	3.8546	0.018
	F	3	831.636	277.212	5.1176	0.005
Error	A-H	34	494.714	14.550		
	F	34	1841.732	54.169		
C. Total	A-H	37	662.974			
	F	37	2673.368			
Means for One-way ANOVA						
Level	Number		Mean	Std Error	Lower 95%	Upper 95%
Inpatient	A-H	8	-1.750	1.349	-4.491	0.991
	F	8	-2.750	2.602	-8.040	2.538
Medical Staff	A-H	8	-2.500	1.349	-5.241	0.241
	F	8	-13.000	2.602	-18.290	-7.712
Outpatient	A-H	14	-1.643	1.020	-3.715	0.429
	F	14	-2.786	1.967	-6.780	1.212
Visitor	A-H	8	-7.000	1.349	-9.741	-4.259
	F	8	-11.375	2.602	-16.660	-6.087

In addition, the One-way ANOVA Analysis of Variance was employed to compare mood change differences among the status. Table 6.4 summarizes the One-way ANOVA Analysis of Variance bivariate fit of mood scale by status, which pick up only significant two moods scale from six; A-H stands for Anger-Hostility, and F stands for Fatigue. Figure 6.9 visualizes the bivariate fit of the POMS A-H scale by status (Top) and F scale by status (Bottom). The data shows that visitors had a great decrease in Anger-Hostility compared with

another status. Medical staff and visitors had a lower decrease in Fatigue than patients with almost the same consequences.

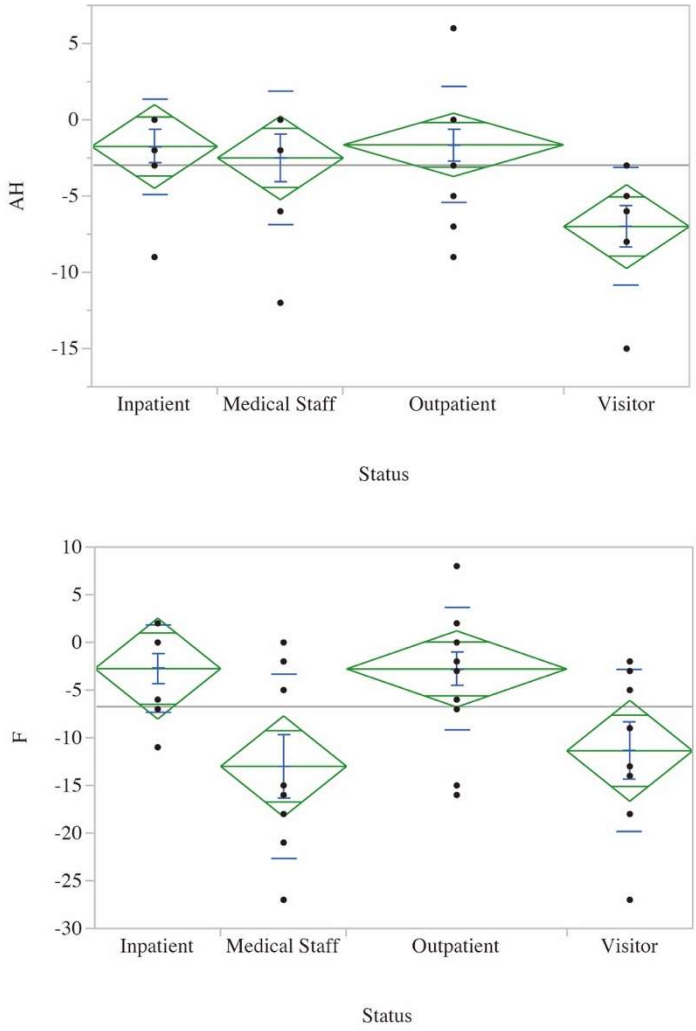


Figure 6.9 Bivariate fit of POMS A-H scale by status (Top) and F scale by status (Bottom)

6.3.4 Quantitative Content Analysis Results

The verbal expressions after workshops operations also were examined by Quantitative Content Analysis using KH-coder software to visualize the co-occurrence network of words, Jaccard similarity coefficient>=0.2. Same as previous evaluation, participants' content from the write-up examinations was observed after workshop operations, classified into three works' characters. However, the number of words was too small to illustrate the noteworthy network of words. Table 6.5 provides the co-occurrence network of words

summary values visualized on modularity. The results show extremely small nodes and edges (below 10) in high density. Therefore, the results from the text mining would not be taken into consideration.

Table 6.5 The co-occurrence network of words summary values of mentions after workshops

Group	Tokens	Types	Nodes	Edges	Density	Min. Jaccard
H1	108	65	6	5	0.333	0.2
H2	306	133	7	7	0.333	0.2
H3	335	137	5	4	0.4	0.2

6.3.5 Participants' perception of workshops

According to the previous experiment, the text mining analysis found the relationships between participant work's characters and the perception of making procedures. The evidence suggests that understanding the perceptions, such as preferring the planning process rather than the open technique, could help providers tailor the workshop procedure more accurately. That is, producers can choose the techniques that support specific preferences and eliminate the task that might obstruct amplifying the ceramic workshop performance. Therefore, participants' perception of workshops questionnaire was created.

The data was collected through eight interesting keywords that were picked up from the laboratory experiments: Expression, Imagine, Freedom, Hands, Expectation, Concentration, Enjoy, and Preciseness. The question investigates the thinking process that correlates with enjoyment, which is the important positive feeling in creative activities, also compares the perception of making procedures among work characters.

Table 6.6 provides the questionnaire analysis index including eight questions representing eight perception keywords used in Japanese. After finishing the POMS post-test, the participants were assigned to answer their perception of making ceramics by rating each question from "Could not do" to "Could do well."

Table 6.6 Analysis index of participants' perception of workshops questionnaire

Index Name	Question	Rating Scale				
		0	1	2	3	4
Expression	気分を作品に表現できた。 I could express my emotions through the work.	全く出来なかった could not do	少し出来なかった slightly could not do	まあまあ出来た Slightly could do	かなり出来た could do pretty well	非常に出来た could do well
Imagine	作りたい物のイメージを持ちながら作った。 I had an image of the work and stick to it while I am making.					
Freedom	自由に作れた。 I had freedom to make the work.					
Hands	手と指をよく動かして作った。 I well moved my hands and fingers while making.					
Expectation	思い通りに作れた。 I could make as I though.					
Concentration	作ることに集中できた。 I could focus on the tasks.					
Enjoy	楽しかった。 I enjoyed.					
Preciseness	正確に作れた。 I could do the work precisely.					

Following the study analysis basis, the mean values of each keyword were compared in three characters. Also, Welch's t-test with a one-tailed distribution of subtraction among groups was utilized to verify the reliability coefficient due to different underlying populations. Table 6.7 provides mean values of eight keywords classified into three groups, H1-H3, and t-test among the groups. Figure 6.10 presents the graph based on Table 6.7 data to visualize participants' perception distinction between three clusters. Group H2 was significantly higher in Expression than group H1 and higher in Freedom than group H3.

Table 6.7 Perception Keywords mean values

Index Name	Group	Mean	Welch's t-test	
Expression	H1	1.250	H1 H2	0.039
	H2	1.846	H1 H3	0.097
	H3	1.765	H2 H3	0.408
Imagine	H1	1.250	H1 H2	0.294
	H2	1.462	H1 H3	0.348
	H3	1.412	H2 H3	0.442
Freedom	H1	2.625	H1 H2	0.179
	H2	3.000	H1 H3	0.186
	H3	2.235	H2 H3	0.051
Hands	H1	2.750	H1 H2	0.385
	H2	2.615	H1 H3	0.118
	H3	2.176	H2 H3	0.136
Expectation	H1	2.375	H1 H2	0.069
	H2	1.769	H1 H3	0.210
	H3	2.000	H2 H3	0.274
Concentration	H1	2.625	H1 H2	0.207
	H2	2.923	H1 H3	0.351
	H3	2.471	H2 H3	0.123
Enjoy	H1	2.875	H1 H2	0.087
	H2	3.462	H1 H3	0.493
	H3	2.882	H2 H3	0.091
Preciseness	H1	1.750	H1 H2	0.322
	H2	1.923	H1 H3	0.394
	H3	1.647	H2 H3	0.283

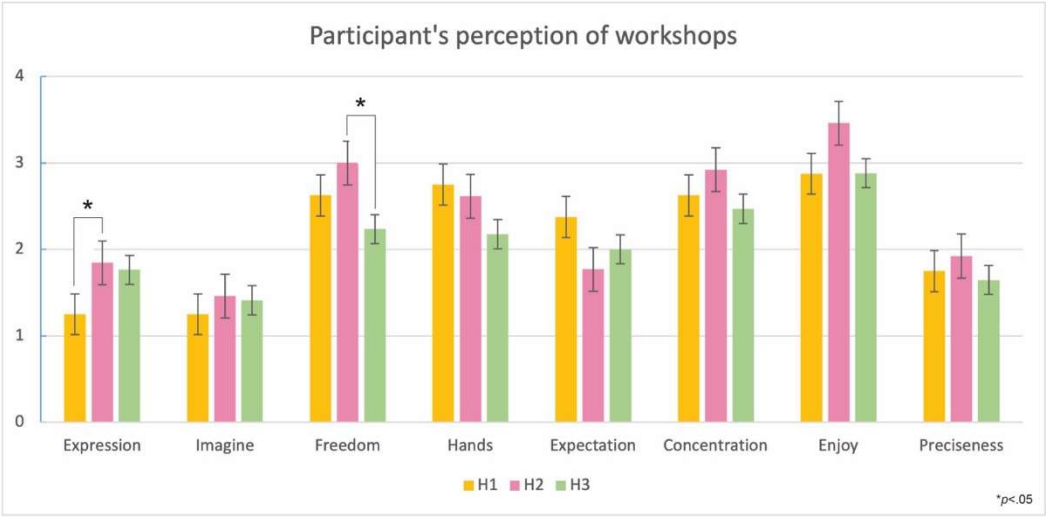


Figure 6.10 The hospital participants' perception of workshops

Moreover, the same data collection was analyzed by multivariate pairwise correlations using JMP software to investigate the correlation between eight keywords then create the correlation structure to observe participants' thinking processes under the developed ceramic

methods. Table 6.8 presented provides data about multivariate pairwise correlations results of eight keywords. The strong correlation pair (correlation>0.5) with a significant reliability coefficient (*p*.05) were considered to create the structural equation modeling (SEM) shown in Figure 6.11.

Table 6.8 Multivariate Pairwise Correlations Results

Variable	by Variable	Correlation	Count	Lower 95%	Upper 95%	p-value
Imagine	Expression	0.421	38	0.1174	0.653	***0.0084***
Freedom	Expression	0.420	38	0.1164	0.652	***0.0086***
Freedom	Imagine	0.131	38	-0.1973	0.432	0.4343
Hands	**Expression**	**0.555**	38	0.2855	0.743	***0.0003***
Hands	Imagine	0.362	38	0.0477	0.611	*0.0256*
Hands	**Freedom**	**0.586**	38	0.3273	0.763	***0.0001***
Expectation	Expression	0.449	38	0.1504	0.672	***0.0047***
Expectation	Imagine	0.360	38	0.0454	0.609	***0.0265***
Expectation	Freedom	0.444	38	0.1449	0.669	***0.0052***
Expectation	**Hands**	**0.726**	38	0.5293	0.849	***<.0001***
Concentration	Expression	0.355	38	0.0399	0.606	***0.0287***
Concentration	Imagine	0.206	38	-0.1217	0.493	0.2146
Concentration	**Freedom**	**0.585**	38	0.3269	0.762	***0.0001***
Concentration	**Hands**	**0.631**	38	0.3902	0.791	***<.0001***
Concentration	Expectation	0.472	38	0.1796	0.688	***0.0028***
Enjoy	Expression	0.499	38	0.213	0.706	***0.0014***
Enjoy	Imagine	0.258	38	-0.0678	0.533	0.1186
Enjoy	**Freedom**	**0.727**	38	0.53	0.849	***<.0001***
Enjoy	**Hands**	**0.636**	38	0.3973	0.794	***<.0001***
Enjoy	Expectation	0.316	38	-0.0042	0.577	0.0533
Enjoy	**Concentration**	**0.684**	38	0.4657	0.823	***<.0001***
Preciseness	**Expression**	**0.579**	38	0.3184	0.758	***0.0001***
Preciseness	**Imagine**	**0.517**	38	0.2363	0.718	***0.0009***
Preciseness	Freedom	0.254	38	-0.0717	0.530	0.1242
Preciseness	Hands	0.426	38	0.1234	0.657	***0.0076***
Preciseness	Expectation	0.325	38	0.0054	0.584	***0.0468***
Preciseness	Concentration	0.314	38	-0.0059	0.576	0.0546
Preciseness	Enjoy	0.404	38	0.097	0.641	***0.0119***

Regarding the enjoyment, the structure presents Enjoy has direct effects on Freedom (0.419) and Concentration (0.556) shown in Table 6.10. Also, it shows indirect effects with Hands (0.654). Notably, the keywords that indicate deliberate, such as Imagine, Preciseness, Expectation, do not directly correlate to Enjoy, but they show pathways through Hands to Enjoy. In brief, hand movement was the intermediate between inner thought and enjoyment.

Table 6.9 Regression Weights

			Estimate	S.E.	C.R.	P Values
Preciseness	<---	Imagine	0.56	0.226	2.477	0.013
Expression	<---	Preciseness	0.409	0.128	3.199	0.001
Hands	<---	Express	0.615	0.19	3.232	0.001
Freedom	<---	Hands	0.743	0.165	4.496	***
Concentration	<---	Hands	0.631	0.135	4.681	***
Enjoyment	<---	Concentration	0.407	0.118	3.447	***
Expectation	<---	Hands	0.729	0.121	6.031	***
Enjoyment	<---	Freedom	0.46	0.1	4.575	***

Table 6.10 Standardized Direct and Indirect Effects

Standardized Direct Effects						
	Imagine	**Preciseness**	**Express**	**Hands**	**Concentration**	**Freedom**
Preciseness	0.418	0	0	0	0	0
Expression	0	0.513	0	0	0	0
Hands	0	0	0.517	0	0	0
Concentration	0	0	0	0.67	0	0
Freedom	0	0	0	0.671	0	0
Expectation	0	0	0	0.777	0	0
Enjoyment	0	0	0	0	0.419	0.556
Standardized Indirect Effects						
	Imagine	**Preciseness**	**Express**	**Hands**	**Concentration**	**Freedom**
Preciseness	0	0	0	0	0	0
Expression	0.215	0	0	0	0	0
Hands	0.111	0.266	0	0	0	0
Concentration	0.074	0.178	0.347	0	0	0
Freedom	0.075	0.178	0.347	0	0	0
Expectation	0.086	0.206	0.402	0	0	0
Enjoyment	0.073	0.174	0.338	0.654	0	0

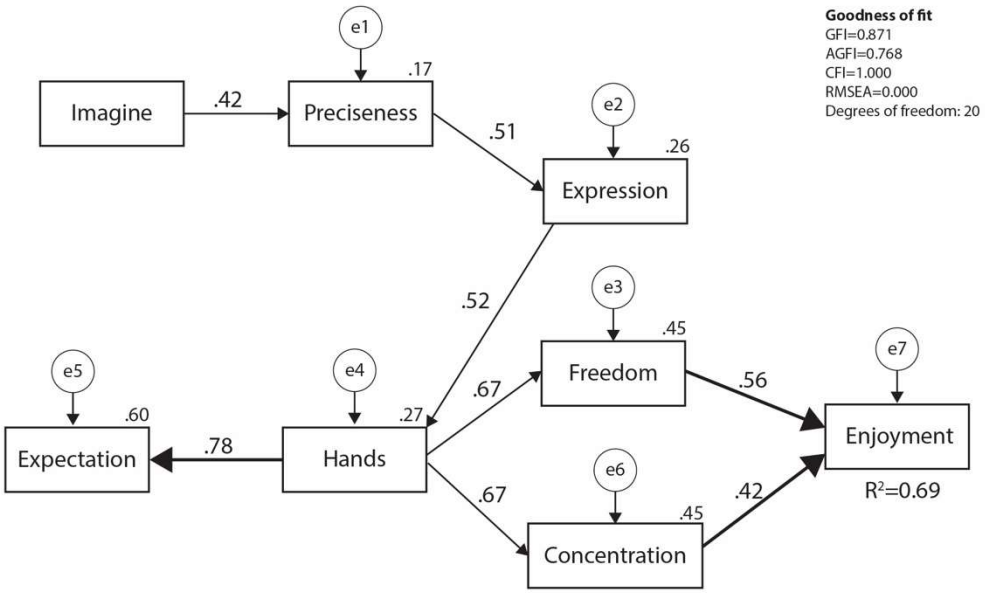


Figure 6.11 The structural equation modeling

In addition, the One-way ANOVA Analysis of Variance was employed to compare perception keywords differences among the status. Table 6.11 summarizes the One-way ANOVA Analysis of Variance bivariate fit of keywords by status, which pick up only two significant variables from eight: Hands and Preciseness. Figure 6.12 visualizes the bivariate fit of the Hands by status (Top) and Preciseness by status (Bottom). The data shows that medical staff has the highest feeling that they moved hands and fingers well, the following was visitors, which is assumably results comparing the movement of healthy subjects with patients. Medical staff were also obviously most capable in terms of the ability to do the work precisely.

Table 6.11 Summary of bivariate fit on the One-way ANOVA Analysis of Variance

One-way ANOVA Analysis of Variance						
Source	DF		Sum of Squares	Mean Square	F Ratio	p-value
Status	Hands	3	12.216	4.072	4.4405	0.010
	Preciseness	3	12.261	4.087	3.599	0.023
Error	Hands	34	31.179	0.917		
	Preciseness	34	38.607	1.136		
C. Total	Hands	37	43.395			
	Preciseness	37	50.868			

Means for One-way ANOVA						
Level	Number		Mean	Std Error	Lower 95%	Upper 95%
Inpatient	Hands	8	2.125	0.339	1.437	2.813
	Preciseness	8	1.125	0.377	0.359	1.891
Medical Staff	Hands	8	3.375	0.339	2.687	4.063
	Preciseness	8	2.750	0.377	1.984	3.516
Outpatient	Hands	14	1.929	0.256	1.409	2.449
	Preciseness	14	1.786	0.285	1.207	2.365
Visitor	Hands	8	2.750	0.339	2.062	3.438
	Preciseness	8	1.375	0.377	0.609	2.141

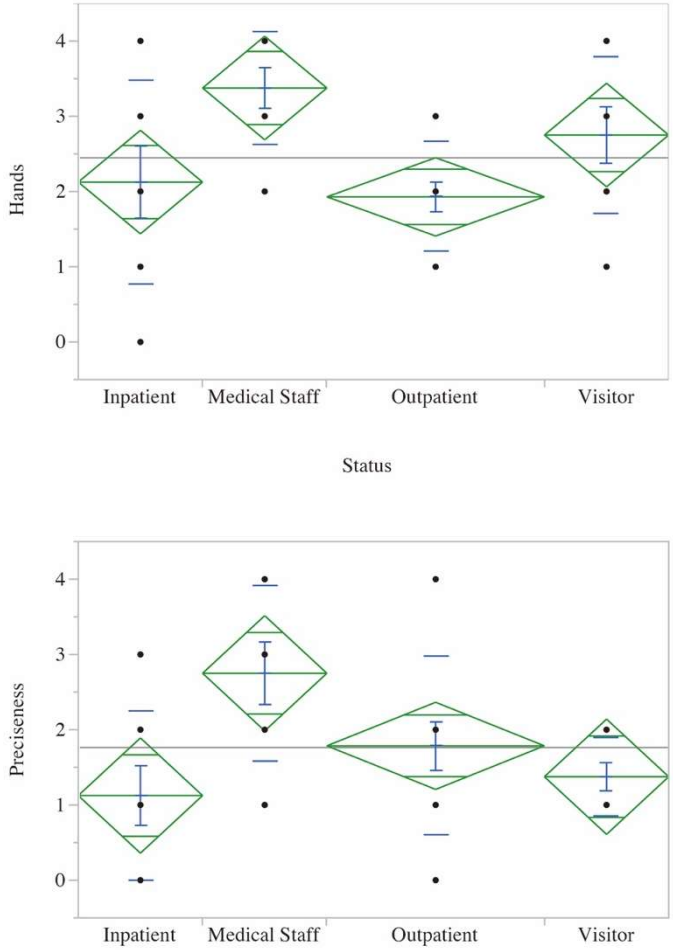


Figure 6.12 Bivariate fit of Hands by status (Top) and Preciseness by status (Bottom)

6.3.6 Examinations after receiving the finished ceramic works

Same as the laboratory experiments, write-up comments after receiving fired works were used to observe verbal reactions after participants saw the finished ceramic works. Moreover, a rating questionnaire was created to examine participants' perceptions after receiving their finished ceramic works. The keywords selection was like the participants' perception of the workshop's questionnaire. Table 6.12 provides the data index that was collected through eight interesting keywords: Feeling better, Waiting, Reminding, Remember, Preciseness, Satisfaction, Contrary to expectation, and Interest. The questions investigate the

feeling that correlates with memories, expectation, and positive feeling after seeing ceramic works that changed their look from the day they were made.

Table 6.12 Data index of participants' perceptions after receiving the finished ceramic works' questionnaire.

Index Name	Question	Rating Scale				
		0	1	2	3	4
Feeling better	作品を見て気分が晴れた。 I felt better after seeing the work.	まったく思わない I do not think so	少し思う I think a bit	まあまあ思う I think so	かなり思う I am pretty sure	非常に強く思う Exactly
Waiting	作品が届くのがまちどうしかった。 I was waiting for the delivery of my ceramic work.					
Reminding	作っている時を思い出す。 I reminded to participating moment.					
Remember	作った作品よく覚える。 I well remember a ceramic work that I made.					
Preciseness	思い通りの作品ができた。 The finish work looks as I though.					
Satisfaction	満足した。 I satisfied the result.					
Contrary to expectation	完成イメージと違っていた。 Finished look is unexpected.					
Interest	またやりたい。 I want to join the workshops again.					

After the exhibition, the participants' works were shipped via parcel with the last questionnaire. We requested participants to reply to the answer form by postal mail. 34.8% (N=15) of participants send back the last questionnaire. Table 6.13 shows the number of received answer papers separated by groups and status. Group H2 was the highest percentage of answering, 61.5%. Meanwhile, only one person from eight participants in Group H1 gave feedback. Moreover, the reply numbers were not significantly different in status.

Because of the small number of answers made the number of words was too small to illustrate the noteworthy network of words same as the write-up comment collection after engaging in the workshops. Furthermore, the difference number among groups is too strong

to be compared in logical analysis. For these reasons, the comment questionnaires were not an effective data collection method for the hospital participants

Table 6.13 The number of accepted answer papers separated by groups and status

Characteristic Groups	Number of subjects	Replied Feedback				Total by Groups
		Inpatient	Outpatient	Medical Staff	Visitor	
H1	8	0	0	1		1
H2	13	0	2	3	3	8
H3	17	3	2	0	1	6
Total	38	3	4	4	4	15

However, Table 6.14 presents participants who returned the questionnaire have a high rated interest in participating in the workshop again (avg. 3.20.) through the participants' perception of the workshop's questionnaire. Also, they have a high rated in 'Reminding' (avg. 3.20) and a low rated in 'Preciseness' (avg. 1.33.) Moreover, group H2 have significant lower rated in 'Contrary to expectation' than group H3, which is shown in Table 6.15.

Table 6.14 Rating questionnaire after receiving finished work results in average

	Feeling better	Waiting	Reminding	Remember	Preciseness	Satisfaction	Contrary to expectation	Interest
H1 1 Subject	1	2	4	3	0	1	2	4
H2 8 Subjects	2.63	2.50	3.38	2.38	1.38	2.25	1.50	3.00
H3 6 Subjects	2.50	2.33	2.83	2.50	1.50	2.83	2.83	3.33
Overall 15 Subjects	2.47	2.40	**3.20**	2.47	1.33	2.40	2.07	**3.20**

Table 6.15 Comparison of rating questionnaire after receiving finished work results in group H2 and H3

Index Name	Group	Mean	Welch's t-test	
Feeling better	H2	2.63		
	H3	2.50	H2 H3	0.426
Waiting	H2	2.50		
	H3	2.33	H2 H3	0.337
Reminding	H2	3.38		
	H3	2.83	H2 H3	0.174
Remember	H2	2.38		
	H3	2.50	H2 H3	0.433
Preciseness	H2	1.38		
	H3	1.50	H2 H3	0.410
Satisfaction	H2	2.25		
	H3	2.83	H2 H3	0.196
Contrary to expectation	H2	1.50		
	H3	2.83	H2 H3	0.022
Interest	H2	3.00		
	H3	3.33	H2 H3	0.260

6.4 Discussion

Based on the main purpose of the investigation, this experiment also focuses on three main points among the group, the quality of mood improvement, the main characteristics, and the making methods, plus the perception of ceramic making under the developed method—discussion sequences from the best mental improvement to the least progress. Unfortunately, the observation could not collect enough text mining results to verify participants' mentions after the making tasks and after receiving the final products. Also, after delivering the finished ceramics, the rating scale feedback questionnaire lacked the appropriate number of returns. Therefore, the discussion focuses mainly on the cluster analysis with principal component analysis, POMS T score transitions, and correlation analysis of participants' perception of making processes.

The overall results indicate that The Chokotto Tougei Time workshop's participants significantly improved moods in five POMS scales despite the 'Confuse' scale. Nevertheless, Group H2: The repetitive structure was the best significantly emotion improved after the operation, which decreased in 'Tension-Anxiety,' Depression-Dejection,' Anger-Hostility,' Fatigue,' and 'Confuse.' The character and structure are shown through the fluidity pictured

between the Fluid and Solid component axis and the duplicative marks, whatever the techniques were used. The evidence indicates that group H2 did not specify the design before starting but continued making repetitive random actions. The result is comparable to the laboratory experiment that shows the participants who do not have a prior plan and expectation showed the greatest emotion improvement under the workshop's making processes. These visions relate to the rating scale feedback questionnaire after the operation. H2 participants mentioned more freedom to make and could express themselves than the other two groups. Moreover, stamping works was the greatest population in the group relating to the Stamping mentioning in Co-occurrence network of words of group L2 from the previous study.

The other similar outcome of the preliminary experiment and the actual workshop was that participants who created abstract characters with uncertain structure had high negative POMS T scores before the workshop; group H3 and L3. However, the actual workshop H3 group significantly improved on two negative mood scales, Anger-Hostility and Fatigue. Meanwhile, the concrete character is shown less in the actual workshop but instead presented through the solid art elements (group H1), which significantly decreased Anger-Hostility and Fatigue as group H3.

As mentioned before, groups H1 and H3 performed similarly therapeutic results. However, the techniques used are different. Group H1 includes the same ratio between Hand Pressing and Stamping but does not include any Slip Trailing task works. Meanwhile, in Group H3, most were from the Slip Trailing technique. This indicated that participants with a concrete character prefer using Hand Pressing or Stamping, which influence Anger-Hostility and Fatigue decreasing after the workshop. While Slip Trailing could influence Anger-Hostility and Fatigue decreasing in participants who made fluid and uncertain structure. However, both were not the best performance for the hospitals' participants.

Regarding the text mining evaluation, missing words amount show that the comments questionnaire was not appropriate for data collection in hospital participants but creating a

rating questionnaire helped researchers collect participants' perceptions through selected keywords. Participants' perception of the workshop procedures did not show the importance of different mean values in eight keywords among three different forming techniques. Regardless, participants who created the repetitive structure significantly felt more expression than the concrete group and more freedom than the abstract group. Regarding the bivariate fit analysis of perception keywords by status, medical staff and visitors have felt that they moved hands and fingers more than patients, presumably outcomes of ceramic making requiring physical movements. However, this point suggests that future ceramics workshops for patients should consider the procedures that more support physically weaker people to enjoy the art activities with a physical component. On the other hand, medical staff also showed in the feedback the highest ability to do the work precisely and lowest to decrease on Fatigue. The developed ceramic program might be appropriate for physically healthy adults who want to release tiredness.

In addition, studying the participants' perception of the workshop procedures could suggest interesting cognitive processes and actions that contribute to enjoyment in ceramic activities. The information can be used in future workshops design and studies, which help providers to scope important factors that influence target feelings. According to the Chokotto Tougei Time program's results, the structural equation modeling presented freedom and concentration significantly directly affect enjoyment in the workshops. Moreover, hand movement significantly has indirect effects on the enjoyment that transmit through freedom and concentration. In brief, creating enjoyment in ceramic workshops should select hand movement engaged methods that give participants the freedom and encourage their concentration.

After receiving the finished ceramic works, it was not easy to collect complete data by requesting participants to send back the feedback via postal mail. Therefore, the results could not be analyzed successfully. However, among participants who give feedback, the repetitive structure group has significantly low expectations of the final results than the abstract group.

This result is similar to the university experiment that showed the great emotional improvement group focuses on making moments rather than planning and expecting the final looks. Due to ceramic processes needing over two to three weeks to finish the final products, artworks need to be returned after the workshops by a month later. Therefore, collecting feedback is appropriate for exclusive activities, such as a university or continued clinical cases, where providers can return artworks to them directly and observe their reaction right after that.

In contrast, the Chokotto Tougei Time program was a one-day open art activity. The feedback replying was also voluntary. Therefore, answering questionnaires by postal was difficult to intend. However, the result indicated that participants who returned the feedback were interested in participating in the workshops, which shows that studying feelings after receiving finished works in ceramic activities should be conducted in the long program group.

6.5 Conclusion

The Chokotto Tougei Time program verifies specific ceramic processes and mood change relationships through the actual samples in the hospital. The program employed and developed forming procedures from the laboratory experiment to perform in the real setting with the random people in the hospital. Investigations verified that the program could influence participants to positive mental development even if the method desired not to touch the clay directly and protect participants and setting from dirt following the cleanliness policy.

The investigation considered in differences POMS transitions in artwork characters then investigate the main techniques in each group instead of comparing the psychological results in techniques alone. The cluster and principal component analyses classified artworks into three groups: the main features, Solid and Concrete, Repetitive Structure, and Fluid and Abstract. The crucial techniques populations are shown quite notably in each character. The Concrete group used Hand Building and Stamping, not including any Slip Trailing. The repetitive structure group included all techniques, but Stamping was the majority. Last, the Abstract character was primarily made by Slip Trailing, and also had all techniques. The result

is the primary idea that different techniques influence both works' appearance and mental effect.

The workshop performed the best in participants who appreciated doing simple repetitive actions with clay rather than creating solid looks or abstract art shown in the repetitive structure group's results. According to the participants' status in three groups, the program tends to be appropriate for releasing exhaustion and irritation in adults who commit some physical action rather than inpatients whom difficulty might have engaging with physical moves due to the workshops performed therapeutic improvement better in medical staff and visitors. The workshop emphasized the workshop's design goal to produce the most basic therapeutic ceramics art activity plan that opens for any level of prior experience due to the neutral character of the most significant subjects.

However, participants who did the concrete and abstract characters significantly improved some negative mood on the same scale, 'Anger-Hostility' and 'fatigue'. Unlike the laboratory experiment that showed the method did not suit participants who prefer to create abstract works shown in the group did not have significant POMS's positive emotions improvement. The technique variation might cause this argument because hospital participants who did the fluid characters used Slip Trailing, which naturally influences abstract features through the fluid material. Hand Pressing did not show significant performance in the hospital workshop, probably because participants did not have strong images and designs that needed flexibility and controllability as in hand-building methods like design students.

The data collection reflected that using write-up comments to collect verbal information in open sessions like the hospital was the inappropriate method. Participants might be uncomfortable expressing their though or taking time to write down answers for the non-profit activities or non-clinical treatments. Also, weak patients difficult to write by themselves. Rating scale questionnaires could collect information better. However, keyword selecting is important. This study picked up keywords from the laboratory experiment results, which were conducted in small subjects. The selected keyword might not strong enough to cover all thinking and

actions in ceramic making. The factor analysis should be conducted to scope appropriate keywords that would be used to study participants' perceptions of the workshop procedures in future research.

Unfortunately, the feedback could not be successfully collected after receiving the works questionnaire, probably because works were delivered via parcel after they were exhibited and requesting all participants to send back the questionnaire was difficult. This is also the problem of collecting the data of reactions after firing in open session workshops. However, reactions after seeing the finished ceramic works are special moments that make ceramics different from other visual art. Therefore, this point of study should be improved.

Chapter7: The Future Possibility of Ceramic Workshops as Social Art Activities

7.1 The participatory art program concept

The workshop design focuses on simplified pottery techniques and staff duties. The plans are to make a pottery workshop which can be held in a hospital environment without studio equipment required and to reduce the quantity of expert potter skill staff in the workshop. Meanwhile, the therapeutic potential must be contained. This workshop does not put a limit on making pottery but also includes conducting an exhibition. As mentioned before, social support from the region is essential for participatory design. In fact, the medical area is a part of society. However, it was thought to be unusual because it relates to unpleasant events that affect the human mind [森口 ゆたか, 山口(中上) 悦子 , 2014].

For this reason, to decrease anxiety in people in a medical environment, arts were utilized to improve the unusual atmosphere and to make it feel like a daily life environment. Therefore, community cooperation takes a role in hospital art [蓮見, 2009]. The previous article also presented that the negative moods reduction in hospitals should be not limited in patients but also the medical staff. Helping employee to reduce stress and burnout relates to doctors and nurses' performance (White, 2013).

Crossing over to the field of studies to the digital business research area. The mobility workspace idea has been a trend for decades when they recognize that the traditional office might not the most efficient way. The previous study focused on improving the working method that suits younger generations involved with their productivity. The study shows the changes in working procedures associated with flexibility and productivity (Heck, 2010) It represents that they do not have a perfect way to suit every situation, place, culture, or even generation. Hence, a flexible procedure that can adapt to several environments tends to improve productivity.

As mentioned before, the actual workshop was conducted at Fukui-Ken Saiseikai hospital, Fukui prefecture, Japan. Nishio laboratory of the Fukui University of Technology has cooperated with Fukui-Ken Saiseikai Hospital to produce art workshops and activities since 2013. Several hospital art programs were conducted to improve the hospital's environment also encourage human relationships in the hospital community by using participatory design. Previous studies employed visual arts techniques and design in workshops such as paper collage, stamping, and crafting [畠中, 2014]. However, natural clay work has never utilized. Therefore, this study intended to employ participatory design in art activity planning and to explore alternative methods to conduct an Art and Design program in a hospital.

This study integrated community cooperation and the mobility workspace idea to improve the pottery program for the hospital. In respect to the traditional studio technique and industrial ceramic craft production, we specified three main dimensions for the “Chokotto Tougei Time” workshop; flexibility to manipulate, the sense of daily life, and efficiency to develop participants' mood as an expression space in the hospital environment.

Flexibility

The entire workshop procedures were designed so that support staff who do not have prior experience in ceramic making could take part. It should be possible for the workshop to be held without special provisions from the hospital. Figure 7.1 shows the workshop management framework that presents the cooperation between the pottery studio representing professionals, the university representing the community, and the hospital.

Besides devising the procedure of making, the author was set as a pottery studio to take responsibility for materials, equipment preparation, ceramic techniques training, and firing processes. The academic section represented the communication connectors that joined the cooperative activity, including the professor who has held art workshops in the Fukui-ken

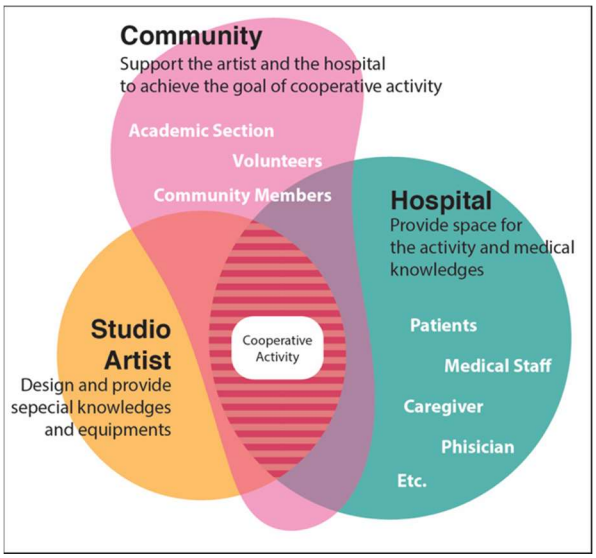


Figure 7.1 The “Chokotto Tougei Time” Participatory Design

Saiseikai Hospital and volunteer students from the design department of the Fukui University of Technology. We devised the structure of the pottery workshop so that it is comparable to traditional studio settings (Table 7.1 shown in page 158-160). However, the procedure had separated the fieldwork from the back end. By this we mean that we removed special equipment such as a kiln, pottery wheel, and washing space from the fieldwork.

Table 7.1 Comparison of the traditional pottery studio workshop procedures and “Chokotto Tougei Time” workshop procedures

		Traditional				**Chokotto Tougei Time**			
Track		**Responsible Man**	**Place**	**Necessary Equipment**		**Responsible Man**		**Place**	**Necessary Equipment**
						Member	**Amount/Day**		
1	Workshop Design	**Artists or therapists (who has experiences in pottery making and hospital art program)**	N/A	N/A	1	-Artist -Specialist -Hospital	1 1 2	N/A	N/A
2	Promoting	**N/A**	N/A	N/A	2	Hospital Staff	N/A	Hospital	-Poster -Flyer -Local Media (Newspaper and website)
3	Material Preparing	**Artists or Therapists (who has experiences**	Studio	-Clay -The other material depends on	3	Artist	1	Studio	All standard pottery studio equipment,

		Traditional				Chokotto Tougei Time			
Track		Responsible Man	Place	Necessary Equipment		Responsible Man		Place	Necessary Equipment
						Member	Amount/Day		
		in pottery making and hospital art program)		the technique such as colors for painting or glaze					Cleaning, and Washing Space should be required
4	Workspace Preparing			-Tables -Chairs -Cleaning and Washing Space -The other equipment depends on the technique such as potter wheel or mold	4	Hospital Staff	2	Hospital	-Tables -Chairs
5	Staff Training		Artist Studio or Art and Craft Academia	All standard pottery studio equipment, Cleaning, and Washing Space should be required	5	-Artist -Specialist -Volunteers	1 1 10	Studio	-Clay -Chokotto Tougei Plaster Mold -Decorating tools depends on technique -Nitrile Glove
6	Workshop Setting		Studio or specific setting	All standard pottery studio equipment, Cleaning, and Washing Space maybe have to require depends on the forming and decorating technique	6	-Artist -Volunteers -Hospital Staff	1 3 1-2	Hospital (not require a specific area)	-Tables -Chairs -Clay -Chokotto Tougei Plaster Mold -Decorating tools depends on technique -Nitrile Glove
7	Workshop Conducting				7	-Artist or Specialist -Volunteers -Hospital Staff	1 3 1-2		
8	Observation	**Therapists or Medical Staff**		-questionnaire or another maturing tools	8				-Chokotto Tougei questionnaire
9	Firing	**Artists or Therapists (who have experience in pottery making)**		Kiln	9	-Artist	1	Studio	Kiln
10	Exhibition	**N/A**	N/A	N/A	10	-Artist	1 2-3 1	Hospital	-Poster

		Traditional				Chokotto Tougei Time			
Track		Responsible Man	Place	Necessary Equipment		Responsible Man		Place	Necessary Equipment
						Member	Amount/Day		
						-Volunteers -Hospital Staff			-Exhibition Space and stand -Local Media (Newspaper and website)
11	Deliver	**Artists or Therapists**	Studio or specific setting	N/A	11	-Artist -Specialist -Volunteers	1 1 1	N/A	-Delivery Company

The Chokotto Tougei Time's techniques and procedures establish a mobility pottery workshop design that accomplished the primary purpose. First, flexibility against the traditional way, the hospital could conduct a pottery workshop that operates with or without an expert potter on the set, and the hospital does not need to necessarily invest in pottery studio equipment.

Sense of daily life

The workshops were conducted in the hospital's open space. Attendees were surrounded by the community ambiance and work together with other attendees to connect them to the sense of daily life. Pottery clay, which is natural clay material, was used as a medium to connect participants with a sense of nature.

According to 'Ikigai,' the Japanese philosophy of being is significantly connected to their daily life. The word 'Ikigai' is defined as the value of living or living's worth. Garcia emphasized in his 'Ikigai' book that a key to Japanese longevity involved living among nature, being rich in social communication, and using hands in daily activities (Héctor García and Francesc Miralles, 2017).

Likewise, Hasumi mentioned that employing handmade art activities in the hospital encourages a sense of ordinary life in people in the hospital [蓮見, 2009], and Lambert

suggested that hand movements contribute to mental health at the neurological level. Tasks of work or making something tend to awake a sense of daily life that we work and communicate surrounded by nature (Lambert K. , 2008). The moist stage of clay during forming and the changing of substances after the firing process allows appreciation of the reality of nature (Henley, 2002). Above all, the pottery making was utilized to encourage the hands' movement. Thus, this study suggests an alternative direction to enhance the sense of daily life in a hospital through the pottery workshop.

7.1.1 The mobility of the pottery workshop

The workshop could successfully follow the specified principle. The workshop could operate without special provisions from the hospital and could operate with or without an expert potter (Table 7.2.) There was not an accident that injures participants or gives damage to the hospital property. Also, people in the area are not disturbed by the workshop operation. After the exhibition, attendees' artworks were not damaged because they were delivered from the hospital to the kiln; afterward, they were fired then delivered to participants via post. Workshop space-changing in the last session increased the number of first session participants, while space-changing does not affect the workshop's procedures.

Table 7.2 Chokotto Tougei Time" staff attendance and number of participants

Date	Section	Professional Potter	Academic Experts	Medical Staff	Volunteer Students	Total Staff	Participants
9/8/2019	Hand Pressing	0	1	1	3	5	10
13/8/2019	Stamping	1	1	1	3	6	13
14/8/2019	Slip Trailing	1	1	1	4	7	18

7.2 The Exhibition

The exhibition was conducted on November 26-December 4, 2019, at Fukui-Ken Saiseikai Hospital. The hospital provided the activity space located at the main entrance called "The piano hall" to exhibit participants' work. The selection decided on the highest traffic area

to attracted customers' attention. The exhibition operating time was following the hospital office time. It started at 8 a.m. until 5 p.m. and closed on Saturday and Sunday. The author referenced a Japanese rock garden in the exhibition theme to make it easy to understand for an ordinary Japanese audience, which was agreed by the team. Participants' works were displayed on the stands comprising three levels representing the rock garden element: sand, water, and rock. The stands were designed to present all sides of workpieces, a three-dimensional work, as much as we could. Workpieces were placed on the first level transparent acrylic plate. The space between each work was surrounded by raked sand. Mirror acrylic plates, set on the second level, reflected the bottom of the work. Patterns of raked sand represent ripples and reflection on the water. The bottom level was a rack of gravels and rocks collected from the regional area. Stand height was designed lower than general, to give easy access to various types of people, even wheelchair users (Figure 7.2-7.3.)

Exhibition posters and postcards were designed to promote the event and invite participants via post mail (Figure 7.4) and the author simplified the pottery processes that were applied in the workshops into information posters for everyday people (Figure 7.5.) The posters were sampled in A4 size shown in Appendix 8-12.

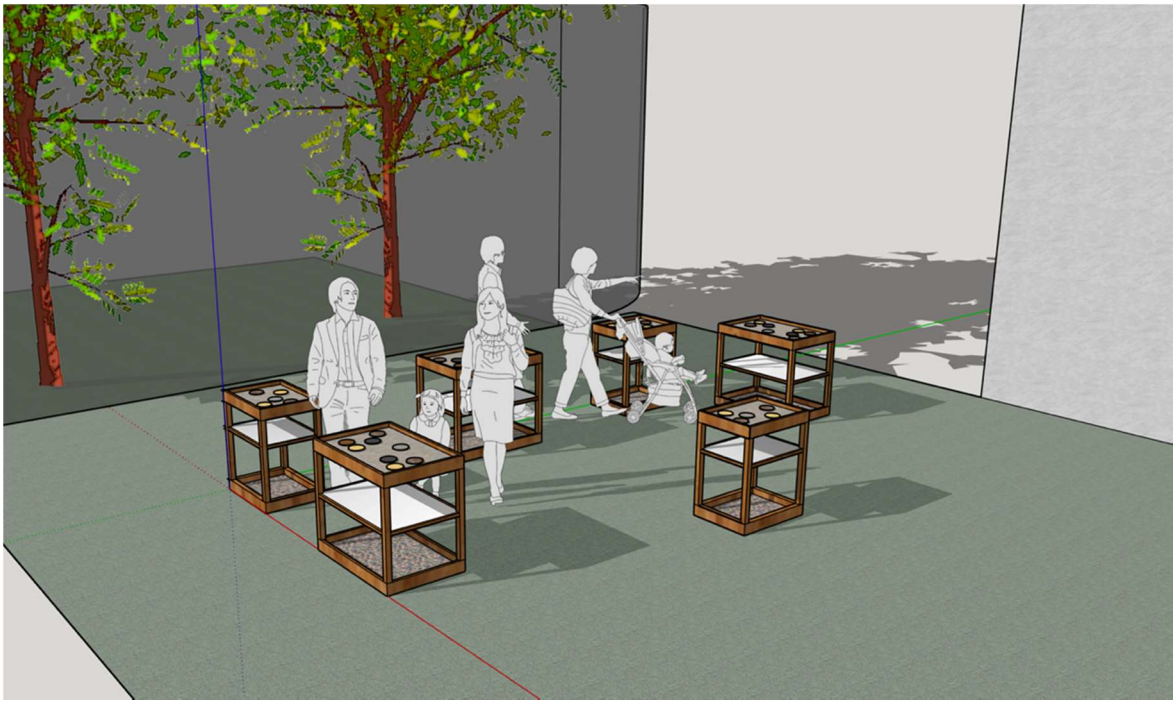


Figure 7.3 The “Chokotto Tougei Time” exhibition space design

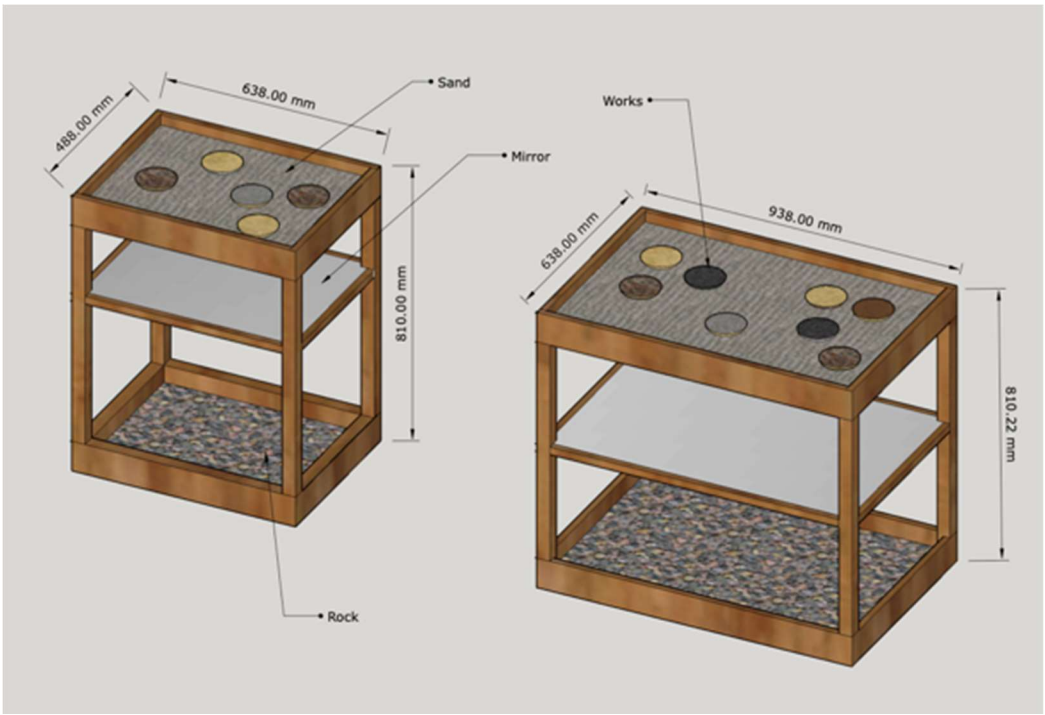


Figure 7.2 The “Chokotto Tougei Time” exhibition stand design

Figure 7.4 The “Chokotto Tougei Time” exhibition invitation poster

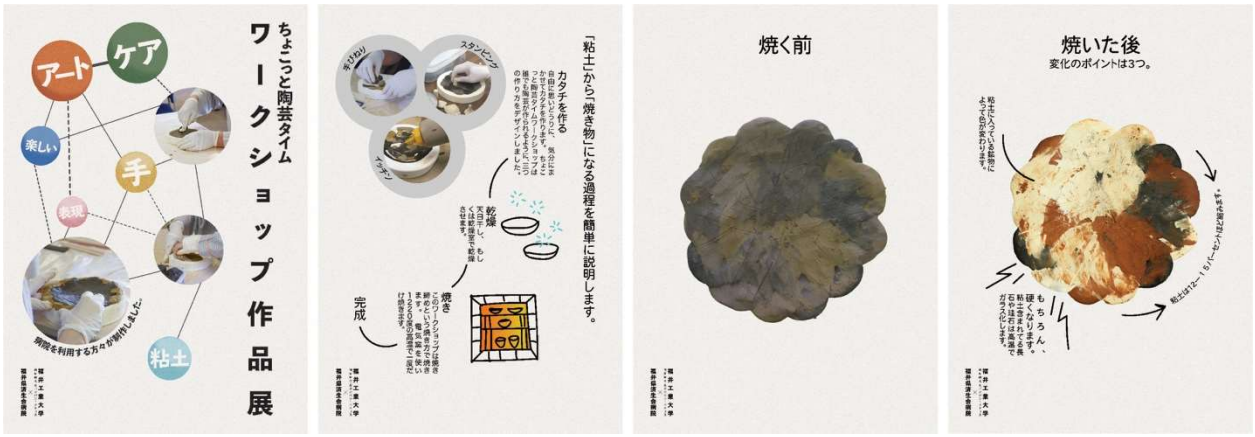


Figure 7.5 information poster series

7.2.1 Creative Art and Public Connection

Forty-three participants' workpieces were exhibited during the exhibition period without damage (Figure 7.6.) The audiences who visited the exhibition were around 30 people per day. After the exhibition, the participants' works were shipped via parcel. Two parcels were returned to the laboratory because they could not contact the receivers. 39% (15 of 38) of participants replied to the last questionnaire, and 60 % (9 of 15) of them visited the exhibition, which was explained in the previous chapter: Examinations after receiving the finished ceramic works. Meanwhile, one participant replied to a questionnaire but missed the exhibition attendance. The average types of participants who visited the exhibition were not significant (Table 7.3)

Figure 7.6 The "Chokotto Tougei Time" Exhibition

Table 7.3 The exhibition attendance

		Exhibition Attendance	
Participants' Status	**Replied Feedback**	**Yes**	**No**
Inpatient	3	2	1
Outpatient	4	3	1
Visitor	4	0	4
Medical Staff	4	4	0
Total	15	9	6

Above all, the hospital satisfied the Chokotto Tougei Time program. The hospital staff reported that the exhibition was fantastic. It showed a new type of art activity that the Fukui-Ken Saiseikai Hospital had not produced before. Audiences are excited about the pottery techniques that differ from the traditional way. They are also surprised when they know ordinary people made those potteries at the hospital. The information poster also helped audiences understand workshop processes easily.

Lastly, touch prohibited marks were attached around the exhibition, but some audiences did not abide by the warning. Mainly, elder audiences touched and picked potteries up from the racked stands with curiosity or drew their fingers on the sand. However, a damaging or losing report was not found.

The Chokotto Tougei Time's techniques and procedures establish a mobility pottery workshop design that accomplished the primary purpose. First, the hospital could conduct a pottery workshop that operates with or without an expert potter on the set, and the hospital does not necessarily invest a pottery studio equipment. At the same time, the participants' moods changed positively over the operation. Second, the result shows that workshop space change did not affect to the pottery making procedure and this supports the successful result of a mobility workshop idea. Providers have no requirement to modify the pottery making

method over the plan. The plaster molds used in the workshop do not only support participants' forming skills, but they also protect works during staff transport them from the hospital to the kiln. The mold and gloves are an essential thing that makes our workshop do not need a washing space or a bucket of water which is a key to the pottery workshop mobility.

This study shows the participatory design in pottery workshops for the hospital. Regional cooperation is the main factor that made it possible for the workshop to operate completely. The keys to success were respect and to accept one's expertise and limitations. Every part of the cooperation utilizes their knowledge to make a new participatory method happen, then satisfying results were returned to the community. The program framework could help potters hold the workshop out of their studio while the hospital does not have to invest in specialized equipment and staff training.

Regarding the display participants' work, the exhibition took a role in a social connection. Audiences had an interest in the exhibition and were excited with pottery works. They could not imagine how it was made and this influenced them to ask questions about traditional pottery making. Moreover, they seem closer to pottery works after recognizing that the hospital staff and patients made it. In other words, engaging in a new way of making a pot tends to awake a curiosity of traditional pottery that has a strong relation to Japanese culture. Notably, the high traffic area is suitable to attract audiences to the exhibition. Even considering this timing we did not have a report about artwork damages. The evidence that indicates some audiences touched work should be noted as a sign of risk. According to previous studies it is suggested that the hospital is not a safe place for art. High traffic areas have reported damage and loss (Janice Palmer and Florence Nash, 1991). Therefore, exhibition security must be considered. Despite the poor security, evidence that exhibited works were touched means audiences have an interest in the exhibition and likely to want to participate in the activity. In other words, it intimates that the exhibition could communicate with audiences, then it might connect audiences with participants through their work more deeply than only looking. The

next program should consider a hands-on exhibition planning that provides an opportunity to make a relationship between audience and ceramic ware while exhibited works were secured

Chapter8: Conclusion

The study clarified ceramic activity efficiency by organizing and verifying afterward produced ceramics activities more accessible under the participatory art concept. The investigation focused on relationships between products' characters, utilized techniques, and mental improvement after the operations.

Organizing ceramic techniques by incorporating the process and related mental states supported tailoring the workshop program and showed adaptive potentials of ceramic activities. Also, it assisted providers to limit the factor point to specific profits of ceramics making among a variety of techniques. Verification could support the workshop efficiency studies, which help activity designers accurately predict the future ceramic intervention through analytical proof. Ceramic workshops under participatory art concepts encourage ceramic making out of the traditional studio, making an unusual art medium more touchable in general. This probably elevates ceramics activities more be used universally. Moreover, the public art exhibition boosted the participatory idea further from personal benefit to community inspiration.

8.1 Workshop Efficiently

The forming method developed from the press mold technique could support hospital participants to make ceramics without concerning prior experiences and contain the cleanliness appropriate for the hospital environment. However, it performed less efficiently in the design student subjects. These reasons can verify that different techniques affect makers' mental states differently, and diverse personalities require various making methods to help them improve their moods through ceramics making. However, in open condition programs like public art, it is obviously difficult to limit clients' personalities and status. Therefore, this study developed making tasks that should be open for a wide range of participants' backgrounds as much as possible. Furthermore, the results from two experiments suggested that the most open processes were the processes that did not force or put pressure on being

successful or those that gave absolute freedom, which leads to a risk of failure in ceramic processes and may increase confusion in inexperience.

8.2 Evaluation Development

The evaluation found that focusing on characters in assembling art pieces helped researchers verify the appropriate techniques and capture the mental transitions that appeared during making moments rather than comparing psychological results between groups of techniques. Creating an efficiently rating questionnaire is important to studying the cognitive factors in ceramics making, which is the supplement that supports the psychological tests. However, verbal data collection such as text mining could be used in close experiments. For example, a clinical case study that researchers can collect rich participants' opinions.

Studying the cognitive factors using SEM in ceramics making also benefits the design of future workshops. Important actions and thinking processes will scope actions or methods in making processes that provide the target therapeutic outcome more precisely.

8.3 Relationships Between Participants' Mood Changes, Artworks' Character, and Techniques

The laboratory experiments and the hospital workshops showed different preference characters of artwork in that participants decided to release their negative emotions and focus on comfortable techniques that supported them. In the design student group, those with strong character enjoyed the activity the most, but the neutral characters showed the most significant mental improvement. Meanwhile, the abstract characters did not show significant negative emotional improvement. According to technique selection, Hand Pressing was popular among the design students, which was the most flexible technique in the laboratory experiment. For this reason, design students prefer to have the freedom to express their emotions, whatever the medium is. The static method might block them from creating the image as they expected, this meant that the most significant mood improvement was shown in the subjects who did not expect a perfect result. These results verified that the procedure should work with everyday

people, which are the actual workshops' targets. In brief, conducting ceramic workshops for design students to improve mental health should use a more open creative process, such as full hand building.

As for the hospital group, the strongest positive transition was also from those with neutral character. The technique that influences attendees to make ceramics follow crafting processes makes them feel better than freely expressing their emotions against the preliminary examination's results. The study hypothesized that liquid clay might influence participants to release their emotional flow with the fluid media. In contrast, the results show that people in the hospital environment feel better after participating in a pottery workshop that encourages them to focus and have fun without prior skills. Then, guide them to achieve a predictable goal. The exhibition took a role in a social connection. Medical staff and patients feel excited to see their works exhibited and wait to show people their good time in a stressful environment. On the other hand, visitors tend to give more interest after recognizing the works made by general clients rather than the professional artist.

8.4 Limitations and Future research

There are several limitations to this study. The result might be changed in a different culture or context. The researcher expects this study to influence existing ceramic workshops as art and craft therapy in various environments and contexts and increase the use of qualitative methods in ceramic activities research. The small population of subjects might be the gaps in analytical research. However, the study would like to present studying psychology phenomenon in pottery activities through continued diagnostic research instead of conducting a big population sample survey. Because the human mind has dynamic, the results from the big group that conducted at the same time could not prove that the results should be the same on the next event. Hence, the developed ceramic program and evaluation methods need to be repeated to collect the data both in the same conditions and others. The repetition of the experiment in the same participants and location will make the verification stronger, which the author plan to do so.

Due to the pandemic situation since 2020 society has been full of stress and anxiety, the researcher hopes that ceramic activities can be used to be the channel that helps people cope with this difficult situation. It is probably an occasion to develop mobility in ceramics-making environments and solutions for mental health toward the new normal lifestyle.

This study theme is continuing. The researcher applied the press mold-based forming method from this study to develop the ceramics class for elementary schools in Awara district, Fukui Prefecture, Japan. The project aims to replace the traditional Hand Building processes with the making method that supports 6th-year elementary students to form useable pottery by themselves from start to finish. The project is concerned about enjoying pottery-making tasks and eliminating professional touch-ups from previous workshop procedures.

Bibliography

Nan, J.K.M. And Ho, R.T.H. (2017). Effects of Clay Art Therapy on Adults Outpatients with Major Depressive Disorder: A Randomized Controlled Trial. *Journal of Affective Disorders, 217*(1), 237-245.

Mechling, L. (2017, January 19). *Pottery Is the New Yoga! Here's to the Mind-Clearing Benefits of Clay.* Retrieved December 29, 2020, from United States Vogue: https://www.vogue.com/article/ceramics-pottery-therapeutic-benefits-mindfulness-meditation

Godwin, R. (2019, August 25). *Throws of passion: how pottery became a refuge from our hyperconnected times.* Retrieved December 29, 2020, from The Guardian: https://www.theguardian.com/artanddesign/2019/aug/25/throws-of-passion-how-pottery-became-a-refuge-from-our-hyperconnected-times

Communications, T. J. (2020, October 13). *Hobby and amusement participation rate in Japan in 2016, by type of activity*. Retrieved August 29, 2020, from www.statista.com/statistics/753393/japan-participation-rate-hobbies-by-activity-type/

M. Rebecca Genoe, Toni Liechty. (2017). Meanings of participation in a leisure arts pottery programme. *World Lrisure Journal, 59*(2), 91-104.

Rosen, J. (2018, June 21). Play time for researchers: How hobbies can boost scientists' productivity and creativity. *Nature, 558*, pp. 476-477.

Committee, S. o. (2009). *Arts in healthcare 2009.* Washington, D.C.: Society for the Arts inHealthcare.

Nakamura, S., Sonezaki, S., Hayashida, Y., & Sato, T. (2017). The Effect of pottery therapy on Heart Rate Variability in College Student with Mental Health Problems. *Journal of Mental Disorders and Treatment, 3*(1), 1000144.

Moon, C. H. (2010). *Materials & Media in Art Therapy: Critical Understandings of Diverse Artistic Vocabularies.* New York: Routledge.

Peterson, S. (1996). *The Craft and Art of Clay.* New York: The Overlook Press.

Quinn, A. (2007). *Ceramic Design Course.* New York: Barron's.

Muller, K. (2007). *The potter's studio handbook : a start-to-finish guide to hand-built and wheel-thrown ceramics.* Beverly, Massachusetts: Quarry Books.

Henley, D. (2002). *Clayworks in Art Therapy: Plying the Sacred Circle.* London: Jessica Kingsley Publishers.

Michal Sholt and Tami Gavron. (2006). Therapeutic Qualities of Clay-work in Art Therapy and Psychotherapy: A Review. *Art Therapy: Journal of the American Art Therapy Association, 23*(2), 66-72.

Hamid Nazari, Alireza Saadatjoo, Shahnaz Tabiee. (2018). The Effect of Clay Therapy on Anxiety, Depression, and Happiness in People with Physical Disabilities. *Modern Care Journal In Press, 15*(4), e83455.

Parisa Rahmania, Naeimeh Moheb. (2010). The effectiveness of clay therapy and narrative therapy on anxiety of pre-school children: a comparative study. *Procedia Social and Behavioral Sciences, 5*, 23-27.

Deborah Elkis-Abuhoff, Robert Goldblatt, Morgan Gaydos, Samantha Corrato. (2008). Effects of Clay Manipulation on Somatic Dysfunction and Emotional Distress in Patients With Parkinson's Disease. *Art Therapy, 25*(3), 122-128.

Helen Graham, Katie Hill, Tessa Holland and Steve Pool. (2015). When the Workshop is working: The role of artists in collaborative research with young people and communities. *Qualitative Research Journal, 15*(4), 404-405.

Hinz, L. D. (2009). *Expressive Therapies Continum: A Framework for Using Art in Therapy.* New York: Routledge.

Penny Simpson and Kanji Sodeoka. (1979). *The Japanese Pottery Handbook.* Tokyo, New York and San Francisco: Kodansha International Ltd.

Taylor, L. (2011). *CERAMICS : Tools and Techniques for the Contemporary Maker.* Singapore: Words & Visuals Press.

Janice Palmer and Florence Nash. (1991). *The Hospital Arts Handbook.* Durham, USA: Duke University Medical Center.

Héctor García and Francesc Miralles. (2017). *Ikigai: The Japanese secret to a long and happy life.* New York: Penguin Books.

Lambert. (2006). Rising rates of depression in today's society: Consideration of the roles of effort-based rewards and enhanced resilience in day-to-day functioning. *Neuroscience and Biobehavioral Reviews, 30*, 497-510.

Lambert, K. (2008). *Lifting Depression: A Neuroscientist's Hands-on Approach to Activating Your Brain's Healing Power.* New York: Basic Books.

Heejeong Jang and Sunnam Choi. (2012). Increasing ego-resilience using clay with low SES (Social Economic Status) adolescent in group art therapy. *The Arts in Psychotherapy, 39*(2012), 245-250.

Douglas M. McNair、 Maurice Lorr、 Leo F. Droppleman. (1992). *POMS, Profile of Mood States: Manual.* USA: Multi-Health Systems Incorporated.

Heck, E. v. (2010, March 1). New ways of working - Microsoft's 'mobility' office. *RSM Discovery - Management Knowledge, 1st Quarter*, pp. 4-6.

畠中勇樹. (2014). 病院における参加型アート＆デザインの効果. 福井: 福井工業大学.

蓮見孝. (2009). 地域再生プロデュース　参画型デザイニングの実践と効果. 東京: 文眞堂.

横山和仁. (2006). POMS 短縮版手引と事例解説. 東京: 金子書房.

片平 建史, 武藤 和仁, 橋本 翔, 飛谷 謙介, 長田 典子. (2018). SD 法を用いた感性の測定における評価の階層性 －EPA 構造の評価性因子の多義性に注目して. *Transactions of Japan Society of Kansei Engineering, 17*(4), 453-463.

Heather L. Stuckey and Jeremy Nobel. (2010). The Connection Between Art, Healing, and Public Health: A Review of Current Literature. *American Journal of Public Health, 100*(2), 254-263.

森田療法センター. (n.d.). *東京慈恵会医科大学　森田療法センター*. Retrieved May 20, 2019, from https://morita-jikei.jp/english/

塩原直美. (2018). 基礎作業療法学演習(制作系)における陶芸の変遷と今後の課題. 茨城県立医療大学紀要, 23, 93-100.

Elizabeth R. Kimport, Steven J. Robbins. (2012). Efficacy of Creative Clay Work for Reducing Negative Mood: A Randomized Controlled Trial. *Art Therapy: Journal of the American Art Therapy Association, 29*(2), 74-79.

Mordechai (Miki) Klein and Dafna Regev. (2020). Using the Clay Slip Game in Art Therapy: A Sensory Intervention. *International Journal of Art Therapy, 25*(2), 64-75.

Doric-Henry, L. (1997). Pottery as art therapy with elderly nursing home residents. *Art Therapy, 14*(3), 163-171.

Pérez, E. (2018). A pilot study on the impact of a pottery workshop on the well-being of people with dementia. *Dementia, 0*(0), 1-17.

Bathje, M. (2014). Sculpting the Illness Experience. *The Open Journal of Occupational Therapy, 2*(4), Article 8.

Aquiléia Helena de Morais, Simone Roecker, Denise Albieri Jodas Salvagioni, Gabrielle Jacklin Eler. (2014). Significance of clay art therapy for psychiatric patients admitted in a day hospital. *Invest Educ Enferm, 32*(1), 128-138.

Aquiléia Helena de Morais, Márcia Aparecida Nazário Dalécio, and Shirley Vizmann. (2014). Effect on scores of depression and anxiety in psychiatric patients after clay work in a day hospital. *The Arts in Psychotherapy, 41*(2), 205-210.

Levine, R. E. (1987). The Influence of the Arts-and-Crafts Movement on the Professional Status of Occupational Therapy. *The American Journal of Occupational Therapy, 41*(4), 248-254.

White, J. (2013, June 13). *Hospitals get creative to reduce employee stress, burnout*. Retrieved May 2019, from HealthcareBusinessTech.com: https://www.prdaily.com/wp-content/uploads/2018/04/burnout-hospital-employees

森口 ゆたか, 山口(中上) 悦子 . (2014). *病院のアート―医療現場の再生と未来 (アートミーツケア叢書)*. 奈良: アートミーツケア学会.

Appendices

Appendix 1 Literature review index

Year	Contribution	Subject/ Condition/ Location	Data Collection/ Analysis	Purpose of Study	Findings	Limitation	Literature
2014	**Ceramic Art** **Occupational Therapy**	Juvenile Rheumatoid Arthritis Patient. Illness artist	Descriptive	To present the efficient of engaging in ceramic sculpture through the artist's experience who is juvenile rheumatoid arthritis patient.	Besides psychological benefits of increased self-concept, self-expression and healthy habits routines, artist believes he can communicate his emotion and experience on the deep level through a visual art. He emphasizes the occasion of expression helps health care provider explore some health concerns of the patients have been overlooked, according to the research, visual arts work on it. Therefore, the relationship between patient and caregiver should be keep concerned.	This study used artist's experiences as an example to describe the case that has succeed in utilized ceramic art as an occupation therapy for arthritis in descriptive interview, but it does not show research methodology.	Bathje, M. (2014). Sculpting the Illness Experience. *The Open Journal of Occupational Therapy*, 2(4), Article 8. DOI 10.15453/2168-6408.1149
2017	**Pottery** **Mental health Problem** **Ego-resilience**	Mental health Problem College Student University Health Care Center Japan	Heart rate variability analysis Poincare plot parameters	To investigate the effect of pottery therapy via *scientific analysis* *Controlled group*	-Long program (Continuous) 6 months -Held by Art Therapist and Medical staff -Statistically significant in the positive effect of pottery therapy difference between the experimental and control group as demonstrated by Poincare analysis -The pottery seem effect with participants those who 1. Interested in manipulated	-Did not mention about firing -Limit of technique and time -Using hand forming technique but not detailing about the procedural of making -Focusing on an individual result	Nakamura, S., Sonezaki, S., Hayashida, Y., & Sato, T. (2017). The Effect of pottery therapy on Heart Rate Variability in College Student with Mental Health Problems. *Journal of Mental Disorders and Treatment,* 3(1). DOI 10.4172/2471-271X.1000144

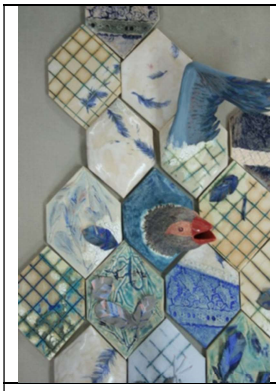
Year	Contribution	Subject/ Condition/ Location	Data Collection/ Analysis	Purpose of Study	Findings	Limitation	Literature
					with clay or not uncomforted in touching clay 2. Not good at verbal communication 4. Satisfied with their work 5.Have a plan to express and concentrate to follow		
2012	**Pottery** **Low Social Economic Status** **Mental Health Problem** **Ego-resilience**	Low Social Economic Status Adolescence School Korea	Ego-resilience test	To examined how pottery group therapy effects on the ego-resilience of low SES adolescents	-Long program (Continuous) 4 months -Held by therapist -Statistically significant in the positive effect of pottery therapy difference between the experimental and control group -Some of participant have negative thinking about clay work because they do not feel comfort to work with clay but they was surprise after saw a finish work. -Using pottery making as a tool for improve social communication. -Experience of pottery making contributed appositive change in the expression of emotion. -The plasticity of clay enable the	-Small size of subjects -Limit of time and sessions -Detailing about the procedural of making is not clear -Focusing on an individual result	Jang, H. And Choi S. (2012). Increasing ego-resilience using clay with low SES (Social Economic Status) adolescent in group art therapy. *The Arts in Psychotherapy*, 39(2012), 245-250.

Year	Contribution	Subject/ Condition/ Location	Data Collection/ Analysis	Purpose of Study	Findings	Limitation	Literature
					participants to get a sense of control over the material because they can make something as their expectation -Group art therapy improve the interpersonal relationships among participants cause interactions environment (sense of human community).		
2018	**Pottery workshop** **Well-being** **Dementia** **non-pharmacological therapies**	Advance stage of dementia National Center for Alzheimer and Dementia Spain	Comparison of Pre-Posttest among subject groups separated by Global Deterioration scale 4-6 -Rosenberg Self-esteem scale (interview) -Smiley-Face Assessment Scale -Greater Cincinnati Chapter Well-Being Observation tool	To investigate the impact of a pottery workshop as a creative arts program in people with dementia that taking part in creativity engaging with a feeling of well-being and improve their mood state.	-Long program (Continuous) 2 month -Supervised by professional ceramists with limited experience in interventions with people with dementia -Non-pharmacological therapies as a supplement the pharmacological treatment -Have significant impact of mood and self-esteem that was independent of the participants' GDS -Pottery may a highly suitable activity for people with dementia -Move works to	-Participants was helped by facilitators during making their ceramic piece (multi-professional intervention team), auxiliary nurse - A place of workshop was designed specifically separate from the common space -Have several pottery pieces was made but not detailing about the procedural of making pottery or type of works -Details of session	Pérez, E. (2018). A pilot study on the impact of a pottery workshop on the well-being of people with dementia. *Dementia*, 0(0), 1-17. DOI 10.1177/1471301218814634

Year	Contribution	Subject/ Condition/ Location	Data Collection/ Analysis	Purpose of Study	Findings	Limitation	Literature
					studio for firing by the facilitators -High rate of attendance subject was selected to analyze data -Pottery workshop session had a very positive significant effect on mood -Successfully complete work encourage positive self-esteem and sense of pride	weren't explained but have report about distinction of session results	
1997	**Pottery** **Art Therapy** **Elder**	Elderly Nursing Home Residents	Quantitative evaluation was based on Hebl and Enright (1993) quasi-experimental Qualitative evaluation included client self-evaluations, case progress notes, journal notes, and photographs.	The aim of improving their psychological well-being by pottery class based on the Eastern Method throwing technique	Following the intervention, the participating group showed significantly improved measures of self-esteem, and reduced depression and anxiety at posttest relative to the comparison group.	-Eastern Method throwing technique	Lee Doric-Henry (1997). Pottery as art therapy with elderly nursing home residents. *Art Therapy*, 14(3), 163-171. DOI 10.1080/07421656.1987.10759277

Appendix 2 The author's previous projects index

		Forming						Decoration								Perception of Processes			
Project No./ Image	Cluster Group	Hand Building	Slab	Wheel	Press Mold	Jigger	Slip casting	Glazing	Brush Glazing	Printing	Painting	Slip	Carving	Relief	Nerikomi	Functional-Unfunctional	Skill-Creativity	No Freedom-Freedom	Perceptual-Affective
1 	A 1			√				√								2	1	3	1
2 	B	√							√							5	4	2	2
3 	B	√											√			5	1	2	1
4	B	√	√		√			√	√		√		√	√		5	4	4	5

																			
5 	A 2										√					1	5	4	4
6   	B	√			√			√	√				√			4	4	4	3
7	B	√							√							5	3	4	4

 																		
8 	B	√											√			5	2	3	2
9 	B	√	√		√			√	√				√			2	2	2	1
10	A 2						√	√			√					1	1	1	1

																			
11 	A 2						√	√			√					2	3	2	3
12 	A 2						√	√			√					2	2	1	1
13 	B	√			√			√	√							5	3	2	5

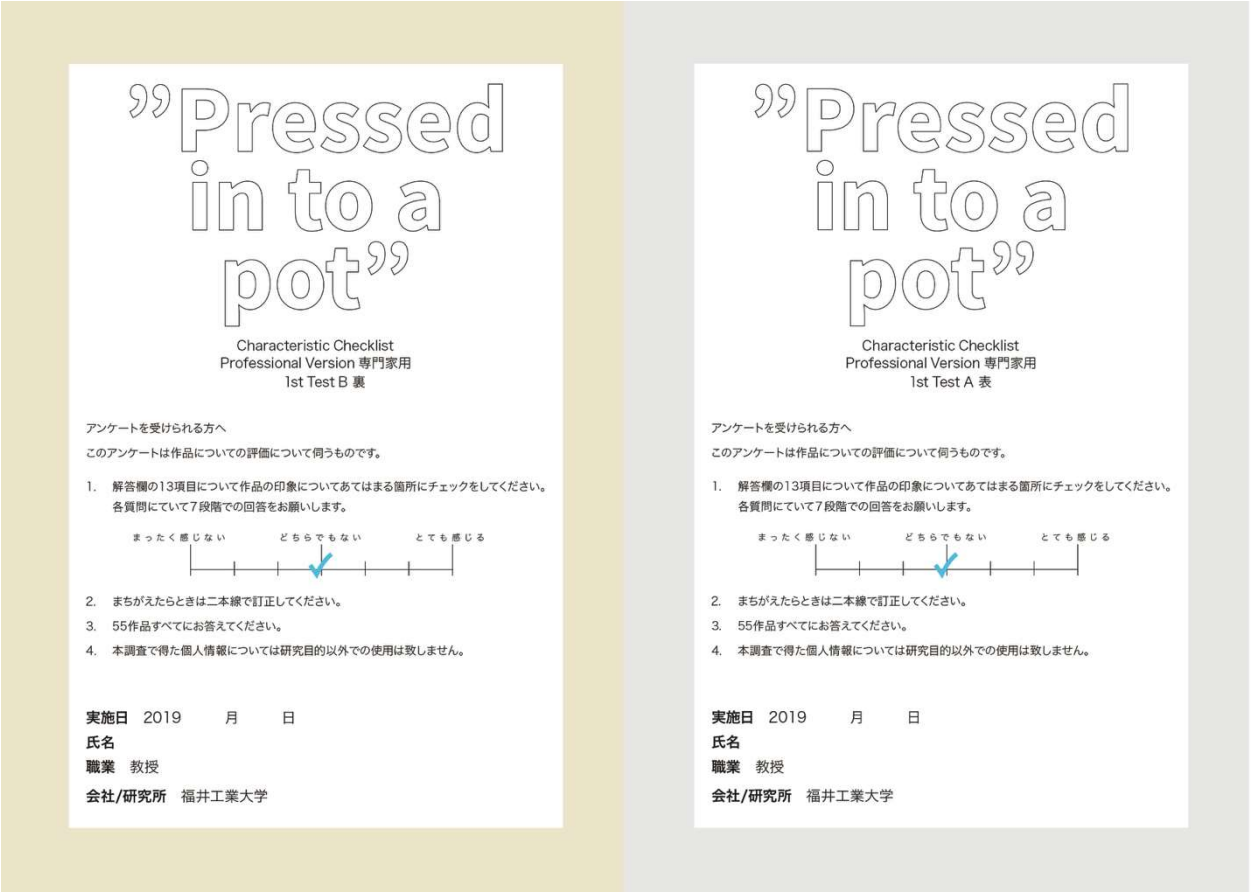
																			
14   	A 2										√					2	4	4	2
15  	A 1	√		√				√			√					1	3	2	1
16	B	√	√					√	√		√					5	4	4	5

  																			
17 	B	√	√		√			√	√					√		2	4	3	3
18 	A1	√		√				√			√					2	3	2	1
19 	A2						√	√				√				1	4	5	3
20	A2						√	√					√			1	2	5	1

																			
21  	A 1			√				√								1	1	1	1
22 	A 1					√		√								1	1	1	1
23 	A 2			√				√		√	√	√				5	3	4	4
24 	A 1					√		√		√						1	1	1	1

25 	A1			√				√						√		1	2	2	2
26 	A1			√				√					√			1	3	2	2
27 	A1			√				√								1	1	3	1
28 	A2		√					√							√	1	4	4	3
29 	A1			√				√			√					1	3	2	2
30	A2		√					√							√	1	1	1	1

																			
31 	A 1			√				√								1	1	2	1
32 	A 2						√					√				2	4	4	1
33 	A 2	√			√										√	2	4	3	2



”Pressed in to a pot”

Characteristic Checklist
Professional Version 専門家用
1st Test B 裏

アンケートを受けられる方へ

このアンケートは作品についての評価について伺うものです。

1. 解答欄の13項目について作品の印象についてあてはまる箇所にチェックをしてください。
   各質問にていて7段階での回答をお願いします。

まったく感じない　どちらでもない　とても感じる

2. まちがえたらときは二本線で訂正してください。
3. 55作品すべてにお答えてください。
4. 本調査で得た個人情報については研究目的以外での使用は致しません。

実施日 2019　月　日
氏名
職業 教授
会社/研究所 福井工業大学

”Pressed in to a pot”

Characteristic Checklist
Professional Version 専門家用
1st Test A 表

アンケートを受けられる方へ

このアンケートは作品についての評価について伺うものです。

1. 解答欄の13項目について作品の印象についてあてはまる箇所にチェックをしてください。
   各質問にていて7段階での回答をお願いします。

まったく感じない　どちらでもない　とても感じる

2. まちがえたらときは二本線で訂正してください。
3. 55作品すべてにお答えてください。
4. 本調査で得た個人情報については研究目的以外での使用は致しません。

実施日 2019　月　日
氏名
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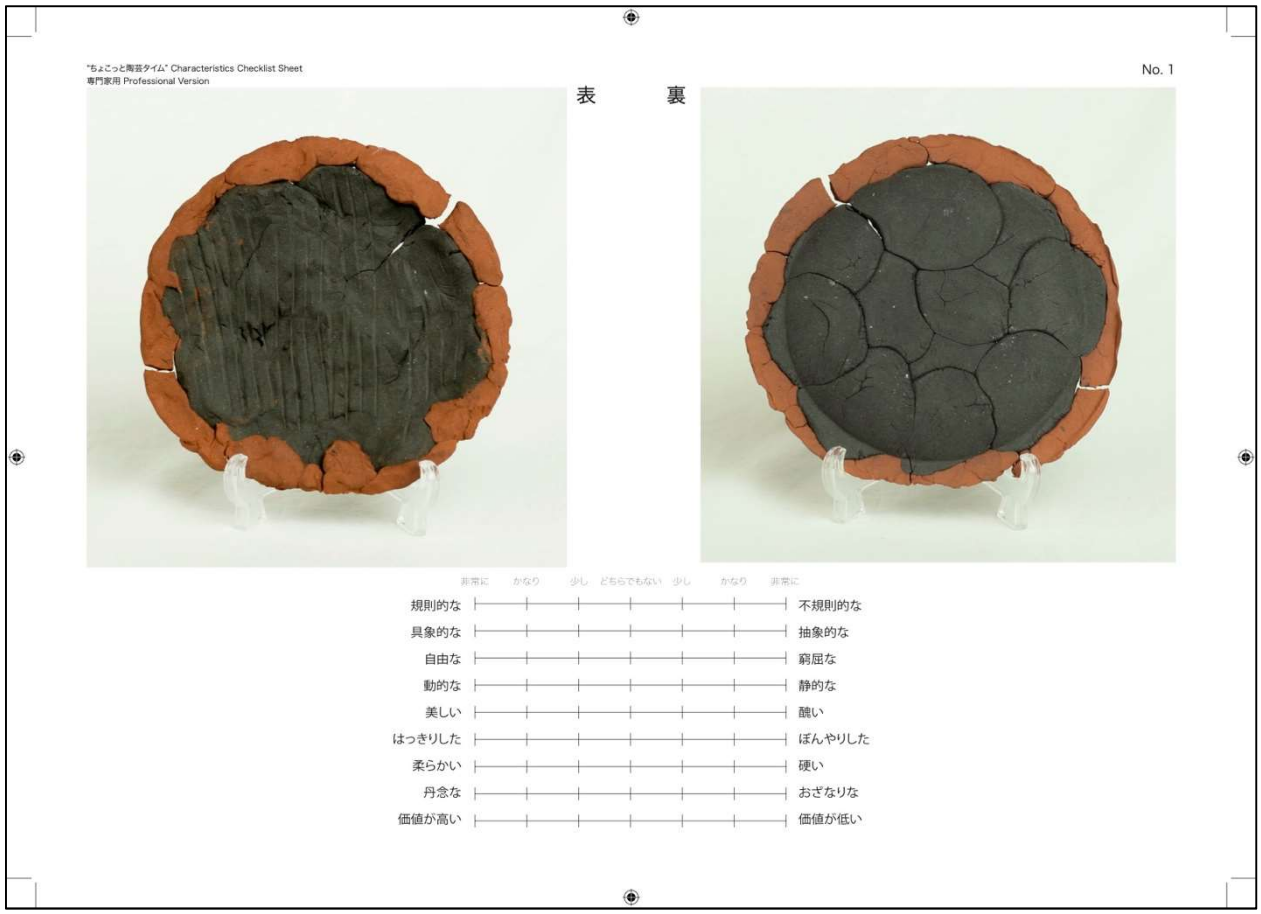
Appendix 3 “Press into a pot” SD questionnaire instruction

Appendix 4 The example of the SD questionnaire shows the picture of both sides of subject number 12 include seven Likert scale separately on each side

Appendix 5 “Chokotto Tougei Time” SD questionnaire instruction



Appendix 6 The example of the SD questionnaire shows the picture of both sides of subject number 1 include one series of seven Likert scale

ちょこっと
陶芸
タイム

あなたの作品について...

アンケートについて

1. この質問紙は、 あなたの気分状態をおたずねするものです。 それぞれの質問について、 あまり深く考えず、第一印象を大切にして答えてください。

2. アンケートは2ページあります。

3. 本調査で得た個人情報については研究目的以外での利用は致しません。

回答欄

		まったくできなかった	少しできた	まあまあできた	かなりできた	非常にできた
1	気分を作品に表現できた	○	○	○	○	○
2	作りたい物のイメージを持ちながら作った	○	○	○	○	○
3	自由に作れた	○	○	○	○	○
4	手と指をよく動かして作った	○	○	○	○	○
5	思い通りに作れた	○	○	○	○	○
6	作ることに集中できた	○	○	○	○	○
7	楽しかった	○	○	○	○	○
8	正確に作れた	○	○	○	○	○

感想をお聞かせ下さい。

No.

後

Appendix 7 “Chokotto Tougei Time” perception of making procedures after the workshop’s questionnaire

ちょこっと
陶芸
タイム

ちょこっと陶芸タイムにご参加いただきありがとございました。
ぜひアンケートにお答えください。

完成した作品についてのアンケート　No.

病院にて行われた展示会はご覧になりましたか？
○ はい　○ いいえ　○ 展示会があることを知らなかった。

アンケートについて

本調査で得た個人情報については研究目的以外での利用は致しません。

回答欄

		まったく思わない	少し思う	まあまあ思う	かなり思う	非常に強く思う
1	作品を見て気分が晴れた	○	○	○	○	○
2	作品が届くのがまちどうしかった	○	○	○	○	○
3	作っている時を思い出した	○	○	○	○	○
4	作った作品をよく覚えてる	○	○	○	○	○
5	思い通りの作品ができた	○	○	○	○	○
6	満足した	○	○	○	○	○
7	完成イメージと違っていた	○	○	○	○	○
8	また作りたい	○	○	○	○	○

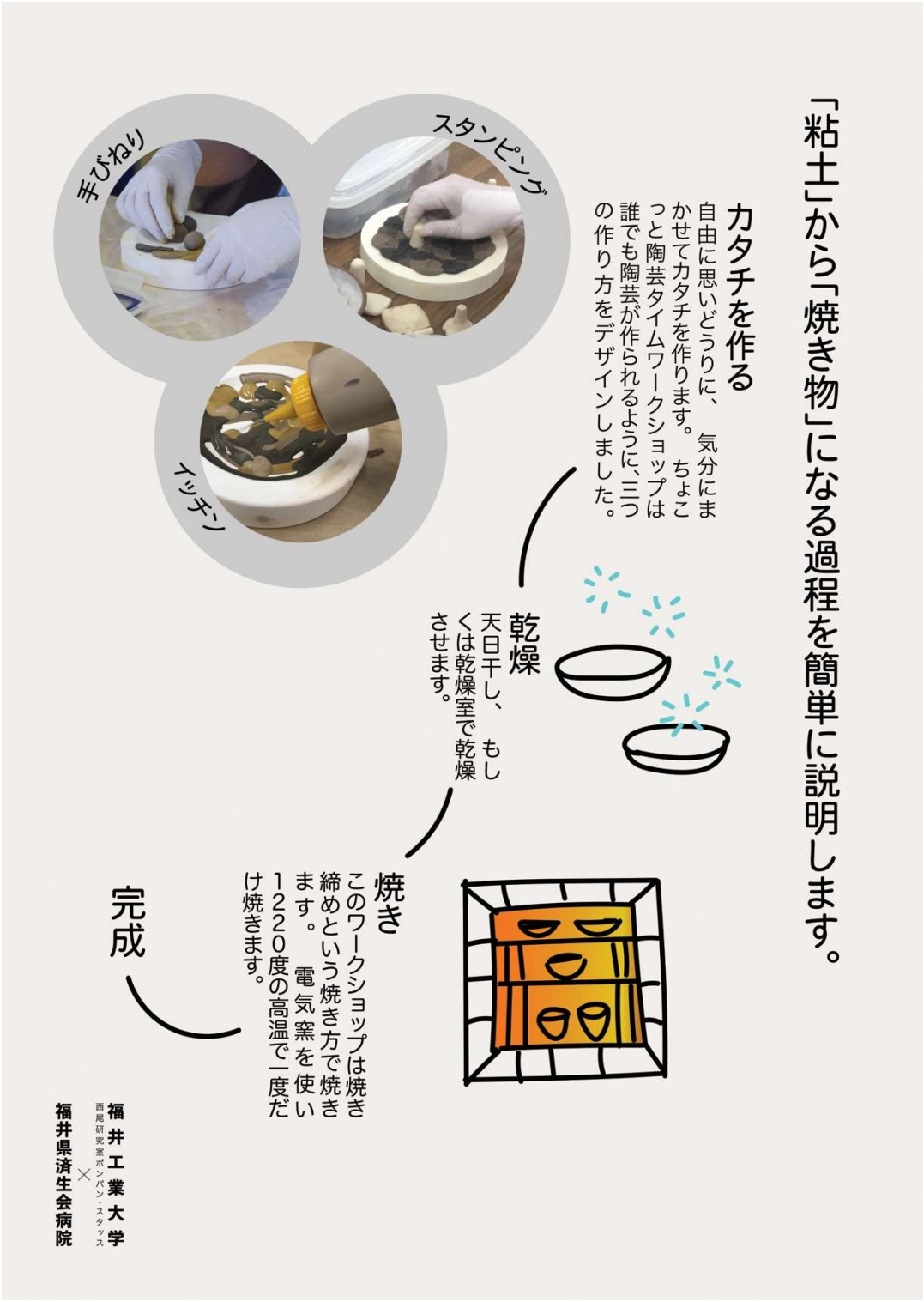
感想をお聞かせ下さい。

完成

Appendix 8 “Chokotto Tougei Time” feedback after received finished works questionnaire

Appendix 9 The “Chokotto Tougei Time” exhibition invitation poster

Appendix 10 The “Chokotto Tougei Time” exhibition information poster 1



Appendix 11 The “Chokotto Tougei Time” exhibition information poster 2

Appendix 12 The “Chokotto Tougei Time” exhibition information poster 3

Appendix 13 The “Chokotto Tougei Time” exhibition information poster 4

論文及び口頭発表

学位論文の基礎となっている印刷公表論文

THE INVESTIGATION OF TECHNIQUES AND MOODS CHANGE IN POTTERY WORKSHOP : Experiments of pottery workshop design in a hospital's environment, Pornpan Sutas and Koichi Nishio, 日本デザイン学会学会誌 Journal of the Science of Design Vol.5 No.2 2021

Mobility Workshop Design for Pottery Program in Hospitals 可動性のある院内陶芸プログラム, Pornpan Sutas and Koichi Nishio, 環境芸術 26, 2021 年 6 月

Pottery Workshop Design for Medical Settings "Pressed into a pot": Investigation of Mood and Expression in Specific Pottery Tasks, Pornpan Sutas and Koichi Nishio, International Association of Societies of Design Research Conference 2019 DESIGN REVOLUTIONS, 2019 年 9 月

学位論文に関する口頭発表の実施

Sa-biang O-Sod:Ceramics tools and Manual for Thai Medical, Pornpan Sutas, 日本デザイン学会第 64 回春季研究発表大会, 拓殖大学, 2017 年 6 月

Comparison of Lampang Ceramic and Echizen Ceramic, Pornpan Sutas and Koichi Nishio, 平成 29 年度日本デザイン学会第 3 支部研究発表会, 愛知産業大学,2018 年 2 月(優秀研究発表受賞)

Consideration of Cooperation Possibility in Lampang Ceramic and Echizen Ceramic by Identity Comparing, Pornpan Sutas and Koichi Nishio, 日本デザイン学会第 65 回春季研究発表大会, 大阪工業大学, 2018 年 6 月

Effect of The Hand Movement Limitation in "Pressed into a pot": Pottery Workshop Design for Hospital, Pornpan Sutas and Koichi Nishio, 日本デザイン学会第 66 回春季研究発表大会, 名古屋市立大学桜山キャンパス,2019 年 6 月

Pottery Workshop Design for Hospital "Pressed into a pot", Pornpan Sutas and Koichi Nishio, 2019 年度院生研究成果公開ポスターセッション, 福井工業大学,2019 年 10 月

Ceramic Art Program for Hospital "Pressed into a pot" Evaluation of mood in pottery workshops in controlled trials, Pornpan Sutas and Koichi Nishio, 日本デザイン学会第 3 支部 2019 年度研究発表会, 名古屋市立大学桜山キャンパス, 2020 年 2 月.