

RESEARCH ON THE DESIGNING PROCESS TO MAKE SOCIAL ACTIVITIES TO BUSINESSES: DEVELOPING PRODUCTS TO HORTICULTURAL ACTIVITY USED FOR “MEDIUM AGENT FUNCTION” WITH THE FACILITIES TO THE AGED

ABSTRACT:

The urbanization of mankind has been globally accelerated. It is not too much to say that human being dreams for the life with nature in their life. In this manner, human being has the homing instinct and eager to return to the nature. The representative pastime for human beings to connect such kind of their eager is gardening. Gardening is the work to plant and grow plants, and it gives human beings pleasure and peace as well as offers just a food fad and objects of interest in the activities. It also heals human beings and it plays a role to prove the relationship between plants and human beings scientifically, thus it is called horticultural therapy. Namely horticultural therapy means the overall activities to raise social, educational, and psychological or physical ability to adapt through various kinds of gardening activities and finally to pursue physical and psychological rehabilitation, and also it is aimed to get the healing and rehabilitation in physical and mental aspects, green amenity and environmental recovery^[1].

It is usually said that horticultural activities are not restricted by age and place and time. However taking a concern on the users who were isolated, it is found that there are also behavioral restrictions in horticultural activities. Especially it is pointed out that it has restriction on location, users' mental and

physical difference of capacity. For instance, it will not be easy for the aged or the disabled to have horticultural activities by themselves because they often face with physical restriction to make even simple movements such as bending their bodies or moving arms.

In order to overcome these restrictions, currently NPO Group 「Tsukuba Urban Gardening」 (* located at Tsukuba, Ibaraki, Japan) has been performing horticultural activities for the people who have various physical restrictions including general citizens^[2].

Firstly, the generalization for design process based on the development scenario of horticultural activities which is mainly focused on 「Tsukuba Urban Gardening」 of NPO Group and the prototype of horticultural activities for various kinds of users by introducing the concept of universal design which can overcome current restrictions of location and behavior in the activities were suggested in this research. And also experimental horticultural service which is targeted for the aged in senior citizens' facilities was performed based on the suggested prototype and the observation and results of the performance were summarized.

In order to do this, the sampling for various kinds of the aged people was done from senior citizens' facilities in Tsukuba City, and then some experimental trials were performed to observe various effects.

Although it is a beginning stage to make design process concept yet, however it is the object of this research to create new product, which integrates NPO's social activities into design process and to extend the business of social activities on the basis of experiment results in the facilities.

Keyword: *Design process, horticulture, NPO, elderly*

1. INTRODUCTION

1.1 DESIGN PROCESS DEVELOPMENT THROUGH BUSINESS MODELING OF SOCIAL ACTIVITIES

Generally mass consumption by mass production is highly valued in the industrialized society. This kind of environment is gradually extended and it is the reality that the companies try to accelerate the process of production and consumption to earn more profit. Thus industrial society creates result-oriented service which facilitates production and consumption and its process has been more accelerated.

Contrary to this kind of consuming type in the industrial society, currently the distinctiveness exists which can not satisfy the isolated users such as the aged, the disabled with the product based on general needs, and the product development for specialized needs in current process has nothing to do with productivity and profit creation so that companies does not have any necessity for new product.

However, considering the overall changes such as the growing population of the aged and the change of recognition in society, it is the high time to have more trial and development for product which can accept special needs of welfare-based society.

Currently as one of such activities, social activities of NPO can be a good example. However NPO activities are highly revitalized due to its clear concept of voluntary service for social welfare, but the power to connect the activities with product-making and business modeling is weak. Thus even though NPO activities, which are performed for those who request social welfare simply have been brought much social effect, it is difficult to get more than NPO activities due to the lack of know-how to develop product and business model as well as to keep service due to insufficient funds and manpower.

At this point, if it is difficult to develop the system which can search for the preparation method of continuous social activities by design methodology and the technology which can develop NPO activities' merits into new business modeling, i.e., if it is difficult for NPO to handle its activities by itself, it is regarded that design process is needed to support its activities as an intermediate management tool. It is the time that product development which can offer continuous activities that has high social contribution by objectifying NPO's activities in design process and the set-up of business model which can secure maximization and durability of NPO activities should be done.

As the first step of such processes, design methodology is practically studied in this research to make NPO main activity (product idea) into new product based on NPO groups' social activities.

Firstly, design process is reviewed by focusing NPO organization's horticultural activities which is called 「Tsukuba Urban Gardening」 in Tsukuba, Japan.

1.2 NPO ORGANIZATION 「TSUKUBA URBAN GARDENING」 ACTIVITIES AND PROBLEMS

1.2.1 NPO ORGANIZATION, 「TSUKUBA URBAN GARDENING」 ACTIVITIES

Horticultural activity is one of hobbies which are beloved by many people in the world, over 20% of people do horticultural activity as a hobby in Japan. Anybody can do it without any burden, and people can experience good effect on physical and mental aspect thus horticultural therapy is used in medical area. Especially horticultural therapy is utilized to improve physical or mental condition of the aged or the disabled. Horticultural therapy is initialized in Europe and America and it is not common in Japan even though it is introduced in the early 90's.

With this background, NPO organization 「Tsukuba Urban Gardening」 in Tsukuba, Japan has been making effort to popularize horticultural therapy to the people who has physical or mental problem such as the aged and the disabled people including general citizens by planning and performing horticultural event which is called 'A Garden of Healing' in the open space. Especially members and volunteers in

NPO organization directly support the aged by providing them with flowers and plants and the aged are those who can not participate in the event by themselves even though they have want to do. Currently many requests from Tsukuba government and event hosts are continuously made.

1.2.2 PROBLEMS

Various kinds of problems on NPO's horticultural activity were found by simple interview and observation on NPO organization's 「Tsukuba Urban Gardening」 management.

- 1) The promotion is needed to popularize horticultural activity and to increase it.
- 2) The maintenance cost and operational problem to keep service in NPO organization are occurred as much as the requests on horticultural service are increased.
- 3) As horticultural service is increased followed by the increase of requests from the facilities for senior citizens, thus recruitment of supporting volunteers for horticultural activity is required. However currently volunteers and operation staffs are of small number.
- 4) Even though local governments request for the activity, it is overlapped with NPO's events or it is current condition that the service can be offered over 3 or 4 times in a year.
- 5) Generally horticultural activity is performed in the garden. However in case the activity is performed in facilities for senior citizens, specialized gardening table for the aged is suggested to be developed for indoor and outdoor activity (Idea of Product development)
- 6) Considering this background, the development of specialized gardening product is needed to perform activity easily such as moving equipment of various kinds of tools in horticulture
- 7) At the same time with the development of product, operation process is needed to manage the system of NPO organization harmoniously.

2. METHOD OF RESEARCH

2.1 DESIGN PROCESS TO MAKE BUSINESS MODEL OF NPO ACTIVTY (FIGURE 1.)

Medium Agent Function process (it is called 「MAF process」 here in after) is developed to make product and business model which makes the most use of social activity from current problem of NPO organization's 「Tsukuba Urban Gardening」. The concept of 「MAF process」 is the design process of

performing intermediate management, the designer who can understand the problems(1.2) when making social activity into a product or a business such as 「Tsukuba Urban Gardening」 based on horticultural activity, and it is the mediator to lead the process from product designing to the establishment of business model And also it is important to establish experts and sponsors from various kinds of fields to develop products in design process as well as to plan the required merits in each investment. In order to do this, it is also important to lead the structure of information sharing between experts on horticultural services. Finally the pursuit of economic profits for social contribution, which is the merit in developing a product based on NPO's activity and idea offering will act as a key point to handle sponsoring company. The merits in each section followed by 「MAF process」 is expected.

- 1) Know-how in each field is applied. : It is possible to make product and service making the most use of NPO, company, designer, and research institute's specialty.
- 2) Feasibility of product development which has high social contribution : Participating companies in the process can raise their reliability by changing from the current method of production and sales to the development of product and service offering that has social contribution. Especially companies can have the chance to make up for the weak points in product development through joint R&D with research.
- 3) Continuous product development and collaboration in research : It is possible to make use of specialty in current product design process. It is a new channel to gather experts' knowledge from various kinds of field. Thus it facilitates the share of information on many areas and finally it has the merit to have huge data for the research achievements and they can be utilized for each research sectors.
- 4) Product development followed by continuous collaboration : Contrary to the product development in a short-term, research process and achievements are highly evaluated. It means the process improving activities on product defect and problem or system are performed by collaboration.
- 5) Taking initiative to make universal design : The designing should be done by considering product's convenience to use for everybody and service and at the same time focusing on isolated users. Namely it is possible to apply for the development of product from the aged people's use to multi-class of users which has the characteristic of ripple effect to different location and users.
- 6) Reviewing current series of products in gardening market, it is not easy to find the products and services which concerns gardening activity itself, while the product development focused on small tools for gardening has been done. Thus it will lead the development of product and service which can distribute gardening to various kinds of users

From the expected merits in the above, the customized product service will be needed to satisfy various kinds of needs of users especially the users in an aging society. The trial on the project connecting 「Tsukuba Urban Gardening」 based on the movement of 「MAF process」 to business is performed.

Generalizing the structure of 「MAF process」, the designer leading 「MAF process」 takes a comprehensive position between producer(company), NPO organization and user(final user), and he/she organizes and maintains the project harmoniously, intermediately, and synthetically. It is functional structure for the designer to deliver core technology of product development to each sector as well as to inspire positive will for sponsor(company), NPO and product user(final user) to participate in a project and also it is the design process which is shared by strong co-existence mind.

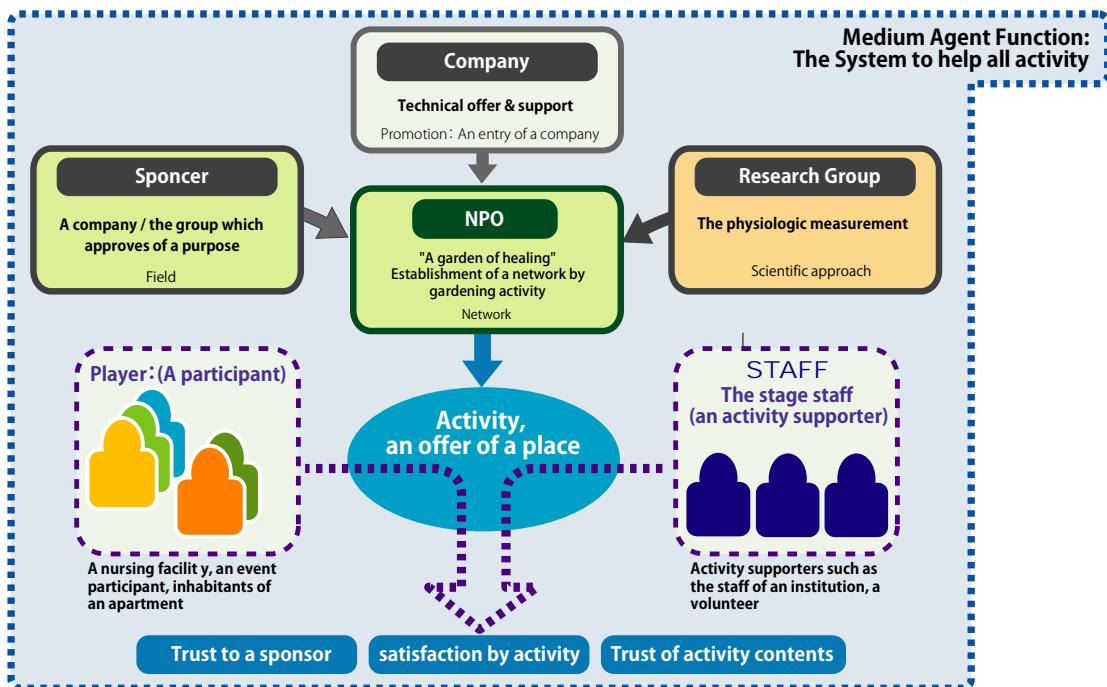


Figure 1. A conception diagram of activity by a design process

2.2 FLOW AND RANGE OF RESEARCH (FIGURE 2.)

Based on this design methodology, experimental approach on product service was tried for those who designed sample product and used it by participating in NPO. It is the performance, observation, and experiment on concrete idea development (design approach) through product-making following the performance of design process, and the below procedures are done.

- 1) Case study on physical, mental, and social effect by gardening activity
- 2) Design development from 「Tsukuba Urban Gardening」 activity in NPO
- 3) Service performance and observation by using sample product in facilities for senior citizens
- 4) Operation of 「MAF process」 (NPO and company side)

5) Service performance and observation by using sample product in facilities for senior citizens

6) Proposal of business model (to-be)

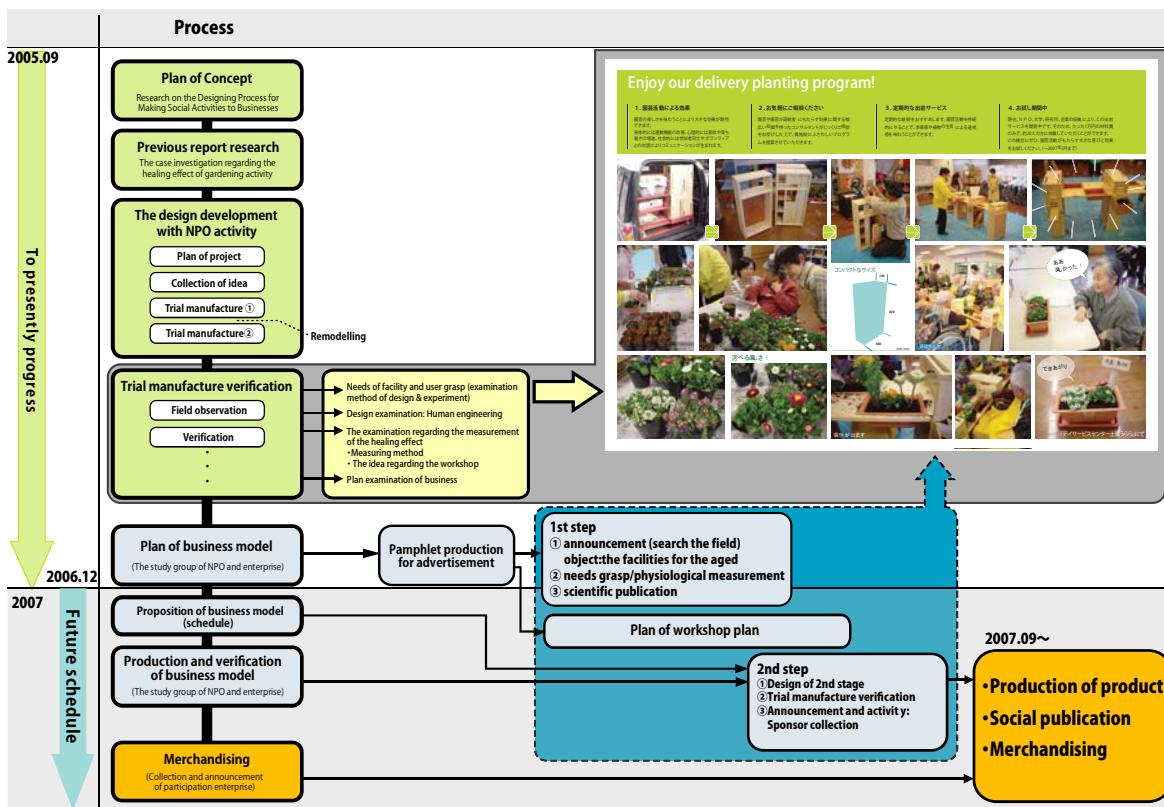


Figure 2. Flow of project

3. DESIGN ON 「PLANTER TABLE KIT」 FOR GARDENING (FIGURE 3.)

After the hosting of public subscription on the product idea was done for the object of members of NPO groups and citizens, selecting product image and the best image was used in product design. Adapting NPO's know-how of 「Tsukuba Urban Gardening」 or the structure and design which make it possible for anybody to enjoy gardening without any burden representing by NPO's catchphrase of 'Enjoy gardening at anytime, anywhere', simple design which can be simply used in indoor were basic concepts. Moreover the point that a number of people in facilities can use at one place was considered and unit type of design was tried which can be divided after it is used. (The problems found in NPO's gardening activity and know-how were reflected in the design) And also the product of service-type which can be easily carried in the facilities was set to make prompt preparation for gardening service. It is the 「planter table kit」 for private gardening use.

The 「planter table kit」 for private gardening use can provide the aged, wheel-chair users, and the disabled in senior citizens' facilities with the pleasure of gardening directly, and specially it was produced with a view to let the senior citizens feel the sense of season which is very difficult for them to experience after they enter the facilities due to the isolation from outside. The final model was manufactured after 2nd times' improvement for sample product was done.

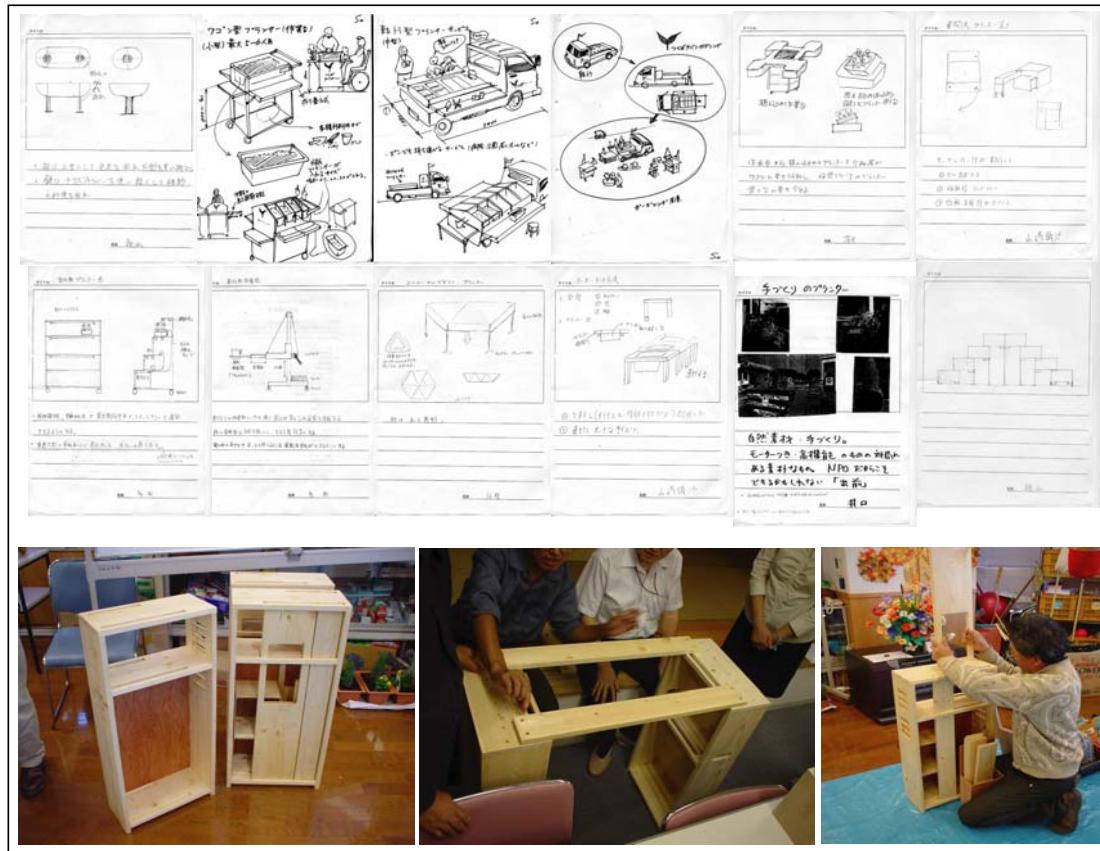


Figure 3. Design process of 「planter table kit」

4. GARDENING SERVICE AND OBSERVATION USING SAMPLE PRODUCT IN FACILITIES FOR SENIOR CITIZENS

Gardening service was performed by using sample product for the object of senior citizens in facilities located in the downtown of Tsukuba City. The service was provided over 2 times in a facility, and observation for testees was mainly done while it was served based on the know-how of NPO. As the result of review on know-how concerned 「planter table kit」, service complement and interview followed by on-site observation were done in the 2nd performance. Based on the se results, it was applied for the experiment on physical and mental effect. at different facility in Tsukuba under the assumption of that gardening experience using by 「planter table kit」 will be harmful to testee at a certain degree.

• HYPOTHESIS

The following hypothesis regarding the effect of gardening was made to verify its effectiveness in gardening test and observation.

Hypothesis 1 : The 「planter table kit」 gardening will have the following effect.

- 1) Psychological effect : Indoor gardening experience enhances people's energy such as volition.
- 2) Physiological effect : Improving effect of exercising function (revitalization of physical activity and rehabilitation)
- 3) Social effect : Overcoming of communication problem between man to man, and attracting social effect

Hypothesis 2 : The short-term and one-time service performed by NPO is changed to continuous product service with the introduction of product and it will be a business chance.

Hypothesis 3 : The 「planter table kit」 will lead indoor gardening activity specially in senior citizens' facilities and it could be a kind of simple recreation which can be done at any place.

4.1 OBSERVATION OF GARDENING EXPERIENCE

Gardening experience and observation were performed over 2 times between December, 2005 and February, 2006 in the facilities of senior citizens. 18 testees (4 healthy aged people, 11 handicapped) in the first time, 14 testees (5 healthy aged people, 9 handicapped) in the 2nd test were participated. 60% of testees from the 1st test participated in the 2nd test voluntarily.

- 1) Observation to find the problem of 「planter table kit」 or way of improvement
- 2) having interview with senior citizens on the problems of using 「planter table kit」 or comments
- 3) observation on the exchanges between testees, between testees and volunteers were processed with gardening activity.

The members of NPO 「Tsukuba Urban Gardening」, volunteers, staffs of facilities were participated as supporters, and 1 staff assisted 2 senior citizens in the activity. The steps of gardening activity are as follows. (Fig.4)

Loading 「planter table kit」 and gardening tools into small-sized car of 660CC → visiting senior citizens' facilities → Set-up 「planter table kit」 (carrying sheet, water bag, port, shovel, culture soil etc)

→ introduction on staffs and gardening activity (explaining on caution etc) → selecting flowers and plants → Gardening(allocating 6 senior citizens in a team and to sit on 「planter table kit」), performing about 10 or 15-minute gardening experience and then shifting with other team) → let participants have the flowers → completion



Figure 4. Flow to gardening experience which uses the “planter table kit”

4.1. 1 OBSERVATION RESULT (1ST EXPERIMENT)

Most of senior citizens were satisfied with 「planter table kit」 gardening experience, and it was indicated that their looks were changed in a good mood. And also the effect of gardening was indicated that the senior citizen who kept silence had much talk. The staffs of facilities were surprised to see the changes. The effects which were verified by observation and interview are described in the below.

- 1) I felt I had very exciting time after a long time.
- 2) I am so happy to cultivate the flowers what I planted by myself.
- 3) It is so exciting to touch soil after a long time.
- 4) It was the first experience I had never since I entered the facility.
- 5) Satisfaction : I thought I can't do it due to my physical condition, but I had a great fun and I want to do it again.
- 6) So happy! (The interviewee had no expression on face, but he made smile not until 2 or 3 minutes past before he started to do the activity)

7) I could think of my younger time before I was healthy.

8) I could have time to talk with staffs in the process of activity (Finding common subject of communication)

And also, it was the time to find the structural problem of 「planter table kit」 itself and the operation of program. The followings are problems of activity and the needs of participants.

1) Lacking of operation time: ①Explanation on flowers was skipped due to lack of time. ②It was felt that the time of experience was too short. We want to have more time. ③Time was not enough for us to remember teammate's name. (necessity of name tag) ④It was very difficult to share communication between teammates due to time limit.

2) Limit of action : The space is too small when approaching to 「planter table kit」 so that participants had the limit of action.

3) Crowded space: average 3 or 4 participants among 6 used wheel chair, and it seemed that they had physical problem.

4) The structure and designing of universal design are needed: ①The design considering senior citizens will be a design which normal people can use. First, it is needed to make complete design for the aged and the handicapped. ②Participants of senior citizens who had problems on hands had difficulty in moving soils by using shovel (it was not the problem for the norm users) ③ Participants are not accustomed to work gardening: they were unskilled to get flowers out of pots, and usually drop them(Supporters helped them in the back but it happened before it is recognized) ④Problem of tools : the thickness and length of shovels etc ⑤Cleaning : problems on the intervals of activities between teams and cleaning

5) Request: It is a wish to participate in the exhibition or show for their works after gardening activity. (staff)

In addition, it was found that participants show off their experience to staffs by recollecting their gardening in younger time. Like this, normal people does not have any difficulty in doing simple pastime in younger time at any time, any place if they have a will to do. However it is not easy for the aged people. Anybody can do gardening activity without any burden, and, 「planter table kit」 makes it for the aged to do simply. Especially it was indicated that the aged who have difficulty in moving arms and hands does not have any problem to plant flowers. This indicates that gardening has the rehabilitation effect to incite the remained ability of human being.

4.1.2 IMPROVEMENTS (AFTER 2ND EXPERIMENT)

The cautions and operation of programs for the future performance were raised to perform gardening activity for senior citizens through the observation of the 1st performance.

- 1) Caution for accident(mistakes, falling-down): Blunting of senses by aging
- 2) Making the atmosphere of being together with staffs, and asking participants about favorite flowers, favorite color of flowers.
- 3) Let participants write down their name on name tag, and it can be used to measure participants' physical
- 4) Let participants be in the activity by themselves even though they made mistakes (Inciting improvement of rehabilitation ability), let them correct mistakes by themselves, but assist them if they want to give up.
- 5) Incite participants to talk about their youth. (even if participant is .)
- 6) Incite the competition between participants. (Making praise for other participant's works.)
- 7) Host show or exhibition for the works of activity or have time to share the works of participants. And make respect to participants with praise in the process of it. (for example. it is likely to be~, it looks like spring has come, colors are so beautiful. etc)

4.2 PSYCHOLOGICAL AND PHYSIOLOGICAL MEASURE IN GARDENING ACTIVITY (FIGURE 5)

Psychological and physiological changes can be easily measured in the gardening observation by 4.1 using 「planter table kit」 for senior citizens' gardening experience. However it was judged that it is difficult to make scientific proof by empirical observation. The necessity for the performance of experiment was raised in this process to prove gardening activity of 「planter table kit」 on the base of more scientific background.

Experimental trial accompanying gardening activity was tested in September, 2006. The object of experiment was the senior citizens of another facility in Tsukuba and 8 aged people (5 females, 3 males) of average 78-year-old were participated in the test. Psychological, physiological test were performed in the process of gardening activity. Firstly the survey of POMS (Profile of Mood States) for 6 participants were done to test psychological change.

POMS(Profile of Mood States) is the test of survey type to check the condition of feeling at present, and it can measure 6 factors of tension, unfairness, anger, vitality, tiredness, confusion at the same time.. The

test in this experiment was done over 2 times for before and after gardening experience and the condition of feeling was checked.

Secondly the investigation of brain bloodstream is the way to measure the degree of brain activity. The time of that the amount of bloodstream is much means the point of brain revitalization. It is regret that the investigation was performed for only 1 testee due to the restriction of time and equipment.



Figure 5. POMS and investigation of the brain bloodstream

4.2.1 THE RESULT OF EXPERIMENTAL TRIAL

1) The result of psychological test (POMS)

According to Tada Mitsuru, studying on the effects of gardening activity to human being, it is suggested that gardening activity is helpful for mental treatment and six factors of nervousness, unfairness, anger, vitality, tiredness, confusion make reaction equally most have psychological stability based on the results of POMS survey for generally young healthy and normal testees.

However contrary to the general case, different results were shown in the test which was one for average 78-year-old senior citizens. The following causes were found from the opinion of Tada Mitsuru.
①The average age of testees are 78-year-old so doesn't they feel stress for the experiment? : The experiment was started under the condition of physical weakness due to old age. ②Problem of experiment time : The survey was processed right after lunch time was finished so it is possible for them to be sleepy. ③Difficulties in vague questions : Doesn't questions of POMS request vague answers and isn't difficult to understand? ④It was regarded that most answers to question were wrong : Filling the answers out in the survey can be done for normal testees, but staffs helped to solve the problems. Nevertheless, the aged had one of characteristic that they usually said 「yes, yeah」 to any questions, so that it was a little bit hard to distinguish right and wrong answers.

Much gap between factors is shown due to such kind of complicated variance of error. Negative reactions were shown in the items of [tension-anxiety, [unfairness-dullness, [anger-hostile] However, the figures of more after-test than before-test were increased in the items of vitality, the confusing condition was decreased more after-test than before-test in the item of confusion(Fig. 6)

Based on the above results, it is regarded that simple gardening work acclimate the confusion of human being.

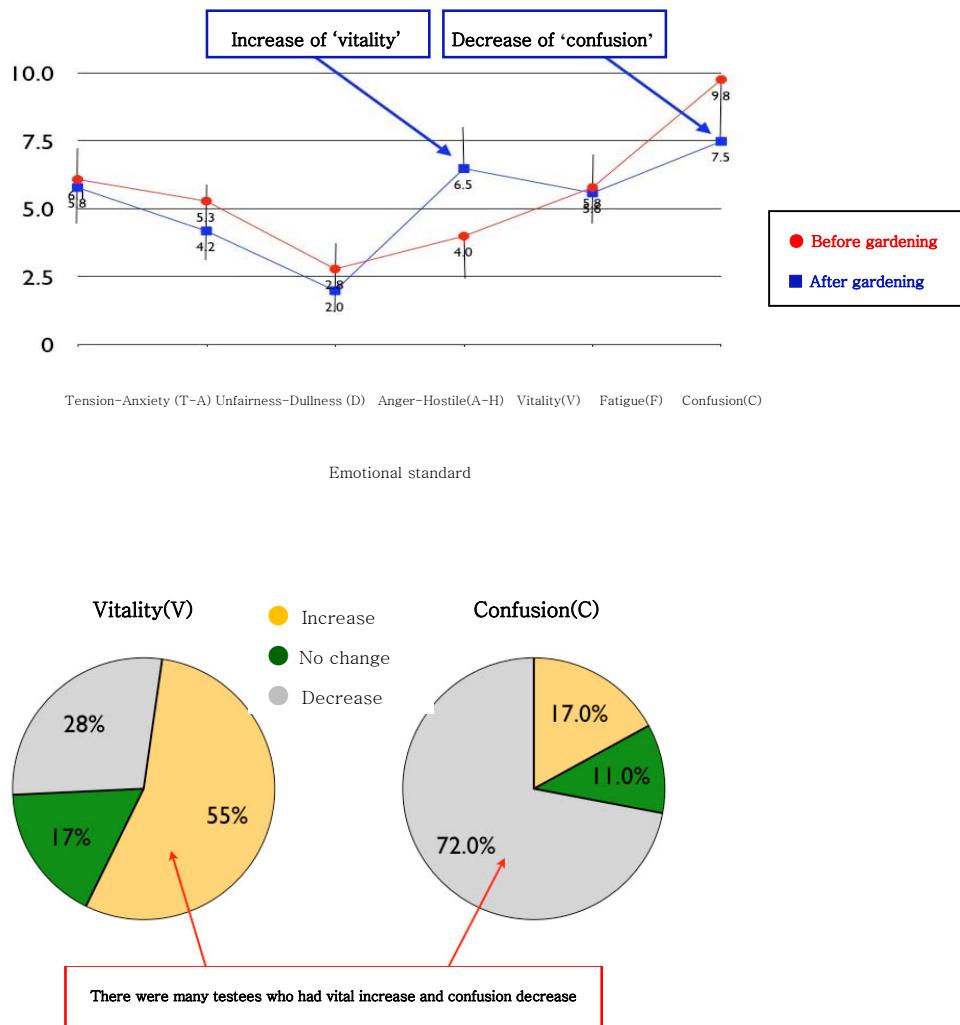
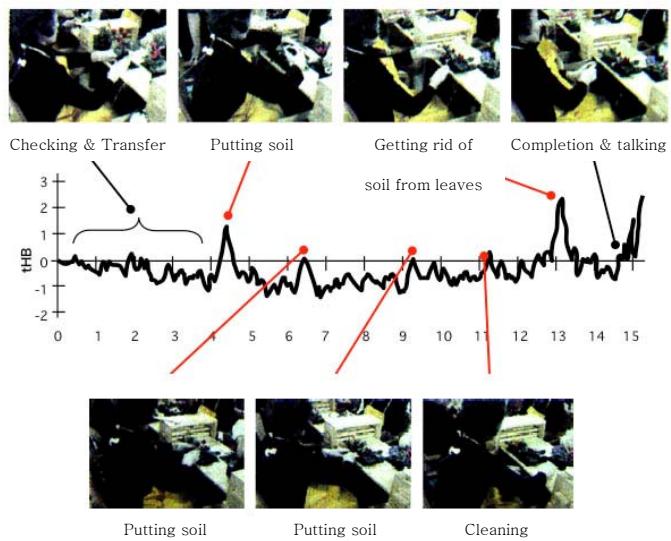


Figure 6. The change of emotional condition by gardening activity (POMS)

2) The result of investigation of the brain bloodstream

Investigation of the brain bloodstream is consisted of periodical increase and decrease of 10 seconds and independent peak of 30~60 seconds in gardening experience. In case of independent peak, the action itself is simple, but it was observed when the subject is in gardening work(planting, watering etc)(Figure 7.) According to expert's advice, it was suggested that the function may be revitalized when participant concentrates on simple work than do on the complicated work in gardening experience.



Simple but attention is need. Peak of 30~60 seconds is observed in work.

Figure 7. The change of brain bloodstream in gardening work (left sinciput measured)

4.3 THE RESULT FROM OBSERVATION, VERIFICATION

The approach of universal design is needed to solve the structural problem of 「planter table kit」 and it is also required to perform experiment which can prove and verify the effect of gardening activity through the observation and experimental test in facilities for senior citizens. The summaries of review are as follows.

- 1) The problems on the space and using of tools in 「planter table kit」 were much indicated. Especially obstacle factors for senior citizens were observed while there were no problem for the young to use tools
- 2) Senior citizens or staffs' reactions (action, gesture, and way of talking) were found in the observation of gardening experiment, and senior citizens' physiological, psychological, and social effect can be observed by gardening activity. It was observed that gardening has the effect to bring out potential energy from human being as well as to improve communication effect at the same time.
- 3) Even though it was impossible to get accurate figures on the degree of general people through experiment test of POMS and investigation of brain bloodstream, it was shown that gardening activity using 「planter table kit」 stimulate senior citizens' senses psychologically, and physiologically. It is regarded that the comprehensive validity of gardening activity was identified when taking into account of that senior citizens have been isolated and losing the chance of locutionary act and movement in the facilities.
- 4) The comprehensive factors of that the average age of senior citizens is high and experiment

conditions were acted as the obstacle factors of experiment. Seeking new model of experiment was required in this experiment. And also the necessity for new experiment which targets relatively younger group of senior citizens or young people of between 20's and 30's than senior citizens over 70's who have remarkably low competence of cognition.

4.3.1 EXPECTED EFFECT

- 1) NPO : It is regarded that system operation is possible to accelerate the development of product and program which has high social contribution through the observation and experimental test and the development of 「planter table kit」 product.
- 2) Producer : It is aimed to develop products which are not included in general companies' business area so that the development of business model which has high social contribution can be done.
- 3) Facilities: The chances will be offered for facilities to have continuous product service which is certified by social system.
- 4) Users : It prevents senior citizens from degenerating body competence(rehabilitation effect), the satisfaction of life and psychological stability are getting higher.
- 5) Medium Agent Function : It is expected that product design which the testing of human engineering is repeatedly done and product service of order-and-delivery type will be incited. And also it will be renovated as the design process to drive NPO activity.

5. CONCLUSIONS

Today design has an important meaning and role in the society. It can be said that design plays a decisive role in the life of mankind, and in this context it is regarded the impact of designer's idea and thought on design product is enormous. As it is mentioned in the above, current process of product development has been operated for only buyers in economic prospect to get profit so that it is impossible to fulfill the equality and welfare of human being in this way. And also the design will reach at uppermost limit if it is continuously done by segmenting buying subjects based on stereotype such as the disabled, the aged. The responsibility on design and ethical consumption to overcome these problems are gathering strength. Thus the approach of universal designing method which does not isolated social members physically, psychologically as well as comprehend everybody in equal.

Sample product designing which used NPO's social activity through the movement of 「MAF process」 was possibly performed. And also the observation and experimental test for gardening experience in senior citizens' facilities were performed as a part of certification step on sample product. As the result of it, it was

an important momentum to certify that gardening activity is valid method to give psychological, physiological, and social effect to senior citizens. However, it is regarded the experimental observation and data verification in scientific experiment are not fully enough. Especially it is needed to seek suitable experiment for senior citizens to perform more accurate results or it is required to make idea to select testees who has relatively stable physical and mental condition as the preparation for higher senior citizens.

Promotion activities to attract sponsorship from company remains in the aspect of operation to make design process to business and this should be done by making use of verification data of sample product and test. In order to do this, product service in other side such as the hosting of gardening event for general people and the extension of users for 「planter table kit」 must be taken into account. This will be a new concept of model which can develop current stage of design process and it is expected to bring new product and product service based on social activities.

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