1.5. Empowerment through design-doing experiences: workshops on nurturing creative makers for sustainability

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Abrstract
Transition towards sustainability entails dramatic changes in design and production. Accordingly, The term "prosumption" coined by Alvin Toffler (1984) refers to a shift in consuming society in which people become creators of their own products. As Anderson (2012) similarly argues that the new industrial revolution concerns "creating creative makers", empowering people through design learning process is of a paramount importance. This paper is a preliminary attempt to examine how people without design background can be empowered through design-doing experiences to create products. To serve this purpose, we conducted two design-doing workshops in Brazil and Finland in which designers played the role of facilitators throughout the learning, designing and making process. The results from both workshops indicate that the participants felt a remarkable sense of empowerment to design and make their own products, and achieved a new perspective on daily life.

Keywords: Design-doing experience, Empowerment, Design learning process, Design for sustainability

Sustainability has received widespread attention over the last two decades and has affected various aspects of human life such as design and consumption. Consequently, design is undergoing a revolution as a result of the recent concerns about sustainability. The transition of design towards sustainability suggests that within the next few years, design is destined to become inevitably sustainable (Shedroff, 2009). Recent developments in design for sustainability have led to a variety of new approaches to re-think the traditional processes of design and consumption. For instance, Walker (2006) underlines the importance of ingenuity and restraint by stressing the necessity of "finding new solutions that requires less". He concludes that the concepts of extemporized design as well as self-made products are directly connected sustainability. Walker's view is in line with the well-known Maslow's pyramid in which self-sufficiency is listed as one of the main needs of human being. Consequently, human tends to shift his role from purely passive consumer to an active producer in order to satisfy his own needs (Atkinson, 2006). Since 1980, as a result of increasing concerns about sustainability, the position of people has been changed from merely customers to co-creators in the design process (Fuad-Luke, 2009). The shift from consumers to creators is also reflected in the term "prosumption" stressed by Toffler (1984), indicating an approach to sustainability in which consumers create (produce) for their own consumption. Arguably, prosumption

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includes not only the process of production and consumption, but also remarkably meaningful layers such as value creation. For this reason, prosumption can be described as an "activity" initiated by the consumer in order to create values (Xie, Bagozzi and Troye, 2008).

DfS: DIY for sustainability

Prosumption activities include a wide range of approaches to self-sufficiency such as "Do It Yourself: DIY". DIY is recognized as being a type of prosumption (Wolf and McQuitty, 2011) in which prosumers creatively make products for their own needs and desires (Buechley,Rosner, Paulos and Williams, 2009). DIY is generating considerable interest in the field of consumer behavior studies as well as design researches. However, there is still a need for further studies in order to develop the concept theoretically and practically. An important area in DIY studies includes the relationship between DIY activities and sustainability and "how can DIY lead to the creation of sustainable societies?". This relationship can be studied from various perspectives. For example, DIY has been identified as being a process of value creation (Wolf and McQuitty, 2011). A product that is made through a DIY process seems to be more meaningful and valuable for the producer due to the use of his own creativity. For this reason, the producer tends to retain the self-made product. Transition towards sustainability entails new visions of value (Fuad-Luke, 2009). Thus, DIY activities as a source of value creation can help individuals as well as communities to reach sustainability (Walker, 2006). In addition to the concept of value creation, DIY activities are consistent with sustainability due to the use of existing resources and repurposing materials. Given that, this paper focuses on how to empower non-designers to participate in DIY activities through design-doing learning process and consequently have a role in creating a sustainable society.

From the design point of view, the focal point of DIY activities is creativity. As previously noted, DIY activities are consistent with value creation and making use of existing resources, both entails creativity as a vital factor. Walker (2006) illustrates that DIY products are more valuable for us due to the use of our own creativity in the making process. He also argues that limited resources and scarcity can provoke creativity. Following that, Walker draws our attention to the role of design in sustainability and underlines the necessity of creativity and concludes that traditional approaches to creativity cannot result in design for sustainability. Thereafter, he suggests that design is a process of creativity by "thinking and doing". Therefore, learning design through theory seems to be insufficient and practice should be embedded in design learning process (Aylward, 1973). Conclusively, efficient learning can be achieved through practice (Wenger, 1999). This reflects the old adage: "I hear and I forget, I see and I remember, I do and I understand".

Recent movements in design suggest a new industrial revolution in which everyone is considered to be a designer (Anderson, 2012). For this reason, people should learn to think as a designer (Lupton, 2006). This entails the development of design education and approaches to learning (Harahan, 1978; Fleming, 2013). To serve this purpose, people should be involved in the learning process through creative activities by Designing and Doing (Harahan, 1978; Kilicaslan and Ziyrek, 2012). Anderson (2012) demonstrates that the current situation of the world demands a new design culture by "creating creative makers". He describes the core criterion of the new industrial revolution as the age of "making of makers" that can be achieved through practical design education. The author highlights the need to place "making things" as a subject in the school programs to create designers for the new era.

While recent approaches to design tend to engage people in different phase of the design process, the concept of new industrial revolution encourages people to become "designers". As noted, the changing position of consumers to the maker of their own products requires a process of learning through design-doing practices. We believe that the concept of "creating creative makers" demands a learning process that empowers people to design and make products. The aim of our work is to empower non-designers to achieve a design-doing experience within the framework of DIY activities. To serve this purpose, we initiated a research by conducting two design-doing workshops, in which the participants were able to experience the sense of empowerment through a learning-making process. The present paper describes the design-doing practice as well as the learning approach provided through DIY workshops.

DIY to design-doing

DIY (Do-It-Yourself) activity is identified as a process of using, modifying and repurposing available resources to creatively produce an object (Buechley,Rosner, Paulos and Williams, 2009; Wolf and McQuitty, 2011). Regarding the relation between DIY activities and Sustainability, Shultz (2011) demonstrates that DIY is remarkably an eco-friendly approach to consumption due to the use of recycled and reused resources. In addition, DIY activities have been proved to be value-creation processes since they create a personal attachment between people and their own products (Hoftijzer, 2011). Consequently, people tend to care more about their own creatures, which in turn leads to more durability of the product (Verbeek, 2000).

In the field of DIY studies, the term "community" is attracting considerable attention. Wenger (1999) argues that one of the initiatives of community creation includes collecting people to tackle a problem or to create. Therefore, connection with the community of creators is known as the major benefit of DIY activities (Frauenfelder, 2011). Tapper, Zucker and Levine (2011) underline the role of community in the process of learning. They argue that learning can be achieved in the framework of social participation. Similarly, DIY is described as a learning process, which provides the participant with opportunity to share ideas with other members of the community (Wolf and McQuitty, 2011). Participating in community-based activities can also encourage people to create new experiences by the support from the community (Scott, Bakker and Quist, 2012). Frauenfelder (2011) illustrates further reasons for the empowerment through DIY activities. He reaches the conclusion that participation in DIY leads to more comprehensive understanding of the environment and consequently the sense of control over that.

Fuad-Luke (2009) stresses the importance of participation in design activities in the transition towards sustainability. We believe that the concept of participation in design includes not only the design activities, but also the learning process of design. According to Kimbell (1982) design learning process entails active engagement of participants, which results in the development of their understanding of the environment. Thus, he proposes that design learning requires a structured practical framework.

In the present research, we focus on a design learning process that aims at design for sustainability. In recent years there has been growing interest in the development of learning processes towards sustainability, suggesting that design learning should remarkably emphasize eco-design and approaches to design for sustainability (McCannon, 2010; Griffiths and O'Rafferty, 2010).

The main question we try to address in the present study is how to construct a design learning process, which can serve the desired purposes. Knott (2013) asserts that people must learn their own ways of designing and doing. This is in complete agreement with Wenger's (1999) statement that design learning should focus on providing new perspectives rather than offering a "recipe". Accordingly, we believe that the design learning process entails facilitation, as Wenger emphasizes facilitation in design learning process. Through facilitation of learning process, participants will be empowered to experience new possibilities and develop their creativity (Aylward, 1973).

Practice-based learning is recognized as being a markedly effective approach in design education. It encourages students to become involved in thinking and doing creatively (McCannon, 2010). Additionally, hands-on experiences are considered as reliable sources to gain knowledge due to the practical nature of experience (Shultz, 2011). However, studies on the efficacy of design-doing experiences in the context of design education seem to be insufficient (McCannon, 2010).

Design-doing experiences empower the participants to realize their capabilities and fulfill three goals within the process: (1) to design, (2) to make, and (3) to evaluate the work (Wolf and McQuitty, 2011). In order to validate the concept of "empowerment by design-doing experience", we conducted the following workshops. Regarding materials and tools, the project was based on using the existing random materials. This was in line with Walker's (2006) argument, emphasizing the effectiveness of making use of existing resources in design. He points out the influence of "scarcity" on "creativity" and concludes that the lack of resources results in more innovative outcomes since people try to "create something useful from very little".

Methodology: designing the framework of workshops

VOQ project (see: www.viraroque.blospot.com) was a practical research within the framework of DIY activities in order to empower non-designers to recognize their design abilities by thinking creatively and eventually making a product. The research project aimed to validate the fact that people can have a considerable influence on their surroundings and consequently on the transition towards sustainability.

The VOQ project sought to address how design-doing practices leads to the development of learning and consequently encouragement of people to think, design and create. We believe that the design-doing practices provided in VOQ project enable the participants to replicate the experience by themselves due to the achieved empowerment.

This section describes the methodology employed in our research project, that is divided into two subsections. Firstly, we give an overview of the theoretical foundations of our methodology and define how the learning process in VOQ project was based on the previous methodologies. Finally, the two design-doing workshops will be presented respectively, and their differences in terms of the process applied in each experience will be explained.

Basis of the design-doing methodology

The methodology in VOQ design-doing experiences is initially based on two learning processes: (1) the "Triangular methodology for art education" presented by Barbosa (1991), and (2) the "Steps of the creative process" proposed by Von Oech (1987).

The triangular methodology (Figure.1) explains the process of art education in three phases. The first phase includes the learning of the art history that initiates an understanding of the connection between arts and everyday life. The second phase consists of the practice of art critique. This practice enables students to understand and evaluate art works. In other words, the practice of art critique empowers students to provide opinions about works of art. The final phase is called "making art", which aims at engaging students in the practice creating an artwork. This creation is assuredly based on the knowledge and sense of evaluation gained through the previous phases (Barbosa, 1991).

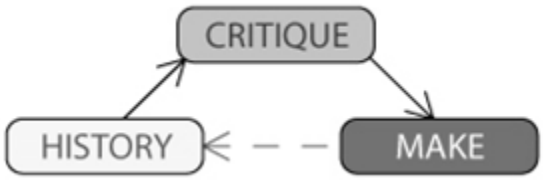

Figure 1 - Triangular methodology by Barbosa (1991)

In addition to the triangular methodology, we used the process of creativity proposed by Oech (1987). He illustrates that the creativity process consists of four steps (Figure ure.2): the explorer, the artist, the judge and the warrior. Each character represents a stage of creativity process. Explorer mirrors the process of collecting necessary information related to a specific topic. Artist represents the experimentation phase of the process in which the previously collected materials is used freely to create a number of possible solutions for the topic. The third character, judge, symbolizes the process of evaluation and critique in order to choose the most appropriate solution among the proposed ones in the previous phase. Finally, the warrior stands for the stage of applying the selected solution in a broader context.

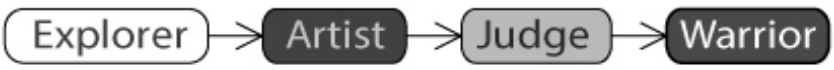

Figure 2 - Creative process by Oech (1987)

Combining the triangular model and the creativity process, we developed the design-doing methodology in VOQ workshops. Figure.3 illustrates the four stages of learning process in VOQ project. Here we provide a brief explanation of each stage. However, due to the practical nature of the project, more comprehensive understanding can be achieved through examining how the methodology works in practice as applied in VOQ workshops.

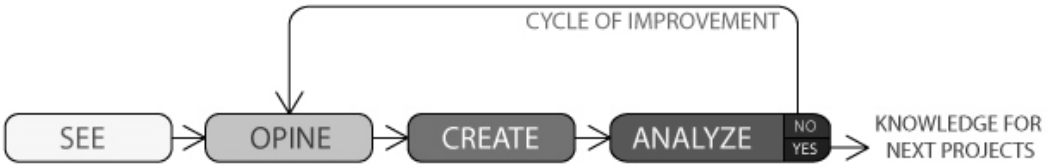

Figure 3 - VOQ design-doing methodology

The VOQ design-doing methodology demonstrates the interplay of thinking and doing and experiencing throughout the four stages, within a problem-solving framework. To inform this framework in proper way, the methodology supports on local issues. Therefore treating topics which are common to the participants.

The first stage, namely "see", consists of understanding the status quo of a proposed topic. The second phase, "opine", comprises critical analysis of information gained in the previous phase. This is where the participant filters information from the previous stage and develops a series of guidelines. The guidelines are prerequisites for the development of the design-doing experience in the next phases. The third stage, called "create", embraces practical experimentations as well as exploration through experiences. "Analyze" is the fourth stage, which aims at the evaluation of the practical work within the framework of the guidelines created in the second stage. At the end of this stage, according to the result of the analysis, the participants can enter the "cycle of improvement". This cycle consist of returning to previous stages in order to perfect the project until it matches the prerequisites.

We found that our methodology is practically in line with a variation of models proposed by other scholars. For instance, Aylward, (1973) and Kimbell (1982) emphasize the skills one should learn to accomplish a design task as: (1) enquiry/exploration skills, (2) communication skills, (3) manipulative/constructional skills, and, (3) evaluative/discriminatory skills. Similarly, Scott, Bakker and Quist (2012) stress the importance of doing and thinking articulation in practice-oriented design. Finally, Kimbell (1982) and Baynes (1969) point out the importance of facilitation in design learning process and argue that design-doing practices should be facilitated by designers.

Design-doing experiences

Workshop 1

Topics: Furniture and Objects
Date: September, 2009
Duration: 4 hrs/workshop
Organizer: Design Possível NGO and Projeto Arrastão NGO
Project name: Design de Perifa (see: www.designdeperifa.blogspot.com)
São Paulo, Brazil

The first sets of workshops consisted of four separate design-doing modules in terms of the theme: (1) to organize (2) to light (3) to sit, and (4) to support. Each workshop included 8 to 17 participants. Participants' age ranged from 14 to 17, studying Art and Environment complementary education programs, at the Arrastão NGO. The workshop was planned as a part their study course, thus no pre-registration was required. None of the participants had

previous knowledge or experience in design. Therefore, the workshops were facilitated by two industrial designers. Despite the difference of workshops' themes, the structures were similar (Figure. 4), varying only in the content. Each topic posed a problem to be solved during the given time (four hours). The participants were asked to tackle the problem using simple hand-tools (such as hand saw, hammer, drilling machine and screwdrivers) as well as scrap materials (such as wood pieces and broken objects, collected from surroundings).

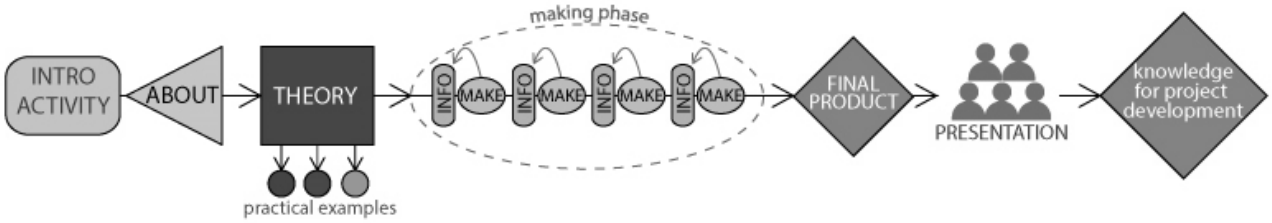

Figure 4 - Process of Workshop1

Figure.4 shows the process of the workshop. The introduction phase consisted of experiencing the actual problem (the main topic of the workshop). For example, to experience the need for "supportive objects", we collected the participants in an empty room in which some images were installed in the middle of the space. Handing papers and pens, we asked the participants to draw one of the images in five minutes while they were not allowed to use walls or floors as support. The aim of the introductory task was to lead the participants to work as a group in order to fulfill the task (Figure.5).

Figure 5 - Group performing the introduction task

Following that, we started a reflective conversation about their experiences. Expectedly, students pointed out the lack of supportive objects such as table that could ease the task. As the conclusion, we presented the main theme of the workshop: "to support" and asked them to make a table to solve the existing problem. To prepare the students for the making phase,

we designed the "theory" phase, which consisted of visual and verbal presentations. Presentations included examples of the topic (in this case, table). We divided the examples into three categories: (1) designers' objects (products designed by famous designers) (2) designed objects with sustainability features (in terms of materials and process of production), and (3) up-cycle vernacular design objects (DIY products). Students were asked to make notes, throughout the presentation, expressing their opinions about the images and explaining why they liked or disliked them. Eventually, each of the participants prepared a list of criteria to refer during the project (Figure 6).

Figure 6 - Presentation phase

In the making phase, participants were divided into groups and each group provided with materials and tools (Figure 7-9). Afterwards, facilitators asked the groups to explore available materials and experiment possible solutions. This stage consisted of the interplay between experimentation and reflective thinking. Throughout the making stage, facilitators were assisting the progress of the groups. In addition to helping the participants to use the tools, facilitators were playing the role of creativity trigger. For example, they were trying to encourage students to think and experience other possible solutions by asking "why not?" or "How many other ways can it be done?", as well as referring them to previous phases.



Figure 7, 8, 9 - The making phase

Simultaneously, each group was provided with media documentation devices such as camera and computer. The computer was connected to twitter and blogger, enabling the groups to document, publish and receive immediate feedback on the development of the project (Figure 10).

Figure 10 - Students documenting their progress

Once the group was satisfied with the result, they focused aesthetical factors such as painting, sanding, coating and drawing on the final object. Subsequently, each group presented their product to the other groups. During the presentations they explained three topics: (1) how they built the product, (2) how they worked to meet their prerequisites, and (3) what changes they would make to improve the product.

Finally, the products (total of 11) were transferred to the DDP exhibition at Arrastão NGO's premises in November 2009, for public visit (Figure 11-20).

Figure 11,12,13,14,15,16,17,18,19,20 - Final products of Workshop 1

Workshop 2

Topic: Trash and Creativity
Date: March, 2013
Duration: 2 hours
Organizer: Metropolia University of Applied Science, Environmental Engineering program
Course name: Environmental Arts
Vantaa, Finland

The second workshop was a part of Environmental Arts course in Environmental Engineering program (Bachelor Degree). The aim of the module was to engage students in a design and creativity process, and familiarize them with design for sustainability. A total of 15

students (17 to 20 years old) participated the workshop. They were divided into three groups, with no background in design. The Environmental Arts course aimed at the production of arts works by using trash, generated in the campus during a semester. The workshop consisted of two hours teaching and experiencing, facilitated by one industrial designer. The major difference between this workshop and the former one included the making phase, as for the latter took place after the workshop. For this reason, we re-designed the module (Figure.????), in which students were given two months to create their products.

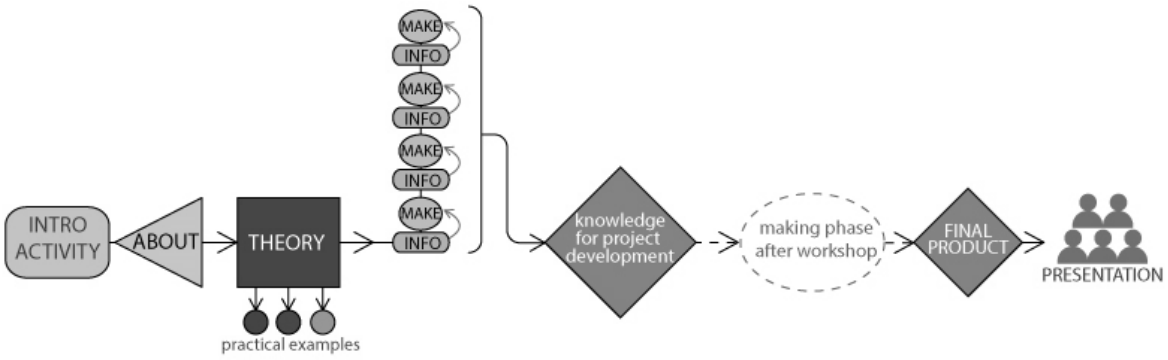

Figure 21 - Process of Workshop2

The introduction phase started with an activity to create an informal atmosphere and prepare the participants for creative thinking. For example, students had to throw an object (Angry bird doll) as "speaker stone" to each other, meaning that the one who receives the object should introduce himself (including name, one thing that he liked and did not like). Afterwards, we described the structure of the workshops that started with theoretical introduction to sustainability, up-cycling and recycling, trash re-use and DIY. Furthermore, we presented examples of products made from up-cycling process or DIY in the VOQ project.

As previously mentioned, the making phase could not take place during the workshop time. Therefore, we planned some exercise based on Oech's (1987) model to prepare the participants for creative activities. The first exercise, called "circle drawing", focused on the "explorer" perspective. We provided students with pen and paper and asked them to do the following tasks respectively: (1) draw a circle, (2) put a dot inside the circle, and (3) draw a line from one side to another side of the circle. After, the participants were asked to compare their drawings with other ones. Expectedly, they realized that the drawings were remarkably similar. Consequently, we explained the importance of exploring in creativity by pointing out alternative ways of doing the task.

The next exercise, sought to address the "explorer" as well as "the artist" according to Oech's model. We handed a paper to the participants, on which 12 empty rectangles were printed and asked the students to transform each of the rectangles into a new image (Figure 22). In other words, our main focus was to improve the explorer (examine what can be done) and the artist (transforming into a new shape).

Figure 22 - The "explorer" phase exercise

In the following exercise, we focused on three aspects of the creativity process: the explorer, the artist and the judge. We asked the participants to stand in a circle, hold each other's hands and remember who the neighbors were. Then they were asked to release their hands and freely walk around the classroom until they hear the "freeze" sound. At this stage, they were asked to find their neighbors and try to catch their hands again without making a circle. As a result, the participant created a sizeable knot. Thereafter, students were asked to re-create the initial circle, holding each other's hands. The purpose of this exercise was to enable the students to experience the "cycle of improvement" in the VOQ methodology. Consequently, the participants could experience the explorer (understand the situation), the artist (create the knot), and the judge (compare it with the initial circle) (Figure 23-25).

Figure 23, 24, 25 - Students performing the circle exercise

In addition to the workshop, the learning process was supported by complementary activities based on the VOQ methodology: (1) see: they visited art museums and investigated the waste issue in the campus, (2) opine: students evaluated the results of the previous stage, (3) create: students had the opportunity to experience the materials during the course, and (4) analyze and finalization: they evaluated and prepared the product for the final presentation.

Figure 26, 27, 28, 29, 30, 31, 32, 33, 34,35 - Final products of Workshop 2

Workshops' results

The outcomes of design-doing workshops derived from the participants' feedback as well as the final presentations of projects. Feedback from Workshop 1 was collected through interviews with participants by a TV program called Usina de Valor (HSM management TV) in Brazil. In Workshop 2, feedback was taken by Metroplia University as a written form. Each team received a feedback form in which the participants shared their feelings and opinions about the following aspects of the workshop:

- Theoretical part
- Practical part
- Teamwork

- Cognitive outcomes
- Emotional Influence

Analysis of workshop 1

The final production of groups underlines the importance of community in design-doing learning process. Our observation from team works as well as feedbacks indicated that Groups with strong connection and communication experienced a more joyful activity and consequently more successful outcome. The presence of media also helped the groups' performance considerably. A team member who was not completely involved with the making phase, took the responsibility for the project documentation. Therefore, we were able to see the workshop through the lens of participants.

Interestingly, students showed significant emotional attachment to their productions, as they asked to take the objects home. However, they were not allowed to take the product because of the exhibition. Nevertheless, the participants were impressively taking care of their own creatures before and during the exhibition.

Stressing the role of empowerment by design-doing experiences, the last workshop (to support) included some participants who participated in the first workshop (to organize). These participants showed a better control over the process and were often leading their new groups through the stages of the workshop. Obviously, these groups showed a higher performance and accomplished the projects considerably faster. As a result, they had enough time to focus on aesthetical aspects of the product such as painting and finishing.

Figure 36, 37 - Finalizing the products

Analysis of workshop 2

In the final presentation, students presented their approach to the design-doing practice as well their achievements. They also presented their trial and errors and consequently focused on how they overcame the barriers. This indicated the importance of "doing" experiences in the learning process, which leads to empowerment. While two groups had a specific goal at the beginning of the workshop, the third followed an open approach to the process. The themes were as follow:

Group 1: Create a piece of art - increasing the awareness to preserve coral reefs

Group 2: Create a graphical piece - raising consciousness of the other students about the waste generated in the campus

Group 3: Create useful objects – using the waste in the campus

The first two groups were straightforward on reaching the goal. They went through the methodology with their strict aim in mind. Therefore, the outcome was not unexpected and the goal was fully achieved. On the other hand, the third group chose an open approach and based their work on experimenting materials in order to create any kind of useful objects. This group had a more diverse result. Their objects ranged from baskets to bags and art pieces (Figure 25 to 34).

Comparing the final products of each group, we did not identify any significant difference in terms of being more creative. All groups reported that they experienced extreme fun during the projects and interested in doing similar practices in their daily life.

Learning process outcomes – feedback on experiences

Participants' feedback after the workshops reinforced the validity of design-doing methodology in three categories:

1 – New perspective

According to feedback, most those participated in design-doing workshops commented that the experience created a new perspective to their daily life. For example, a participant from Workshop 1 strongly believed that the experience shifted her vision in life, "It is another way to see things. Completely different from how I used to see. It changed my way of life", she said. Similarly, a group from Workshop 2 concluded that "The reality of things depends on how you look at it, a complex thing may prove to be simple, when you change your point of view".

2 – Empowerment

The majority of respondents reported a sense of empowerment after the design-doing experiences. For instance, a student from Workshop 1 commented, "so, (we did) things that I could not even imagine that I had the power to do". One of the groups in workshop 2 stated, "First we did not know much about the topic and how to do, but the process was really understandable and inspiring".

3 – Practical experience

Interestingly, nearly all of the participants emphasized the importance of practical experiences to deal with everyday problems. For example, a student from Workshop 1 described the experience as: "It was like, like a shock! We didn't know… then you see that thing lying down on the floor… and thought it is useless. And then after a short time, this same thing, you take and transform in something different", and another participant from Workshop 2 stated that "It is extremely useful to see how your project relates to real life".

Conclusion

This paper has underlined the importance of design-doing practices as examples of DIY activities in the process of design learning. It has also portrayed the process of empowering the participants to experience hands-on activities. In addition, the study indicates the fundamental role of designers as facilitators in leading the learning process into desired outcomes. Furthermore, we believe that the strength of our work lies in the methodology

designed according to the framework of each workshop. Referring to the participants' feedback, results have been noticeably promising, thus we think that our method could be applied to similar design-doing practices with minor modifications.

Our work has led us to the conclusion that design-doing experiences result in creating the sense of empowerment despite the differences of learning process. According to the students' feedback, the sense of empowerment as well as achieving new perspective indicate the long-term effect of design-doing experiences on their daily life, which can eventually lead to a more sustainable way of living. This supports Anderson's (2012) idea about the new industrial revolution as "creating creative makers", in which people are encouraged to design and make their own products.

We hope that our work will be helpful for future studies on the transition towards sustainability on a wider level. Thus, to further our research about empowering people to choose sustainable life ways, we are currently investigating alternative ways of living in particular contexts such as Helsinki, Finland. The prospect of being able to empower general public to believe in their roles in sustainability, serves as a continuous incentive for future works.

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