

The Interdisciplinary Collaboration of Innovational Design

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Abstract. The purpose of empathic design is to motivate the empathy of designers to better understand the potential needs of users (including the proprietors). The example of Youth Originality Design Camp of Liouduei in 2011 was used in this research to examine the design procedures of the innovative products for interdisciplinary empathic design of the local industries and to analyze the process of interdisciplinary empathic design conducted by grouped specialists in various fields and the students, design behavior of students from different departments and the influence on design after students experience the local cultures and industries. Thirty-six students participating in the contest were investigated in four phases. According to the findings of the research, recognition from 64(%) to 90% of the students was obtained after allowing them to experience the Liouduei culture and the students, learning from the proprietors on the first stage, benefited from empathic design in learning of the local culture. In phase two, students considered that they stayed at the proprietors' homes for the night, which provided an opportunity for them to have an in-depth understanding of the proprietors' problems. On the third stage, recognition of 87% of the students was acquired after an in-depth interview between the students and proprietors. In the last phase, 84 to 85% of the students identified with brainstorming and prototype production. The results of the research indicate the procedures for innovative interdisciplinary empathic design help the students enhance their empathy basically, and benefit them to better understand the needs of the proprietors and motivate them to form creative ideas; however, there is still a long way to achieve commercialization.

Keywords: Empathic design · Innovational process · Creative design · Interdisciplinary collaboration · Design workshop

1 Introduction

People emphasize the spiritual significance of consumption and emo Design in the 21st century focuses on the emotional needs in the minds of consumers and is characterized with the properties of touching and experiencing. Design changes with the trendy demands in various fields and empathy has been explored in philosophy and aesthetics

already. Empathy has been applied to design recently to provide more considerate design to users and to discover and satisfy the potential needs of users. Consequently, the example of Youth Originality Design Camp of Liouduwei in 2011 was used in this research to examine the design procedures of the innovative products for interdisciplinary empathic design that the students participating in the contest might be empathic to the needs of the proprietors.

Design is empathic since designers are required to have more penetrative ideas that others may not observe for improvement. This kind of observation can be trained and developed through systematic ways. Empathy of designers may be enhanced and the potential needs of users can be disclosed more clearly when applying the concept of empathic design during the process. Empathic design is to create empathy via the design procedures to discover the potential demands of users. Nevertheless, demands usually aim at two targets from the perspective of the industrial chain. One is the proprietors and the other is the users. Innovation of interdisciplinary empathic design in the local industry in Liouduwei of southern Taiwan is the theme of this research. Design behaviors of the students in the design department were analyzed and the practical needs of the local industry were observed. Innovative procedures of interdisciplinary empathic design can help students to have an in-depth understanding of the industrial problems for empathic creation.

The example of Youth Originality Design Camp of Liouduwei in 2011 was used for the procedures of the interdisciplinary empathic design. Innovative products of the local industry in Liouduwei were designed and selected by the host. Thirty-six design young students participated in the contest in addition to design scholars, locally respected grand old men, craftsmen and experts. The purposes of the research are as the follows:

If the interdisciplinary empathic design procedures may develop innovative products that meet the proprietors' needs, if the interdisciplinary empathic design procedures can help students to be empathic to the proprietors' needs, and whether the interdisciplinary empathic design procedures can help students to develop empathy and design from the points of views of the target.

2 Literature Review

2.1 Interdisciplinary Spiritual Design Age

The dramatic changes in the 21st century arouse people to be aware of the environmental, cultural and social demands for a balanced development among the human beings, nature and technology. Natural and man-made disasters for the past few years are frequent in particular. Besides environmental protection, the spiritual need of people is even more important when facing major calamities. Take the natural and man-made disasters in Japan, including the earthquake, the tsunami and the nuclear disaster as an example. The lesson of spiritual reconstruction after disasters should be learned. Nowadays, people stress an emotional and spiritual life and the emphasis on materials in the past has been converted to minds. Though the spiritual needs are as important as the air, they have always been neglected. Empathic design listens to the

minds of the consumers and realizes the real needs of the human beings by applying a variety of ways and tools in this spiritual age. Luxury and elegance are no longer considered, but comfort and spiritual communication should be satisfied instead. The time of meeting physical needs earlier is called the physical age and the time of satisfying mental and spiritual needs now is called the spiritual age. Spiritual consumption will be the mainstream and a spiritual economy will be formed in the future (Tsao 2003: 10–11). Henceforth, the spiritual age of empathic design has also arrived.

2.2 Previous and Current Design

Design changes with social, cultural, economic, technological, political and educational variations. In other words, changes are to be made to cope with age demands. How to make changes among past, present and future has become an issue for designers. Design was usually conducted by an individual alone or teamwork in a single field before. However, such model won't be able to solve complicated design problems today. Therefore, an interdisciplinary teamwork model is required for current design (see Fig. 1).

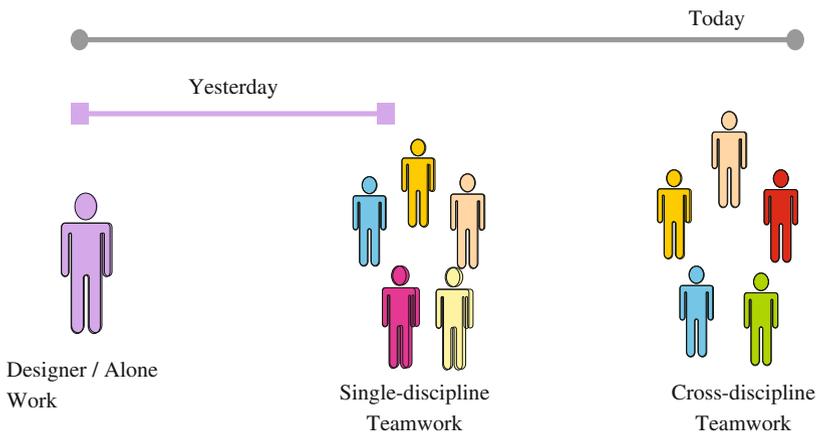


Fig. 1. A comparison of previous and current designers (Pitipanich 2010: 41)

2.3 Changes of Design

Influenced by the internal and external factors of technological and time changes, design needs to be changed as well. Designers used to execute a continuous design process from start to finish of a project in the past. However, an interdisciplinary team at present needs to decide what types of designers and tools are required for the task in the beginning and these designers will take part in the project until completion, which is a linear design process (see Fig. 2).

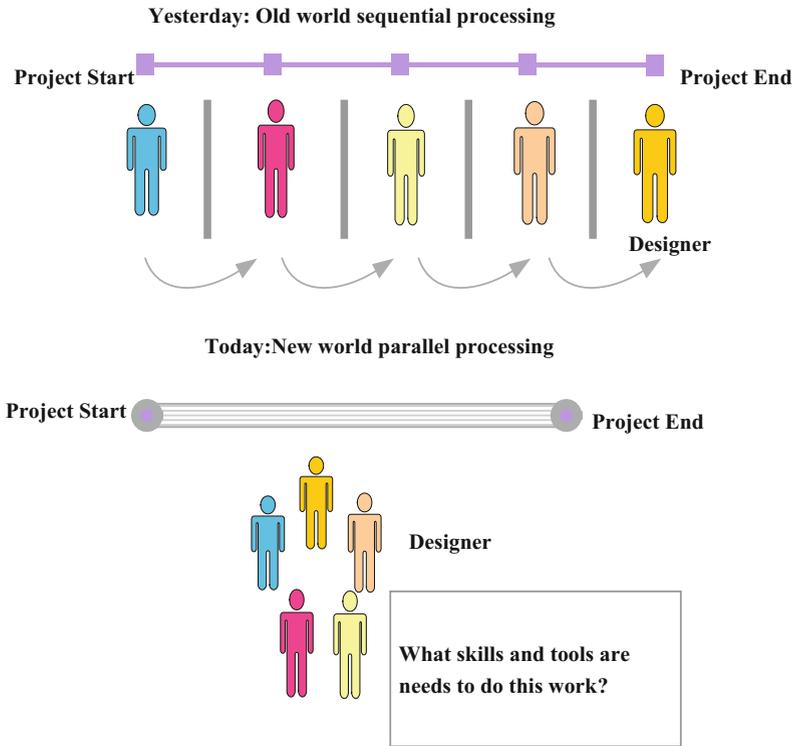


Fig. 2. Changes of design

2.4 The Advent of the Spiritual Empathic Design Age

Waal's mentioned in the preface of his book titled "The age of empathy – Nature's Lessons for Kinder Society" that greed was out and empathy was in. In the financial crisis of 2008, Obama, the newly inaugurated president of the United States presented the issue of empathy in his speech to the Northwestern University in Chicago. He said "I think we should talk more about our empathy deficit.... It's only when you hitch your wagon to something larger than yourself that you will realize your true potential." (Waal 2009). The coming of the empathic age reminds people of the necessity to ponder and reflect the essences of human nature and mother nature especially when tremendous changes happen to the politics, economy and culture so that empathy can be restored and the highest value of human being can be achieved (The 911 event occurred in the US then and the conflicts between Americans and Islamic people were unceasing.).

3 Methodology

3.1 Design Structure

Forming of an interdisciplinary design team: take IDEO as an instance. The members of its interdisciplinary design team consist of ergonomic and anthropologic experts and

visual and industrial designers depending on the project requirements, which belongs to a general industrial design process. Nevertheless, to suit the measure to local conditions, the interdisciplinary design team of the Youth Originality Design Camp of Liouduei in 2011 was composed of experts and teachers who were good at leisure and sightseeing, furniture production and design, design culture, community development and crafts along with participating proprietors and artisans. It was expected the combination of the traditional technique and the creativity of young designers might innovate the cultural products in Liouduei, which belongs to a cultural creativity product design process (Fig. 3).

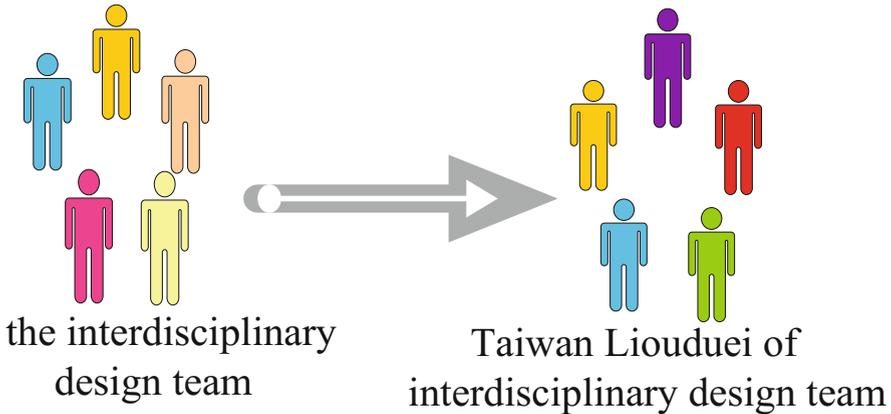
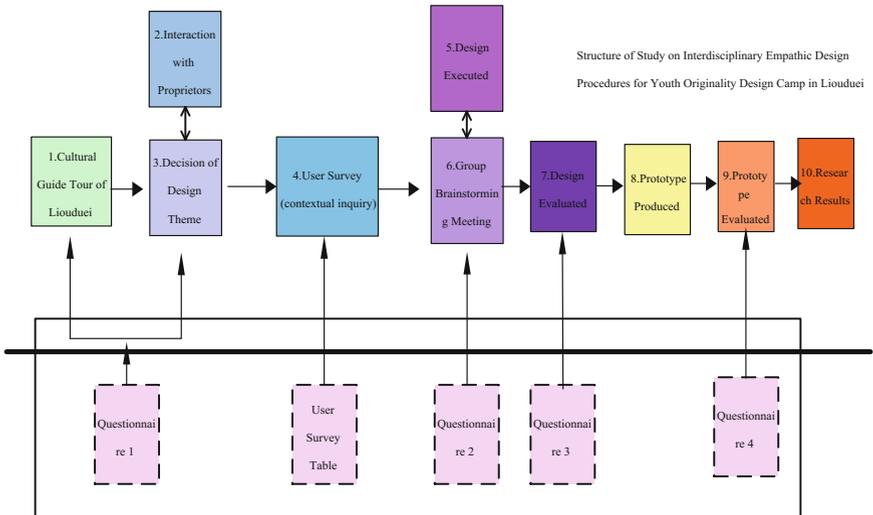


Fig. 3. Illustration of an interdisciplinary design team



Questionnaire Survey of Interdisciplinary Empathic Design Conducted

Fig. 4. Structure of interdisciplinary empathic design procedures

The structure of the research on the steps of interdisciplinary empathic design in Taiwan is based on the interdisciplinary design team of the Youth Originality Design Camp of Liouduwei in 2011, which was composed by interdisciplinary experts and teachers and was a design process of innovating local industry. To cope with the design competition rules planned for the Youth Originality Design Camp of Liouduwei in 2011, five stages were divided for testing and the study frame was illustrated as the following (Fig. 4).

3.2 Innovative Procedures of Empathic Design

Empathic design methods and testing steps are described as follows. On the first day, young designers were given cultural and historic classes about Liouduwei as well as lectures on cultural creativity product design and development after signing in to comply with the requirements of the design proprietors. They also had a guided tour in Liouduwei and decided the design theme with the proprietors before staying at the proprietors' houses for the night. For the second day, young designers were arranged to observe and record the demands of the proprietors and discussed with the teachers about their preliminary design charts and findings. The design concept of each group could be understood during interactive communication of team brainstorming meeting. On the third day, a design review and a discussion with the interdisciplinary design teachers were made for the completion of a model. For the fourth day, model production and a report were completed and presented. Finally, the judges decided and awarded (Fig. 4).

4 Analysis of Results

4.1 Data Collection

As related experts couldn't be invited like in the case of IDEO, five phases were divided for testing in compliance with the design competition rules planned for the Youth Originality Design Camp of Liouduwei in 2011. Data collection of these five stages is described as the following.

1. Phase 1: designers experienced a cultural tour and learned from the proprietors about the design culture (making sure of the design subject with the proprietors) after understanding the culture and communicating with the proprietors (2011/07/07–07/08).
2. Phase 2: observation and survey of the proprietors (users): staying at the proprietors' houses for the night, discussing with the proprietors on the morning of July 8th and returning to the host at noon. Designers might learn observation and interview based on contextual inquiries while staying at the proprietors' homes.
3. Phase 3: what had been learned after observing and interviewing with the proprietors.

4. Phase 4: making a prototype, completing a brainstorming meeting with the interdisciplinary experts and teachers and designers’ feelings during the process of making the prototype.
5. Phase 5: evaluating and displaying the prototype for testing.

4.2 Data Analysis

1. There were 226 respondents for the questionnaire survey on the interdisciplinary empathic design procedures in five phases and 143 valid copies were retrieved.
2. Results of descriptive statistics on the interdisciplinary empathic design steps in five phases for the Youth Originality Design Camp of Liouduei in 2011 are as follows.

(1) Phase 1 (after cultural understanding and communicating with the proprietors): major dimensions of the questionnaire are local cultural recognition, learning from and communicating with the proprietors and design culture. For the dimension of local cultural recognition, 64% of the designers approved and 90% of the designers agreed to the dimension of learning from and communicating with the proprietors. They reveal staying at the proprietors’ residences and learning from them are quite helpful for the designers to apply empathy to their design and learning. 85% of the designers made a positive response to the dimension of design culture. It shows designers take local cultural elements into consideration, and imagine themselves as users and ponder long and deeply over the factors of people, things, objects, places and landscape, which helps the designers to project their empathy onto their design a lot (Figs. 5, 6 and 7).

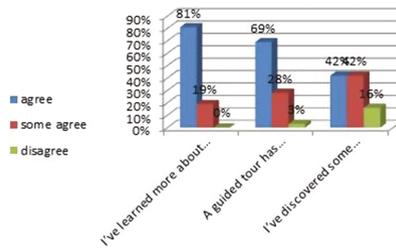


Fig. 5. Questionnaire 1/(dimension 1) local cultural recognition

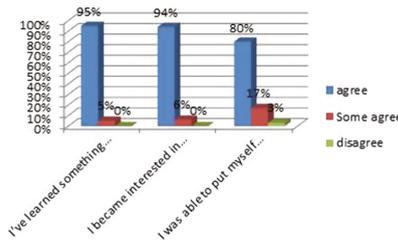


Fig. 6. Questionnaire 1/(dimension 2) learning from and communicating with the proprietors

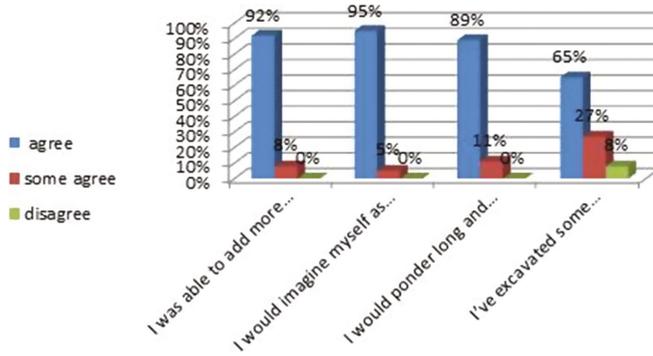


Fig. 7. Questionnaire 1/(dimension 3) design culture

(2) Phase 2 (observing and surveying the proprietors): the design theme needed to be decided with the proprietors and the teams had to discuss with the proprietors and find their problems and opportunities on this stage. The hosting organization selected two people as a team in advance and eighteen teams were formed. There were 18 copies of the questionnaire survey and seventeen copies were retrieved with a retrieval rate of 94%. In the Youth Originality Design Camp of Liouduwei in 2011, designers had more time to communicate with the proprietors and had a closer observation of the proprietors' daily life, work habits, family members and the environment by staying at their homes. Therefore, they excavated the proprietors' (users') experiences and problems via applying empathy. Contextual inquiries with the proprietors helped the designers to observe and experience deeply as well as to discover the proprietors' problems and opportunities.

(3) Phase 3 (after investigating the proprietors): designers had a basic understanding after experiencing a cultural trip, staying at the proprietors' places for the night and observing and interviewing them. Designers were tested on this stage if they truly comprehended the problems and opportunities of the proprietors. Thirty-six participants were asked to fill in a questionnaire survey and handed it over the following afternoon. Thirty-two out of a total number of thirty-six copies were retrieved with a retrieval rate of 89%. There were two major parts in this questionnaire, including comprehension of the proprietors (users) and help by observing the proprietors (users) (Figs. 8 and 9).

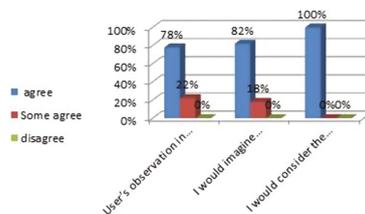


Fig. 8. Questionnaire 2/(dimension 1) understanding of the proprietors

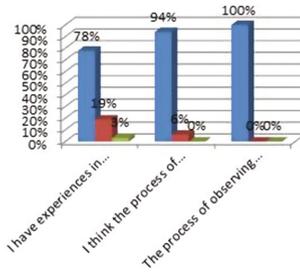


Fig. 9. Questionnaire 2/(dimension 2) help from observing the proprietors

For the dimension of comprehension of the proprietors (users), 87% of the designers agreed to it and 100% of the designers identified themselves with Item 3 (I will put myself in the user’s shoes when designing.), which proves designers imagine the user’s scenario while designing. 87% of the designers agreed to the dimension of help by observing the proprietors (users) and 100% of the designers identified themselves with Item 7 (The process of observing and interviewing the user helps me a lot on product design.), which shows observing and interviewing the users (by applying the user’s survey table) help the designers a lot when designing.

(4) Phase 4 (after producing the prototype): feelings of the designers while producing the prototype were tested on this stage Thirty-six participants were asked to fill in a questionnaire survey and handed it over the following morning. Seventeen out of a total number of thirty-six copies were retrieved with a retrieval rate of 47%. There were two major parts in this questionnaire, including the feelings of producing the prototype and the brainstorming meeting. For the dimension of the feelings of producing the prototype, 84% of the designers agreed to it and 100% of the designers identified themselves with Item 1 (I will imagine myself as the user and put myself in his/her shoes when producing the prototype.). It proves designers truly identify themselves with the users and consider for them by placing themselves in the users’ position (applying empathic design), which helps designers a lot when designing. 85% of the designers agreed to the dimension of the brainstorming meeting and 94% of them identified themselves with Items 5 (I can get different creativity ideas by meeting with

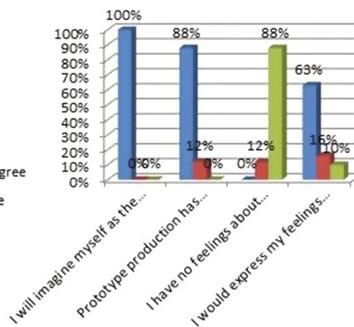


Fig. 10. Questionnaire 3/(dimension 1) feelings of producing the prototype

teachers of various fields.) and 6 (I have a different thought after the brainstorming meeting.), which reveals meetings with teachers from various fields and brainstorming meetings really assist designers in their innovation and creativity (Figs. 10 and 11).

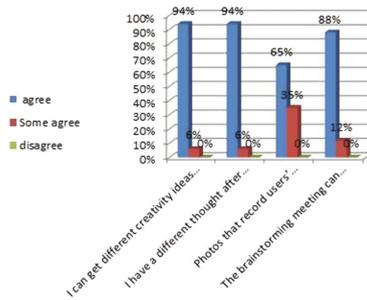


Fig. 11. Questionnaire 3/(dimension 2) brainstorming meeting

(5) Phase 5: thirty-six designers were divided into sixteen teams (two out of the original eighteen teams were combined for display) and exhibited their prototypes. Local people, students, administrative personnel and specialty teachers on site were given the questionnaire survey. Though 100 copies were handed out, only 41 were collected with a retrieval rate of 41% because of a sudden downpour. The main purpose of this questionnaire survey is to understand visitors' opinions about the displayed prototypes. The survey was conducted in the afternoon of July 10th before the announcement of prize winners. The question items were described as follows. 1. Which team's design touches you the most? (Select 1 team.) 2. Which team's design is the most creative? (Select 3 teams.) 3. Which team's design reflects the culture in Liouduei the best? (Select 3 teams.) 4. Which team's design meets the users' requirements the most? (Select 3 teams.) 5. Which team's product you hope you can get on the market? (Select 3 teams.) An analysis was conducted as the following.

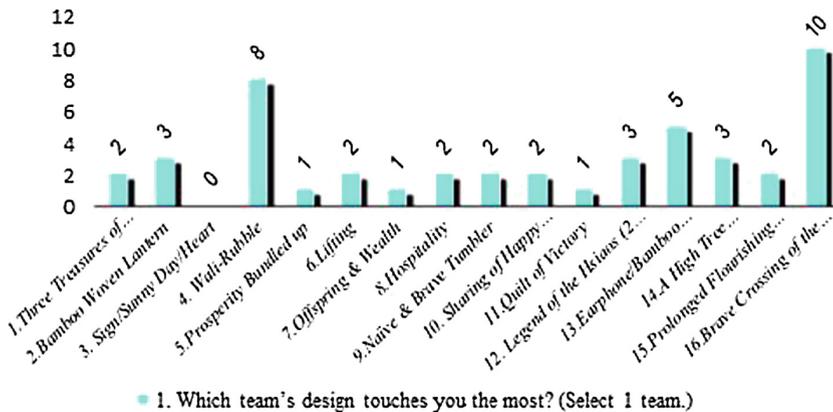


Fig. 12. Bar chart of respondents' choices on question item 1

Ching-yao Liang and Mei-ting Huang's Brave Crossing of the Strait was awarded the prize of Hakka spirit. The best creativity prize went to The Earphone presented by Fu-ying Chang and Wei-ting Chi. The ecological pen named A High Tree Discovered designed by Ching-ren Shih and Ting-yu Chen and the bamboo woven lantern named Lifting made by Li-fang Fan and Yu-su Yang were honored by the prize of the innovated product. Lin-li Huang and Yu-tze Lin's Wali-Rubble was awarded the most popular prize. Compared with the survey result of the fifth phase on the evaluation of the prototype in questionnaire 4, choice items 16 (A Brave Crossing of the Strait) and 13 (The Earphone) got more votes for those five question items. Besides, Choice item 16 (Brave Crossing of the Strait) was in the first two places in four question items and choice item 13 (The Earphone) was in the first two places in three question items (Fig. 12).

5 Conclusion

- (1) **The source of the design project.** As the organization hosting the Youth Originality Design Camp of Liouduei was not under control of the researcher, planning and considerations of the host were still respected. However, it is suggested a budget for design projects will be available in the future so that the design process can be controlled completely.
- (2) **Personnel participating in the design project.** The organization hosting the Youth Originality Design Camp of Liouduei was not an academic institution but an NGO. Therefore, the personnel taking part in the camp were the members of the organization. The advantage was that this NGO knew very well about the local proprietors and had good interaction with them; however, the shortcoming was the researcher couldn't handle if the participants of the design project were required by the research. Another issue was whether a creativity design camp was suitable to be held outside the school. It was lucky this time since the design department of a certain university gave full support of students, equipment and technology; otherwise, the hosting organization might not be able to hold the Youth Originality Design Camp of Liouduei alone and to present the final design results.
- (3) **Pre-planning and empathic design of the design project.** As the researcher met the host only one time, both parties couldn't have a good understanding of each other, let alone planning and communication in advance. Although the researcher sent the questionnaire surveys to the person in charge by mail; nevertheless, unwanted influence was resulted still. The researcher got to know and communicated with the host two to three days earlier, but it took time to be familiar with each other. In addition, the research was a stranger there and needed full support and assistance from the host (traffic and local proprietors, etc.). It goes without saying that familiarity and mutual understanding are important factors for collaboration.
- (4) **Expected results of the design project.** The research on verifying the interdisciplinary empathic design procedures was slightly different from that expected by the researcher. Being not familiar with the host might be the main reason; however, it was not a bad study experience since a researcher can't know every research organization or object. It was lucky this research was successful to a certain extent and the questionnaire survey tables were collected.

- (5) **Innovative results of the design project.** Thanks to the efforts of the participant students for four days, some accomplishments were made in the Youth Originality Design Camp of Liouduei. For instance, the Earphone of the best creativity prize will be available on the market after only making slight modification.

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