# The Teaching Method of Multidisciplinary T Workshops

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Abstract: This paper presents an ongoing project, which aims to develop an effective method to cultivate students with multidisciplinary capacity. This research emphasizes that a multidisciplinary people who should have their own professional knowledge, the ability of observation by experience, and the ability of design thinking at the same time. The learning process of students begins with observation by experience, design thinking and multidisciplinary collaboration, and then, to reflect the possibility of their own profession and to understand the thinking of other field. This ongoing project developed "T Workshop" with three main elements: (1) dual-instructor, (2) Monograph Development (practical problem and solution), (3) multidisplinary peer. In the past year, we hosted 8 T workshops, 16 professional instructors and 210 students who come from different fields have attended in all. From the feedbacks of instructors and students, we found that the ability of communication, collaboration between multidisciplinary and the cultivation of soft power progresses through T Workshop. Furthermore, it helps break barriers of different professionals, and realize true collaboration method to validate the effectiveness of the new teaching method.

Key words: multidiscipline, T-shaped professional, Problem-Based Learning

## 1. Introduction

Ageing populations have grown rapidly in most developed countries since the Baby Boom population after World War II has grown old and Taiwan is no different. According to calculations from the Ministry of Interior of the Executive Yuan, Taiwan has officially become an ageing society with 10.89% of its population being over 65 years old. This number is expected to rise to 20.0% in 2025, meaning one out of five people would be over 65 years old, according to estimates from the CEPD.<sup>[1][2]</sup>

The current service and technology design is unable to meet the needs of the ageing society, as there are still many blind spots. We expect healthcare needs to increase dramatically in the future and if the service and technology cannot keep up with the increasing ageing population, this would impact our society tremendously. We will need talented people who are professional, caring and full of creative spirit to invent or design products and services for elders. As such, we would need to arrange a way to cultivate potential pupils that would eventually encourage and/or create a new industry for ageing society. This is the main goal of our program. We are attempting to create a new learning model in higher education to train potential pupils to use multidisciplinary approaches.

An "I-shape" specialist with only one professional skill has started to face difficulties in the speedily changing environment. Only people who have been cultivated and trained into "T-shape professionals" would be more competitive in this diverse world. The most fundamental way to obtain creative skills is to change one's way of thinking. "The 'I-shape' specialist only think and understands his/her professional field. S/he wouldn't be able to jump outside of his/her comfort zone to find other plausible solutions. However, the 'T-shape' professional would have the flexibility of using his/her strength to embrace changing environments and find creative solutions to various problems since s/he will be equipped with many skills from various disciplines."<sup>[5]</sup> This is the talent that this generation would need to obtain.

The "T-shape professional" concept was promoted by Prof. Dorothy Barton from Harvard University. In her book, Wellsprings of Knowledge in 1995, she used examples from companies like Microsoft and HP to explain the need for such talents. Instead of looking for an I-shape specialist, the market has changed to search for T-shape professionals that can work across fields. The shape of the letter "T" represents not only the acquisition multidisciplinary knowledge but also the ability to communicate with others from other disciplines, which is crucial. <sup>[3]</sup> This is essentially what the T workshop focuses on, to cultivate multidisciplinary skills, to communicate with other disciplines and generate creative and efficient solutions.

"In its early stage, the T-shaped profession means to obtain both technology and business skills that will help the industry to analyze and create a better and newer solutions."<sup>[6]</sup> Nevertheless, the T workshops aren't limited to just two specific fields. We have designed different sets of two distinct fields or subjects to be taught in different workshops as to develop a new possible teaching pattern that can integrate various fields.

### 2. Problem

#### 2.1 The education in Taiwan lacks multidisciplinary lessons

The education in Taiwan is discipline-based and lacks lessons that are multidisciplinary. This problem can be easily shown in the difficulties in motivating an ageing society industry in Taiwan. Two main and current problems are (1) the difficulties in communication between the Medical fields and the Design fields; and (2) the difficulties to understand and communicate with each other in various disciplines in the Medical system. Taiwan's educational system is rigid in the sense that students can only take classes that only belong to one department. Furthermore, a constant pursuit for higher education is part of Taiwan's culture, where knowledge from textbooks is over-emphasized.<sup>[7]</sup> This pushes society to praise students who are only knowledgeable about a single discipline.

#### 2.2 Taiwan lacks of cross fields communication elite

The world nowadays needs communication and cooperation between different professionals and fields. Unfortunately, our education has trained the pupils in a completely opposite way, which has caused different disciplines to fight over who is in charge in certain projects. In order to develop or create a new industry that is functional for ageing society, we need elites that have the ability to communicate and cooperate with different fields, especially between business and medical fields. Thus there is a strong need to revolutionize Taiwan's educational system. We need to train T-shape professionals that are capable of interpreting and bridging different fields.

## 3. Goal

The goal of T workshop is to build a teaching model for cultivating "T-shape" professionals, elites that are capable of interacting and cooperating with a wide range of disciplines and fields (Please refer to Figure1). In our lesson plan, we combine two professional instructors with problem identification and problem solving fields to cooperate in this workshop. Moreover, we hope to teach students to reorganize their thinking pattern in identifying and solving problems and to polish their skills through solving a real problem, such as elders' sleeping issue. This way, students are trained while creating actual solutions. Through this teaching method, pupils would not only learn a singular professional knowledge, but also know how to use different skills in different disciplines to find suitable solutions for the problems.



Figure1. The concept of T-shaped people

#### 4. Method

The course lasts two weeks and is structured in the following manner: An introduction is first given of a specific problem to help the students understand more about the issue. We then introduce the design thinking methods and the mode of the operation. Lastly, the students will apply what they learned in the morning to practical activities in the afternoon. The students are then given a week to generate creative ideas so that in the second week they may present their solutions or prototypes of their design products and share what they learned throughout the process. Students will be given small take-home assignments to help them practice how to observe and develop ideas (Please refer to Figure2).



Figure2. The schedule of T workshop

This project involves three main elements from the T workshop:

## 4.1 Dual instructor

This course combines the ability of observation by experience and the ability of design thinking and allows the student to use both abilities simultaneously. The ability of observation by experience helps students observe problems, while the ability of design thinking cultivates students to gain notions of solving problems. The class is led by two instructors from different fields, who are experts at observing and designing (problem identification and problem solving). Students from different disciplines will learn to communicate with each other through class discussions (Please refer to Figure3).



(a) "Great Help for Elders × Engineering New Sensation" T workshop in May, 2012.

(b) "Mental Development x Ageing technology" T workshop in April, 2013.

Figure3. T workshop is led by two instructors from different fields.

# 4.2 Monograph Development (practical problem and solution)

The model for the course is Problem-Based Learning (Please refer to Figure4). In the workshop, we provide an actual problem that the elders face in real life as topic to the students, and then teach them different ways of solving a problem. "There is no correct solution; the point is to allow students to learn how to work as a team in order to identify what they would need to learn in order to solve the problem. Through this process, the students can learn to think from different angles, which will be a useful skill to them throughout their lives." <sup>[4]</sup>



(a) Students had ageing experience in T workshops.



(b) Students visited elders in T workshops.

Figure4. Students know deeply about elders' needs through observation, communication and experiences.

# 4.3 Multidisciplinary peers

Our participants come from various backgrounds, such as Electronic Engineering, Medicine, Design, Business, and Social Studies and more. They will learn how to use knowledge from different disciplines to solve problems in the workshop (Please refer to Figure5). Teaching assistants will lead the discussing process and provide aid at certain moments during this process.







(b) "Mental Development × Ageing technology" T workshop in April, 2013.

Figure 5. Students learn how to team-work with partners from different disciplines in T workshops.

#### 5. Results

We have held 8 workshops from March of 2012 to January of 2013, where a total of 210 students have participated, led by a total of 16 instructors (2 per workshop). Further details are shown in Table 1.

Workshop	Category of problem	Discipline for solving the problem	Participants Number
Fun in food	Elders' Diet	Industrial Design	26
×Design Thinking			
Healthcare	Elders' Board Game	Industrial Design	30
×Design Thinking			
Great Help for Elders	Elders' Furniture	Engineering Design	31
× Engineering New Sensation			
ICT Technology for Elders	Elders' ICT Technology	Industrial Design	45
× User Experience Design			
Lifestyle of aborigines	Medical Service Deficiency	Service Design	21
×Service Design	in Tribe		
Advanced Level	Medical Service Deficiency	Oral History	15
in Aboriginal Culture	in Tribes and Heritage in		
	Aboriginal Culture		
How elders see color	Elders' Sight	Graphic Design	24
×Graphic Design			
Healthy Diet	Nutrition Healthcare	Industrial Design	18
×Design Thinking			

Table 1. Categories in Workshops

It is worth noting certain features that can be discovered through the workshops in Table 2, where a summary of the participants' responses is provided. First, their ability to observe has improved on average; this is due to clear observational instructions given by the first instructor, which allows students to identify problems that can be tackled. The students also became more adept at designing thanks to our design professor. Second, the students learned to think from a different angle by leaving their comfort zone and crossing to another discipline. And third, the students learned to cooperate by generating ideas and designing products in a team. Furthermore, having two instructors in the same room allows students to see how different each discipline approaches the same problem and how different disciplines interact.

Table2. The participants' reflection in each workshop

Workshop	Participant's Reflection	
Fun in food	I have learned to observe more by listening and understanding everyone's	
×Design Thinking	perspectives. II felt as if I shouldn't just stick to my own major, which is	
	the Medical Field. What I should really do is walk outside of the box to	
	experience this big world and the future.	
Healthcare	I have discovered every field has different considerations while facing the	
×Design Thinking	same problem. Some focus on functionality while some focus on the	
	comfortableness of elders. I am glad I wasn't persistent in my opinions in	
	the first place and was able to participate with others in designing products	
	that I am proud of.	
Great Help for Elders	After participating in the workshop, I have realized that learning new	
× Engineering New Sensation	things can broaden my perspective.	
ICT Technology for Elders	After partaking in the workshop, I now understand that a good design	
× User Experience Design	should consider the user's experience and not just the designers' subjective	
	thinking. I've also learned from different points of view and learned	
	different methods to problem solving by cooperating with people from	
	different fields.	
Advanced Level	Attending this workshop has provided an opportunity for different	
in Aboriginal Culture	disciplines of people bringing various skills to solve one problem. It was	
	new for me. I also learned so many things in the workshop. When back in	
	school, I never had the opportunity to cooperate or discuss with others	
	from different disciplines. I really learned and have grown a lot from this	
	experience.	
How elders see color	In traditional classes, we are always looking for the right answer. Even in	
×Graphic Design	PE class we were asked to have perfect posture. This "perfect" has	
	suppressed our original creativity. While in the workshop there is no	
	correct answer, we are looking for ways to design a product that is both	
	practicable and also attractive to the elders. If we miss these	
	considerations, the design would be useless because no one would use it.	
	What was most surprising to me was how big the gap is between what we	
	think is true and what the reality is, such as in the case of what we thought	
	the elders wanted and what they actually wanted. It made me realize that	
	certain things can only be understood on a superficial level.	

According to the lesson plan of these eight workshops, we have discovered the three main elements of a successful T workshop. First, having two instructors leading; one instructor introduces the problems of elders while the other leads the methods to help students find solutions. Second is monograph development; we teamed up different participants to discuss different topics and develop their monograph in the workshop. Third is having multidisciplinary peers; the teaching assistant helped team up participants from different backgrounds into groups, where the participants could practice multidisciplinary communication skills while cooperating with each other in the workshop.

#### 6. Ongoing Work

To verify what students influence from the teaching method of multidisciplinary, we are developing questionnaire for T workshop within the following half year. Assume to four core competences of T shaped people, the ability of observation by experience, the ability to feedback of introspection, design thinking and multidisciplinary collaboration, therefore we devise the questionnaire of these four dimensions. We will complete the questionnaires on fourteen T workshops this year and look forward to the result would improve the successful of the T workshop model.

## 7. Conclusion

The current education lacks connection and interaction between different industries, which is something our ageing society will desperately need in the future. In this way, NTU INSIGHT CENTER has designed a specific course based on the ideas of cultivating T-shape professionals. In the actual process, we have come up with the idea of having dual instructors to promote a potential way of teaching multidisciplines. Moreover, we were glad to meet our goal in increasing the communication ability by gathering participants from different backgrounds to solve a problem as a team with some professional help from the instructors and teaching assistants. We believed through this kind of T-shape cultivation. It is going to help break barriers between different professionals and increase the possibilities in multidisciplines cooperation or interaction. It will also help provide more opportunities and possibilities of a better life for ageing societies in the future.

Last but not least, we have promoted a standard operation of procedure for T workshop. We have also been helping other schools to host their own T workshops. We expect 14 workshops to take place in 2013. We have encouraged schools to add their own resources to adapt our T workshops to make them more suitable to their own school.

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