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Hoe-Chin GOI  
*NUCB Business School*

Wee Liang TAN  
*Singapore Management University, wltan@smu.edu.sg*

Yuki HARA  
*Keio Research Institute*

Shuichi TAKAO  
*Tokyu Land Corporation*

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## *Addressing Social Needs Through Remote Based Design Thinking*

Hoe-Chin Goi, NUCB Business School, Japan  
Wee-Liang Tan, Singapore Management University, Singapore  
Yuki Hara, Keio Research Institute of SFC, Japan  
Shuichi Takao, Toyku Land Corporation, Japan

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### **Abstract**

With ageing as the coming and increasing phenomenon in Japan, there is a need for innovative solutions for seniors to lead active lives in their residing communities. Little research has been conducted on the use of design thinking as a means to develop social innovations, especially with the designers not being present on-site from a distance. This paper reports the study on the effectiveness of employing a remote based design thinking in a university course with the goal for participants to develop social innovations that elderly, as stakeholders, would be engage to adopt and implement. The study involved two cohorts of participants in a design thinking course at the Nagoya University of Commerce and Business, where the participants were asked to employ design thinking to develop social innovations for two regional communities in Japan without them visiting. Findings from the comparison of the two cohorts show that higher social innovation occurs if the participants have clearly identified target users and addressed the needs of seniors. Future research is needed to better understand how cultural differences enhance or hindered the design process especially as the users come from a Japanese culture while most of the designers are international.

Keywords: Design Thinking, Social innovation, Aging

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## **1. Introduction**

There is a growing trend of aging population in Japan that requires innovative solutions for seniors to lead active lives in their residing communities. International student teams who are located in Nagoya prefecture, have been tasked to create the solutions for the seniors who resides in Tokyo area to make them active, in a distance environment with the given context.

Design Thinking method has been applied to resolve social problems and create solution as applied in many fields. The method has the characteristics of being user centric, process oriented due to its ethnographic richness in deriving empathy of end users through face-to-face observation and direct interview. However, there is a lack of understanding on how design thinking can be effective to develop solution for seniors to lead active lives in their communities under the distance environment. Furthermore, there is little empirical research on the effects of design thinking as a means to measure social impacts. Thus, the study has 2 research questions: Can design thinking method be used to develop solution to encourage active aging amongst residents? How to overcome distance barriers between student teams and the residents?

The research employs case approach and field research as research methodology. The traditional classroom approach has been applied on one cohort of students, while a remote based approach has been applied on another cohort of students in the following semester for a 14-week course. Observation, report and interview with student teams and community stakeholders are used as means of data collection. The study applies comparative analysis on 4 project cases undertaken by 4 student teams to describe and analyse the process of creating the innovative solutions and collaboration between student teams and residents of the 2 selected residential towns.

The study shows important findings that contribute to design thinking method through communal practice. Firstly, international students teams from university can develop creative solution that encourage active aging through design thinking method. Secondly, embedding a two-way communication, solution iteration, and interface of intermediate agents into existing design thinking process as a remote based approach can overcome distance barrier that results in a social impact.

The paper is divided into 4 sections. Firstly, section 1 provides background and research question. Section 2 is the current research on design thinking. Section 3 highlights the research design and methodology. Section 4 describes the 4 cases. Section 5 is the research findings. Finally, section 6 is the conclusion with future research.

## **2. Literature Review**

There is increasing attention on design thinking as an effective methodology as a practice towards innovation since originated by IDEO (Brown 2008). Current literatures have discussed design thinking as a scientific method, beyond just a practice.

The current literature provides many discourses and approaches for the understanding of Design Thinking (Johansson-Sköldberg et al, 2013). In the management science field, design thinking is grounded in experience for working with design and innovation (Kelley, 2001, 2005; Brown, 2008, 2009) and management theoretical perspective (Boland & Collopy, 2004a). Grounded in cognitive science, design thinking has been an approach used in different areas, such as a problem-solving activity (Buchanan, 1992 based on Rittel and Webber, 1973), or a necessary skill managers (Dunne & Martin, 2006; Martin, 2009). Design thinking has also been introduced as education and teaching into the Academy of Management, with examples of company successes (Dunne & Martin, 2006; Martin, 2009). However, there is a lack of understanding on how design thinking can be effective to develop solution that provides social impact, whereby the innovators are unable to fully employ the ethnographic approach to study the problem faced by the end user under a distance environment. Thus, the purpose of the research is to study the effectiveness of employing a remote based design thinking in education with the goal for participants to develop social innovations for end users to adopt and implement.

### **3. Research Design and Methodology**

#### **3.1 Case approach and field research**

The research employs research methodology of case approach and field research. The study involves a tripartite collaboration amongst university, local community and industrial partners. International students from Nagoya University of Business and Commerce (NUCB) represents the innovation teams from academic institution. Tokyu Land Corporation, which is one of the largest real estate corporation, represents as the industrial partners. Two towns, namely Kiminomori town and Kugenuma town are selected to represent as local community respectively.

#### **3.2 Context of regional projects for Design Thinking practice**

The two selected towns, namely Kugenuma Town (KUG), in Kanagawa Prefecture and Kiminomori (KIMI) town, in Chiba prefecture, are developed by Tokyu Land Corporation in 1980s. Both towns have similar characteristics of a “fading” town with abled, financially independent, skillful but retired residents. The 2 towns have good infrastructure, however less accessible to big city, such as Tokyo. With the above conditions, both towns are selected as “experimental town” for regional revitalization.

The targeted students consisted of 2 cohorts of international students, which include local Japanese student, are 27 students in cohort one and 24 students in cohort two. In each cohort, 5 innovative teams were formed. The students were mainly business background, undergraduates, however with a few master level and engineering background. They were mostly not able to speak Japanese, unfamiliar with the Japanese local communities and new to design thinking approach. They were tasked to develop solution that promote active living by the elderly communities in Tokyo area as their course project.

Table 1: Makeup of 2 cohorts of students

Town	KUG	KIMI
Students' Batch	Cohort 1	Cohort 2
Period of participation	April – July 2017	Aug- Dec 2017
Background	Mainly Business and Finance background From faculty of business or management	
Level	Mainly undergraduates	
No of Team	5 teams, each about 4-7 students,	
Experience in Design Thinking	None	

### 3.3 Implementation

Design thinking course was designed to select a local city as a real case to practice design thinking approach. The aim was for student team to form as design thinking team to creation innovative solution to create active participation amongst local residents. The designed structure of education system has two phases. In phase 1, students learnt about the theory of design thinking within the classroom environment. In phase 2, students proposed their ideas through some form of communication with local residents and made real solution as project requirement.

A similar team of guest speakers, made up of researcher, corporate representatives and residents' representative presented the facts, problem faces, current activities, and future goals in the town at the lectures respectively. There were two session of feedback and evaluation, the mid-term and final presentation, whereby students obtained direct feedback from remote partner team to improve the idea and prototype. A post mortem session was carried out between the researcher and the residents directly act the end.

Table 2: Schedule for implementation of design thinking using 2 approaches

Cohort	Month (2017)	Activity	Action
1	Feb	Planning for Action Research	Formalization of joint research
	Mar	Design of content and system for "Design Thinking course- Kugenuma Project"-(KUG)	Formalization of content and system
	April - July	Implementation of "Design Thinking course- Kugenuma Project"(KUG)	5 solutions and prototypes were created
	July	Presentation of outcome to Kugenuma residents	Resident has no intention to continue
	July	Post mortem lesson discussion	Feedback

2	Aug	Design of content and system for "Design Thinking course-Kiminomori Project"-(KIMI)	Formalization of content and system
	Sept- Dec	Implementation of "Design Thinking course-Kiminomori Project"-(KIMI)	5 solutions and prototypes were created
	Dec	Presentation of outcome to Kugenuma residents	Residents were impressed with the proposal. Strong interest to pursue the proposal Invite students to implement in town
	Jan 2018	Post mortem lesson discussion	Feedback

### 3.4 Classroom based versus remote based approach

In the research, the study constructed and tested two approaches: traditional classroom approach and remote based approach. In the practice of design thinking, ethnographic or fieldwork research could not be applied as student teams were restricted to create the solution with the classroom environment.

#### 3.4.1 Classroom based approach

For the classroom based approach, there were 3 steps to the process. Firstly, resident leaders and community stakeholders were invited to class as guest speakers to share the background, problem face and current activities undertaken by them respectively.

Student teams had to utilize the data to create empathy, formulate their ideas and prototype and received the evaluation by the end. At the evaluation phase, the panel were invited to access the proposed solution. Thereafter, the solution was forwarded to the residents for feedback and consideration for implementation.

Under the classroom room approach, all lessons were conducted in classroom. Resident leaders were appointed and invited by project coordinator to be guest speakers. Their communication was via online communication software.

#### 3.4.2 Remote based approach

For the remote based approach, the researcher constructed and embedded 3 components within the design thinking process. The 3 components included the following: (I) Face to face and Online Communication (FOC), (II) Design Iteration Mechanism (DIM) and (III) Interface of Intermediate Agent (IIA).

The Face to Face and Online Communication (FOC) functioned as a structure design to provide a 2-way communication with the purpose of enabling great information exchange between both the student teams and the participating residents who were distance away. The communication was done via face to face lecture, with additional

application using social media, such as Messenger software and Facebook web base platform.

Design Iteration Mechanism (DIM) functioned as a process design to enable smooth and chronological solution between student teams and residents through the iteration of ideas , prototyping and even evaluation. The two-way iteration were employed at the exploratory phase of forming empathy and idea; feedback phase when creating the prototyping and evaluation phase when received final assessment of the final solution.

Interface of Intermediate Agent (IIA) functioned as a network design with the purpose to enable the spanning of spatial boundary due to the distance and weak ties and increase information flow between the student team and residents. There were 3 roles for the IA. Firstly, IA was the primary data provider to enable a two-way information in tripartite relationship. Next, they acted as the innovation validator to create empathy by aligning values and emotions with student teams and end users. In addition, they were the bridge to strengthened weak ties between student teams and end users.

In summary, remote based approach was differentiated from traditional classroom based approach in 3 aspects, namely structure, process and human network design, with the 3 respective components being embedded into the design thinking methodology to be used under a distance environment between student teams and residents.

*Table 3: Comparison between Classroom based and Remote based approach*

3 Dimensions	Classroom based approach	Remote Collaborative based approach
Structure	Only online classroom lecture	Interactive lecture and out of classroom communication
Process	One-way presentation by student team	Two-way solution iteration between student team and residents at intermittent stages
Network	Resident as guest speaker	Residents and Intermediate Agents (3 <sup>rd</sup> party) as collaborators

#### **4. Case studies**

Based on the observation, the 4 cases of project collaboration with the highest score were compared and contrasted. However, both CO2 Hunter (CO2) and Friendly Reminder (FR) from KUG had different responses as compared to Mori Design (MORI) and Human in Kimi (HUMAN) from KIMI. The cases are selected with the criteria that they are the best proposals evaluated by stakeholders, researchers, corporates and resident representatives, based on innovativeness, applicability to community and high team motivation.

##### **4.1 Case I: “Friendly Reminder (FR) project**

FR team was made up of 6 undergraduate students who embarked in the project using design thinking from April to July 2017. Friend defined their wicked problem to be “lacking in communication between residential organizer and residents”. Thus, FR

was proposed as the idea to create a leaf design instrument as a portable hardware with sensor that provided sound and light signals to residents on community event as friendly reminder. It served as a communication platform to advertise community activities and made residents more active.

Throughout the design thinking process using the classroom approach, there were minimum contact and interaction between the student team and the residents. At the exploration phase, the student team collected primary and secondary data through the lecture to create their initiate proposal. By the midterm presentation, judges feedback that the idea was innovative. However, there was a lacking in the validity of the prototype and data. At the iteration phase, student team continued to collect data through secondary sources. In terms of prototype, member used some of the class tools to configure into their idea. The iteration was drive by creating the prototype. There was no specific persona for contact between FRIEND and residents.

The final solution had created interests amongst evaluation panel. However, when the final proposal was briefly presented to residents at a separate session by local researcher on behalf of FR team, residents did not indicate their interest to the proposal due to the idea being too abstract, lack of personal motivation and lack of know how to initiate the project by themselves

#### **4.2 Case II: CO2 Hunter (CO2) project**

CO2 Hunter project was made up of 5 undergraduate students who embarked in the project using design thinking from April to July 2017. They identified 2 wicked problem as lacking of green with respect to limited land, and inactiveness of increasing retirees in local community. Thus, CO2 hunter was proposed as the idea of planting species which can absorb more carbon dioxide from the air and can produce more oxygen. In this way, they can not only achieve a greener Kugenuma but also make residents more active.

Throughout the design thinking process using the classroom approach, there were minimum contact and interaction between the student team and the residents. At the exploration phase, the student team received data of local community. Then they combine the hardware and software tools that were taught in class into create their prototype. By the mid-term, CO2 had created idea using powerpoint slide as the concept of their prototype. It was feedback that the idea was innovative. However, the solution lacked proven outcome of the prototype and sufficient data to explain the problem. The iteration phase was accessed to be driven by ability of student team to create the prototype rather than feedback from residents.

The final proposal had created interest amongst evaluation panel. However, when the proposal was briefly presented to residents at a separate session by local researcher, on behalf of them team, the residents did not respond to the proposal due lack of motivation and lack of know how to initiate the project.

#### **4.3 Case III: Human in Kiminomori (HUMAN) project**

HUMAN project was made up of 4 members who have participated in the process of design thinking from Aug- Dec 2017. They identified the wicked problem as “lacking



in understanding the residents' experience". Their proposal was to create a publication with narratives of individual life stories of residents in Kiminomori town.

Throughout the design thinking process using the remote based approach, there were intermittent direct contact and interaction between the student team and the residents. The student team received the first-hand data of Kiminomori from the researcher, resident leaders and corporate representative through the lecture series via face to face and online system. By the mid-term presentation, the student team could only propose a fictitious character to be the project persona for their solution. At iteration phase, in order to make the solution more relevant, the student team contacted their intermediate agent, named Ms Mayo, who was a related partner with close relationship to Ms Kita, one of the residents via communication tools, such as Facebook and SKYPE, in order to conduct interview. After completing the English version, the other members assisted to translate it into a Japanese version. The final prototype was a 15-page magazine in both English and Japanese version.

The final proposal had created interests amongst evaluation panel. Some residents were pleased a new possibility of paper calling people sitting back into Kiminomori communal practices. The other needed wider marketing tool, such as instant messages of FB and totally structured information of HP. This idea satisfied both needs and the prototype.

One of resident leaders said "we are ready to adopt the idea". The student leader also said "Our team was motivated to make real the prototype. Even though we could not interview Ms Kita or even speak Japanese. We hope our proposal is a contribution to the community. So, we did our best to complete it as a prototype".

#### **4.4 Case IV: Mori Design (MORI) Project**

MORI Project was created by 5 undergraduate students who embarked in the process design thinking for 3 months from Aug till December 2017. They identified 2 wicked problems. Firstly, extensive destruction of natural habitat, in order to build affordable residential areas. The second wicked problem was the non-existence of central communication platform has led to infrequent interaction among retirees. The community service matching website served as a communication platform to foster exchange of expertise and resources amongst residents, and to create participation within the community in Kiminomori.

Throughout the design thinking process using the remote based approach, there were intermittent direct contact and interaction between the student team and the residents. The student team identified 3 residents as their solution personas to be their targeted end user for behavior change based on event matching. At the iteration phase, MORI identified their real project persona, Mr HARA as the direct contact in this project. Through Mr HARA. Student team received the exact data on the members of the community (picture, email, telephone) to add on the website. This information will also be utilized to contact the KIMI citizens. Students completed to create proposal and prototype with updated and sampling of activities in KIMI in 2017. A mockup up of wooden recycling and workshop was also included.

The final proposal had created interests amongst evaluation panel. The proposal had big potential to connect potential participant into the communal practices from outside and inside of KIMI. Such matching mechanism was not yet successful in other regions in Japan.

## **5. Findings**

### **5.1 Creativity and motivate by student teams**

Design Thinking can be applied to develop solution to encourage active aging, even if residents are distance apart. Using either “classroom based” or “remote based” approach. Students felt “motivated and meaningful” to deal with real life cases, rather than textbook cases. All solution were evaluated to be “creative and innovative” that addressed active aging needs at a great extent by resident leaders and stakeholders. International students could gain ability to develop creative solution that encouraged active aging through design thinking method.

### **5.2 Social Impact through remote based approach.**

There were high social impacts observed with higher level of engaging between students and residents for HUMAN project and Mori Design Project through remote based approach, as compared to Friendly Project and Co2 Project under the traditional classroom based approach.

Firstly, through FOC component, there was an increase in rate of information and interaction exchange. It helped establish ties between students and stakeholders through the classroom and online platform. Next, DIM component resulted in increased design iteration and better quality of solutions that met users’ needs and increased inclination for adoption. We created 2 evaluation and feedback sessions by aligning mid and final presentations with residential committee meetings. Thirdly, IIA component produced feasible solutions after the idea and the prototype were customized to meet the users’ needs and community in large. The student teams leveraged on individual stakeholders as their IAs to connect with residents as real persona and address specific environmental conditions. There was an increase in level of “self-help” spirit and ownership amongst residents to directly influence the solution creation. The solutions were accepted with intention for future implementation by residents.

On the other hand, Friendly Project and Co2 Project under the classroom based approach, there were little or no direct engaging between students and residents. Secondly, there was lesser satisfaction amongst the students. Thirdly, the solutions were well appraised, but no intention for implementation by residents.

## **6. Conclusion**

This paper reports the study on the effectiveness of employing a remote based design thinking in a university course with the goal for participants to develop social innovations that elderly, as stakeholders, would be engage to adopt and implement. There are several important findings. Firstly, under either classroom based or remote based approach, student teams can feel the great sense of motivation and relevance in

direct contribution to community by dealing with real case practice through design thinking process. All solutions are evaluated to be creative and innovative proposals that address active aging needs. Thus, we conclude that design thinking method applied under a distance environment is effective to develop solution to encourage active aging amongst residents. The second important finding shows that by embedding a two-way communication, solution iteration, and interface of intermediate agents as a remote based model into design thinking process, the approach can overcome distance barriers and result in a higher social impact. However, improvements can be made in training of pre-identified intermediate agents to enable greater information sharing in the tripartite relationships with student teams and the residents in future.

The limitation of the study is that there is a lack of control on the influence of cultural background of international students that may affect the creativity of solution and the interest on the residents. Thus, future study may address both limitations. Future research may also focus on cultural factors that enhance or hinder the design process especially as the users come from a Japanese culture while most of the designers are international.

Secondly, the identification of resident as the “end users” is random and difficult due to their commitment to participate throughout the process. Another study may focus on the effects of “proxy end users” on student team effectiveness and solution quality.

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