

# **Project Report**

Moving my self \_ Acti

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## **1. Executive summary**

Acti: the mobile office furniture which provides functions as a partition, blackboard, standing desk and chair, is the design solution breaking sedentary working culture for sustain health life.

The reason why the design aims to smash the sitting culture is that, these days, a number of people work in sedentary for approximately 10 hours per day and have a tendency to not to move frequently caused by several reasons such as productivity or social issues. However, this sedentary pattern impacts on our health negatively. For instance sitting for a long period increases death rates in individuals whether he/she exercises regularly or not on all-cause, cardiovascular disease or metabolic syndrome. For the reason, there have been several attempts to motivate people to move themselves but most of them did not change user's behavior sustainably because of a lack of motivation. For the reason, the design solution: Acti has been designed to keep people more active unconsciously rather than the general approaches to motivate people to move: poking.

Through the user research, traditional desk type workstation was the biggest obstacle to be sedentary so that the aim for the project become a design that breaks the traditional workstation completely therefore people can work as well as being active without paying attention. For the reason, the design solution contains mobility and variability to be moved to anywhere and plays core roles, desk and chair, in the office. The concept was evaluated by users through testing actual working prototype. Participants indicated that durability is the most important aspect for them to purchase if the product released and required blackboard to become a core function on Acti under start-up context which were relative less significant from the draft model.

## **2. Introduction**

### **2.1 Project Theme**

The fundamental topic is ‘Moving Myself’, which is led from one big question. ‘*We are lazy. How could people make themselves keep moving to sustain healthy life?*’. Lack of exercise is radical issue to our contemporaries. That is the reason why lots of design projects are implemented to make people move more frequently. Unfortunately, thousands of projects fail to make people move in their real circumstance. Only few design successes to do that, but even those have short term effect. Through this course, under the project theme ‘Moving Myself’, the factors which make people really move would be find. At final design, those factors will be reflected and success to motivate people in real circumstance.

### **2.2 Desktop Study**

What is ‘Moving Myself’? According to WHO, World Health Organization, it includes moderates to vigorous physical activity of any type that anyone can perform anywhere to improve health. In other world, ‘Moving Myself’ cover from small motion such as stretching and standing to light exercise and extreme sports. Project Theme should be contracted because ‘Moving Myself’ contains copious scope. Through the desktop study, the topic of the project is focused on ‘Standing’. Reasons are bellowed.

The time that people spend sedentary or sitting too long with doing too little physical activity has recently been proposed as a population-wide, ubiquitous influence on health outcomes. It has been argued that sedentary time is likely to be additional to the risks associated with insufficient moderate-to-vigorous physical activity. New evidence identifies relationships of too much sitting with overweight and obesity, type 2 diabetes, cardiovascular disease, some cancers and other adverse health outcomes. The effect is prominent among desk-bound workers, who spend about 10 hours a day in average. The effect is found even in people who class themselves as fit, such as those who cycle to work, if they also spend long periods of time sitting. The most shocking research is followed. Even if people met the recommended physical activity requirements, death rates were similar in exercisers and non-exercisers who spent most of their day sitting. In other world, the more people stands, the longer people live. Exercise is useless if people do not stand frequently.

### **2.3 Problem definition**

The population that specifically targeted is sedentary workers. According to research, sedentary workers is defined as people who work in circumstance where can not do regular amounts of physical activity. People who usually work in front of the computer, receive the phone call or making something in their seat and hundreds of others workers would be pertinent for sedentary workers. Compared to other group, sedentary workers spend lots of time in a sitting position which means that they do not stand up as required amount. Therefore, target context is work station where sedentary people work in their business time. The goal of this project is ‘Making People Stand Up’.

## **2.4 Research Question**

How could design promotes sedentary workers to stand up frequently to sustain their healthy life? Before doing user study, research question should be defined. Through answering pre-defined research question, the factors that make sedentary workers to stand up for sustain their healthy life would be fined. Research question is below. If these factors are found, they could be used as criteria for design solutions.

- In which situation do people move?
- In which situation do people *not* move?
- What do people usually do in sedentary?

## **3. User Study**

### **3.1 Goal**

The purpose of user study is for answering the research question above. Through this process, factors that promotes movement of sedentary workers can be found. User study is conducted to find out the specific dimension of sedentary culture across the office workers.

### **3.2 Participants**

Participants of user study were sedentary workers. One person is information guide who work in information desk of UNIST, two people are employee who work in UNIST CDE administration office and two people are start-up workers, *Open Arena*. Three groups were varying in their professions and demographics were recruited. Total 5 people are invited to the user study. All participants work in a sitting position dominantly.

### **3.3 Method**

#### **3.3.1 Video Ethnography**

Video recording of workers were done for their whole working hours. Their actions within the environment were scrutinized. It is useful method to get unbiased raw data and understand unconscious activity. Furthermore, video ethnography is suitable for sedentary workers because their workplace is limited. Every moving activity, even it is trivial, is written on the code book. The time, duration, trigger and insight are written and analyzed. [Figure 1]

Administration Staff					
Scene	Start Time	End Time	Duration	Category Trigger	Description(작관)
1a	8분 32초	15분 26초	-26 s	e	일상(일상적인 일상)
2a	15분 26초	15분 49초	-22 s	e	일상(일상적인 일상)
3a/b	19분 26초	19분 49초	-23 s	s	누군가 사과를 먹어보거나 인사하고 애정( 않은 후에도 이야기 나눌)
4b	10분 30초	14분 39초	-46 s	s	전공원회(전시회에만 일과 진행)
5a	4분 46초	8분 41초	-34 s	s	누군가 수면 일정을 확장(화장)
6a	8분 41초	10분 10초	-18 s	s	준비되어 있는 물을 마실(비워차기2)
7a	10분 10초	11분 30초	-80 s	e	어디가 나오오션(손을 만지작 하면서 들어오심)
7b	11분 30초	12분 48초	-18 s	e	일상(일)
8b	7분 23초(다)	7분 23초(다)	-10 s	e	일상(일)
9b	17분 47초	18분 30초	-576 s	e	전체원회(총회 일정)
10a	8분 30초	8분 40초	-10 s	e	전체원회(총회 일정)
11a	8분 40초	13분 7초	-537 s	s	대체원회(총회 일정 계속 하실)
12b	15분 30초	15분 56초	-26 s	e	일상(서무직원을 가지고 오신)
13b	17분 22초	17분 22초	-8 s	e	오픈지 수선을 마침
14a	10분 28초	10분 28초	-8 s	s	서류를 쌓아두던 한은 자판에서 해결(바로 옆에 서류 있음)
15a	10분 28초	10분 38초	-10 s	s	온라인으로 출장하시는 분들이 있어서 해제하는 것(한은 신경쓰지 않음)
16b	11분	16분 34초	-554 s	s	온라인으로 출장하시는 분들이 있어서 해제하는 것(한은 신경쓰지 않음)
17a	14분 37초	14분 43초	-6 s	s	서류를 갖고어서 자판을 고집하는 한은 신경쓰지 않음
18a	10분 43초	12분 43초	-120 s	p	의자 를 고르고 앉는다(의자를 풀리면서)
19a	12분 43초	14분 54초	-131 s	c	의자에 앉아서 일정
20a	15분 30초	15분 48초	-18 s	c	의자 위에 기대
21a	16분 47초	16분 54초	-7 s	c	의자 위에 기대
22a	2분 28초	3분 25초	-57 s	s	전체원회(화장이라고 전화 받음)
23b	14분 40초	14분 40초	-8 s	e	문을 열고 들어온 한은 일정에서 무언가를 찾
24b	14분 57초	14분 57초	-8 s	e	비서임을 여겨
25b	8분	9분 34초	-106 s	c	의자에 앉아서 고개를 뒤로 까닥힐(1번)

Figure 1 Codebook

### 3.3.2 In-depth Interview

After analyzing video ethnography through the codebook, interview script is made for each groups. Their rationale behind their action was further inquired by interviewing. Same participants in video ethnography did in depth interview about 30 minutes. It is useful method to get information that can not know from the video ethnography. For in-depth interview, two experimenters are required. One is interviewer and the other is writer.

### 3.3.3 Material

Video camera is needed for video ethnography. Charger and large set of SD card is required because recording time is over 8 hours average. For In-depth interview, questionnaire of interview and voice recorder are needed.

## 3.4 Procedure

Recorded videos were then analyzed by coding each action that was seen as significant related to our research questions. Each action was taken notes of into Microsoft Excel cells with triggers and interpretation behind it. The interview was also analyzed by coding the content with the rationale behind each phenomenon. Organized data were then walked by research team, writing interpretations on Post-it notes. Notes written were put up on the wall to make an affinity diagram and answer to key questions made in the beginning of the study. [Figure 2]

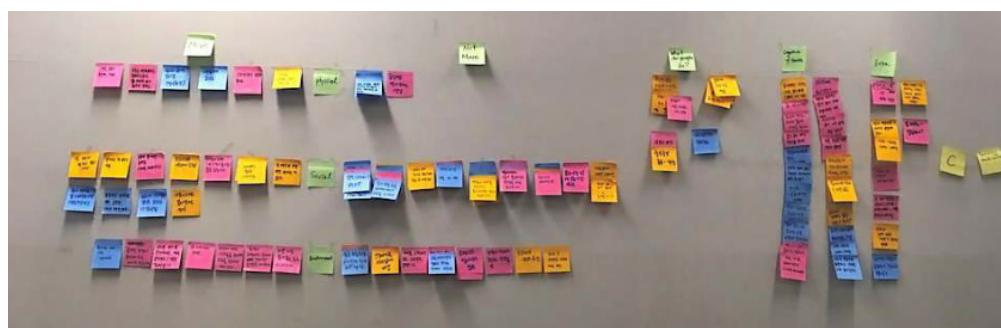


Figure 2 Affinity Diagram

### **3.5 Analysis and Results**

From the affinity diagram, answer of research questions can be analyzed. The situation in which people move was divided into three subcategories, and the activity people do in sedentary environment were also able to be categorized. Apart from the questions, other insights on the user's perception of their own health were also gained. Further details are discussed below based on research questions.

#### **3.5.1 In which situation do/ do not people move?**

Situations in which people move could be divided into three dimensions.

- Physical : Situations related to bodily causes.
- Social : Situations related to social relationships or agreements. Issues regarding work also falls into this category because task accomplishment is also related to social engagement.
- Environmental : Situations related to working environment and its artifacts.

For physical dimension, people moved themselves when they 1. felt fatigues and 2. self-consciously acknowledged it's time to move. Such occasions include stretching when they feel tired, or moving themselves because it's the time they're supposed to move (e.g. break time). However, no phenomenon has been observed for occasions when people refrain to move themselves in physical dimension.

For social dimension, people moved themselves when 1. it was related to rules or social agreement, 2. they hustled up for accomplishing their tasks, 3. social dynamics triggered them to move themselves. Such occasions include going out for lunch, whereas lunch time is social agreement among workers, getting coffee whenever they feel fallen behind, and getting up when people come around them. On the other hand, they refrained from moving themselves because 1. they put their task accomplishment as their priority, 2. the nature of their task required sedentary behavior, and 3. they don't feel any necessity for moving themselves while working. Such occasions include giving up their health when facing deadline, participant whose job was standing still and giving instruction to visitors, and remain being sedentary because they will go exercising anyway after the work.

For environmental dimension, people moved themselves when 1. their everyday object was related to movement and 2. their optimized work environment is broken. Such occasions include when interacting with their swivel chair in office, and moving more in uncomfortable working environment. On the other hand, they refrained to move themselves when 1. their environment is optimal for work and 2. they are bogged down by work. Such occasions include stacking snacks on their desks and not letting go of their computer while working.

### **3.5.2 What do people usually do in sedentary?**

Beside their tasks, people usually tended to do actions listed below.

- Mucking around (like Facebook or messaging)
- Getting Tired
- Fighting Fatigue
- Planning Work

### **3.5.3 Perception of their own health**

During the inquiry, other insights were found, which some of them are related to their cognition of health condition. Insights in general suggested that although people seem to be sedentary, they tend to be concerned of their health. Such examples include checking their body while working, or making up with their sedentary environment such as refrain from eating junk foods or going to exercise after work. This indicates that our design solution has acceptability to users (i.e. this problem is worth solving).

According to the results of user study, sedentary workers were lacking their movement for maintaining their wellness. They have found out their own ways to move themselves, but were difficult to pursue them because of their social and environmental dimensions. Therefore, we decided to focus on social and environmental dimensions to promote their movement.

## **4. Design Criteria and Ideation**

### **4.1 Design Criteria**

After analyzing the user study, design requirements are formulated, which our solution must address to solve the sedentary culture problem. The requirements are based on the situations when people do or do not move themselves. These are the followings:

- Stand more frequently
- Know being sedentary is bad for your health, shortening your life spans
- Perceive micro-movement is also enhancing their health
- Achieve their goal with micro-movement without bothering their ongoing work
- Hustle up for efficiency of their work
- Increase movement through social interaction within their workplace
- Break optimized sedentary environment

- Make a cycle of their work and moving break time (physically)
- Know being sedentary doesn't lead to high productivity

As well as design requirements, list of approaches are came up with, which is took based on the results of user study. These were –

- Providing knowledge of health
- Design of work station
- Enhancing Productivity
- Behavior nudge (alert, Tracking, notification)
- Design of seatings
- Balance between work and break
- Spatial design
- Rewarding

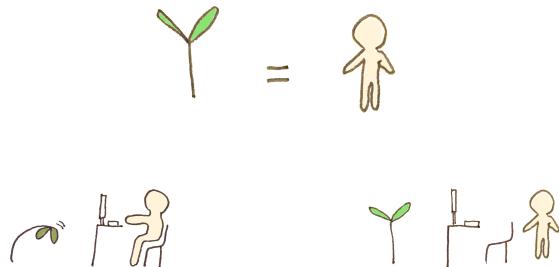
Altogether, House of Qualities [figure 3] is made to set priority between ‘whats’ and ‘hows’ and narrow them down to make a comprehensive set of design criteria, and use them to drive design thinking and help ideation.

Row #	Max Relationship Value in Row	Relative Weight	Weight / Importance	Quality Characteristics (a.k.a. "Functional Requirements" or "Hows")		Column #									
				1	2	3	4	5	6	7	8	9	10		
				Direction of Improvement: Minimize (▼), Maximize (▲), or Target (x)	x	x	▲	▲	x	x	▲	▲	x		
1	9	13.8	9.0	Demanded Quality (a.k.a. "Customer Requirements" or "Whats")	stand more frequently	o	o	o	o	o	o		o	o	
2	9	10.8	7.0		know being sedentary is bad for your health, shortening your life spans		▲					o	o		
3	9	7.7	5.0		perceive micromovement is also enhancing their health		▲					o	o		
4	9	15.4	10.0		achieve their goal with micromovement without bothering their ongoing work	o	o		o	o	o		▲		
5	9	9.2	6.0		hustle up for efficiency of their work		▲		o	o	o		o		
6	9	13.8	9.0		increase movement through social interaction within their working place	o	o	o	o	o			o		
7	9	10.8	7.0		break optimised sedentary environment	o			o	o			▲		
8	9	10.8	7.0		make a cycle of their work and moving break time (hot-break) (physically)	o	o	o		▲	o		▲		
9	9	7.7	5.0		know being sedentary doesn't lead to high productivity			o		o	o	o	▲		
10															

Figure 3 House of Quality

## 4.2 Ideation

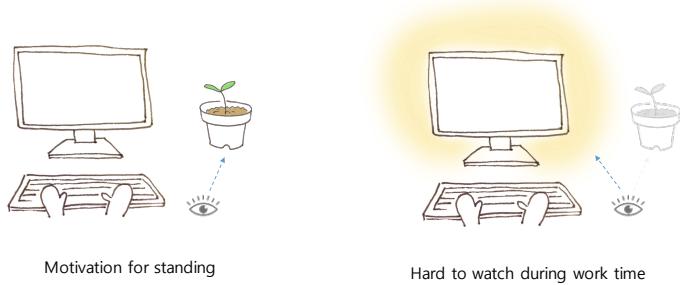
### 4.2.1 Plant is me



**Figure 4 Plant is Me**

The first idea generated from the result of user study is ‘Plant is Me [Figure 4]’. The specific concept is reflecting the health of plant to human health. In short, the state of the human health is shown as the state of plant. The more people seat on their work seat, the more bent plant is. It implies the health of plant gets bad when people work in sitting position too much time. The time when user stand up is time when the plant is straightened. ‘Plant is Me’ is designed to motivate people through reflection of human health into the plant.

### 4.2.2 Limitation



**Figure 5 Limitation of 'Plant is Me'**

Although the idea, ‘Plant is Me’ stems from the result of user study and design criteria, the limit is clear. As observed through the video ethnography, people do place lots of things on their working desk. When they work, their eye sight is limited on the basis of the monitor [Figure 5]. It makes hard people to focus on the plant which shows the reflection of human health. What if user watch the product and notice the station of their own health? In that situation, the clear problem is also expected. Ultimately, with visual notification, it is really hard to motivate people to stand up, our purpose of project theme. The motivation is too weak and indirect to make people stand up in their real work environment.

## 5. Concept

### 5.1 Mental model

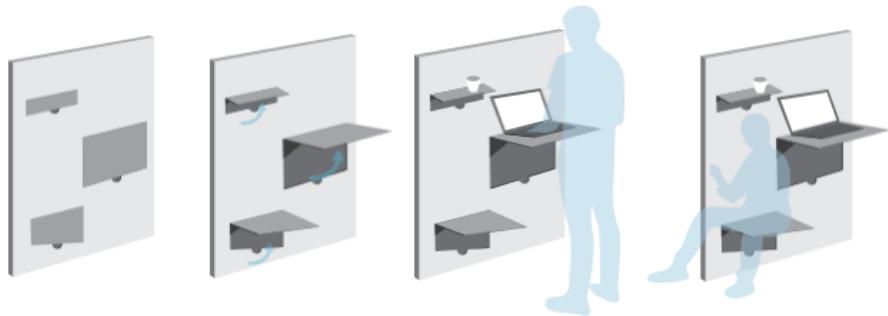


Figure 6 Mental model of 'acti'

During the concept development process, concept, dramatically, changed the concept from a little behavior nudge to changing work station which surrounds the target user directly. It is because, there was a doubt whether a little visual trigger can change user's behavior consistently. Throughout looking back research findings from the video ethnography, the optimized sedentary environment such as traditional desk seems the most critical reason why people tend to sit longer. Breaking optimized sedentary culture through re-design work station turns the point of the concept. The figure 6 is the new concept that combining a desk and a partition which provide standing desk as a fundamental function and a little stool to get a rest.

### 5.2 Use Scenario

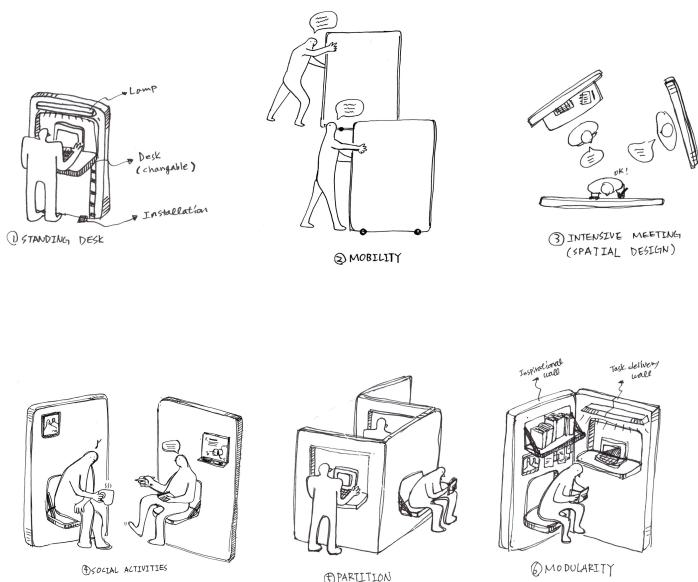


Figure 7 User Scenario of 'acti'

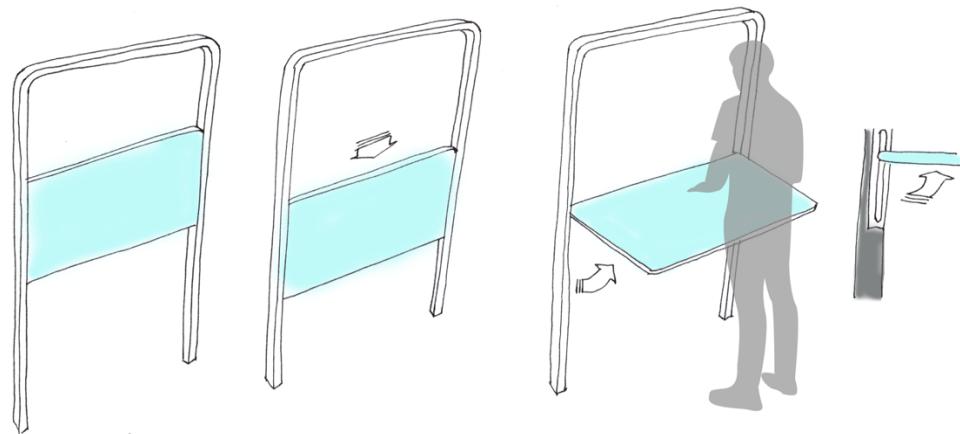
In order to engage and promote people to move more frequently, mobility function is added finally. Through this finalized concept office worker is expected to use the product under defined user scenario which contains:

- Standing desk: The product plays the role as a standing desk once the user folds down the plate on top of the moving partition. It might be designed with toggle link mechanism.
- Mobility: Through the movable functions and the light design, the product's target user, members of start-up who have a tendency to move more frequently can use the product anywhere simply and easily.
- Spatial design: Users can use the products to make their own layout freely. For example, a couple of people can place three products as a triangle then it becomes a space for meeting enough even if it is not completely isolated.
- Modularity: For whom wants to use more than two products, it can be modular design such as one for the chair and book shelf; inspirational, and another one for standing desk; task management.

The specific target of 'acti' is start up workers. They regarded suitable group for adapting 'acti' because start-up workers does not much space for allocating lots of office furniture. Not only spatial issue, but also financial issue can be the reason. When they launch their start-up, they does not have enough money so 'acti' is target for them properly because it has lots of function, desk, chair, partition and black board.

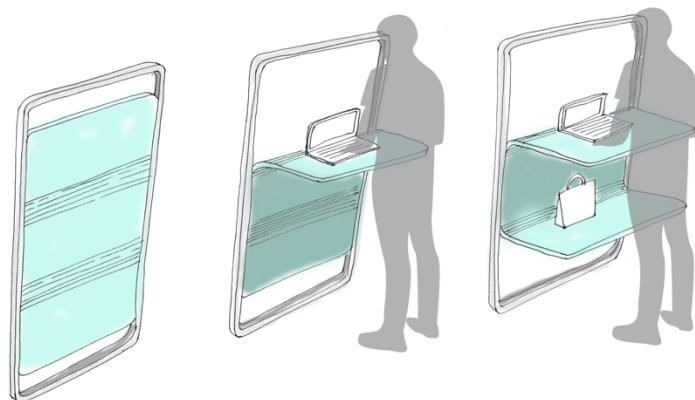
### 5.3 Proposal

According to the user scenario design, the product's main features were determined; mobile partition, standing desk and chair. In order to develop the product further, the main issue was to contemplate functionality and its related mechanism.



**Figure 8 Proposal 1**

The first proposal [Figure 8] was designed with toggle link mechanism which is most well-known structure and provides best durability that we can easily observe among home appliances such as a small door on a refrigerator.



**Figure 9 Proposal 2**

Secondly, folding wood approach was considered to meet the concept. To design the structure, the proper method: kerf-cutting and types of wood: ash have been considered.

## 6. User Evaluation

### 6.1 Prototyping



**Figure 10 Prototyping**

The biggest challenge for user evaluation was making 1:1 size working prototyping in order to observe what users might do and think with using the object naturally. Before the real test, a pilot test was proceeded and the durability was raised as the one of the most significant issue. The final working prototype is made linear aluminum rod and thick box paper. The aluminum frame is used for making the product frame, which holds the body, and stand needed to hold the wheels. The thick box paper is used for the main body which is transformable as desk, chair and partition. To hold the paper as 90 degrees, steel wire is fixed at the hinge part of the paper. Thanks to the hole of aluminum rod, the body part can be moved upward and downward, which is the required function for ergonomic issue.

### 6.2 Goal

The goal of user evaluation is testing usability and deciding tone and manner of design. Because the ‘acti’ is new concept of product, which does not exist before, the opinion of target groups are really important. The usability test is a main theme of this user evaluation because the product ‘acti’ includes lots of function such as transformable technic and mobility. Finding of tone and manner of design is another issue of this evaluation because it is not discussed before. With prototyping test and questionnaire, participants scope the usability of design and answer what they expect to office furniture specially targeted for start up.

### 6.3 Participants

The target groups are start up workers who have work experience in their start – up over 1 year. Total two groups are recruited. One group is composed as two people who work in the same start up. User Evaluation should be conducted as group because of utilization of space. For adapting ‘acti’ to various situation discussion of co-workers is really important. Total four start up workers did user evaluation.

## 6.4 Method

### 6.4.1 Prototyping test



Figure 11 Prototyping Test

The first step for user evaluation is prototyping test. Each group is asked to use ‘acti’ freely without any descriptions. They all answered to the question ‘what kind of product is might be?’. It is for experimenting how they feel and accept this new concept of product? Then all functions are informed and they are recommended to use every function. Moreover, they also use these prototype to three specific scenarios, ‘free time’, ‘working’ and ‘meeting’. Through these prototyping test, user can experience usability and utilization of space.

### 6.4.2 Questionnaire

After the prototyping test, they do answer to questionnaire. It is operated to get quantitative data. It also helps people can sprout more specific reasons why participants look and feel the product ‘acti’ like that. Questions in this paper is categorized as three, usability, utilization of space and look and feel.

A screenshot of a Korean questionnaire survey form titled '이동형 사무용 가구 디자인 사용자 조사' (Survey of mobile office furniture design users). The form includes sections for basic information (Name, Age, Gender), usage scenarios ('Free time', 'Working', 'Meeting'), and satisfaction levels for various features using a 5-point Likert scale. There are also two large empty rectangular boxes for comments or drawing.

Figure 12 Questionnaire of User Evaluation

### **6.4.3 Material**

For user evaluation, the most important material is prototype. Two prototypes are prepared for testing utilization of space. Participants can constitute working space more effectively because the amount of the prototype is more than one. For recording the user evaluation, video camera is needed.

## **6.5 Results**

### **6.5.1 Usability**

- Standing Desk : It is Good, but it should be stable to stand laptop.
- Chair : It is really uncomfortable to clean up desk for using chair. Storage is required for changing the mode from desk to chair. It is suitable for temporarily use
- Partition : It has proper height, which is slightly hide team member.
- etc : It will be much better when all body parts turn as white board.

### **6.5.2 Utilization of Space**

It is really satisfied. The wheels work well but holding is required in real situation. The function of mobility is really suitable for start up because they do movement frequently. Thanks to mobility, various meeting place can be generated.

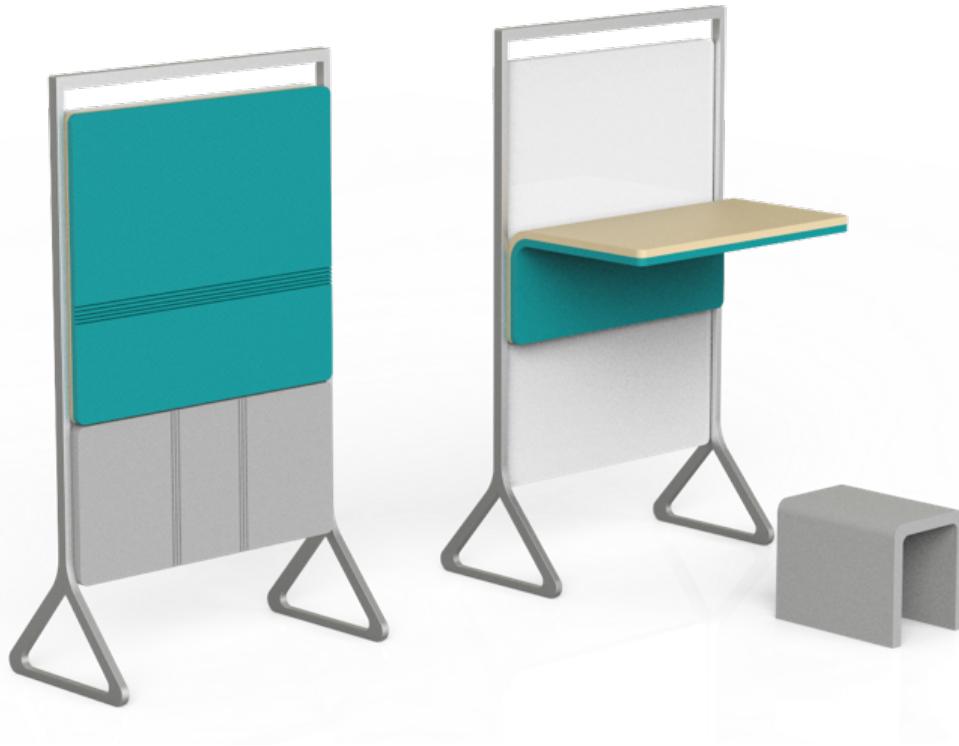
### **6.5.3 Tone and manner of design**

The office furniture specially targeted for start up workers should be *Futuristic, active and Simple*. Moreover, it is needed to be cheap and should contain various functions because many start up struggle with spatial and economical issue, in particular, at the beginning state of entrepreneurship. In addition, the office furniture for start should help efficient communication between team members, because the particular working environment of start up.

## 7. Final redesign and additional recommendation

### 7.1 Redesign

After executing user evaluation, the first product type was designed as above. The most contemplated aspect on the model was to reflect participants feedback thus the model had a installable chair and the general look & feel become more stable with extra thickness of the aluminum frame. As a result of the detachable folding stool, the product can be two types of desks; standing desk and traditional desk combined with the chair.



**Figure 13 Redesign**

### 7.2 Final design

Although users' feedbacks were fully reflected for the first design, the product did not meet the research question, how can we promote sedentary workers to move for their health life, and the target user, start-up, ironically. It is because the form of the concept design was similar with conservative partitions which are bulky and somber. Also, adding all functions what users asked make the product to lose the core value of the product. In order to deliver the product for start-up team and let them to be

more active, productive and creative, the second version of design was finalized as the image. Generally, it became thinner and lighter in terms of CMF, color, material and finishing, in order to give a delightful atmosphere. Lastly, installable extra chair has been removed and turned back to the previous concept that can be a desk or a chair. Although, it might cause the inconvenience of removing goods on the desk to transform to chair, the product's core value, to promote people to be more active, will be dedicated better with focusing on standing desk function.



**Figure 14 Final design**

### 7.3 Human scale

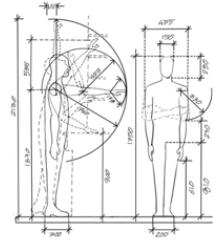
The office is the place where various people are gathered. For the reason, the design solution should meet different scale of human bodies. The total height is 1400mm. It sum of ergonomic sizes of a desk and chair:

Stool: 450mm for height and 300mm for width for sitting. The height of stool affects the length of the leg parts of Acti finally.

Desk: 450mm for the depth of the desk

Adding three factors become 1200mm for the height then added extra 200mm for considering both gender's height.

On the other hand, the height of the handle was considered height of arm folded to 90% among male and female of 90%.



**Figure 15 Human Scale Model**

#### **7.4 Mechanism**

The most challenging task for the project was to design the transformable product which works in practical. The major issue for the product was how to provide both desk and chair functions with single plate. In order to meet the requirement, there were two fundamental aspects should have been considered. How to fold and how to fix once the user satisfy one of two functions.

To bend, wood, especially, Slash pine, Merbau, Silver birch and Ash were considered because they are easier to manufactured and more flexible than other woods then for manufacturing, kerf-cutting method was considered. Additionally, magnetic is used to fix the foldable plate.

#### **7.5 Additional recommendation**

At the end of the design process, there were feedback to improve the product to become the product which can be released in the market. Mainly two aspects were considered. For the first, proper mechanism to transform the product is significantly necessary to be considered. In addition, proper engineering calculation is fundamental for finding stable balance of the product. For example, Acti should be durable enough even if users place their goods such as laptop computer on the desk plate. Continue to technical point of view, proper CMF should be considered to give active impression. Secondly, economical price is significant to satisfy target customer.

## APPENDIX

### Codebook

	A	B	C	D	E	G	L
1	Start Up (Open Arena)						
3	Scene	Start Time	End Time	Duration	Category	Trigger	Description(객관)
4	#30						
5		4:30	5:30	60	e	가: 일어나서 밖으로 나감(사과씻으러 간듯)	
6					e	가: 사과를 먹으며 업무를 보는듯함	
7		6:10			e	나: 사과 씻으러 나감	
8		7:05	8:05	-60	e	가: 손을 씻는대신 앉은 자리에서 휴지로 손을 닦는다.	
9		14:23			e	가: 이어폰을 꺼내서 노래 듣기 시작	
10		14:58			e	나: 자리에서 일어서서 막던 사과를 들고 나감.	
11		17:12			e	나: 자리에서 일어서서 막던 사과를 들고 나감.	
12	(테이프 끝)	18:15		-63	e	나: 사과를 버린듯 하고 손을 씻고온듯.	
13	#31						
14		1:38			e	나: 머리를 정돈한다.	
15		0:00			e	나: 책상 위에 두고 핸드폰을 계속 사용한다.	왜 계속 사용하는걸까? 개발자라서 그런걸까 딴짓일까?
16		8:53			p	가: 코를 출찍이다 기지개를 떤다.	진짜 움직이기 싫어하는거 같다...
17		9:40			e	가: '나'의 컵에 있는 물을 자기 컵에 나눠 담는다.	
18		9:49			e	가: 악갈은 것을 먹는다.	
19		11:32			c	가: 몸을 뒤로 젖혀 기침을 한다.	
20		18:18			e	나: 양팔을 걸어올린다.	
21		18:24			e	나: 머리를 다시 정돈한다	머리를 한창동안 자주 정돈한다. 버릇인가?
22	(테이프 끝)						
23	#32						
24		0:30			e	나: 물을 마신다.	
25		6:30			e	나: 핸드폰 충전기를 연결한다.	핸드폰이 움직여야하는 강제성을 주는걸까? -> 주변의 물체가 몸의 움직임에 영향을 주나?
26		10:20			p+c	가: 스트레칭을 하면서 하품을 한다.	
27		10:53			p	가: 손을 자주 풀어준다.	이때 말고도 가와 나 둘다 손을 자주 품다. 왜?
28		14:24			e	가: 준비돼있는 초콜릿을 먹는다.	
29		17:04			c	가: 몸을 뒤로 젖혀 기침을 한다.	
30	(테이프 끝)						
31	#33						

	A	B	C	D	E	G	L
1	Admistrartion Staff						
3	Scene	Start Time	End Time	Duration	Category	Trigger	Description(객관)
4	1b	6 분 32초	6 분 58초	-26	e	일어남 (a는 거의 안움직임.자세변화 없음)	
5	2a	15분26초	15분48초	22	e	일어남	
6	3a/b	19분26초	19분49초	-23	s	누군가 사와서 일어났다가 인사하고 앉음(앉은후에도 이야기 나눔)	표정이 밝아진다 전화받을 때는 움직임이 많아진다
7	4b	10분30초	14분39초		s	전화받음(전화어깨로 받으면서 일을 진행)	
8	5a	4분 46초			s	누군가 오면 얼굴만 돌려서 확인함	
9	6a	8분 41초			e	준비되어 있는 물을 마심(보리차?)(2)	
10	7a	10분 10초	11분 30초	80	e	어딘가 더녀오심(손을 만지작 하면서 들어오심)	
11	8b	13분 48초	15분 53초	-161	e	일어남	
12	9b	7분23초(다음비디오)		-576	e	일어남	
13	10a	17분47초	6분 40초		e	전화받고 물을 마심(3)	
14	11b	6분 30초	8분7초		s	전화받으면서 일을 계속 하심	
15	12b	13분 7초	13분58초	-28	e	일어나서 무언가를 가지고 오심	
16	13b	15분 30초	11분		e	오랜지 주스를 마심	
17	14a	17분22초	17분47초		s	서류를 꺼내는데 앉은 자리에서 해결(바로 옆에 서류 있음)	
18	15a	10분2초	10분59초		s	순님이 찾는데 간단한 목인사	
19	16b	10분59초	11분		s	순님의 행정처리를 말아서 하심(a는 인사후 신경쓰지 않음)	
20	17a	14분37초	16분34초		s	서류를 꽂고나서 자세를 고쳐앉은 후에 신경씀	
21	18a	10분43초			p	의자를 고쳐 앉는다(의자를 놀리면서)	
22	19a	14분47초	14분50초		c	의자 뒤에 기침	
23	20a	15분 39초	15분 48초		c	의자 뒤에 기침	
24	21a	15분 47초	18분53초		c	의자 뒤에 기침	
25	22a	2분2초	3분25초		s	전화번호 확인하고 전화 받음	
26	23b	14분14초	14분40초		e	몸을 숙여서 책상 밑에서 무언가를 함	뭘 하는거지?
27	24b	14분57초	3분		e	배지말을 마심	
28	25b	3분	3분3초		c	의자에 앉아서 고개를 뒤로 까딱함(1번)	
29	26a	5분55초	11분25초	330	e	물을 가지고 일어남/물을 채워오지 않고 드시고 오심	어디를 갔다오시는 걸까?(휴식?)
30	27a	15분28초			e	계산기가 행동반경에서 품 위에 있음에도 불구하고 앉아서 가지고 오심	손을 그냥 뺏어서 해결(앉은자리에서)
31	28a	16분 15초	16분20초		p	의자를 고쳐앉으면서 어깨를 주름	
32	29a	17분 8초			p	목을 계속 움직인다	뻐근한가?
33	30b	18분16초			p	고개를 숙이면서 머리를 만진다	
34	31a	19분42초			p	목을 계속 움직인다	
35	32b	56초			e	자신의 옆에 있는 휴지를 뽑아서 사용함	

	A	B	C	D	E	G	J
1	Information Guide						
3	Scene	Start Time	End Time	Duration(s)	Category	Trigger	Description(객관)
4		8:00	8:00:30		s	웃을 갈아 입으신다	
5		8:00:20	8:01:30		s	집정리 및 인사	
6		8:01:30	8:03:50		e	어디 간다. 돌아온다.	
7		8:04:04	8:10:00		s	컴퓨터를 서서 키다. 계속 서서 문 쪽을 본다. 테이블의 물건들도 서서 만진다.	
8	촬영시각	Run Time					
9	8:10	0:00	16:12	972 s		계속 서서 문 쪽을 보신다. 출근하는 사람들을 한데 인사. 번호도 누르고.. 서류정리도 하고... .	
10		16:12	16:40	28 p		어디론가 밖으로 나간다.	
11		16:40	17:41	61 s		다시 들어와서 계속 서있는다.	
12	촬영시각	Run Time					
13		0:00	17:41	1061 s		계속 서있는다~~	
14	촬영시각	Run Time					
15		0:00	2:50	170 s		계속 서있는다~~~	
16		2:50	3:21	31 p		어디론가 나간다.	
17		3:21	4:44	83 s		다시 돌아와서 서있으며 활짝 웃는다.	
18		4:44	6:00	104 p		다시 어딘가로 나간다.	
19		6:00	11:27	327 s		다시 돌아온다.	
20		11:27	11:55	p		앉아서 담요도 덮는다	
21		11:55	12:54	e		책상 밑을 본다	
22		12:54	17:41	p		자세를 편하게 한다. 계속 앉아있다.	뭘 보지?
23	촬영시각	Run Time					
24		0:00	5:59	c		계속 기대어있다.	
25		5:59	7:14	s		웃매무새를 고친다.	
26		7:14	7:42	p		독어깨운동을 간단하게 하고 가세를 고쳐앉는다.	
27		7:42					
28		8:33		p		고개를 컴퓨터쪽으로 기울이더니 살짝 까딱거린다.	
29		10:05	12:02	117 e		담요를 넣고 일어나서 뒤로 들어간다.	커피타러 가는거였음
30		12:22		p		다시 자리에 앉아서 담요를 무릎에 덮는다.	담요는 무슨 역할일까?
31		12:49		p		잠깐 커피를 마신다.	
32		14:14		s		쓰레기통 책상 밑 쓰레기통에 버린다.	왜 책상 밑에 쓰레기통을 뒀지?
33		15:06		c		살짝 일어나서 자세를 고쳐 앉는다.	
34		16:43	17:06	23 s		안내를 했다가 다시 앉는다.	
35		17:06	17:41	35		End of the Video	

## User Evaluation

## Participant 1

디자인 공학 융합 전문대학원 IDP1

### 이동성 사용용 가구 디자인 사용자 조사

'이동성 사용용 가구디자인' 사용자 경험을 조망하기 위한 설문입니다. 기본의 환경으로 알아가는 사용환경을 기준하여 활용하는 기본원칙을 적용할 수 있는 이동식 휴대전화스탠드입니다. 가로운 모드로 다양한 서비스를 수행해야 하는 스마트폰을 허켓으로 디자인하였습니다. 제품을 사용한 경험을 바탕으로 진단하고 충진 답변 요청드립니다.

\*프로토타입을 통한 실험으로써, 실제 제품과 같은 사용성 및 내구성이 제공되지 않음을 감안하고 평가 부탁드립니다.

이름:	곽 재인	나이(만):	24
회사 명:	(주)스타트리니	산업 분야:	IT
창업 연도:	2016. 09.		
직무:	영업 개발	업무 경력:	2년

#### 책상

	Bad	Good
높이 조절	<input type="radio"/>	<input checked="" type="radio"/>
홀/나비	<input type="radio"/>	<input checked="" type="radio"/>
사용 방식	<input type="radio"/>	<input checked="" type="radio"/>
작용(포스트잇, 화이트보드)	<input type="radio"/>	<input checked="" type="radio"/>
기타 의견	<div style="border: 1px solid black; padding: 5px;">                     휴대폰 세워서 사용하는 행위가 편리한데 너무 높아서 헛걸어다니고, 노트북 같이 놓은 풀풀은 풍경을 때려 면 좋았던 것 같았습니다.  <small>이전 경험에</small> </div>	

#### 의자

	Bad	Good
높이 조절	<input type="radio"/>	<input checked="" type="radio"/>
홀/나비	<input type="radio"/>	<input checked="" type="radio"/>
사용 방식	<input type="radio"/>	<input checked="" type="radio"/>
작용(포스트잇, 화이트보드)	<input type="radio"/>	<input checked="" type="radio"/>
기타 의견	<div style="border: 1px solid black; padding: 5px;">                     휴대폰을 갖는 풀풀한데 걸어서 걱정할 때는 풀풀은 생각해놓고 앉아서 헛걸어다니고, 저녁에도 걸어서 이 바닥에 걸어놓았지만, 휴대폰으로 풀풀을 갖 같았습니다.                 </div>	

#### 파티션

	Bad	Good
높이	<input type="radio"/>	<input checked="" type="radio"/>
기타 의견	<div style="border: 1px solid black; padding: 5px;">                     (전체)                      상황에 맞지 못하는 방향성을 높여야 좋은 것 같았어요.                      다른 열린 책상 위에도 걸어와 한 풀풀 원 풀풀 원 것 같았습니다.                 </div>	

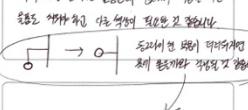
#### 오피스 적용

	Bad	Good
이동성	<input type="radio"/>	<input checked="" type="radio"/>
공간 구성 능력	<input type="radio"/>	<input checked="" type="radio"/>
기타 의견		

#### 제품 평가

	Bad	Good
필요성	<input type="radio"/>	<input checked="" type="radio"/>
제품의 좋은 점	<div style="border: 1px solid black; padding: 5px;">                     휴대폰에 세워 두면 휴대전화처럼 휴대전화는 풀풀은 거주권을 찾을 수 있었던 것 같았습니다.                 </div>	

#### 불편한 점

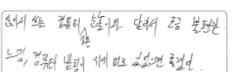
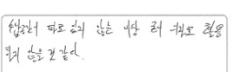
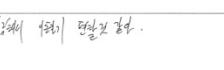
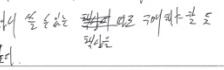
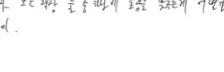
	Bad	Good
	<input type="radio"/>	<input checked="" type="radio"/>
기타 의견	<div style="border: 1px solid black; padding: 5px;">                     휴대폰을 갖는 풀풀한데 걸어서 걱정할 때는 풀풀은 생각해놓고 앉아서 헛걸어다니고, 저녁에도 걸어서 이 바닥에 걸어놓았지만, 휴대폰으로 풀풀을 갖 같았습니다.   </div>	

#### 기타 의견

스마트폰 품질에 맞는 가구는 어떤 것들이어야 할까요?

제작하고 예전부터 활용되고,  
creative 하면서 예전 품질을 회복하고 있는

## Participant 2

디자인 공학 융합 전문대학원 IDP1		파티션	
		높이	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
		기타 의견	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
이동성 사용을 가구 디자인 사용자 조사			
'이동성 사용을 가구 디자인 사용자 조사'를 관찰하는 데 있어 기준은 다음과 같습니다. 기준의 좌석으로 앉아야하는 사용환경을 고려하여 사용환경에 맞는 디자인을 제공할 수 있는 이동식 파티션 대상입니다. 기준은 인도리를 다양화하는 테스트를 수행해야 하는 스크립트입니다. 디자인은 디자인입니다. 제품을 사용한 경험을 바탕으로 진행하고 충직한 답변을 요청드립니다.		Good	
'프로토 타입을 통한 실험으로서, 실제 제품과 같은 사용성 및 내구성이 제공되지 않았음을 감안하고 평가 부탁드립니다.		<input type="radio"/>	
이름:	한수우	나이(연):	23
회사명:	온도설계	산업 분야:	I T
직무:	[기획/설계]	창업 년도:	2016
업무 경력:	[1~5]		
책상			
높이 조절	<input type="radio"/> <input checked="" type="checkbox"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	폭/너비	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="checkbox"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
사용 방식	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="checkbox"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	작용(포스팅, 화이트보드)	<input type="radio"/> <input checked="" type="checkbox"/>
기타 의견			
의자			
높이 조절	<input type="radio"/> <input checked="" type="checkbox"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	폭/너비	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="checkbox"/> <input type="radio"/> <input type="radio"/>
사용 방식	<input type="radio"/> <input checked="" type="checkbox"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	작용(포스팅, 화이트보드)	<input type="radio"/>
기타 의견			
사무용 가구 선호도			
*스타일은 환경에 맞는 가구는 어떤 것이라면 어떤가요?	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="checkbox"/> <input type="radio"/> <input type="radio"/>	미래학관	평상
선호도			
스타일은 환경에 맞는 가구는 어떤 것이라면 어떤가요?	<input type="radio"/> <input checked="" type="checkbox"/>	활동적인	평상
파티션			
높이	<input type="radio"/> <input checked="" type="checkbox"/>	Good	<input type="radio"/>
기타 의견			
오피스 적용			
이동성	<input type="radio"/> <input checked="" type="checkbox"/>	Good	<input type="radio"/>
공간 구성 능력	<input type="radio"/> <input checked="" type="checkbox"/>	Good	<input type="radio"/>
기타 의견			
제품 평가			
필요성	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="checkbox"/> <input type="radio"/> <input type="radio"/>	Good	<input type="radio"/>
제품의 좋은 점			
불편한 점			
기타 의견			

## Participant 3

디자인 공학 융합 전문대학원 IDPI

이동성 사무용 가구 디자인 사용자 조사

'이동성 사용을 기구디자인'의 사용자 경향을 조사하기 위한 설문입니다. 기존의 환경으로 돌아오는) 사무환경을 개선하여 활용적인 기능들을 제공할 수 있는 이동식 페터션메스코입니다. 기대로 인프로트 디자인 서비스를 수행해야 하는 스타트업을 대상으로 디자인 작업했습니다. 제품을 사용한 경험을 바탕으로 정직하고 솔직한 답변 요청드립니다.

\*프로토타입을 통한 실험으로써, 실제 제품과 같은 사용성 및 내구성이 제공되지 않았음을 감안하고 평가 부탁드립니다.

이름: 배정동 나이(만): 21  
회사명: 퍼링크 주식회사 산업분야: 소프트웨어 개발 창립년도: 2015.09  
직무: 제품 개발 업무경력: 2년

책상

	Bad	Good
높이 조절	○	○ ○ ○ ○ ○ ○
복/난비	✓	○ ○ ○ ○ ○ ○
사용 방식	○ ○ ○ ○ ○ ○	✓
작용(포스트잇, 화이트보드)	○ ○ ○ ○ ○ ○	✓

기타 의견

책상이 그대로 높이 조절이 되면 좋는 것 같습니다.

의자

	Bad	Good
높이 조절	○	✓ ○ ○ ○ ○ ○
복/난비	○	✓ ○ ○ ○ ○ ○
사용 방식	○ ○ ○ ○ ○ ○	✓
작용(포스트잇, 화이트보드)	○ ○ ○ ○ ○ ○	✓

기타 의견

의자로 매우 만족한 것 같습니다.

사무용 가구 선호도

\*스타트업 환경을 생각하여 답변해 주세요.

선후도

스타트업 환경에 맞는 가구는 어떤 것이어야 할까요?

미래적인	편안	편리	우아한	상용적	현대적	고급스러운
○	○	✓	○	○	○	○

각 구성원이 활용적으로 의사소통 할 수 있게끔 도와주는 가구.  
그리면서 가격이 저렴하면 좋다.

페터션

	Bad	Good
높이	○ ○ ○ ○ ○ ○	✓
기타 의견	서너 키워는 페터션은 쓰지 않지만 매우 좋습니다.	

오피스 적용

	Bad	Good
이동성	○ ○ ○ ○ ○ ○	✓
공간 구성 능력	○ ○ ○ ○ ○ ○	✓
기타 의견	방화면인 책상이 좋습니다. 서회 책상과 유족 이사가 같아서	

제품 평가

	Bad	Good
필요성	○ ○ ○ ○ ○ ○	✓ ○
제품의 좋은 점	서로 일할 수 있는 책상	

불편한 점

너무 깊은 너비

기타 의견

## Participant 4

디자인 공학 융합 전문대학원 IDPI1

### 이동성 사용용 가구 디자인 사용자 조사

'이동성 사용용 가구디자인'의 사용자 경험을 관찰하기 위한 실험입니다. 기존의 화식(오래 앓아인)는 사무환경을 개선하여 활용적인 기법문화를 제공할 수 있는 이동식 퍼티션/데스크입니다. 기여한 인프라로 다양한 테스크를 수행해야 하는 스타트업을 타겟으로 디자인 되었습니다.

\*프로토타입을 통한 실증으로써, 실제 제품과 같은 사용성 및 내구성이 제공되지 않았음을 감안하고 평가 부탁드립니다.

이름: **송대신** 나이(만): **90.07.05**  
 회사명: **페달링(주)** 산업 분야: **소프트웨어** 창업년도: **2015.09**  
 직무: **대표** 업무 경력: **7년차.**

#### 책상

	Bad	○	○	○	○	○	○	Good
높이 조절	○	○	○	○	○	○	○	
폭/너비	○	○	○	✓	○	○	○	
사용 방식	○	○	○	○	○	○	✓	○
작용(포스트잇, 화이트보드)	○	○	○	○	✓	○	○	

#### 기타 의견

**의자빼고 전체화이트보드**

#### 의자

	Bad	○	○	○	○	○	○	Good
높이 조절	✓	○	○	○	○	○	○	
폭/너비	○	○	○	✓	○	○	○	
사용 방식	○	○	○	○	○	○	○	
작용(포스트잇, 화이트보드)	○	○	○	○	✓	○	○	

#### 기타 의견

**○ 원래 책상을  
다뤄놓는게 힘들니다.**

#### 파티션

Bad	○	○	○	○	○	○	○	Good
높이	✓	○	○	○	○	○	○	

#### 기타 의견

**제가 파티션을  
안 좋아 했던거에**

#### 오피스 적용

Bad	○	○	○	○	○	○	○	Good
이동성	○	○	○	○	○	○	○	

#### 기타 의견

**전체 책상!**

**전체화이트보드!**

#### 제품 평가

Bad	○	○	○	○	○	○	○	Good
필요성	○	○	○	○	○	○	○	

#### 제품의 좋은 점

**작은 책상**

**기능  
의자를 빼놓고 되지  
않을까요...?**

#### 불편한 점

#### 기타 의견

#### 사무용 가구 선호도

\*스테디걸 환경을 생각하여 답변해 주세요.

#### 선후도

스타트업 환경에 맞는 가구는 어떤 것이라 할까요?

**온라인의 제 개인적인... 등등**

**스타트업 사무실은 구성원이**

**자주 바뀌고 내부 크기도**

**유동적이기 때문에**

**기능이 조금은 열려있으면 좋습니다**

**+ 가격 중요  
(스타트업은 저렴해야)**

How to bend Wood : <http://www.wikihow.com/Bend-Wood>

relationship between Sitting and mortality : Katzmarzyk, P.T., Church, T.S., Craig, C.L., & Bouchard, C. (2009). Sitting time and Mortality from All Causes, Cardiovascular Disease, and Cancer. MSSE, 41(5),998-1005.