Creativity · Convergence · Collaboration · Confidence

Hub Center for implementing C^4 in Innovation of Engineering Education

Yeungnam University Hub Center for Eng. Edu.
Director: D. J. Song

Contents

Yeungnam University
Hub Center for Eng. Edu.

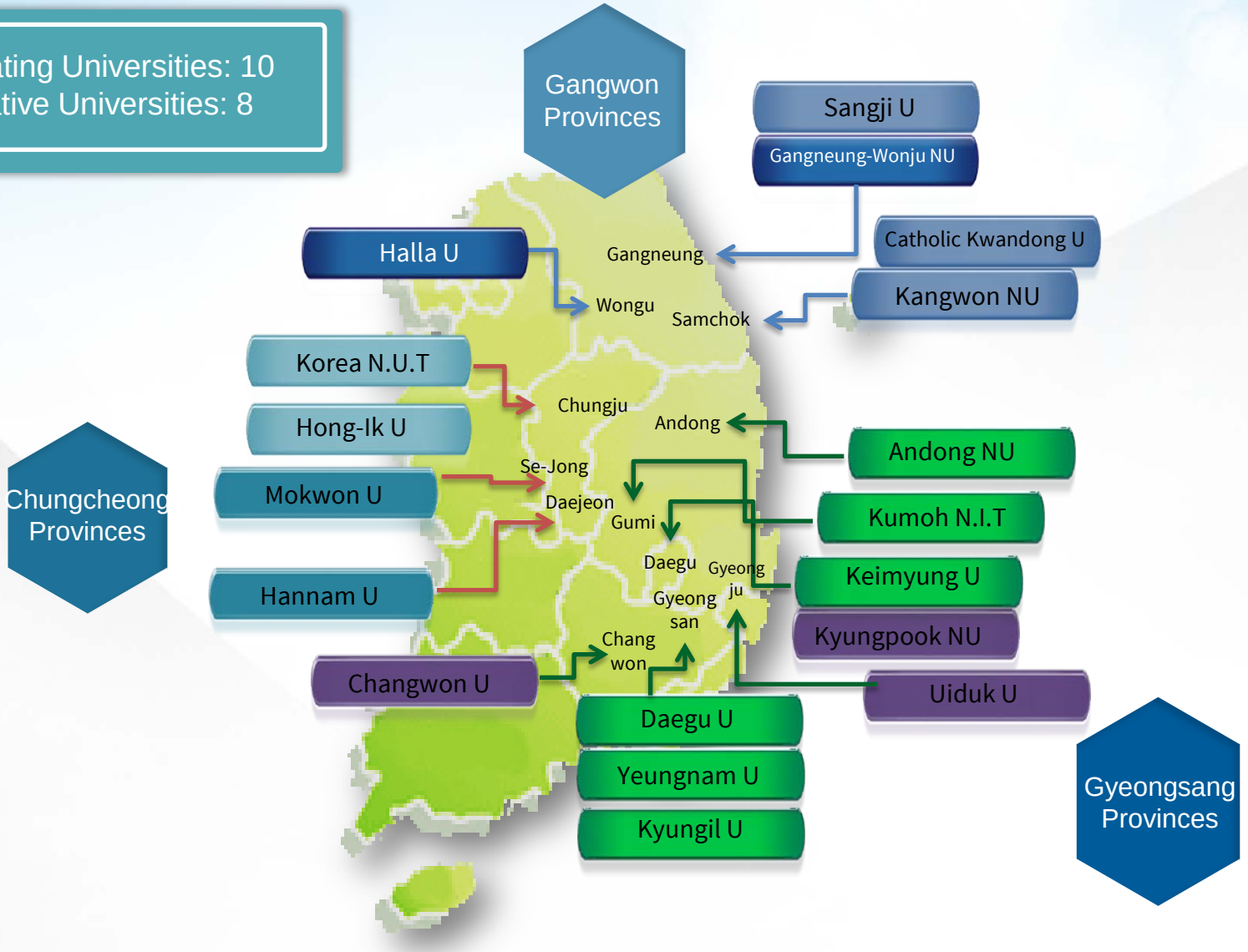
Gyeongsan Campus

Daegu Hospital and Campus

Yeongcheon Hospital

YU HCEE Participating Universities

Participating Universities: 10
Cooperative Universities: 8



Vision of YU Hub Center

VISION

The Leader of Educating Engineer with Creative Confidence

Hub center for Engineering Education Innovation

GOAL

Educating 'New-Fusion technology' Innovators with Creative Confidence

Strategic objective

- Building-up global sense
- Strengthening the ability of creative-fusion planning
- Improving creative 'new-fusion technology' skill
- Spreading the Engineering Education Outcomes
- Fostering Leadership & upright character

Innovative AGENDA

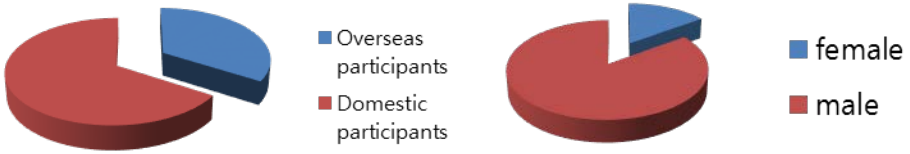
1. Expanding global networks	1. Developing the ability to solve fusion-creative problems	1. Improving 'new- fusion technology' skill	1. Disseminating and spreading the Result of Innovative-Engineering Education	1. Developing leaders with humanities skills
		2. Strengthening the capability of creating & getting jobs		
	2. Strengthening International Capstone Design capability	3. Fostering K-Innovator	2. Operating E2FESTA	2. Developing desirable character of engineer

The Program schedule of the year 2016

Apr.	◦ **International Design Thinking Workshop 2016**
May	◦ YU Hub center kick-off workshop on Innovative Engineering Education
Jun.	◦ **Creativity·Convergence Storytelling Camp 2016**
Jul.	◦ **International Capstone Design Project Camp 2016** ◦ Meeting **of industry-academy-cooperation** Corp for Engineering Education Innovation 2016
Aug.	◦ **Engineering Ethics Education** Workshop 2016 ◦ Students' Portfolios Fair 2016
Sep.	◦ Staff Council 2016 ◦ **Creativity·Convergence Camp 2016 with Design Thinking** ◦ 2015 Capstone Design Fair & Entrepreneurship training ◦ CDP ties with demands of corporations
Oct.	◦ 2nd workshop on Innovative Engineering Education
Nov.	◦ **E²FESTA 2016** ◦ WEEF 2016
Dec.	◦ 3rd Workshop on Innovative Engineering Education ◦ **Enjoyable Design-project contest 2016 & New-fusion technology training program**
2017.1	◦ **Global Field Training Program in Engineering Education and International Capstone Design Project Exchange 2016**

Project Goals of the year 2016 (1)

Goals Ⅰ. Fostering talented ties with Industry field

Goals	Project	Detail
Strengthening International Capstone Design capability	International Capstone Design Project Camp 2016	Date: Jul. 11 ~ Jul. 16, 2016 Place: YU Campus Theme: Mini-Baja & Model car(which is an autonomously driven car) Participants: Total 62 students Auspice: Yeungnam University Hub center for Engineering Education Supported by: Ministry of Trade, Industry & Energy, Korea Institute for Advancement of Technology 
Improvement of problem solving ability Through Creative nConvergence	Creativity nConvergence Camp 2016	Date: Sep. 8 ~ 10, 2016 Place: Dream Center, Gyeong-ju Contents: Educating Engineers with Creative Problem Solving Skill by using Design Thinking & Deep Dive Theme: 'Creative-Convergence product & service / Entrepreneurship' Participants: Engineering 46 students, Non-engineering 4 students, Total 50 Students Award: (Grand prize) Team. 1 , 'A bracelet to help you get home safely' Effect: Enhancing creative problem-solving skill, Enhancing systematic problem-solving capability

Project Goals of the year 2016 (2)

Goals Ⅰ. Fostering talented ties with Industry field

Goals	Project	Detail
Improvement of new Technology Convergence ability	Enjoyable Design-project Competitive exhibition 2016	Date: Dec.26(Mon).~28.(Wed), 2016 Place: Dream-center, Gyeong-ju Contents: Lecture, production, presentation, Award
Education for Strengthening Employment And Entrepreneurial capacity	1) Competitive Exhibition of Student portfolio	Date: Aug. 03 ~ Oct.12, 2016 Place: Yeungnam University Award: SEO In Ae(grand prize)
	2) CDP ties with demands of corporation	Date: Sep. 30, 2016 Place: Gangneung-Wonju NU Award: Team_P.M.O.D (Production: 自請妃(Jachungvi-The goddess of agriculture)
	3) Entrepreneurship Training	Date: Sep. 29, 2016 Place: Gangneung-Wonju NU Theme: Understanding the 'Start-Up' Process
	4) 2016 Capstone Design Fair	Date: Sep. 30, 2016 Place: Gangneung-Wonju NU Auspice: Yeungnam University Hub center for Engineering Education Co-management: Yeungnam University Hub center Gangneung-Wonju NU Innovation center for Engineering Education Award: Team_P.M.O.D (Grand prize)

Project Goals of the year 2016 (3)

Goals Ⅱ. Hub function linked with innovation center for Engineering Education

Goals	Project	Detail
Creative 'new-fusion Technology' skill	K-Innovator	– Yeungnam University Hub center program : Enjoyable Design project, Creative-Convergence camp, ICDP, Outbound Capstone design program, Capstone Design Fair etc. – Participating University program : Comprehensive Design of the school curriculum, Individual program of Innovative Center for Engineering Education (Employment and entrepreneurial capacity , program about creative-convergence talent training)
Global Network	International CDP exchange	Date: Jan. 3 ~ 6, 2017 Institutions: South China University of Technology, Hong Kong University of Science and Technology City University of Hong Kong Purpose: 1. Exchange of undergraduate students for international capstone design projects, study and research 2. Exchange of graduate and undergraduate students for study and research 3. Exchange of faculty members for research, lectures, and discussions 4. Exchange of academic materials and academic publications 5. Joint research activities

Project Goals of the year 2016 (4)

Goals Ⅲ. Result Diffusion

Goals	Project	Detail
Result diffusion of Innovative Engineering -Education	Workshop on Innovative Engineering Education	[KICK-OFF] Date: May. 19 ~ 21, 2016 / Place: The KAL Hotel Seogwipo [2nd Workshop] Date: Oct. 6 ~ 7, 2016 / Place: Honglk University, Sejong / Theme: "Convergence of Economy, Art and Engineering Education" [3rd Workshop] Date: Dec. 8 ~ 9, 2016 / Place: OceanSuite JeJu Hotel/ Theme: ""Convergence of IoT, Humanities and Engineering Education"
	E2FESTA	Date: Nov.11.(Thu) ~ 12.(Fri), 2016 Place: KINTEX, Ilsan-gu, Goyang-si, Gyeonggi-do Auspice: Ministry of Trade, Industry & Energy Management: KIAT(Korea Institute for Advancement of Technology), Innovative Engineering Education Council Subject: Engineering Next generation-Light our Future!

Project Goals of the year 2016 (5)

GoalsⅣ. Good Engineering

Goals	Project	Detail
Engineering Education With Humanistic value	CreativitynConvergence Storytelling Camp 2016	Date: Apl. 23 ~ 24, 2016 Place: Hotel Interbulgo EXCO, Daegu Contents: Making a storyboard after touring Daegu modern alley Presentation using storytelling Theme: 'Daegu Modern Alley Tour Redesign' Participants: Total 36 students Award: (Grand prize) Team. 5 , 'Subject: Modern alley student supporters' Effect: Improved ability to create stories
Students With Good toughness	Engineering Ethics Education Workshop 2016	Date: Aug. 18, 2016 Place: Yonsei University Auspice: KSEE, YU HCEE, Yonsei University ICEE Contents: Technology, business and ethics of our society

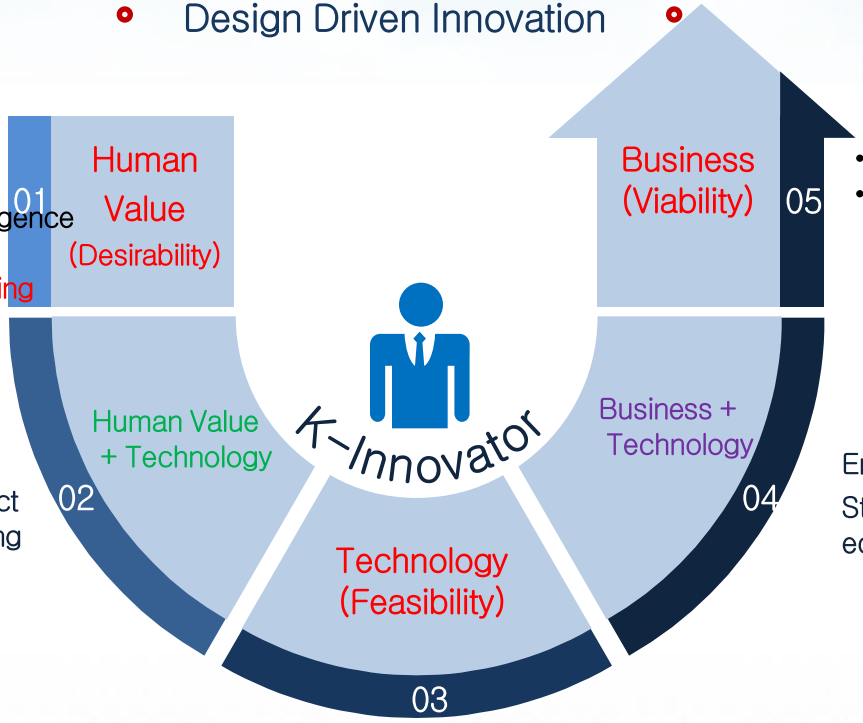
Creating Creative Innovators

Creating Creative Innovator

Creativity | Convergence | Collaboration | Confidence

Design Driven Innovation

- Design Thinking/TRIZ Camp
- Global CDP with Foreign University
- New Technology Creative and Convergence Camp with DT
  : Increase Creativity and Problem Solving Capability, achievement rate 84.4%



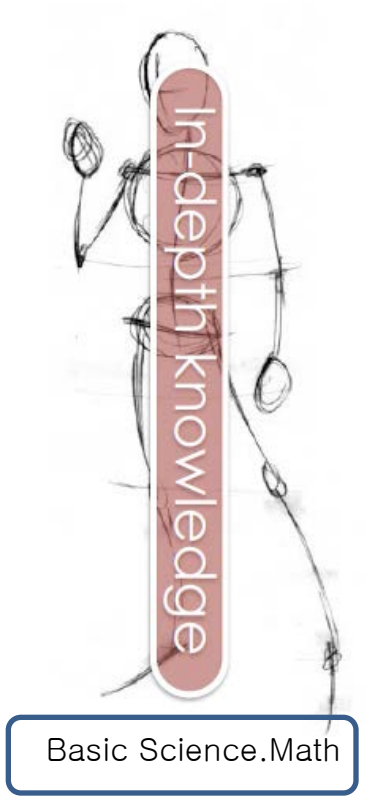
- Student Portfolio contest
- Global Exchange program with foreign universities and CDP exchange

ICT technology Convergence camp & Enjoying Design Project Contest : understanding ICT technology and usage 86.7%

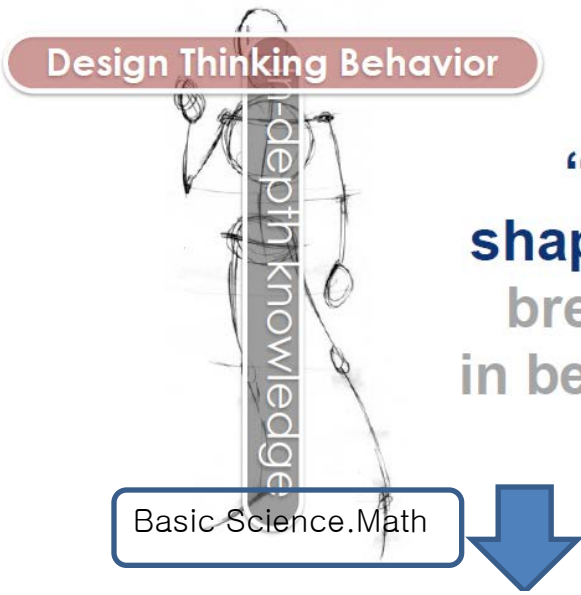
Enterprise driven CDP contest
Start-up, Entrepreneurship education

- ICDP camp: electric vehicle: achievement rate 81.2%
- CDP contest under auspice of Hub
- E2 FESTA program operation
- Advanced Engineering subjective education in participation university

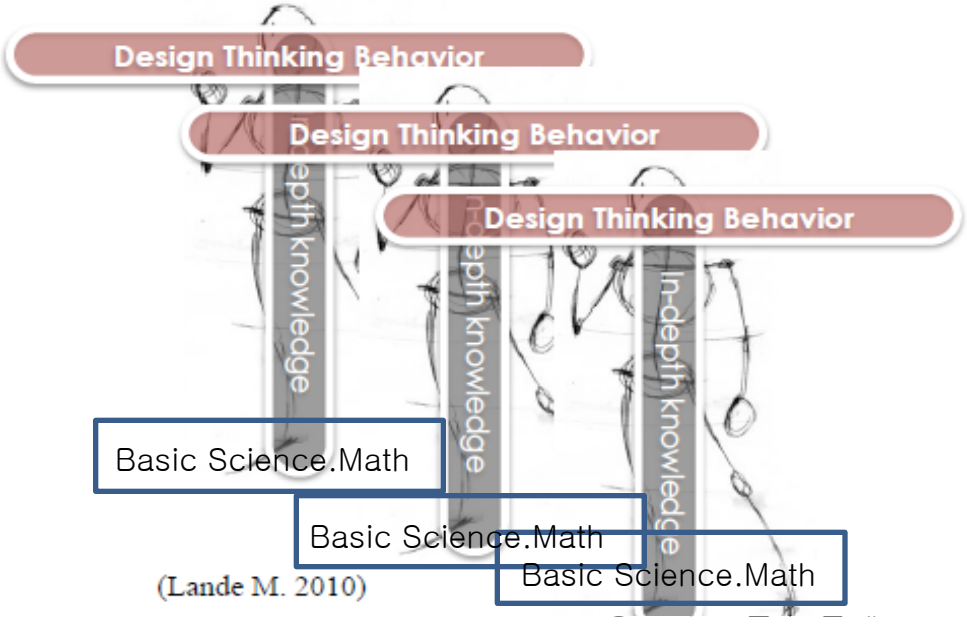
Engineers Attributes in Industry 4.0



"I"
shaped by
knowledge
in depth



"T"
shaped by
breadth
in behavior



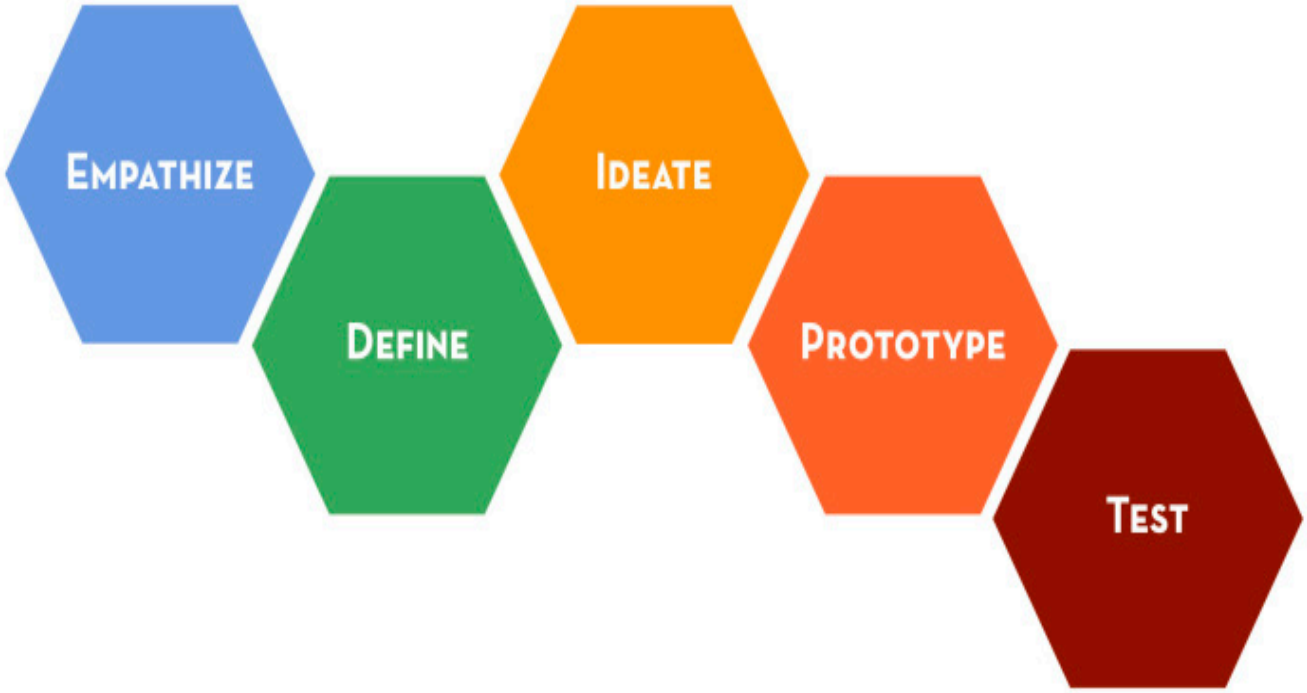
(Lande M. 2010)

STANFORD MECHANICAL ENGINEERING

Innovative Engineering Education :

Design Thinking

Thinking out-of-the-box
Human-Centered Approach



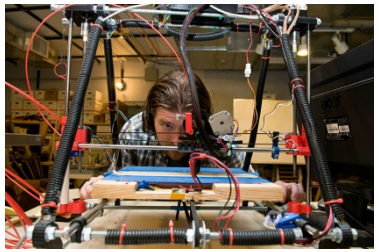
Stanford dSchool: Design Thinking Education

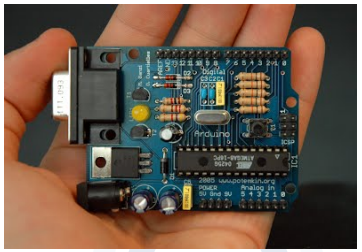
https://dschool.stanford.edu/groups/k12/wiki/cc09d/Summer_Workshop_2013.html

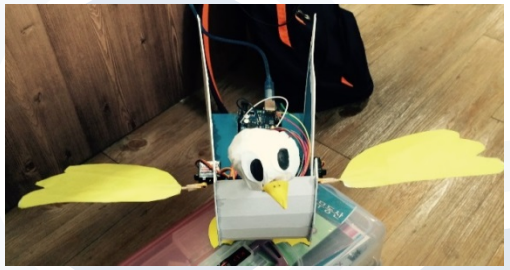
Innovative Engineering Education :

Maker Movement: MIT Fab Lab etc.

- Maker
- "Do It Yourself" culture extends to technology fields
- Application of New Technology to Invention, prototyping
- Open Source S/W+H/W : 3-D Printer, 3-D Scanner, CNC, Arduino, Raspberry PI Board Platform
- H/W Start-up







- Multidisciplinary Design in Curricular and extracurricular activities
- UC Berkeley Jacobs Institute for Design Innovation
  Design Driven Innovation

-MIT FabLab, Georgia Tech Invention Studio, UT Austin Eng. Edu. and Research Center - Makerspace

Innovative Engineering Education :

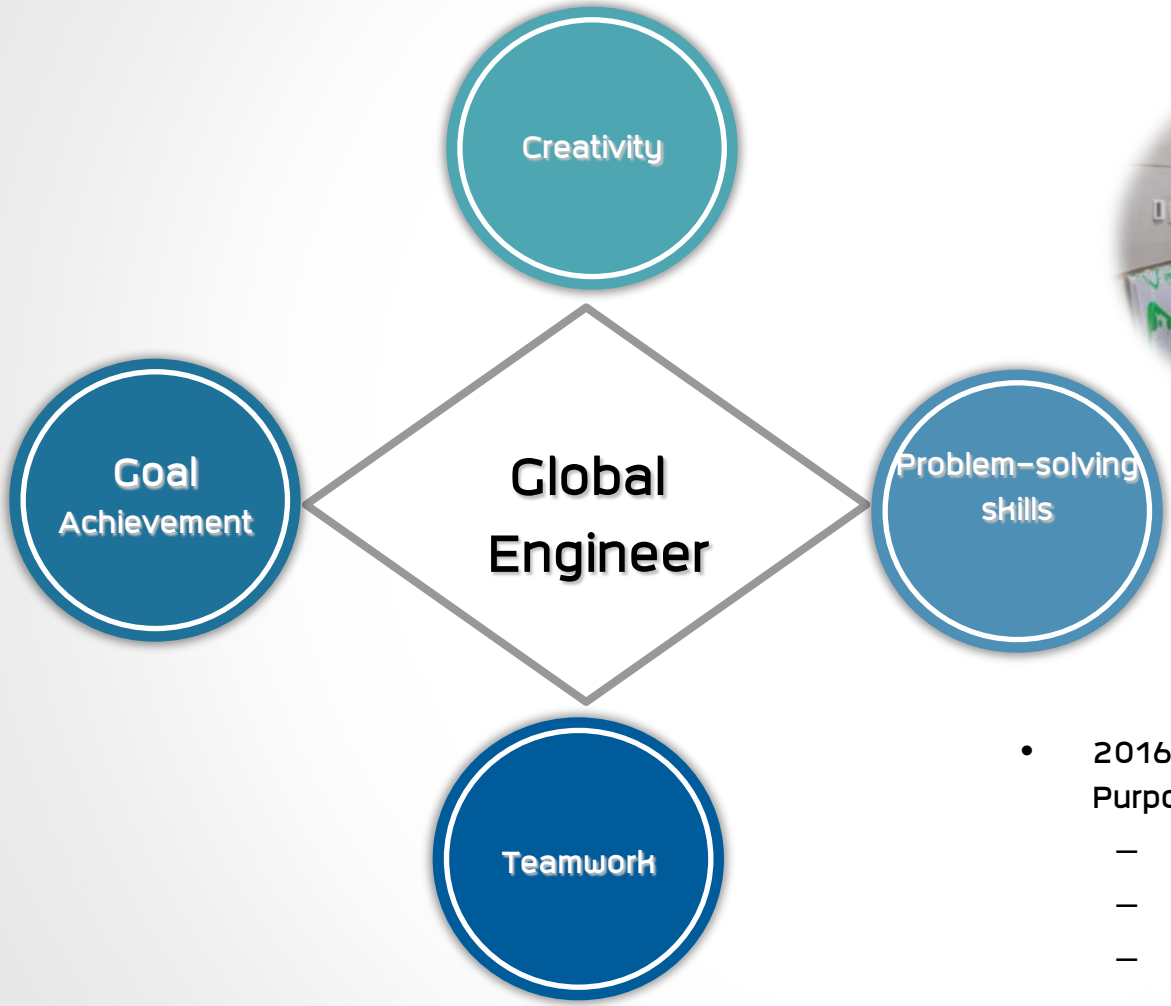
Intrinsic Motivation: Olin, Singapore Polytechnic

- Play, Passion, Purpose Intrinsic motivation
- Enjoy engineering design and develop such engineering eco-system

Tony Wagner. *Creating Innovators: The Making of Young People Who will Change the World.*

- Liberal Arts, arts, technology convergence education
- Project Based Learning, entrepreneurship, flipped learning, PBL, Liberal Arts education
- SCOPE Projects: Experience practical product development through Capstone design with company

Major Programs (1) ICDP



- 2016 International Capstone Design Project Camp Purpose
  - Understand and Practice Leadership
  - Improving Problem-solving skills
  - Improving Communication skills
  - Improving Intercultural understanding skills
  - Tied to student's desire to help others

Capstone Design Projects Objectives

1. Good Design vs Good Design Experience
2. Complex Real Problems: Industry
3. Convergence: technology +liberal arts

   tech+
   - Form & Aesthetics(art)
   - Function, Usability & Interaction (technology+human)
   - Marketability, image & brand (business)
4. International Cooperation:
   - Global Market
5. Systematic and creative engineering design

Major Programs (1) ICDP

- Date: Jul. 11th(Mon.) ~ Jul. 16th(Sat.), 2016
- Place: Yeungnam University campus
- Auspice: Yeungnam University Hub Center for Engineering Education

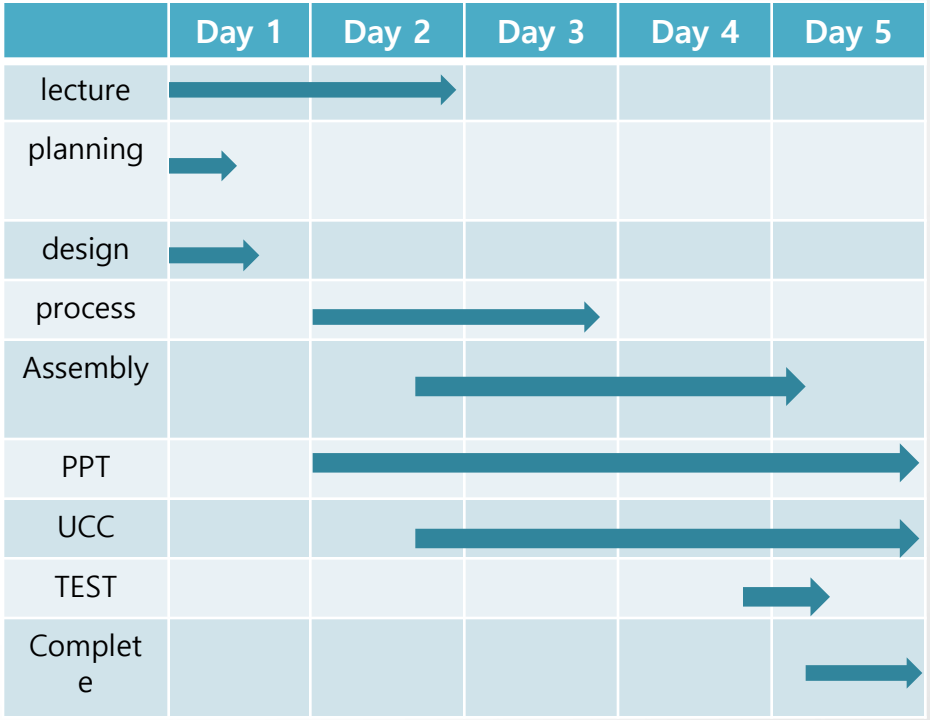
- Manage: Yeungnam University Hub Center for Engineering Education,
  Kyungil University Innovation Center for Engineering Education,
  Keimyung University Innovation Center for Engineering Education,
  Daegu University Innovation Center for Engineering Education,
  Yeungnam University Innovation Center for Engineering Education,
  Hongik University(Se-jong) Innovation Center for Engineering Education,

- Supported by: Ministry of Trade, Industry & Energy, Korea Institute for Advancement of Technology
- Participants: 62 students, 10 teams (Students work in teams of 6~7 members)

Major Programs (1) ICDP

Time table	07.11(Mon)	07.12(Tue)	07.13(Wed)	07.14(Thu)	07.15(Fri)	07.16(Sat)
~ 08:40		Breakfast [Dormitory Restaurant]	Breakfast [Dormitory Restaurant]	Breakfast [Dormitory Restaurant]	Breakfast [Dormitory Restaurant]	Breakfast [Dormitory Restaurant]
		Move to the Learning Factory Bldg.	Move to the Learning Factory Bldg.	Move to the Learning Factory Bldg.	Move to the Learning Factory Bldg.	Move to the Learning Factory Bldg.
09:00 ~ 10:00		Lecture II Ph.D. SEOK Jul Ki [E28 #212]	Team activities - the manufacturing of vehicles - ready for presentation [KCLP / E28 #106]	Team activities - the manufacturing of vehicles - ready for presentation [KCLP / E28 #106]	2015 BAJA SAE KOREA Car Parade [Track Field]	2015 BAJA SAE KOREA Endurance event
10:00 ~ 11:00						
11:00 ~ 12:00		Team activities- Design (completion) [KCLP / E28 #106]				
12:00 ~ 13:00		Lunch [Technopark Restaurant]	Lunch [Technopark Restaurant]	Lunch [Technopark Restaurant]	Lunch [Technopark Restaurant]	Lunch [Technopark Restaurant]
13:00 ~ 14:00		Team activities - the manufacturing of vehicles - Design [KCLP / E28 #106]	Mid-Presentation [E28 #106]	Team activities - the manufacturing of vehicles - ready for presentation [KCLP / E28 #106]	Driving Test of model car - ready for presentation [KCLP / E28 #106]	Dormitory Check-out
14:00 ~ 15:00	(~ Registration) Opening ceremony & Orientation [E28 #212]					The Questionnaire [E28 #212]
15:00 ~ 16:00		break time	break time	break time	break time	Closing ceremony (Celebration photo)
16:00 ~ 17:00	Lecture I Researcher KIM Jun Hyoung [E28 #212]	Team activities - the manufacturing of vehicles - ready for presentation [KCLP / E28 #106]	Team activities - the manufacturing of vehicles - ready for presentation [KCLP / E28 #106]	Team activities - Manufacture, Assembly - ready for presentation [KCLP / E28 #106]	Team activities - the manufacturing of vehicles - ready for presentation [KCLP / E28 #106]	
17:00 ~ 18:00	Explain security management rule				Final-Presentation - Award Presentation [Convention Hall, Chunma Arts Center]	[E28 #212] -Opening ceremony - Lecture [Convention Hall, Chunma Arts Center] - Closing ceremony - Dinner party
18:00 ~ 19:00	Dinner [Technopark Restaurant]	Dinner [Technopark Restaurant]	Dinner [Technopark Restaurant]	Dinner [Technopark Restaurant]		
		Move to the learning factory Bldg.	Move to the learning factory Bldg.	Move to the learning factory Bldg.		
19:00 ~ 20:00	Team activities / Presentation - Initial Concept Design PPT [HRD #115]	Team activities - the manufacturing of vehicles - ready for presentation [KCLP / E28 #106]	Team activities - the manufacturing of vehicles - ready for presentation [KCLP / E28 #106]	Team activities - the manufacturing of vehicles - ready for presentation [KCLP / E28 #106]	Dinner party	[KCLP] - Team activities (Electric car) [E28 #106] - presentations - Team activities (Arduino) [Dormitory restaurant] - Breakfast (0800~0900) [Technopark Restaurant] - Lunch (1230~1330) - Dinner (1800~1900)
20:00 ~ 21:00						
21:00 ~ 22:00	Go to bed [Dormitory]	Go to bed [Dormitory]	Go to bed [Dormitory]	Go to bed [Dormitory]	Go to bed [Dormitory]	
		Laser Cutting Compressor	Manufacture Welding of metals(1900~)			

Daily Schedule



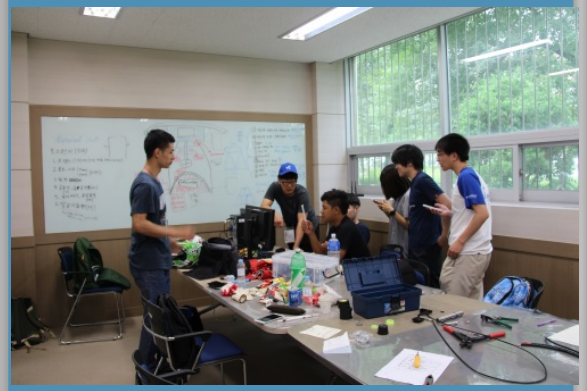
Major Programs (1) ICDP

Orientation & Lectures

Lectures:

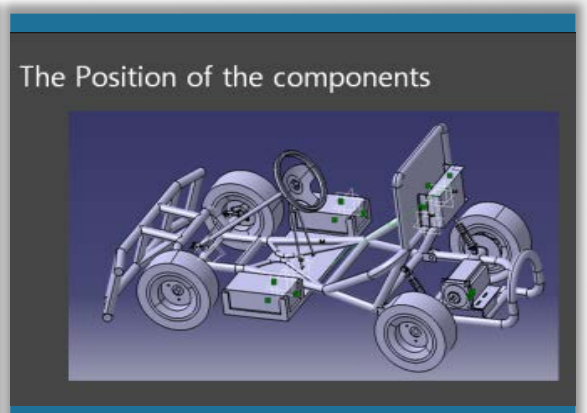
1. Basic Education of Arduino
2. Adjustable Speed AC Motor Drives for Electric Vehicles

Icebreaking



1. Self introduction
2. Make your Team Name & Team Logo!

Initial Concept Design Presentation



◈ Conceptual Design: electric vehicle, Idea generation, function structure, evaluation, selection and build process

Brainst orming

Brainstorming

- Vehicle design: safety, efficiency, originaiity
- Safety : Belt, Clothes, Helmet, Front & main loops, Brake Closer to foot, Add a Bumpers…
- International team : name, logo

Material

materials

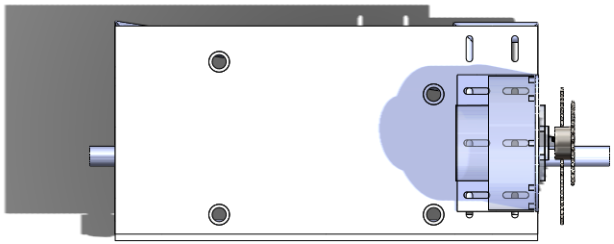
- motor: 아그니 모터, 모터컨트롤러, 페달, 스프라켓, 스프라인, 체인
- structure: 프레임, 타이어, 휠, 핸들, 샤시, 범퍼, 원형파이프, 각재앵글
- battery
- safety: 킬스위치, 키스위치, 전기브레이크, 브레이크 패드
- tools: 렌치, 드라이버, 니퍼, 롱노즈, 줄자
- etc: 전기테이프, 작업용 장갑 및 마스크, 볼트, 너트, 용접용 봉
- Driving safety device: 보호장갑, 안전벨트, 헬멧

Design

Design: CAD + CAE s/w

- s/w: ANSYS, CATIA, UG, Solidwork, Fluent, CFX
- Place: HRD bldg 119 studio

Preparation of important parts and technical drawings



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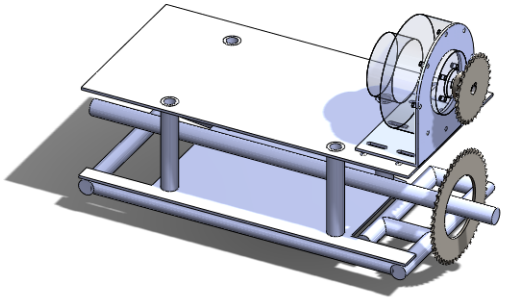

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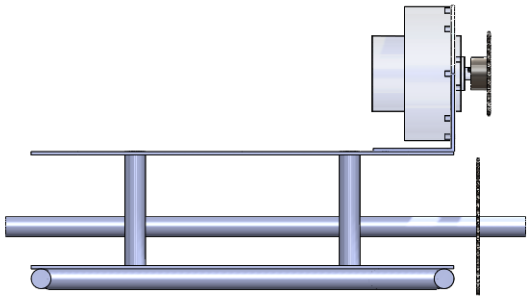

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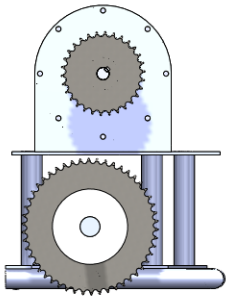


*우측면

Major Programs (1) ICDP

Processing

Assembly

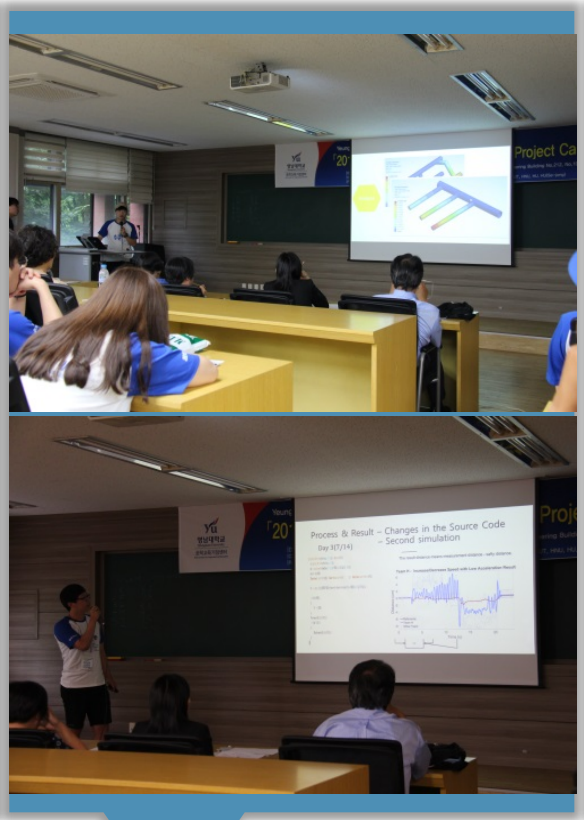
Test

1. Mini-Baja Car production Period: 3days
2. Safety Considerations: Belt, Clothes, Helmet, Front & Main Loop, Brake Closer to Foot, Add a Bumpers, etc.

Major Programs (1) ICDP

Mid-Presentation

Final Presentation



2016 Baja SAE Korea Car Parade

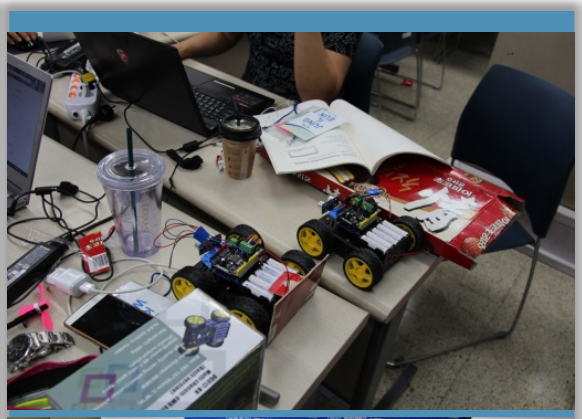
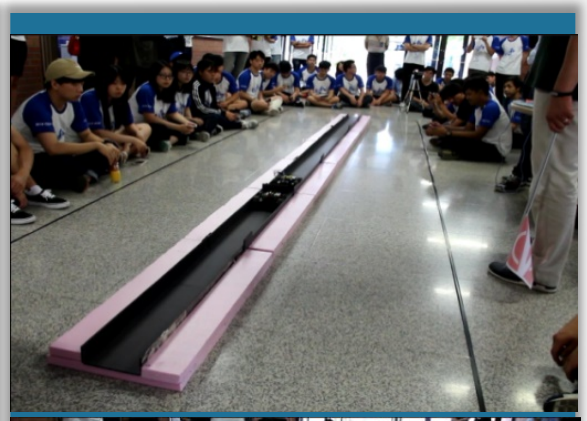
Presentation

1. Presentation: PPT, UCC, etc.
2. Limited-time: 10minutes
3. Definition of the problem and proposal of integrated solution for the problem

1. 2016 Baja SAE Korea at Yeungnam University
2. Date: Jul. 16, 2016

Major Programs (1) ICDP

Design, Build, Test, Contest of An autonomously driven car


2016 ICDP Newspaper Interview (YU_news 2016.07.17)

일요신문

영남대 공학교육거점센터 주최, '2016 국
열려

온라인 기사 2016년07월17일 22시53분

[대구=일요신문] 김재원 기자 = 한국, 일본, 중국, 태국 등 4
와 모형 자율주행자동차를 만들었다. 지난 11일 '2016 국제
Capstone Design Project Camp)'가 영남대서 열린 것.

올해로 4회째를 맞은 이번 캠프는 영남대 공학교육거점센터
됐다.

'창의적 종합설계'를 의미하는 '캡스톤 디자인'(Capstone D
춘 엔지니어 양성을 목표로, 학생들이 분야별로 습득한 지식
요로 하는 제품 등을 학생 스스로 설계·제작·평가해 봄으로
십 등을 키우게 하는 공학교육프로그램이다.

2014 International Capstone Design Project Camp
At Yeungnam University, South Korea

Name : Phanuphong Soncha
Major : Mechanical engineering, RMUTT
Work : Siam Kyosan Denso (Product Common rail system)
This is my first camp in oversea and very excited.

Project : Electric Go Kart competition
Group target : The Fast Electric Go Kart
- Plan
- Modeling
- Idea discussion
- Work shop
- Assembly
- Test drive

This camp make me level up about System thinking, Time management, Respect other people, improvement my English and new friendship.
Now I can use my experience in my job and try to level up in this skill.
Centerficate have benefit to job interview.
Company interested experience of this program.

of Technology), 가나자와공대(Kanazawa
ina University of Technology), 태국 라자
anyaburi) 등 4개 해외 대학과 15개 국내
가했다.

들이 골고루 섞여 팀을 구성해 과제를 수행
설계하고 제작하며 6개 팀은 모형 자율주
품의 완성도를 높이기 위해 컴프 2주 전에 팀
의견을 공유하고 작품 콘셉트를 미리 정해

시모토 카츠마사(Yoshimoto Katsumasa,
식수준과 한국의 교육과정을 조금이나마 체
일간의 짧은 기간 동안 세계 각국의 친구도
경험이었다"고 참가 소감을 밝혔다.

강의를 듣고 워크숍을 하는 것 뿐만 아니라 직

제 전기자동차를 직접 만들었으며 자율주행
형 자율주행자동차를 직접 제작했다. 특히
접 만든 전기자동차로 영남대서 개최되는
퍼레이드도 펼쳤다.

대 등 총 9개 대학 학생들로 구성된 D팀의
4년) 씨는 "다양한 전공의 학생들이 각자 강
자동차의 복잡한 제작 과정을 수행해 볼 수 있
학생들과 함께 팀을 이뤄, 여러 관점에서 작

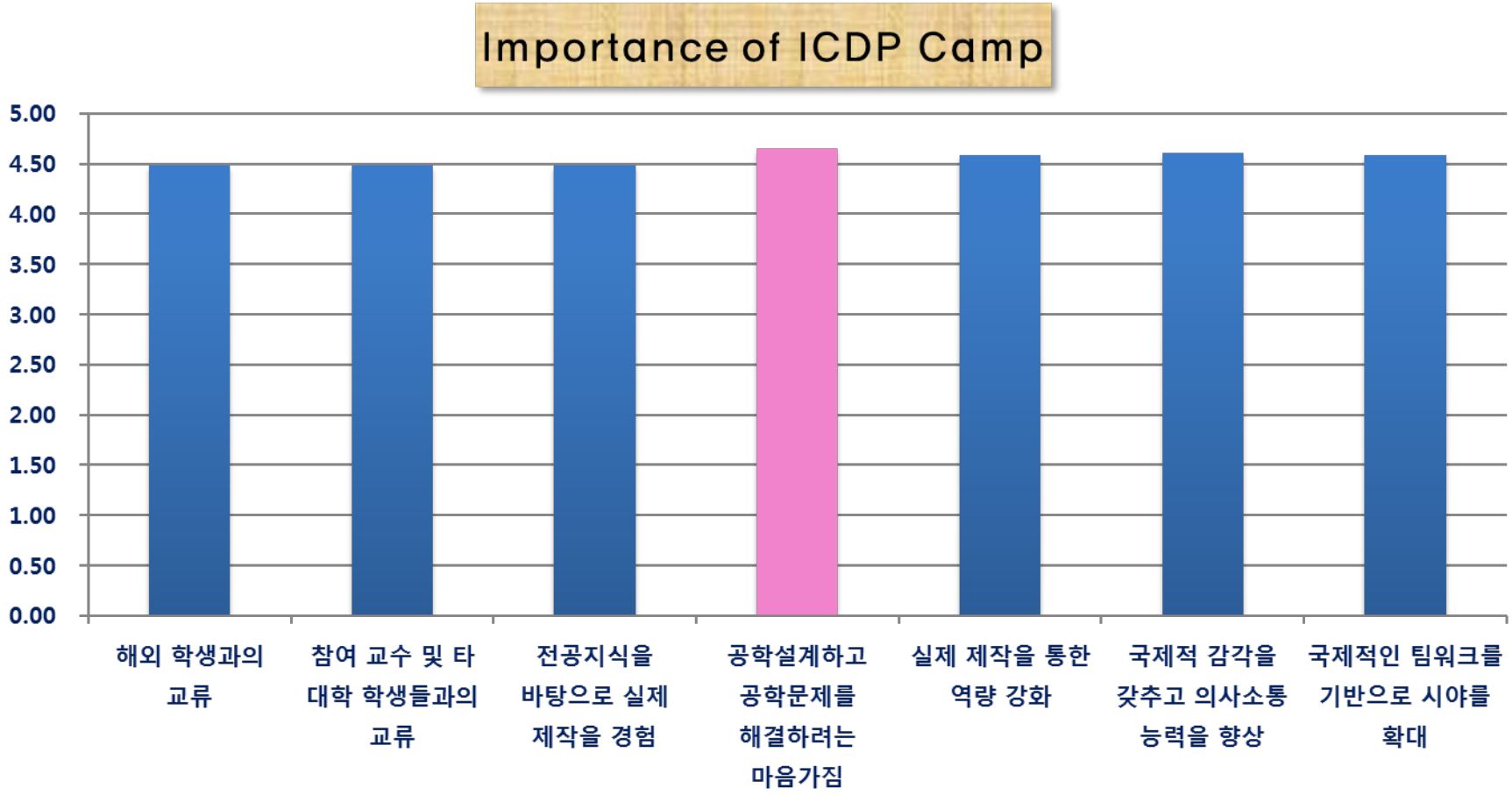
ICDP camp was a big success! Design Camp provided excellent Environment to design, build , Test a real vehicle!

Major Programs (1) ICDP

2016 ICDP Effects

- Enhancing the **engineering problem-solving capability** by design and manufacturing of electric vehicles
- Multi-dimensional professionals (**Communication skills, Technical skills**)
- Engineering design (**design thinking**)
- **Teamwork and communication** with overseas participants from SIT, KIT, Japan, SCUT, China, RMUTT, Thailand
- Enhancing the engineering manufacturing skill by making model car
  (an autonomously driven car)

◈ Feed back: from students



Global exchange

cowork among students

real mfg. experience

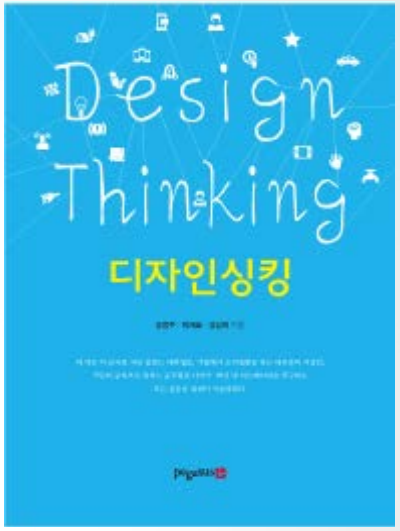
Design & solving real prob.

design mfg. Capa.

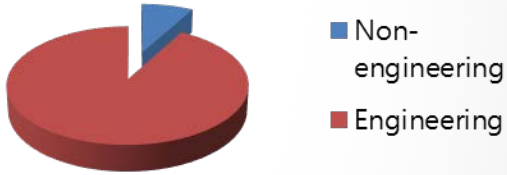
global Comm.

global teamwork

Major Programs (2) C·C Camp



* **CreativitynConvergence Camp by using Design Thinking**
* Date: Sep. 8 ~ 10, 2016
* Place: Dream Center, Gyeongju
* Purpose:
  * Educating Engineers with Creative Problem Solving Skills by using Design Thinking
  * Experiencing Multidisciplinary, Engineering / Non-engineering Fusion Education
  * Students deal with limited time Improving Student Teamwork
* Theme: 'Creative-Convergence product & service / Entrepreneurship'



* Participants:
  * Engineering 46 students, Non-engineering 4 students, Total 50 students
  * 10 teams (students work in teams of 5-6 members)
* Schedule
  * Day 1: Design Thinking lectures, Deep Dive, Prototyping
  * Day 2: Doing Projects with materials, Mid-presentation, On-site Interview
  * Day 3: Contests (Products Display and Presentation), Prize

Major Programs (2) C·C Camp

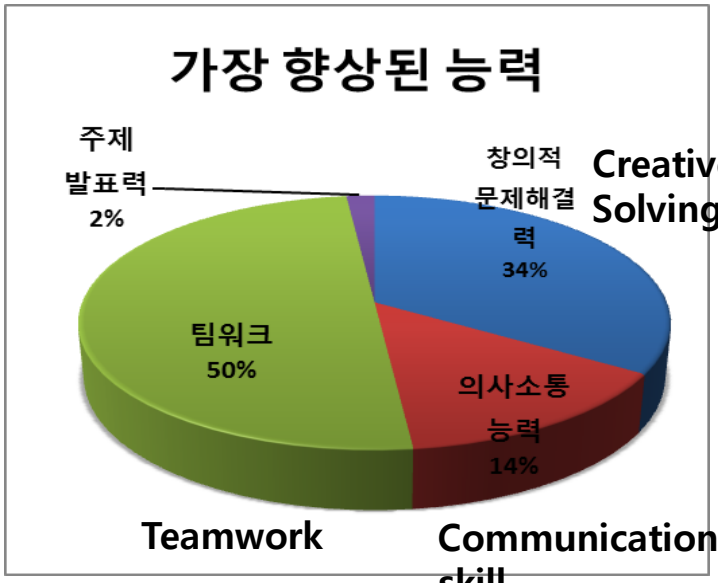
* Design Thinking lecture + Deep Dive + paper Design, build, test, and competition!

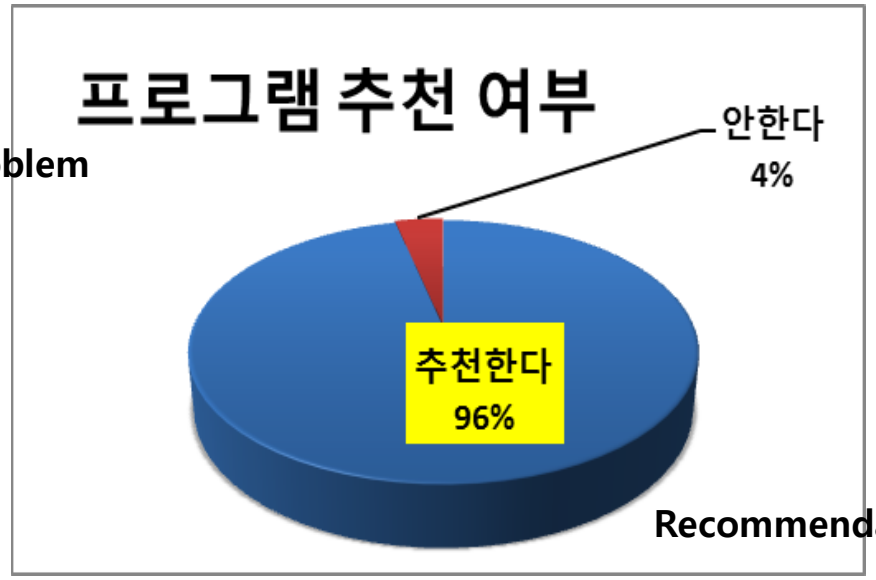
Major Programs (2) C·C Camp

CnC Camp Effects

- Enhancing Creative Problem Solving Capability
- Enhancing Systematic Problem Solving Capability
- Improving the ability of the implementation of ideas
- Improving teamwork skills in Interdisciplinary Convergence Team
- Improving communication skills

Feedbacks from students





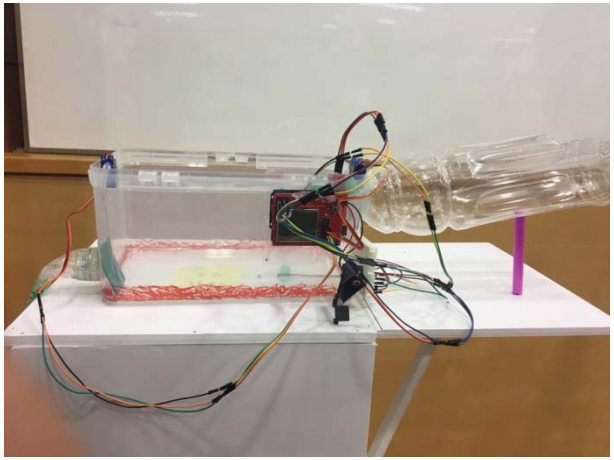
Mostly enhanced capability
50% creativity, 34% problem
Solving Cap., 14% comm. skill

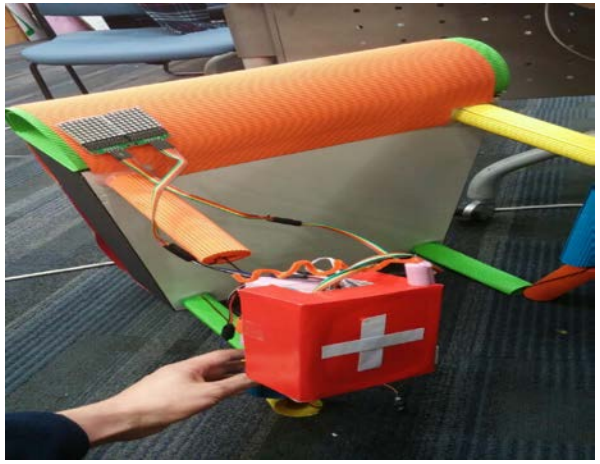
Recommendation to friends
96% positive

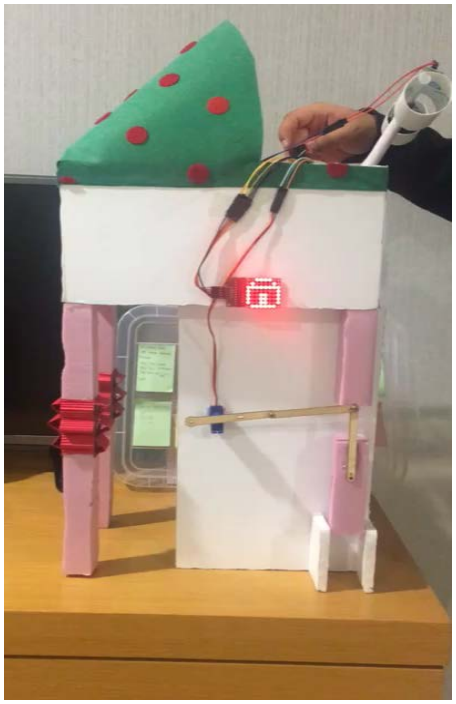
Major Programs (3) 2016 E²FESTA

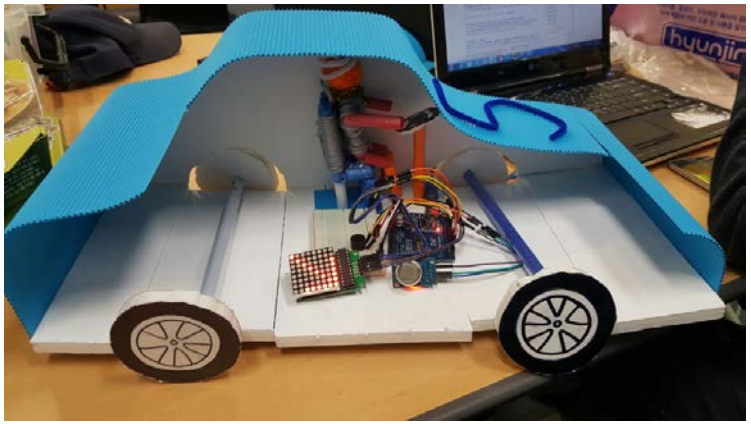
* **E²FESTA 2016(Engineering Education Festival 2016)**
* Date: Nov. 11 ~ 12, 2016
* Place: KINTEX, Ilsan-gu, Goyang-si, Gyeonggi-do
* Purpose: Exchange of ideas through participation and communication for the organizers of the field of engineering education
* Theme: Engineering Next generation-Light our Future!
* Participants: The Middle and high school students, The Engineering Students, The Professors of Engineering, The Corporations etc.
* Award a prize
  - University of the year: (Grand prize) Yeungnam University.
  - Students' Portfolios Fair(Computer, IT, agricultural engineering, food engineering, etc.) : (Silver prize) Choi Ji Hye
  - Capstone Design Fair: (Award of KIAT) 'Peace KMU' Team

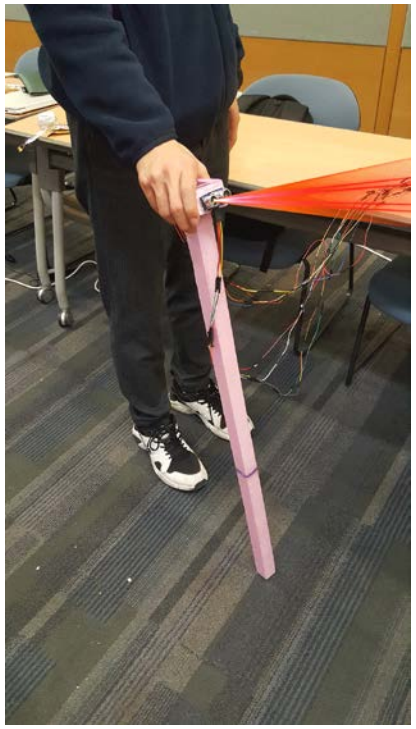
Enjoyable Design-project contest 2016 & New-fusion technology training program

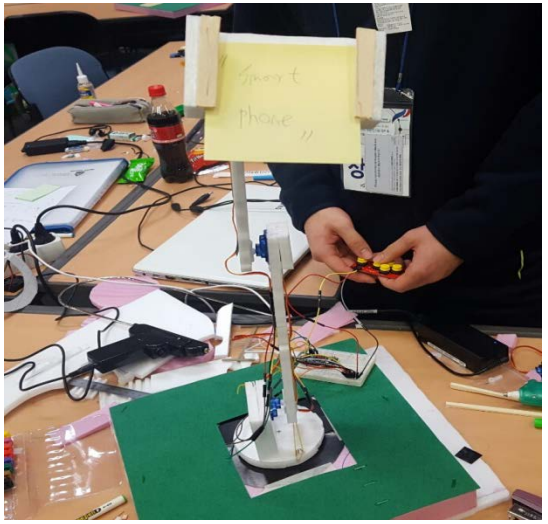


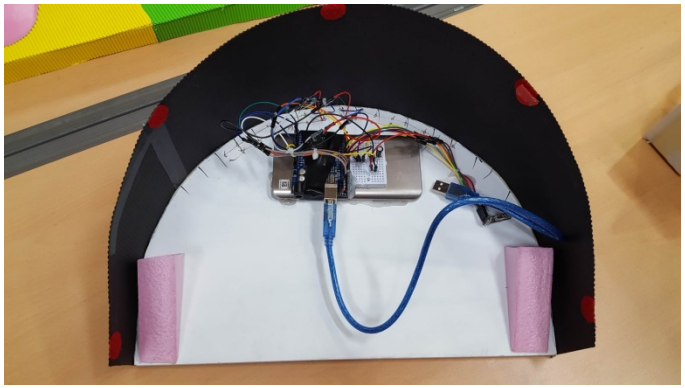








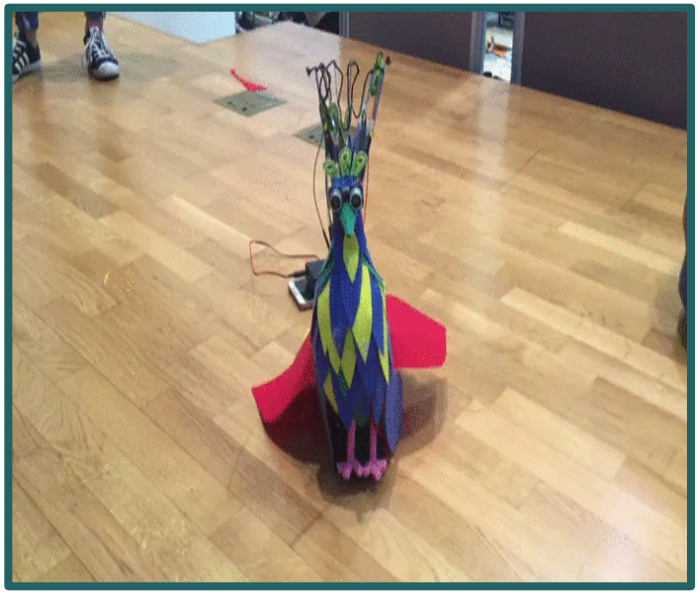




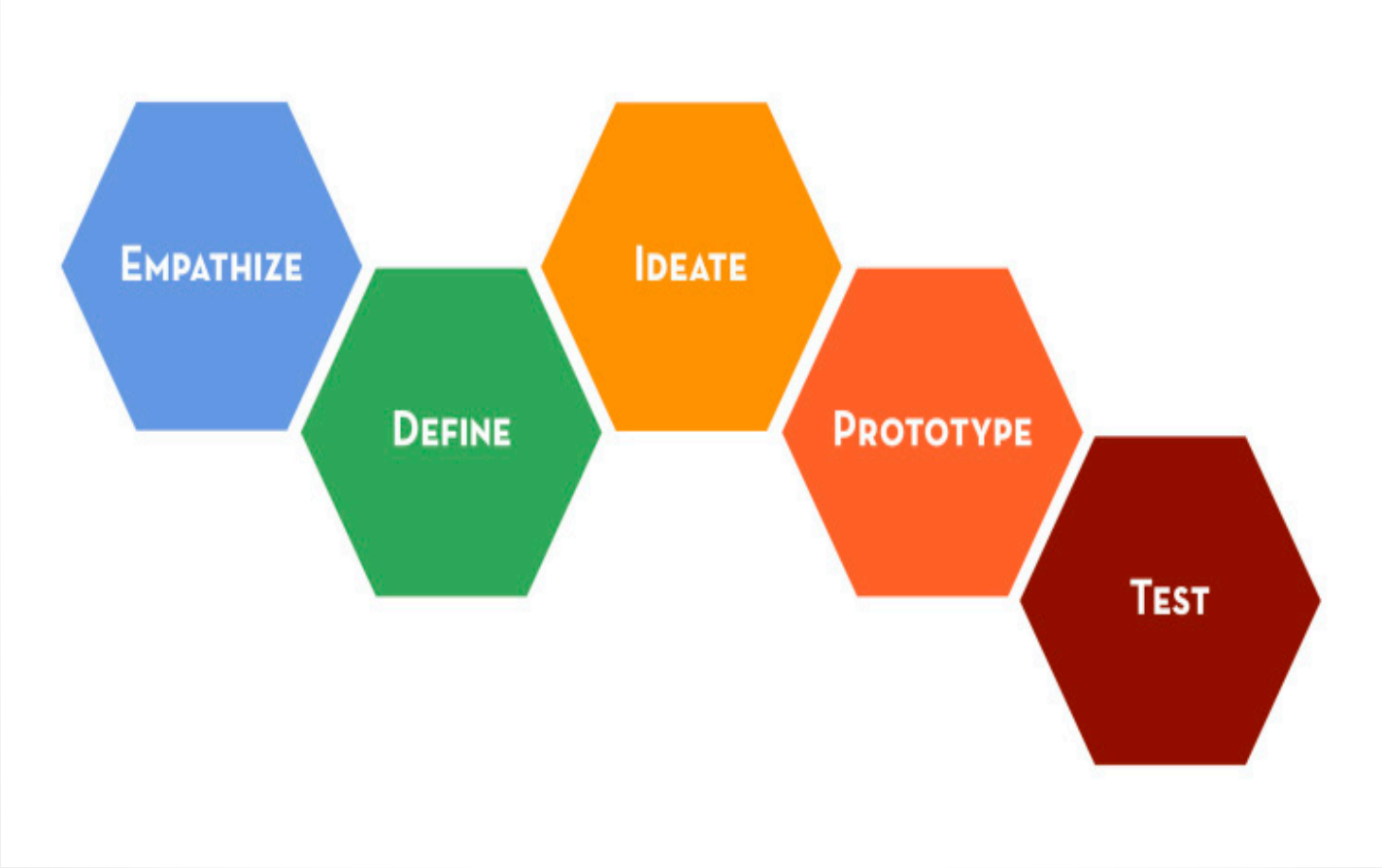
Simulating Peacock movement: ICT technology convergence camp
Dec. 28 -30, 2015

암컷을 발견한 수컷공작새는 소리를 내며 깃털을 편다.

한껏 멋을 내는 듯 화려한 불빛을 깜빡인다.



Design Thinking Process



Design Thinking

Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.

Tim Brown, president and CEO, IDEO

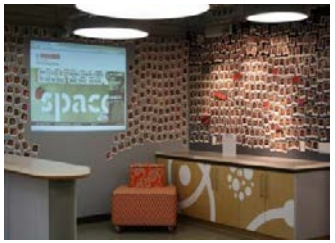
I am not designer or engineer, but I still design students' learning experience

http://www.dustinkirk.com/2007/01/06/tim-brown-innovation-through-design-thinking/

DT is unlocking potential
and creating creative confidence!

Design Thinking

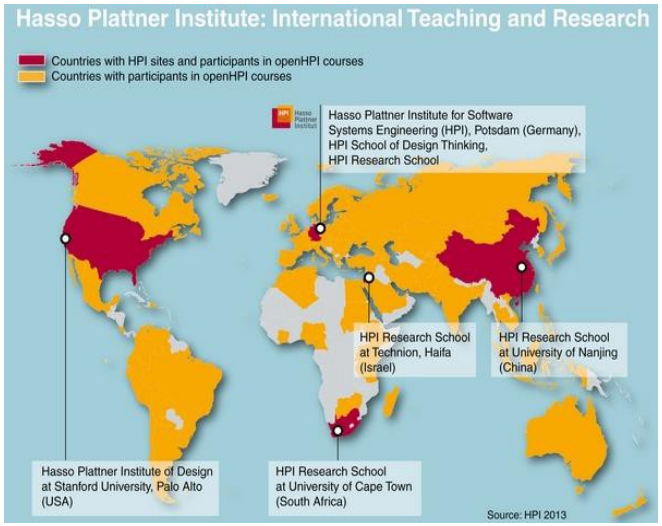
SAP, GE, P&G, Deutche Bank, Apple, IBM, Whirlpool
Nike, UVA, SP, NTU, Air NZ, …



Stanford University

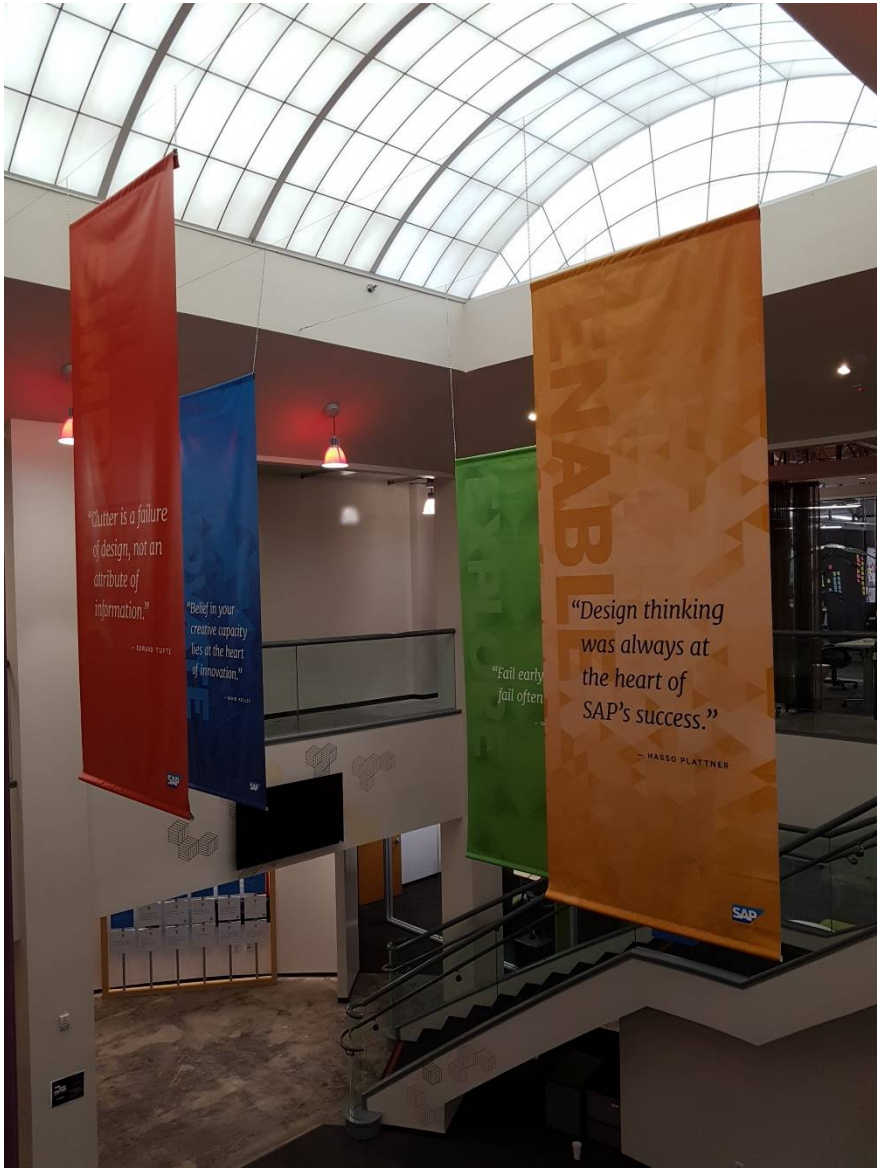
HPI Hasso Plattner Institut

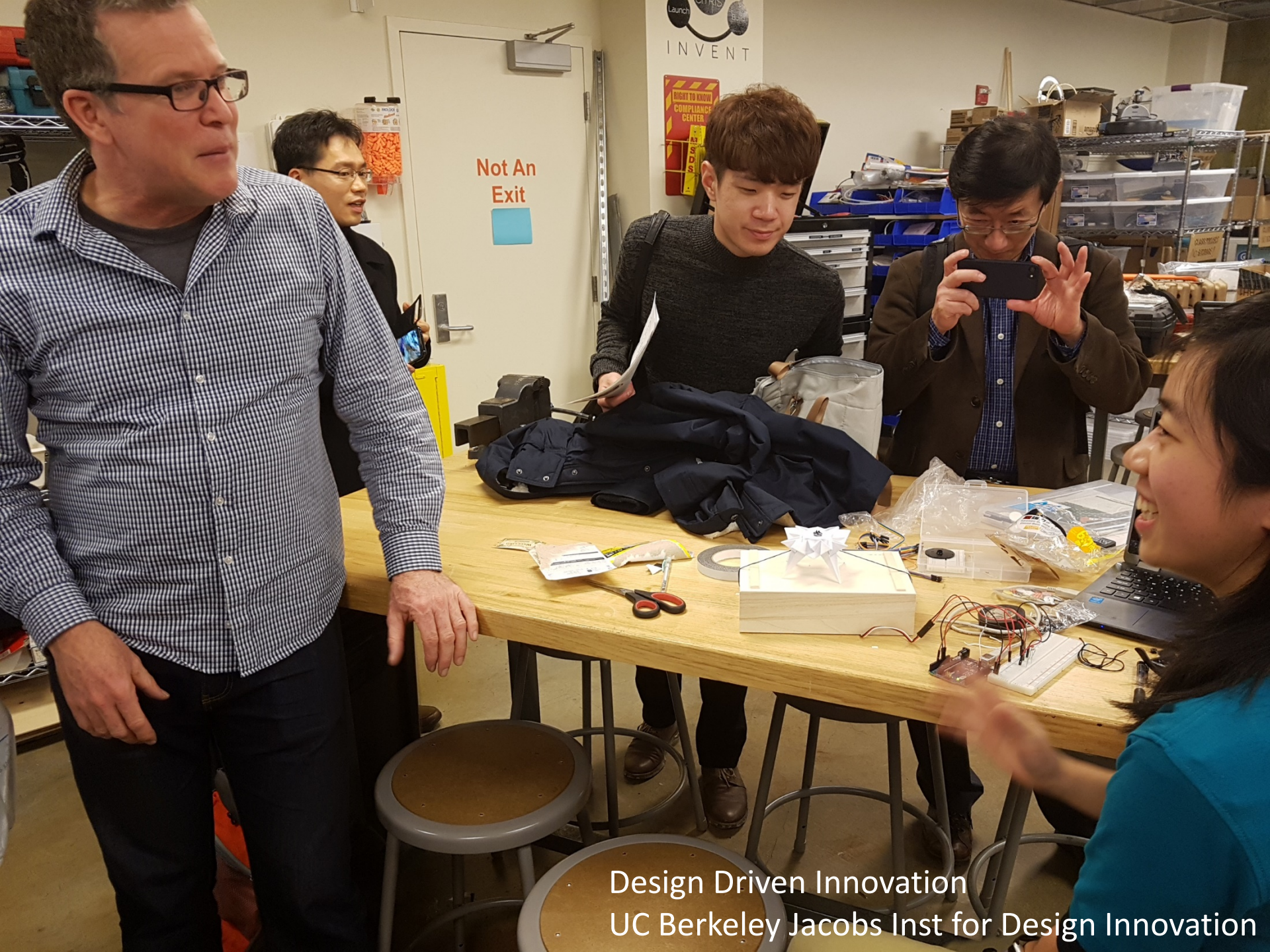
SAP



Institute of Information Management
University of St.Gallen

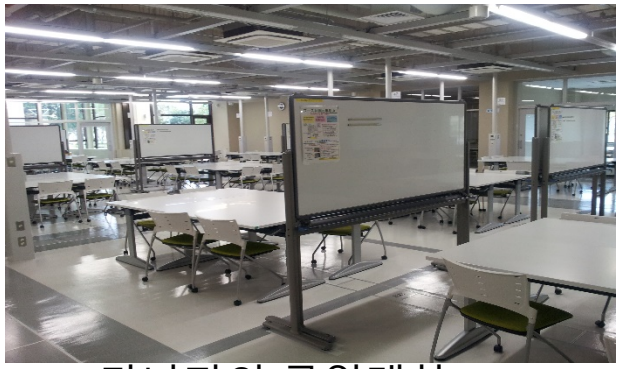
SAP Palo Alto Design & Co-Innovation Center 2017. 2. 1




Not An
Exit
INVENT
Design Driven Innovation
UC Berkeley Jacobs Inst for Design Innovation


POV: Technicians at Stanford need to gain more autonomy from management in decision making because they are often prevented from innovating due to slow and bureaucratic systems.
Pain Points
URINALS
CANTOR ARTS CENTER
OUTDOOR ART
(STATUES & SCULPTURES)
MOTHER NATURE
CARELESS CAROL
FRISBEE PHIL
DELIBERATE DENNIS
CHICAGO TRIANGLES
RETROFUTEE
THE FALCON
Who?
THE STORY
Current Prototyping
MANY SPOTS
STORE
CARRY
FEW TOOLS
PROPOSED SOLUTIONS
LOW HANGING FRUIT
BIGG CHANGES
Key Observations

Space/Environment/Furniture. Movable furniture, comfortable environment



가나자와 공업대학

Genovasi School of Design Thinking

DT Loft Univ. of St. Gallen

DT Loft Univ. of St. Gallen

Singapore Polytechnic

DT Loft d.School

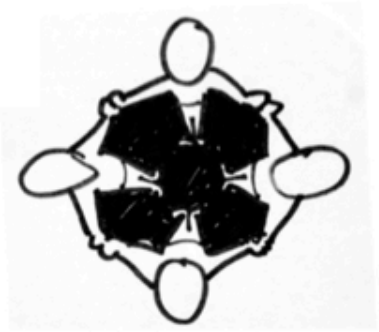
FOCUS ON
HUMAN VALUES

SHOW
DON'T TELL

EMBRACE
EXPERIMENTATION

BE MINDFUL
OF PROCESS

BIAS TOWARD
ACTION



RADICAL
COLLABORATION

CRAFT CLARITY

행동우선
Just do it!

d.MINDSETS

https://dschool.stanford.edu/groups/k12/wiki/cc09d/Summer_Workshop_2013.html

The DT Mindsets

Art-learning from experience scientific

- More Donald Schoen than Herbert Simon
- Reflective rather than Analytical
- Heuristical rather than Sequential
- Adaptive and dynamic rather than planned
- Rough learning prototypes rather than full scale simulations
- Space/tangible and empathy vs. process/intangible and measuring

...Dancing with ambiguity rather than pretending certainty.

DT Case: Samsung Electronic Co. Q9500 Air conditioner without wind

Empathy

Want to Turn on A/C
However, want to turn off immediately

Like Cool, however,
Not like cool wind

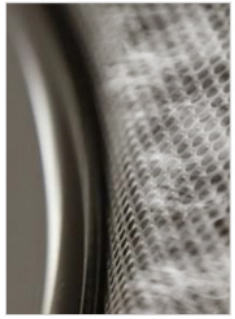
Like A/C, but
Not like wind

Try, Look, Interview with Extreme user

Miracle window

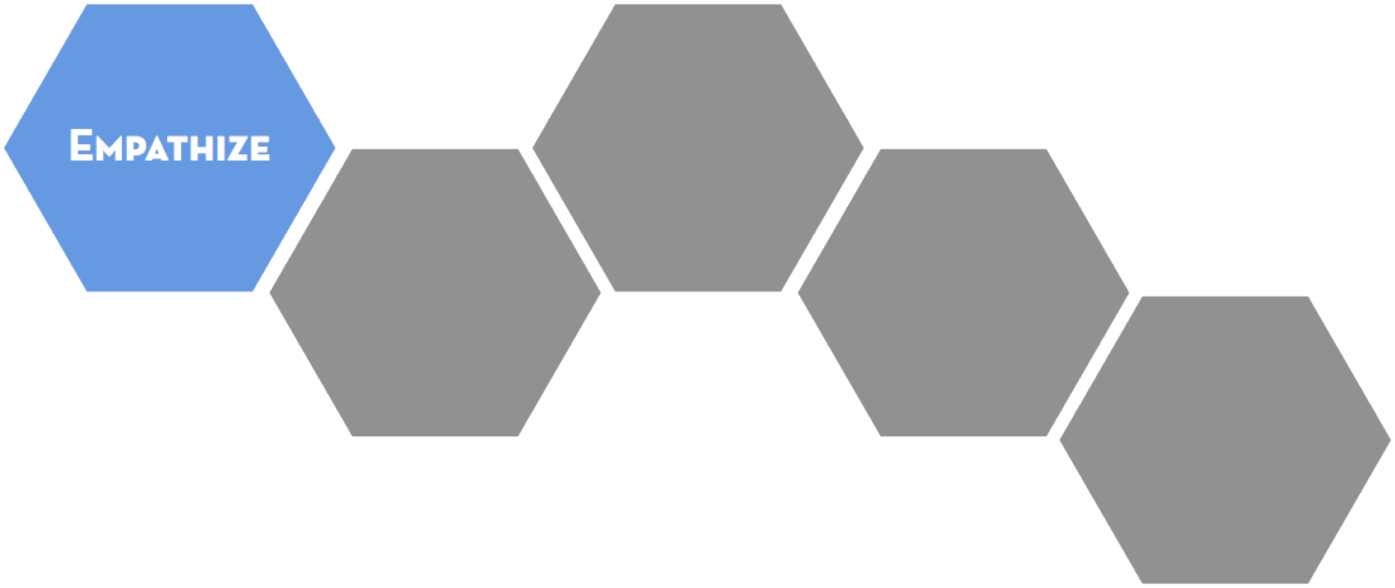
미라클 바람문이
닫히면

차가운 냉기가
바람의 길을 통해



마이크로 홀에서
미세한 기류가 만들어져

메탈 쿨링 패널을 통해
냉기를 확산시킵니다


Empathize

1st step Empathize

[DT Tool] survey

5 users who had experience in wind power generator 설15
non using experience

Searching for users who had difficulties in using wind power generator.

Visit Westech company to

Survey and interview

EMPATHY MAP (Portable charger design)
[DT Tool] Survey, interview, observation

SAY(발언)	THINK(생각)
폰 케이스처럼 같이 쓸 수 있었으면 다른 제품과 혼용이 가능했으면 휴대가 편했으면(Portable) 여러 가지 기능이 있었으면 오래 쓰기 위해서 튼튼해야지 그래도 너무 무거워도 안 돼! (should be light) 태양광 등 기타전력과 같이 사용 오래 쓸 수 있는 제품이 좋다 가방에 들어가야지, 폰 충전과 관련 불편한 점이 많다	고속충전 되면 좋겠다. 약한 바람에도 충전가능 하겠지? 게임 기능 있으면 심심하지 않겠다. 풍력발전기 충전이 잘될까? 아이폰처럼 심플한 디자인이 나오면 사볼 생각이다.
DO(경험)	**FEEL(느낌)**
캠핑장 이런 곳을 갔는데 전기가 없어서 불을 켜지 못했다 맨날 충전한다고 오래 걸려, 평소에 다른 배터리 가지고 다녀 고장 좀 안 났으면, 풍력발전기가 너무 크다 충전기만 몇 번을 샀는지 모르겠네	대부분 사람들이 쓰고 있지 않다. 캠핑시 전기충전이 않되어 기분이 나빴을 거야

2nd Step POV: define problem

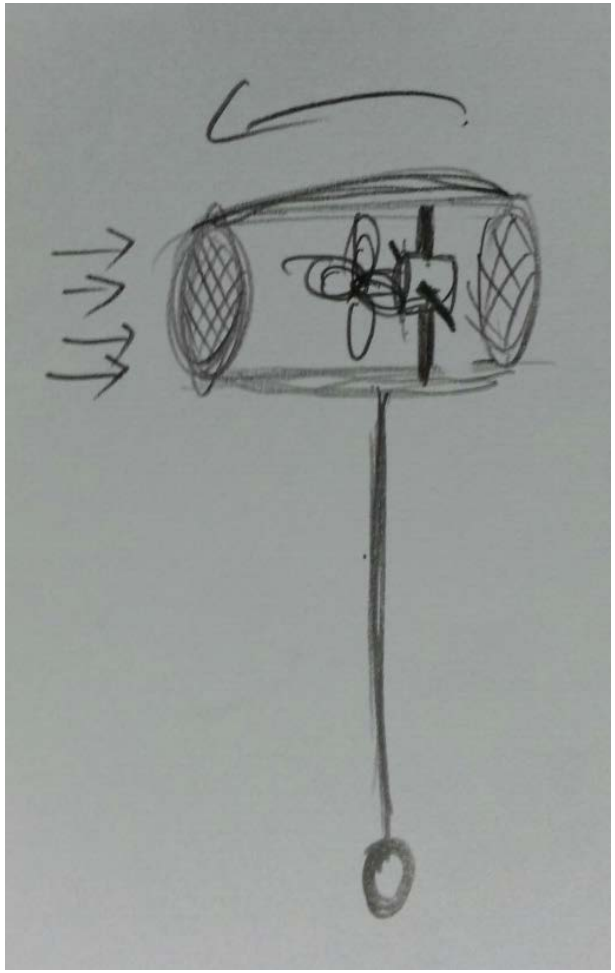
[User] Camper

[Needs] develop portable electric charger

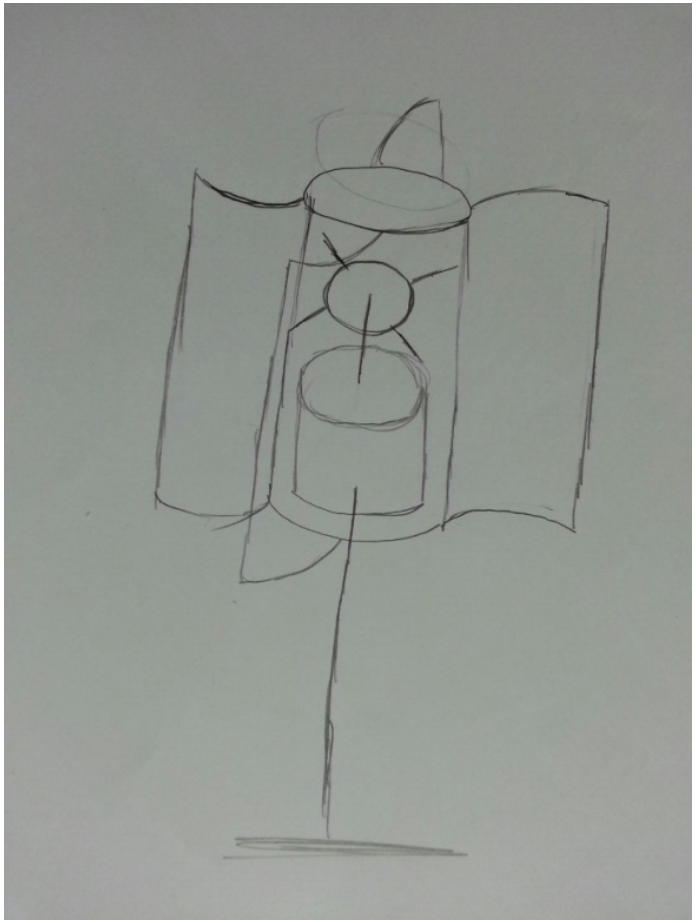
[Insight] because there is no electric in campsite and charger is too heavy to carry.

3rd Step Ideate [DT Tool] Sketch

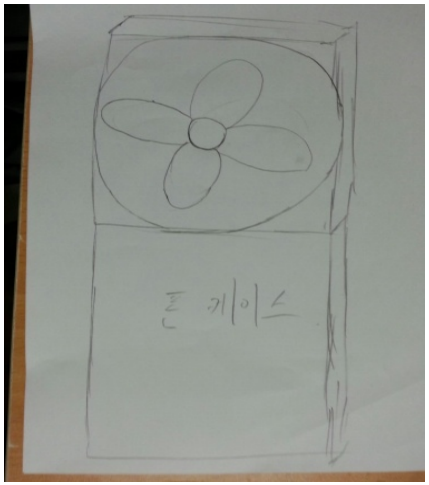
1. 쥐불놀이에서 따온 풍력 발전기

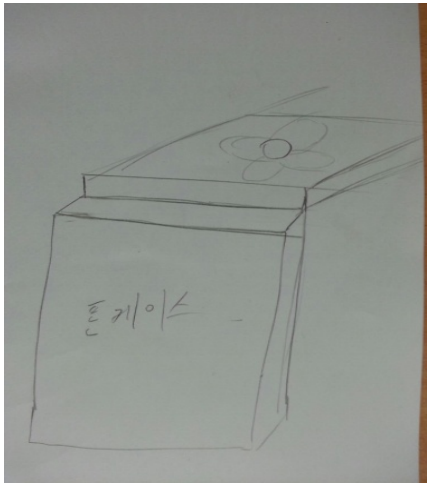


2. 휴대성이 좋은 수직축 풍력발전기

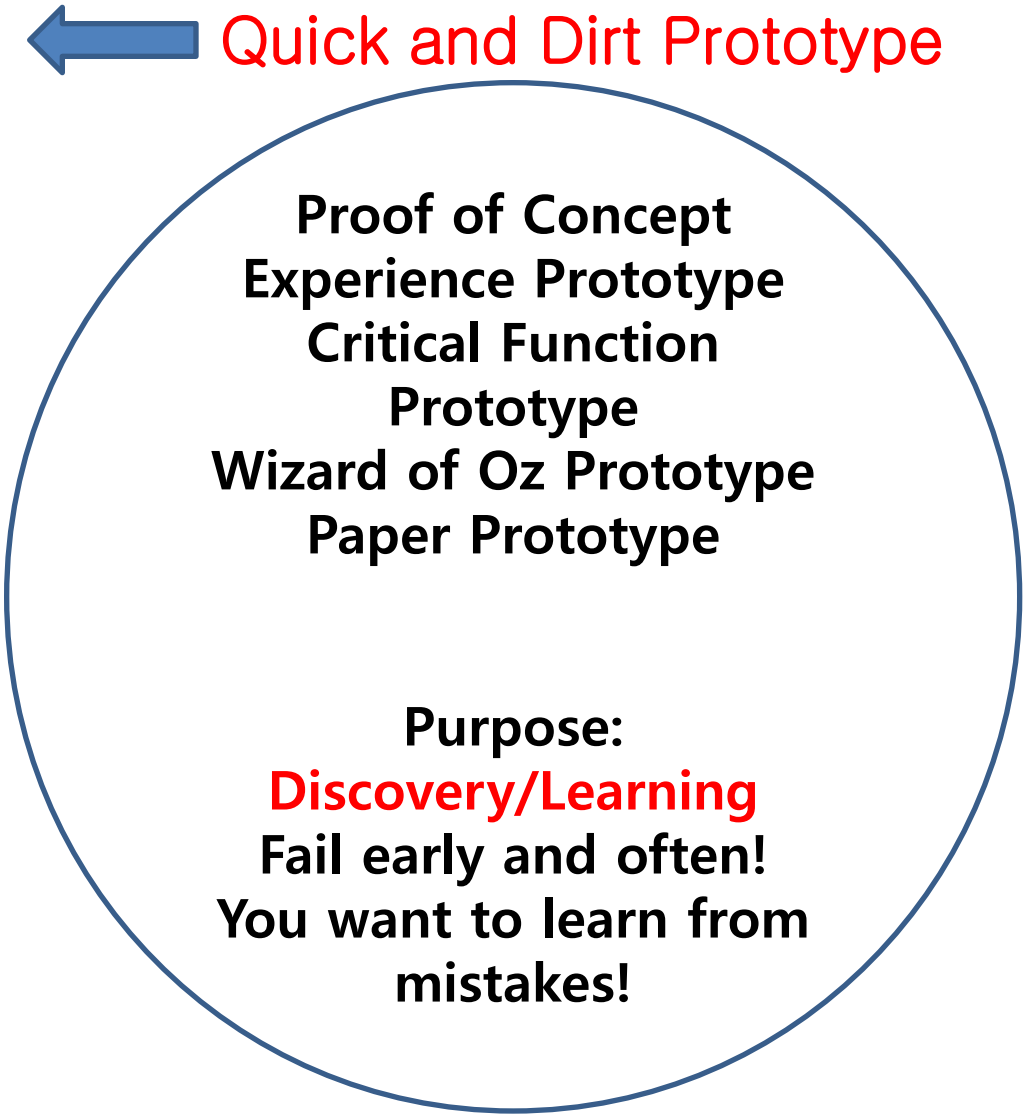


3. 휴대폰 케이스에 부착한 형태



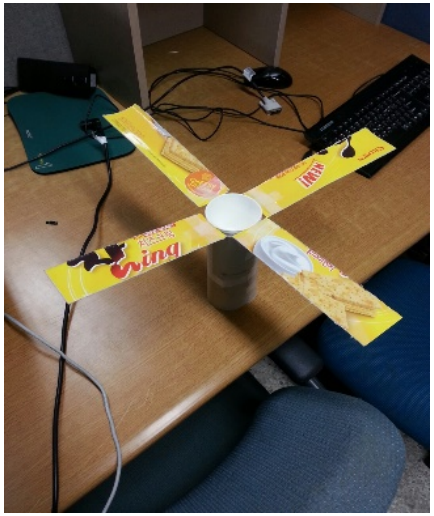


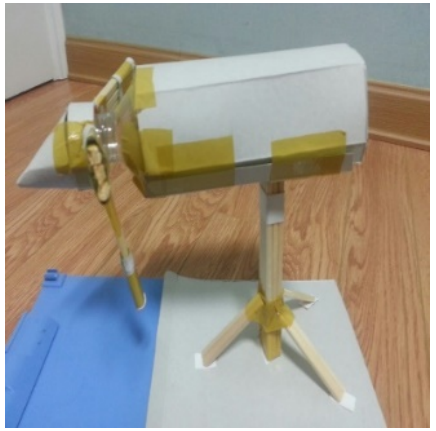
4th Step Prototype: Why do we prototype?



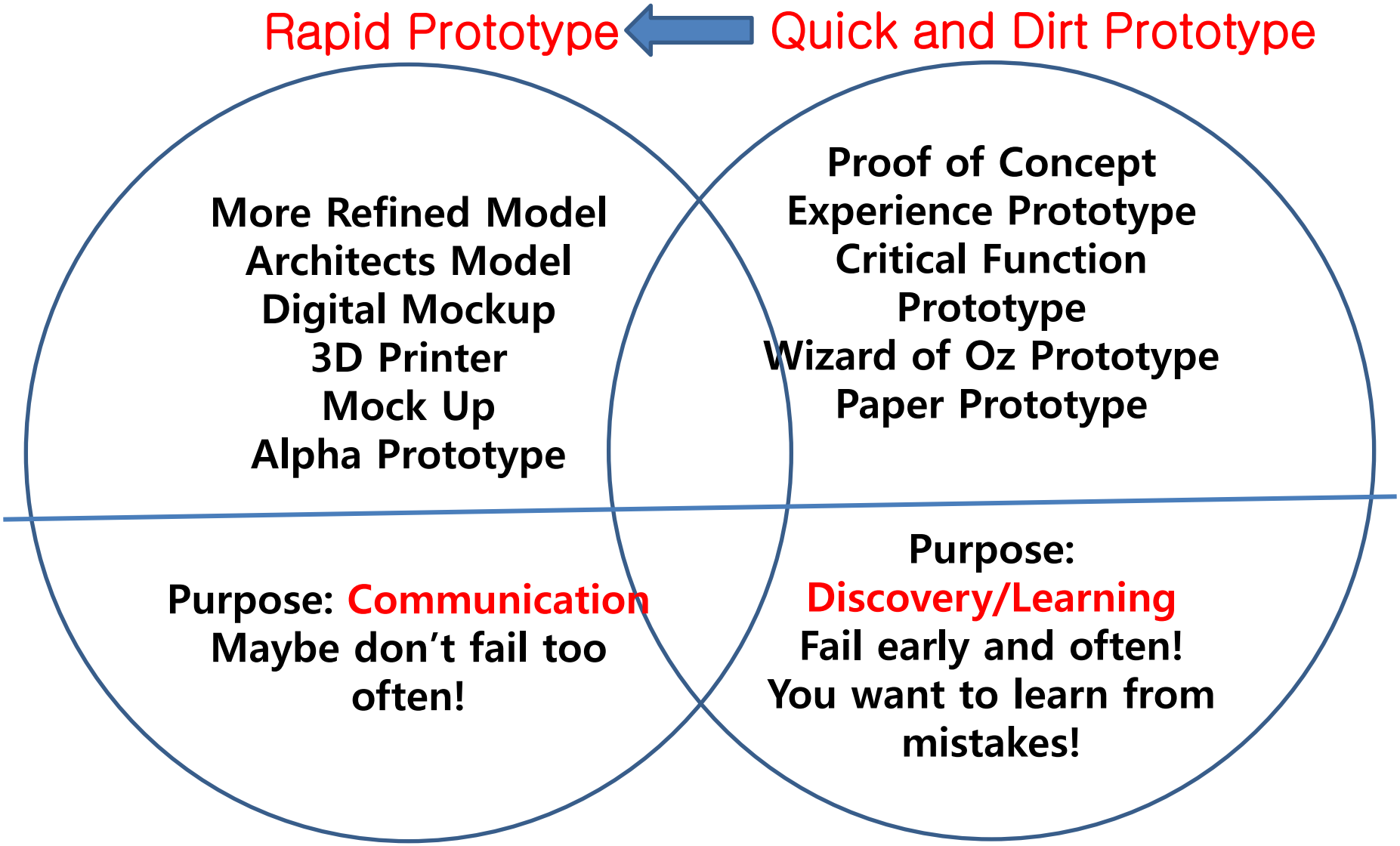
4th Step: Prototype (Wind Power Generator)
5th Step: test

Quick and Dirt Prototyping



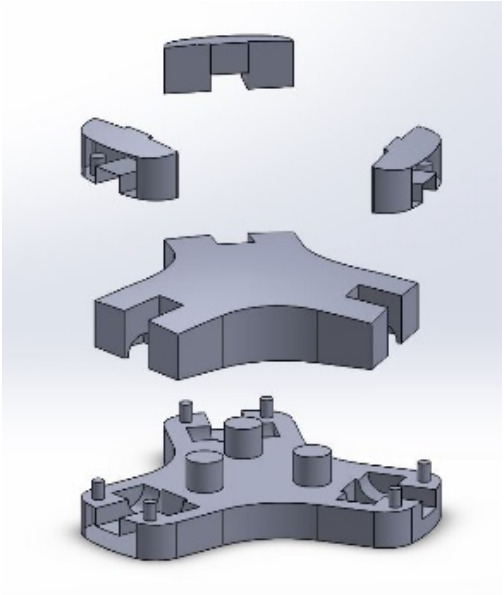


Why do we **prototype**?

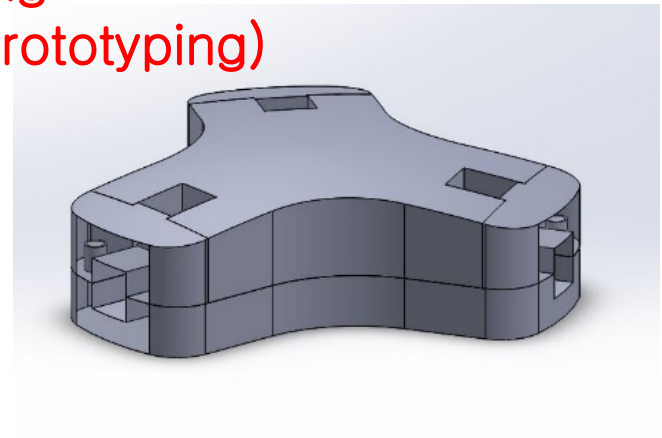


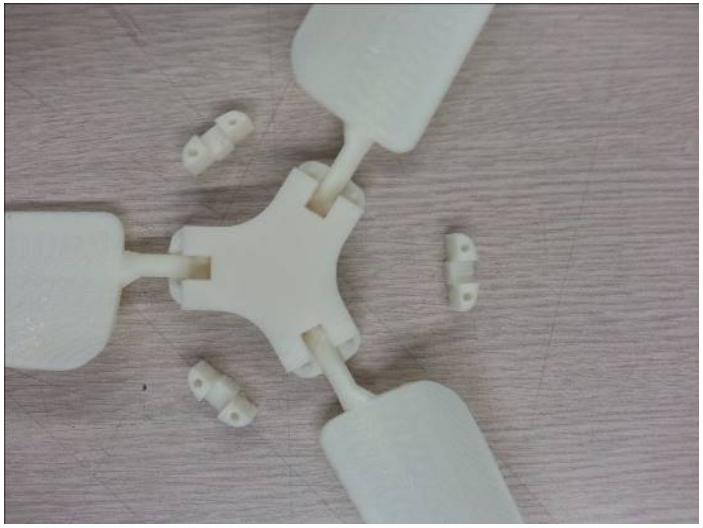
4th Step prototype: function prototype

Rapid Prototyping
(or Functional Prototyping)

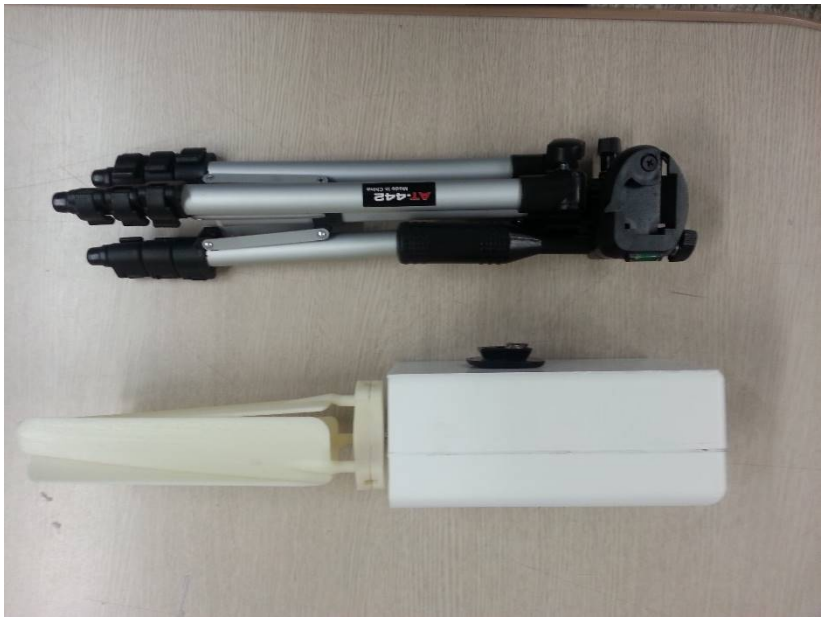


3-D Modelling





3-D Printing

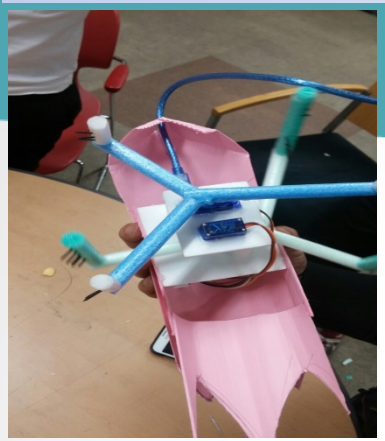


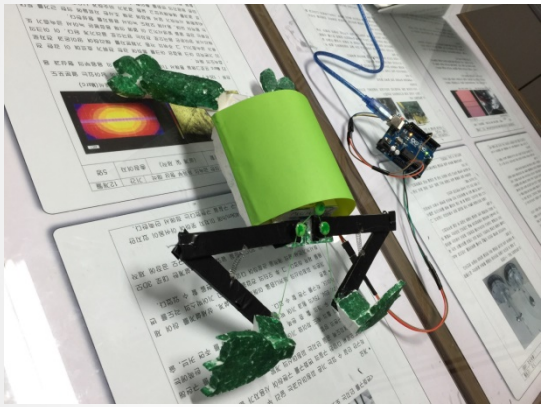
Capstone Design Project

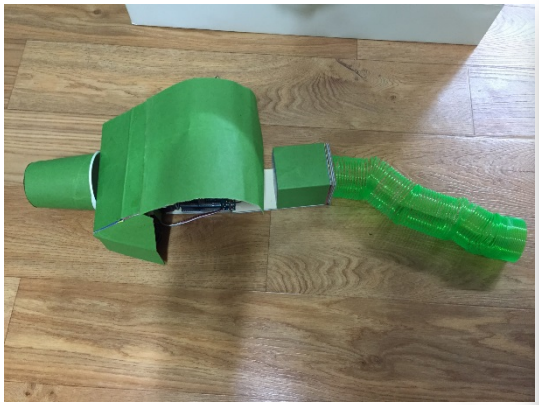
Patent
pending

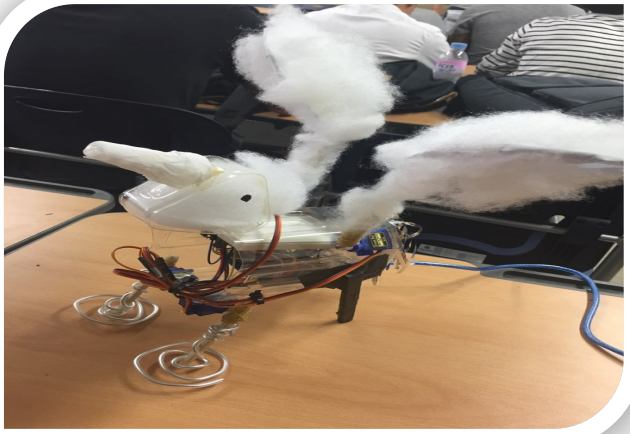
Capstone Design Project

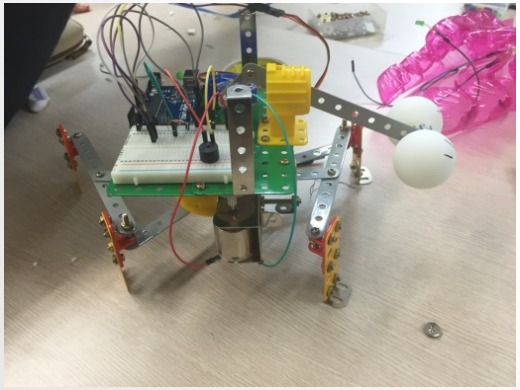
ME Creative Engineering Design course: Products simulating animal movement Arduino & Creative.Convergence Problem Solving Capability

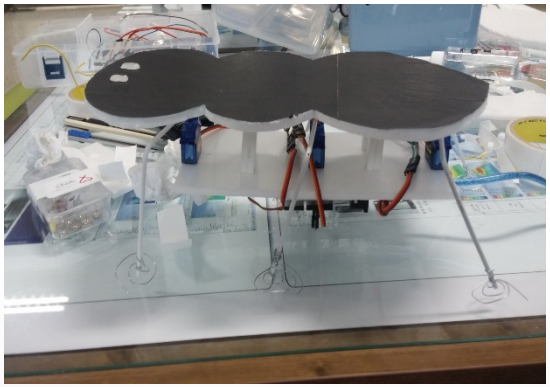


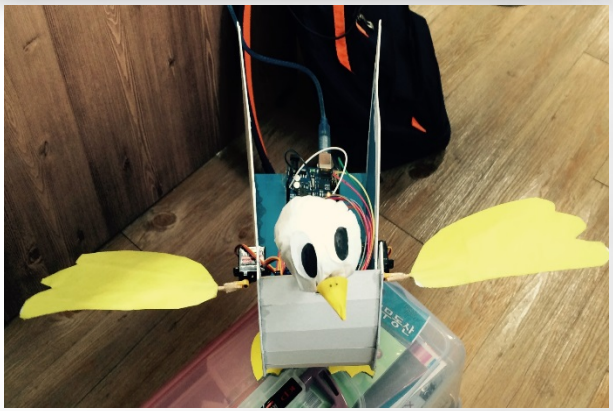












ME Creative Engineering Design course: Products simulating animal movement Arduino & Creative.Convergence Problem Solving Capability

ARDUINO를 이용한 바퀴벌레 움직임 모사 프로젝트

1. Empathize

대상설정

WHY

타 곤충에 비해 날렵하고 독특한 움직임

Question	Answer
바퀴벌레의 움직임의 특이한 점?	타 6족 보행 곤충보다 빠른 움직임
왜 더 빠른가?	특이한 다리 구조
다른 특이점은?	보행 중 안정적인 균형
그 이유는?	역시 특이한 다리 구조에서 발생
또 다른 관찰 사항은?	벽을 빠르게 탈수도 있음을 관찰
그 이유는?	다리에 있는 갈퀴 때문
빠르게 달릴 수 있는 또 다른 이유는?	가벼운 무게 때문

2. Define

Finding N Insight

전진 특화된 다리 구조
다리만 움직이는 패턴
교차되어 움직이는 다리 구조로 빠른 움직임 가능
각기 다른 역할을 하는 다리 구성
마디 길이의 특이성으로 안정감 있고 빠른 움직임 가능
다리의 마디가 길어 체중을 분산 시키므로 안정적인 균형 유지

분석 사항을 바탕으로 아이디어 내기

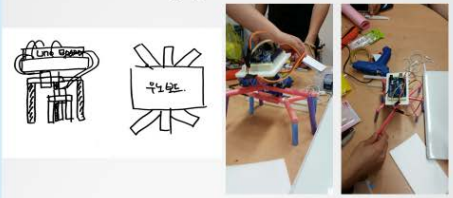
3. Ideate

목적계통도

기능구조도

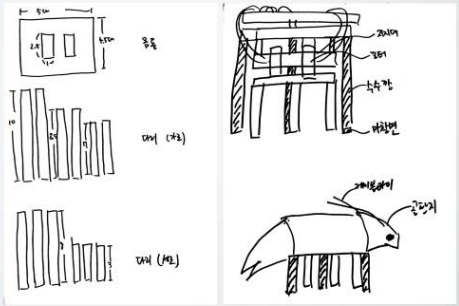
BrainStorming

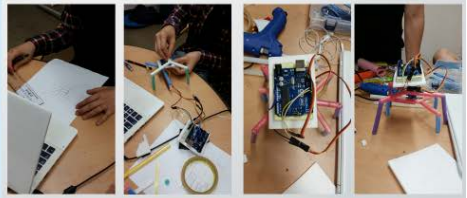
4. Prototype

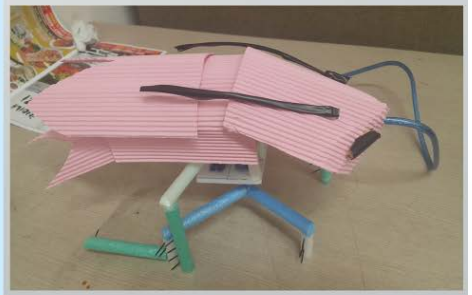


5. Test and Feedback

도면 재설계







ARDUINO를 이용한 악어 움직임 모사 프로젝트

1. Empathize

달성공원 견학

2. Define

관찰내용	적용
4족 보행	다리를 4개
다리가 짧고 회전함	모터를 이용한 움직임
뒷다리가 원동력	뒷다리로 움직임을 표현
무게중심이 낮음	낮은 몸체
입이 크고 잘 벌어짐	입을 벌릴 수 있도록

연속적인 동작을
필요로 하는 악어를 만들자

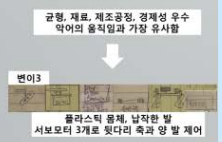
3. Ideate

기능구조 정립

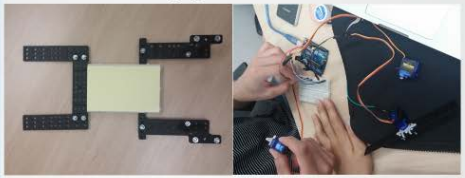
작용원리 탐색

Pugh selection chart

개념안 선정

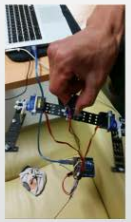


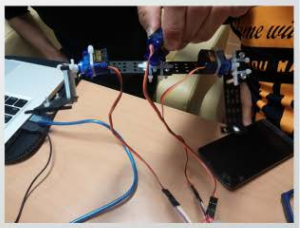
4. Prototype

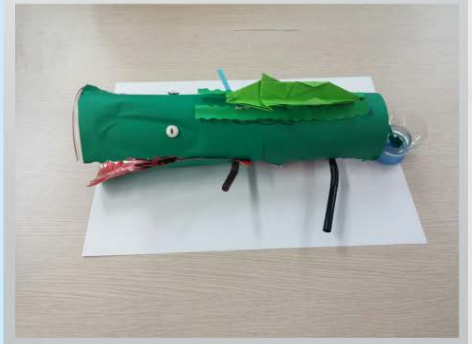


프로그래밍

5. Test








Thank you
영남대학교
Yeungnam University