

An idea-generation workshop using TRIZ Cards (Chie Cards)

TRIZのカード (智慧カード) を用いたアイデア創出ワークショップ

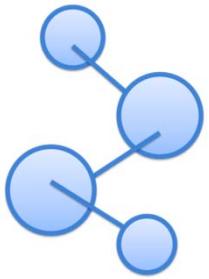


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IDEAPLANT (Japan)

Jaeho Park 朴 在鎬
Yeungnam University (Korea)

Contents

- 1.Overview
- 2.Details
- 3.Future
- 4.References



Overview



Team



Jaeho Park (朴在鎬)

- ・嶺南大学校 産業及び組織心理学教授、大学院主任教授
／GRCIOP代表
- ・Goettingen大学院 産業及び組織心理学 博士
- ・専門：組織心理学、クロスカルチャー、グループダイナミクス

Rikie Ishii (石井力重)

- ・IDEAPLANT 代表 ／ 宮城TRIZ研究会 会長
- ・東北大学 大学院 理学研究科 修士
- ・専門：創造工学、アイデア創出促進ツール開発



Places



大邱
Daegu

岩手

Iwate

宮城

Miyagi

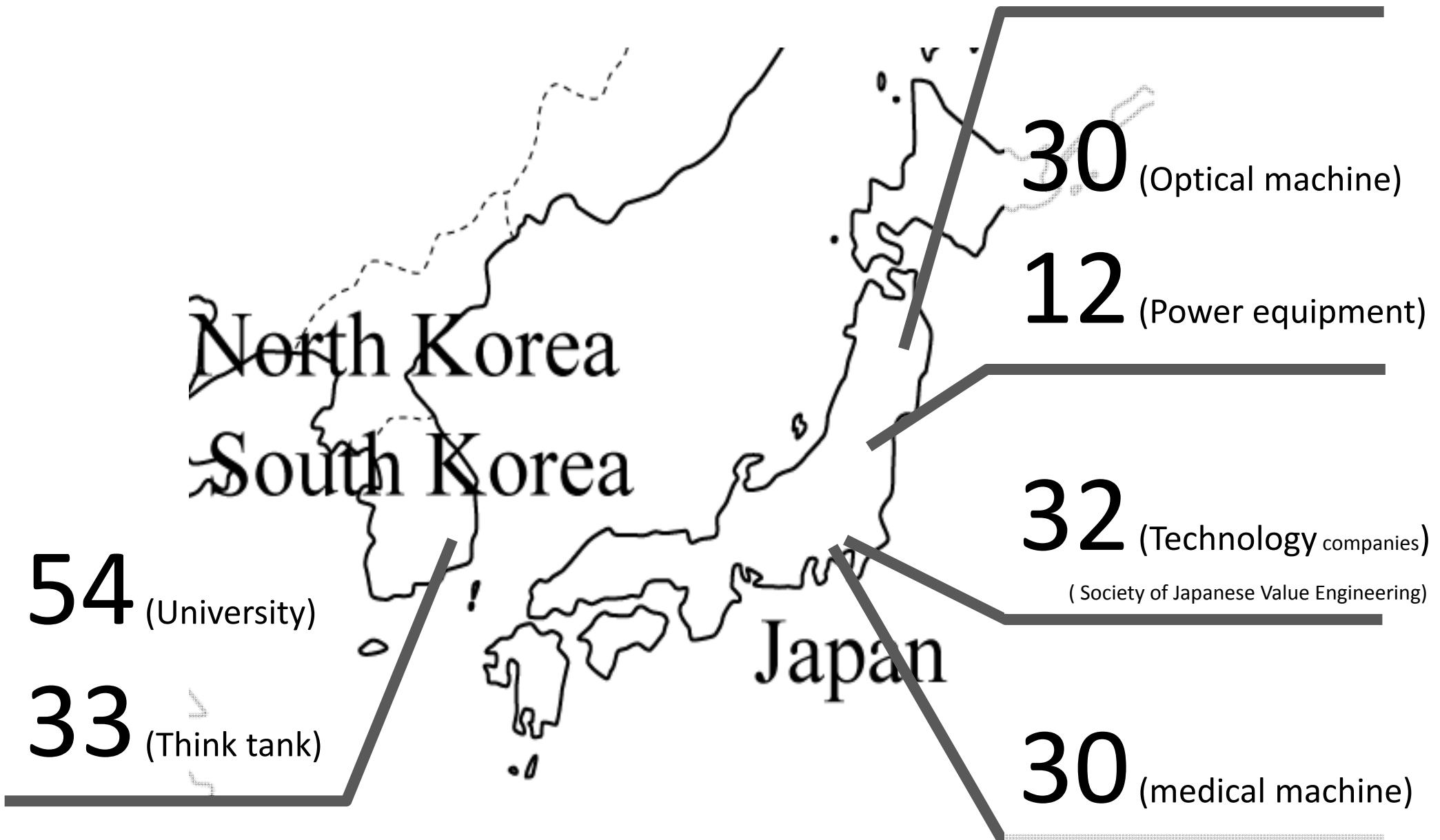
東京

Tokyo

神奈川

Kanagawa

Participants



Items



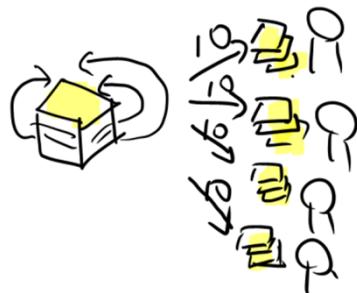
For work

Which TRIZ Card is effective?

Improvement needs	Very effective	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33																																																																													
Moving object's weight	35	28	18	26	27	29	31	34	2	3	10	1	8	19	36	5	15	24	37	38	40	6	11	12	22	32	39	4	14	17	20	21	30	7	9	13	16	23	25	33																																																																							
Motionless object's weight	35	19	10	28	11	21	19	18	22	29	6	8	11	17	28	35	2	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35																																																																					
Moving object's length	1	29	15	35	41	7	8	10	17	24	28	14	19	26	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																															
Motionless object's length	35	28	18	26	31	10	15	18	21	27	30	4	6	7	17	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																									
Moving object's surface area	2	15	13	26	30	4	10	14	17	29	32	1	11	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100															
Motionless object's surface area	18	2	35	10	16	30	40	49	4	36	39	5	7	15	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100													
Moving object's volume	1	35	2	10	28	41	24	19	34	6	7	13	30	46	16	25	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																													
Motionless object's volume	35	2	10	14	34	18	19	21	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																
Velocity	28	33	35	10	19	34	38	2	1	3	15	18	32	3	2	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100								
Force (strength)	35	18	37	10	11	36	19	15	28	3	13	21	21	24	31	32	3	11	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100										
Stress or pressure	35	10	38	37	21	14	19	1	3	6	15	18	40	4	13	16	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																		
Shape	10	1	14	15	32	34	39	2	4	29	40	13	22	28	5	17	28	31	36	7	16	18	30	8	9	19	25	36	37	39	11	20	21	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Stability of the object's composition	35	2	39	27	40	11	13	15	18	32	3	19	22	23	30	4	5	7	8	9	12	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100				
Durability	3	35	10	15	40	17	21	28	14	21	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																													
Moving object's operating time	36	1	10	16	40	6	21	27	34	8	18	19	20	21	22	23	24	25	26	27	28	29	30	31	33	36	39	4	5	7	8	11	12	13	14	21	22	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100			
Temperature	35	19	2	3	27	21	17	18	22	30	4	15	16	27	30	36	24	38																																																																																													

Process 1 (For Game)

Hand it out to everyone.



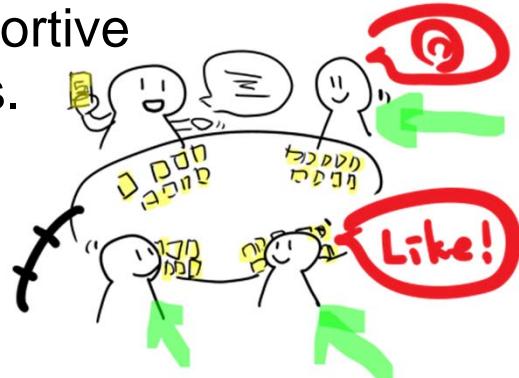
Start with the person who wins the most, then go clockwise.



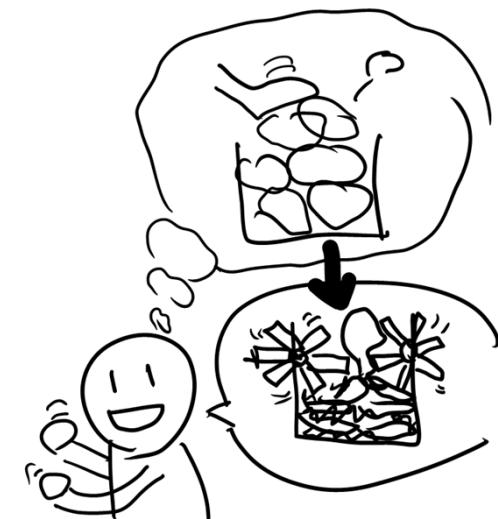
Choose one card.
Use that to begin stating your idea.



Give supportive comments.



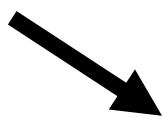
Give an idea that solves an issue of existing trash bins.



Process 2 (For Work)

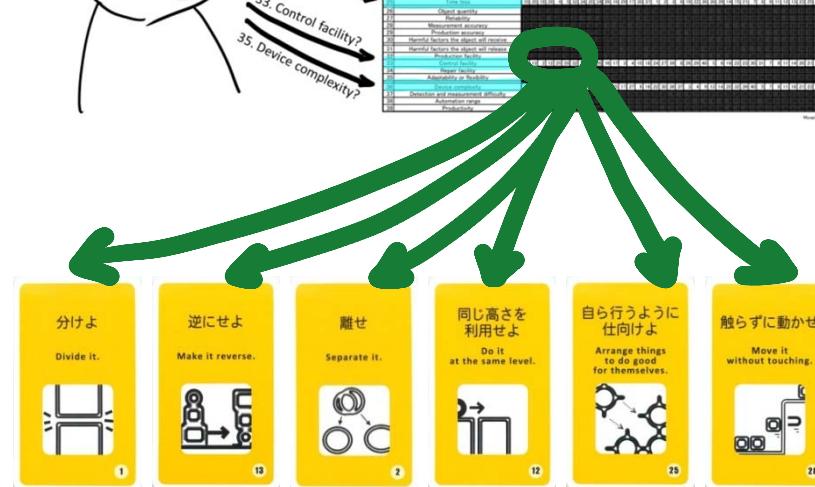
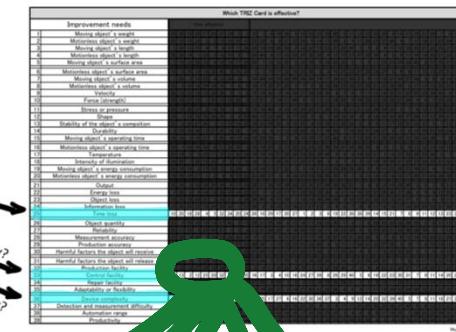


I want to make it easier to use!
(Decide improvement needs.)



“Make it easier to use”. Which one is this issue out of the 39 ?

Choose one that applies to the “39 improvement needs”.



Propose solutions using those that help you come up with an idea.

Lay about 5~10 of the TRIZ Cards in the order of the first numbers on the line.

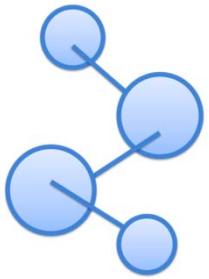
Purpose



Grow Creativity

Contents

- 1.Overview
- 2.Details
- 3.Future
- 4.References



Details



Profile of Participants

Korea

- Undergraduate students 50
- Graduate students 4
University(phycology)
- Social issue researchers 33
Think tank

Japan

- Manufacturing engineers 24
Auto Parts
- Engineers & planners 30
Optical machine
- Maintenance technicians 12
Power equipment maintenance
- Engineers & planners 32
Various Companies that belong to the Japan Society of VE
- Product developers 30
Medical machine

88

The number of
people who know
the TRIZ : 1

128

The number of
people who know
the TRIZ : 8

Facilitators

Korea



Ishii

Co-Facilitator



Park

Japan



Ishii

1st process

(For Game)

Tool Principle → 40 Cards (Illustration & Phrase)

Japanese
English



Tool 40 Cards of Special Korean version

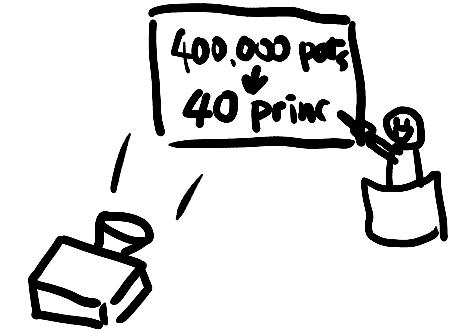
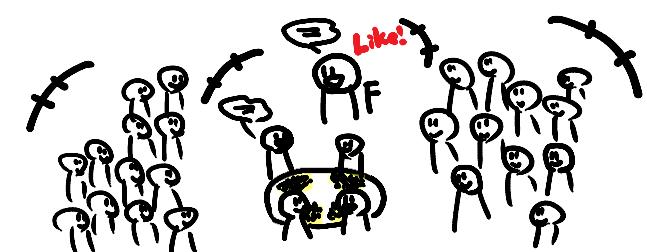
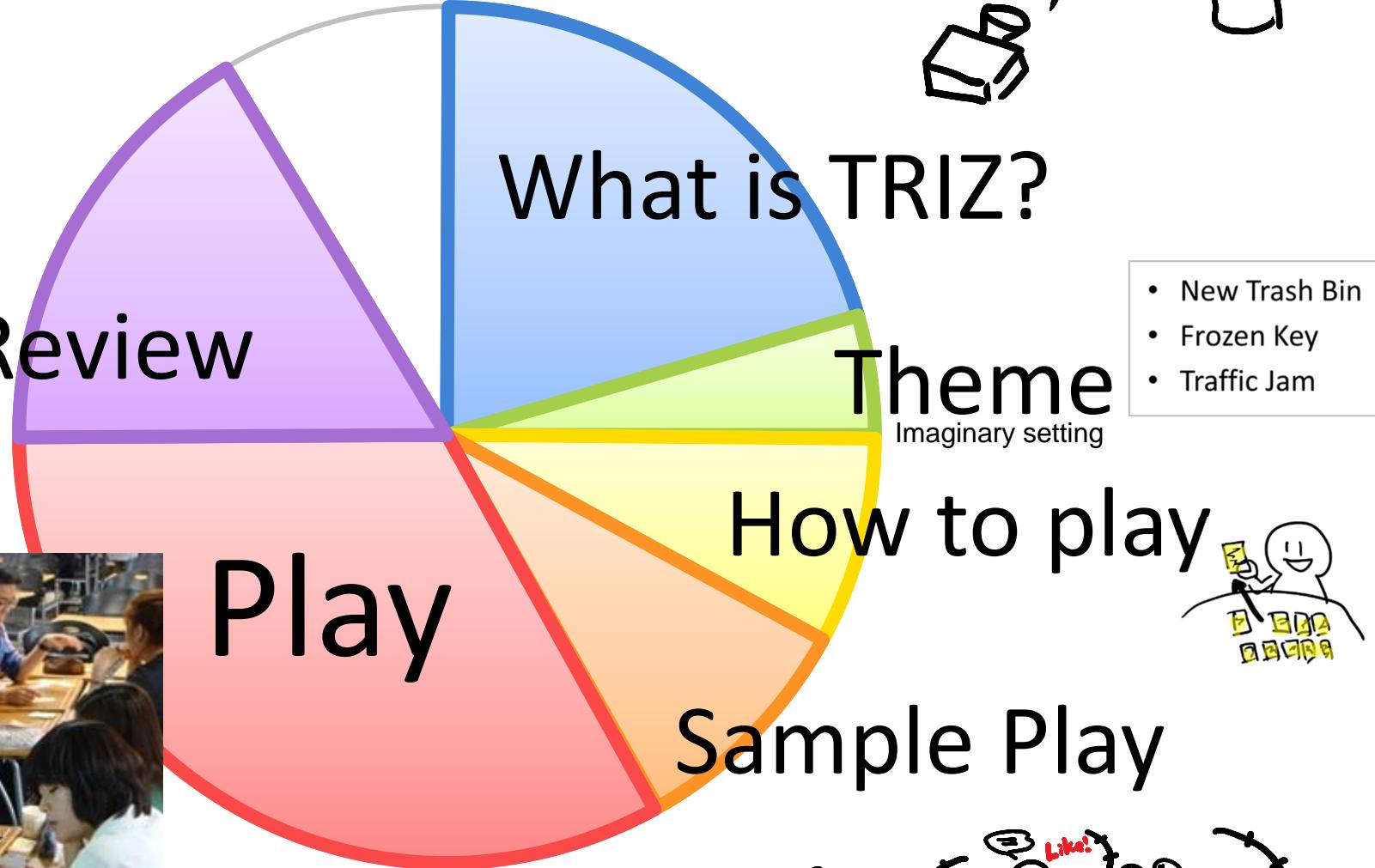
Korean
English
Japanese



Theme of Ideation

- New Trash Bin
(New product idea)
- Frozen Key
(Problem solving, include new product idea)
- Traffic Jam
(Problem solving, include mechanical innovation
~ social system innovation)

Process 1 (55 minutes)



2nd process

(For Work)

Tool

“Which TRIZ Card is effective?” TRIZ Card Sheet

TRIZ Card

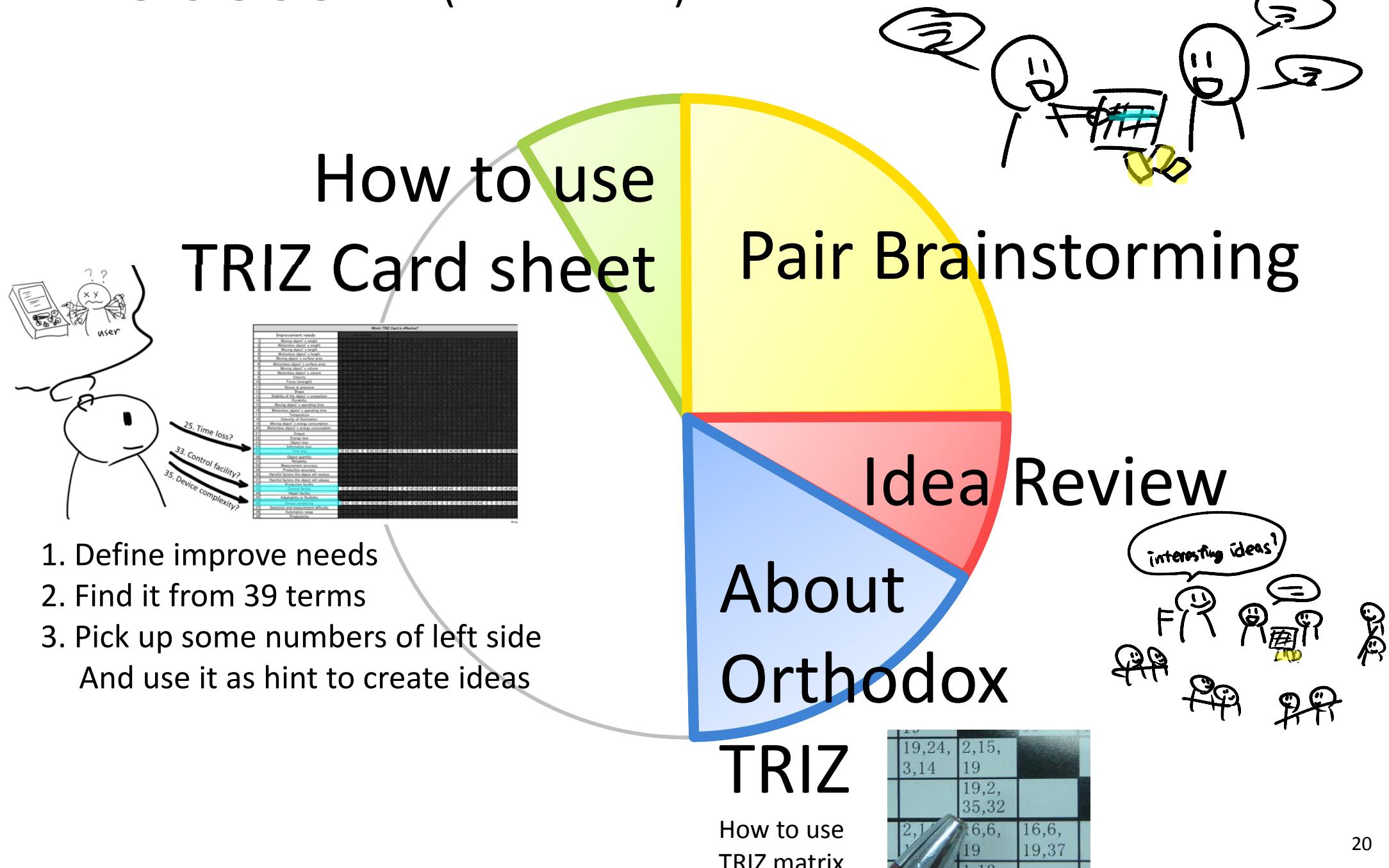


TRIZ Card
(智慧カード)

&

Improvement needs			Very effective			Which TRIZ Card is effective?		
1	Moving object's weight	35 28 18 26 27 29 31 34 2 3	10 1 8 19 36 5 15 24 37 38 40 6 11 12 22 32 39 4 14 17 20 21 30 7 9 13 16 23 25 33	22 29 6 8 27 32 39 5 14 17 30 3 9 11 20 25 37 40 4 7 12 16 21 23 24 31 33 34 36 38				
2	Motionless object's weight	35 10 19 28 1 2 15 18 26 13	28 14 19 26 34 2 16 32 13 23 37 39 40 3 5 6 9 11 12 18 20 21 22 25 27 30 31 33 36 38					
3	Moving object's length	1 29 15 35 4 7 8 10 17 24	29 40 8 17 18 24 25 30 32 6 12 13 27 37 38 39 4 5 9 11 16 19 20 21 22 23 31 33 34 36					
4	Motionless object's length	35 28 14 1 26 3 10 15 2 7	32 1 18 19 28 3 34 39 6 16 35 36 5 7 9 11 22 23 24 33 40 8 12 20 21 25 27 31 37 38					
5	Moving object's surface area	2 15 13 26 30 4 10 14 17 29	1 7 15 17 32 14 26 38 3 9 19 22 23 27 28 29 37 5 6 8 11 12 13 20 21 24 25 31 33 34					
6	Motionless object's surface area	18 2 35 10 16 30 40 4 36 39	13 40 16 25 26 28 36 39 14 17 18 22 30 37 9 11 12 21 24 27 38 3 5 8 19 20 23 31 32 33					
7	Moving object's volume	1 35 2 10 29 4 15 34 6 7	16 17 30 37 39 3 7 8 9 15 24 25 26 27 28 31 32 38 40 5 11 12 13 20 21 22 23 29 33 36					
8	Motionless object's volume	35 2 10 14 34 18 19 1 4 6	28 13 35 10 19 34 38 2 1 8 15 18 32 3 14 26 27 29 24 30 4 5 6 7 11 12 16 20 21 23 25 33 36 40 9 17 22 31 37 39					
9	Velocity	28 13 35 10 19 34 38 2 1 8	35 18 37 10 1 36 15 19 28 3 13 21 2 14 17 40 8 9 11 12 24 29 5 16 20 23 25 26 27 34 4 6 7 22 30 31 32 33 38 39					
10	Force (strength)	35 18 37 10 1 36 15 19 28 3	15 18 40 4 13 16 24 25 27 28 33 9 11 21 22 29 34 39 5 7 8 12 17 20 23 26 30 31 32 33 36 38					
11	Stress or pressure	35 10 36 37 2 14 19 1 3 6	10 13 22 26 5 17 28 3 6 7 16 18 30 8 9 19 25 33 36 37 39 11 12 20 21 23 24 27 31 38					
12	Shape	10 1 14 15 32 34 35 2 4 29	10 23 28 30 3 19 22 4 14 16 21 26 34 6 8 9 11 17 29 31 33 37 5 7 12 20 24 25 36 38					
13	Stability of the object's composition	35 2 39 27 40 1 13 15 18 32	3 35 10 40 15 27 28 14 26 1 29 2 8 11 13 18 32 9 17 19 30 7 16 22 31 34 37 4 5 6 12 20 21 23 24 25 33 36 38 39					
14	Durability	3 35 10 40 15 27 28 14 26 1	19 35 3 10 27 2 28 4 13 16 18 29 39 1 5 6 14 15 17 22 40 9 11 12 20 21 25 26 30 31 33 34 38 7 8 23 24 32 36 37					
15	Moving object's operating time	19 35 3 10 27 2 28 4 13 16	35 1 10 16 40 6 27 34 38 3 18 19 20 2 17 22 23 24 25 26 28 31 33 36 39 4 5 7 8 9 11 12 13 14 15 21 29 30 32 37					
16	Motionless object's operating time	35 1 10 16 40 6 27 34 38 3	35 19 2 3 22 17 18 21 32 39 10 15 16 27 30 36 24 28 38 40 4 6 9 14 26 31 1 13 23 25 29 33 34 5 7 8 11 12 20 37					
17	Temperature	35 19 2 3 22 17 18 21 32 39	19 32 1 35 15 26 2 6 13 16 10 3 17 28 39 11 25 27 30 4 5 7 8 9 12 14 18 20 21 22 23 24 29 31 33 34 36 37 38 40					
18	Intensity of illumination	19 32 1 35 15 26 2 6 13 16	35 19 18 2 15 28 12 6 24 1 13 16 17 27 32 3 5 14 21 23 25 26 29 38 8 9 11 22 30 31 34 37 4 7 10 20 33 36 39 40					
19	Moving object's energy consumption	35 19 18 2 15 28 12 6 24 1	19 35 18 27 1 2 4 6 10 22 31 36 37 3 9 16 23 25 28 29 32 5 7 8 11 12 13 14 15 17 20 21 24 26 30 33 34 38 39 40					
20	Motionless object's energy consumption	19 35 18 27 1 2 4 6 10 22	35 19 2 10 38 26 34 6 17 16 28 31 32 15 18 20 22 25 27 29 30 36 37 1 4 8 13 14 24 40 3 5 7 9 11 12 21 23 33 39					
21	Output	35 19 2 10 38 26 34 6 17 16	10 35 2 6 18 19 38 10 15 32 23 1 3 13 17 21 22 26 28 30 9 11 14 16 25 27 29 36 37 39 4 5 8 12 20 24 31 33 40					
22	Energy loss	7 35 2 6 18 19 38 10 15 32	10 35 18 28 31 2 24 27 3 29 39 40 6 15 34 1 13 14 30 36 38 5 16 22 23 32 33 12 21 37 4 7 8 9 11 17 19 20 25 26					
23	Object loss	10 35 18 28 31 2 24 27 3 29	10 26 35 22 19 24 28 32 1 23 30 2 5 13 15 16 21 27 33 3 4 6 7 8 9 11 12 14 17 18 20 25 29 31 34 36 37 38 39 40					
24	Information loss	10 26 35 22 19 24 28 32 1 23	10 35 18 28 4 5 32 34 20 24 26 16 29 17 30 37 1 2 3 6 19 22 36 38 39 14 15 21 7 8 9 11 12 13 23 25 27 31 33 40					
25	Time loss	10 35 18 28 4 5 32 34 20 24	35 3 29 18 10 14 27 40 2 15 28 31 25 34 6 13 16 17 24 33 39 1 4 7 8 20 26 30 32 36 38 5 9 11 12 19 21 22 23 37					
26	Object quantity	35 3 29 18 10 14 27 40 2 15	35 11 10 3 28 40 27 1 2 8 13 21 24 32 4 14 29 15 16 17 19 23 26 6 9 25 30 31 34 36 38 39 5 7 12 18 20 22 33 37					
27	Reliability	35 11 10 3 28 40 27 1 2 8	32 28 6 26 3 10 13 24 35 34 1 2 16 5 11 25 27 17 18 19 22 23 31 33 39 4 7 8 9 12 14 15 20 21 29 30 36 37 38 40					
28	Measurement accuracy	32 28 6 26 3 10 13 24 35 34	32 28 10 2 18 26 35 3 27 29 30 36 1 13 19 23 25 34 40 4 9 11 17 24 31 33 37 39 5 6 7 8 12 14 15 20 21 29 30 36 37 38 40					
29	Production accuracy	32 28 10 2 18 26 35 3 27 29	22 35 2 1 33 18 19 24 28 39 27 40 10 13 37 21 29 31 34 3 17 23 26 4 6 11 15 25 30 32 5 7 8 9 12 14 16 20 36 38					
30	Harmful factors the object will receive	22 35 2 1 33 18 19 24 28 39	22 35 2 1 39 18 40 15 17 19 21 24 3 27 33 4 10 16 26 28 31 34 6 23 29 30 32 5 7 8 9 11 12 13 14 20 25 36 37 38					
31	Harmful factors the object will release	22 35 2 1 39 18 40 15 17 19	22 35 16 27 28 16 24 12 15 26 2 4 11 18 29 8 10 17 19 32 34 40 3 5 6 9 23 33 36 37 7 14 20 21 22 25 30 31 38 39					
32	Production facility	1 35 13 27 28 16 24 12 15 26	1 10 2 11 35 13 15 25 16 32 27 28 4 34 7 9 3 12 18 19 26 29 31 5 6 8 14 17 20 21 22 23 24 30 33 36 37 38 39 40					
33	Control facility	1 13 2 12 25 28 32 34 15 35	35 1 15 29 16 13 2 6 3 8 10 19 28 37 7 14 27 30 31 32 34 4 5 9 11 17 18 20 22 24 26 12 21 23 25 33 36 38 39 40					
34	Repair facility	1 10 2 11 35 13 15 25 16 32	13 26 1 28 2 10 19 29 15 24 34 35 37 38 40 6 16 22 30 33 39 4 5 7 9 11 12 13 14 16 23 25 33 36 38 39 40					
35	Adaptability or flexibility	35 1 15 29 16 13 2 6 3 8	13 26 1 28 2 10 19 29 15 24 34 35 37 38 40 6 16 22 30 33 39 4 5 7 9 11 12 13 14 16 23 25 33 36 38 39 40					
36	Device complexity	13 26 1 28 2 10 19 29 15 24	28 35 16 26 27 1 2 18 19 3 29 13 15 24 39 10 22 32 4 5 6 11 17 21 25 30 34 36 37 40 8 9 12 31 33 38 7 14 20 23 25 31 33 38					
37	Detection and measurement difficulty	28 35 16 26 27 1 2 18 19 3	35 13 28 26 1 2 10 18 27 32 23 34 5 12 14 15 17 19 24 25 33 3 4 6 8 9 11 16 30 7 20 21 22 29 31 36 37 38 39 40					
38	Automation range	35 13 28 26 1 2 10 18 27 32	10 35 28 1 18 2 26 38 24 34 37 7 14 15 17 19 22 3 13 20 23 27 29 32 39 4 5 6 12 16 21 25 30 31 36 40 8 9 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40					
39	Productivity	10 35 28 1 18 2 26 38 24 34	10 35 28 1 18 2 26 38 24 34 37 7 14 15 17 19 22 3 13 20 23 27 29 32 39 4 5 6 12 16 21 25 30 31 36 40 8 9 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40					

Process 2 (35 minutes)



Examples of generated ideas (創出されたアイデアの例)

- A color change trash bin depending on weight.
中の重さによって色の変わるゴミ箱
- Mist comes out the trash bin. (Reduce the volume of scrap paper, cram a lot)
ミストの出るゴミ箱 (紙クズをしなと小さくさせ、たくさん詰め込む)
- Lock with a handle to cause a frictional heat inside
内部で摩擦熱を起こせるハンドルが付いた錠

Impressions of the participants (参加者の感想)

- Productive. (実際にたくさんアイデアが出せた)
- Pleasant. (ゲーム感覚でアイデアが出て楽しかった)
- Interesting. (発想の手段として興味深い)

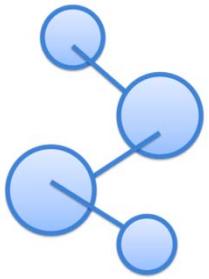
(観察からの仮説としての)

Effect of the workshop



Contents

- 1.Overview
- 2.Details
- 3.Future
- 4.References



Future



We will research on “The effect of Group Dynamics on the Idea Generation - focusing on SYMLOG(SPGR) and TRIZ Games -

SYMLOG

A SYstem for the Multiple Level Observation of Groups

Research Hypothesis (研究仮説)

- グループダイナミクスはチームビルディングに重要な役割を果たすだろう。
 - チームダイナミクスはチームのアイデアの生産性に強く影響する。
 - SYMLOGとSPGR (個人とグループの関係の体系化モデル) は創造的産物についてのグループダイナミクスを明らかにできる。統一チームは偏ったチームより、多くのアイデアを生産するだろう
 - 4つの文化「日本、韓国、ドイツ、ノルウェー」におけるクロスカルチャー的研究をする。
 - 研究構想：SYMLOGあるいは（それとは独立変数である）SPGRと、TRIZ Cardを使って創出されるアイデアの数は従属変数である。
-
- Group Dynamics would play an important role in building teams.
 - Team dynamics impact the productivity of team ideas.
 - SYMLOG or SPGR(Systematizing Person-Group Relations) enables to find out group dynamics on creative products.
 - Unified teams would produce more ideas than polarized teams.
 - Cross-cultural Research in four cultures.
 - They are Japan, Korea, Germany and Norway.
 - Research design: SYMLOG or SPGR as independent variable and the number of generated ideas by TRIZ cards is dependent variable

4 countries

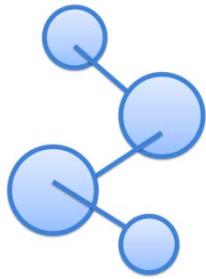


Prospect (見通し)

- チームの発想は個々の発想とは異なる。なぜなら、前者はチームダイナミクス（集団力学）によって影響されるからだ。
- けれどさらに、4か国（日本、韓国、ドイツ、ノルウェー）間の文化の違いは、個々の発想vsチーム発想の嗜好の差を示すだろう。
- この研究結果は、異なる文化や文化にもとづくリーダーシップ開発や研修プログラムにおいて、チームのイノベーション能力の創造性を高めるための、チームの構築（チームビルディング）の仕方についてアイデアを提供するでしょう。
- Team idea generation is different from Individual idea generation because the former is influenced by team dynamics(group dynamics)
- However, the cultural differences between countries(Japan, Korea, Germany and Norway), would show difference for the preference of Individual Idea Generation vs Team Idea Generation
- This research result would offer ideas about how to build teams(team building) in different cultures, culture-based leadership development and training programs in order to raise the creativity of the team innovation capability.

Contents

- 1.Overview
- 2.Details
- 3.Future
- 4.References



references

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- Robert F. Bales(1970), *Personality and Interpersonal Behavior*, Holt,
Rinehart Winston, NY,
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the Multiple Level Observation of Groups)* Holt, Rinehart Winston NY,

Material (參考資料)

智慧カード (TRIZ Card)

Web site

<http://triz.sblo.jp/archives/20070814-1.html>

<http://www.ideaplant.jp/products/chiecard2/>

Smart phone App “ideaPod”

For iPhone <http://itunes.apple.com/us/app/ideapod/id325360569?mt=8>

For Android <https://play.google.com/store/apps/details?id=jp.co.etos.android.ideapod&hl=ja>



“Which TRIZ Card is effective?” (TRIZ Card Sheet)

Web site

<http://triz.sblo.jp/article/57164815.html>

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