AC 2007-678: CREATIVE DESIGN CLASS WITH PATENTS

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Creative Design Class with Patents

Abstract

All forty-two students in my class applied for the patents. In Creative Design Class, students have learned that how to generate creative idea and apply for patents with creative inventions. All students understood their type of preference through MBTI (Myers-Briggs Type Indicator) test. They also got their grades of creativity through TTCT (Torrance Tests of Creative Thinking) test. The students have learned about safety engineering, product design and optimization which to develop their creative inventions. All students of this class applied for patents successfully.

Forty-two students were divided into 10 groups and each groups applied for a patent with a creative invention. (One group applied for an additional patent.) Eleven inventions were developed in this class; a Solar Powered Hover Craft, Solar Powered Balloon Toy to Propose Her, an Auto Watering Machine with Timer, a Bicycle with built-in a Fuel Cell Powered Charger, a Portable Capsule Shampoo, a Reversely Holding Umbrella, a Solar Powered Airship, a Nude Coffee Mix Bar (You can see the contents of coffee.), a Clothes Rack with Drying, a Ruler with a Sliding Pen and a Spot Removal Machine.

In this class, they had brain storming about designs and the concepts of products and made a schedule to do for about three months. Their ideas of designs, concepts and the real products were presented in the class. The teamwork and communication skills are very important to develop their creative inventions. At the last step of this class, all students participated in Creative Design Contest held in YONSEI University.

1. Introduction

What is creativity? There are many definitions of creativity. In the dictionary, the word ‘creative’ is defined as ‘an ability to invent and develop original ideas, especially in the arts.’ Creativity has been focused on every field. The lecturer used many methods to improve this creativity in the classroom by keep practicing brainstorming, brain writing, checklist, morphological analysis, etc. These ways of practicing solved the problem either directly or indirectly. Thus, practical experiences have been applied to make the problems to be solved, and make new ideas on the other hand.

Forty-two students in the Creative Design Class have applied for their own patents with creative inventions. Students have taken from elementary steps as followings:

- Myers-Briggs Type Indicator (MBTI) & Torrance Tests of Creative Thinking (TTCT)
- Lectures
- Creative Invention
- Applying for patents

2. Curriculum of Creative Design Class

The goal of this Creative Design Class is to apply for patents with creative inventions. All the students should follow the curriculum and schedule exactly. There are four steps in this class. Figure 1 shows diagram of curriculum in Creative Design Class.

First, all students are required to understood their type of characteristics through MBTI (Myers-Briggs Type Indicator) test. They should be also able to know their grade of creativity through TTCT (Torrance Tests of Creative Thinking) test.

The second step is called knowledge expansion in improvement of creativity. In this step, students need to study lectures related with improvement of creativity such as engineering design, technical administration, patent, product design, optimization and TRIZ.

The goal of third step is to make products with creative invention. In this step, students should make products with creative invention. They need a brain storming about design and concept of the products. Their ideas of designs, concepts and real products are presented in the class. The teamwork and communication skills are the main points to develop their creative inventions.

The goal of last step is to apply for patents. A patent is an official right given only to a person or company and allow making or selling a new product for a certain period of time. Everyone applies for a patent but its procedures are not simple.

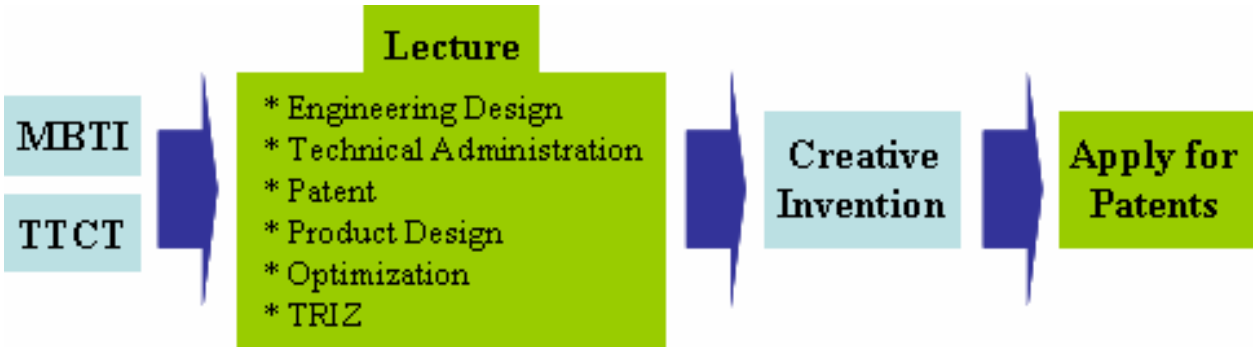

Figure1. Diagram of Curriculum in Creative Design Class

2.1. Myers-Briggs Type Indicator (MBTI) and Torrance Tests of Creative Thinking (TTCT) test

(TTCT) test Myers-Briggs Type Indicator (MBTI) is a personality test designed to assist a person in identifying some significant personal preferences. The types the MBTI sorts for, known as dichotomies are extraversion / introversion, sensing / intuition, thinking / feeling and judging / perceiving. Participants are given one of 16 four-letter abbreviations, such as ESTJ or INFP, indicating what their preferences are. The term best-fit types refers to the ethical code that facilitators are required to follow. It states that the person taking the indicator is always the best

judge of what their preferences are and that the indicator alone should never be used to make this decision.[1]

All students have had a MBTI test. Table 1 shows the results of MBTI test. The averages of MBTI test in this class are as follows:

- Extraversion(+) or Introversion(-) : +3.571
- Sensing(+) or Intuition(-) : +7.452
- Thinking(+) or Feeling(-) : +13.405
- Judging(+) or Perceiving(-) : -5.548

According to this average, students of this class totally had extraverted attitude. They also got sensing, thinking and judging position.

1	I	N	F	P	12	I	S	T	J	23	E	S	T	J	33	I	S	F	P
	25	5	15	40		39	31	19	1		15	19	7	19		15	9	13	17
2	E	S	T	P	13	E	S	T	P	24	E	N	T	P	34	E	N	T	P
	23	14	10	20		24	18	15	21		31	11	19	55		19	9	23	15
3	E	S	T	P	14	E	S	T	P	25	E	S	F	P	35	I	S	T	J
	27	16	8	4		27	10	7	23		27	5	17	1		47	25	39	39
4	I	N	T	P	15	E	S	T	J	26	E	N	F	P	36	E	N	F	J
	47	3	23	35		27	25	7	7		1	11	15	39		5	3	19	9
5	E	S	T	P	16	E	S	F	P	27	I	S	T	J	37	I	S	T	P
	33	5	5	51		33	7	21	13		25	17	27	3		19	21	43	25
6	E	S	F	P	17	E	N	T	P	28	E	S	T	J	38	I	S	T	P
	19	27	7	11		49	3	55	9		19	15	30	22		17	7	57	3
7	I	S	T	P	18	I	N	T	J	29	I	N	T	J	39	E	S	T	P
	27	1	45	17		15	7	37	25		23	5	9	53		23	13	15	-18
8	E	S	F	J	19	E	S	F	P	30	I	S	T	J	40	E	S	T	J
	24	21	27	21		1	19	11	57		4	41	7	51		23	27	35	45
9	E	S	T	P	20	E	S	T	P	31	E	S	T	P	41	I	N	T	P
	39	5	23	25		29	3	17	1		31	3	33	51		31	13	27	5
10	I	N	T	J	21	E	S	T	P	32	I	N	F	P	42	I	N	F	P
	22	20	17	41		13	19	21	17		5	5	15	47		29	3	3	35
11	E	S	T	P	22	I	N	T	P	Creative Design Class									
	5	3	19	9		35	15	27	5										

Table1. Results of MBTI test

Developed by Dr E. Paul Torrance, the TTCT is a highly reliable and one of the most widely used creativity testing of its kind. This is a test where multiple methods of creative thinking are assessed, recognized and potentially nurtured. These tests come in two forms: Figural and Verbal Students of this class had a TTCT-Figural test. TTCT-Figural is appropriate at all levels, kindergarten through adult. Testing Time is 45 minutes. It uses three picture-based exercises to assess five mental characteristics[2]:

- Fluency
- Originality
- Abstractness of titles
- Elaboration
- Resistance to premature closure

Table 2 shows the result of TTCT test. They got their grade of creativity through TTCT (Torrance Tests of Creative Thinking) test.

#	Fluency	Originality	Abstractness of titles	Elaboration	Resistance to premature closure	AVG	#	Fluency	Originality	Abstractness of titles	Elaboration	Resistance to premature closure	AVG
1	99	112	110	140	95	111.2	22	83	91	70	140	60	88.8
2	79	83	40	106	60	73.6	23	93	101	61	106	51	82.4
3	112	125	92	133	81	108.6	24	120	119	40	133	69	96.2
4	117	130	40	133	75	99	25	141	130	81	115	69	107.2
5	83	91	81	106	64	85	26	104	119	156	115	91	117
6	117	130	61	140	69	103.4	27	99	98	127	140	81	109
7	104	119	86	125	60	98.8	28	108	94	70	95	54	84.2
8	96	108	76	125	60	93	29	108	94	92	125	81	100
9	115	127	86	140	60	105.6	30	70	91	92	106	64	84.6
10	90	98	86	158	54	97.2	31	79	125	101	115	75	99
11	87	94	40	95	54	74	32	117	112	76	160	75	108
12	87	94	81	125	69	91.2	33	104	105	122	140	81	110.4
13	139	150	86	133	86	118.8	34	120	116	110	106	69	104.2
14	79	83	96	95	75	85.6	35	104	119	141	156	95	123
15	120	133	61	153	60	105.4	36	150	150	86	133	86	121
16	127	141	110	140	81	119.8	37	130	116	40	140	75	100.2
17	115	127	81	125	60	101.6	38	95	112	76	115	81	95.8
18	80	87	76	125	51	83.8	39	96	79	154	115	69	102.6
19	112	125	76	125	60	99.6	40	96	98	53	85	95	85.4
20	59	62	53	61	40	55	41	81	66	75	55	55	66.4
21	83	91	81	83	40	75.6	42	96	98	53	115	54	83.2

Table2. Results of TTCT test

2.2. Lectures

Before students made creative products, they should study lectures related improvement in creativity. The lectures are:

- Engineering Design
- Technical Administration
- Patent
- Product Design
- Optimization
- TRIZ

All forty-two students had a presentation in their topics, and Table 3 shows the list of presentation in this class.

After a presentation, they asked questions. The presenter answered the question and they exchanged opinions each other. Through this step, they could know both own and other topic.

#	Field	Subject	#	Field	Subject
1	E.D.	Problem Definition	22	P.D.	Six Sigma in Product Design and Manufacturing
2	E.D.	An Idea Creation	23	P.D.	CVD of polysilicon in IC (integrated circuit) manufacture
3	E.D.	Creative Valuation	24	P.D.	Solar desalination unit
4	E.D.	Idea Decision	25	P.D.	What is Product Design
5	E.D.	Pugh Method	26	P.D.	Examples of Product Development Processes (Rapid, Research Intensive)
6	E.D.	Solution Scheme fulfillment	27	P.D.	Examples of Product Development Processes (Systems Industrial Design)
7	E.D.	What is a Design?	28	P.D.	Benchmarking & Establishing Engineering Specifications
8	E.D.	Engineering Design Process	29	P.D.	Automotive fuel cell
9	E.D.	Project Plan	30	P.D.	Environmental safe refrigerants
10	E.D.	Decision based on Economical Efficiency	31	P.D.	Hem dialysis device
11	E.D.	Design Document Preparation	32	P.D.	Hand warmer
12	E.D.	Innovation of a Workshop	33	Opt.	Quantity of Alcohol which is the most suitable
13	T.A.	A New Technology development strategy	34	Opt.	The Optimum Studying
14	T.A.	R&D project management	35	Opt.	Matching Problem
15	T.A.	TRIZ for R&BD	36	Opt.	Casanova
16	T.A.	R&BD Leadership	37	Opt.	The Dinner of West Hill Family
17	T.A.	Technical Writing	38	Opt.	Terran
18	Patent	Patent Case1	39	Opt.	Horse Racing
19	Patent	Patent Case2	40	Opt.	Putting in a Bag
20	Patent	Patent Case3	41	Opt.	A Popularity Secret of Professor MOON
21	P.D.	Examples of Product Development Processes	42	Opt.	Example

Table3. List of Presentation (E.D.; Engineering Design, T.A.; Technical Administration, P.D.; Product Design, Opt.; Optimization)

2.3. Creative Invention

At this step, students are divided into 10 groups. Each group made products with a creative invention.

Students should make products with creative invention. To do so, first of all, they had a brain storming about design and concept of the products and made a schedule to do for three months. Their ideas of design, concept and real products are presented in the class. The teamwork and communication skills are very important to develop their creative inventions.

2.4. Applying for patents

All students of this class have applied for patents with creative products. Everyone can apply for a patent but its procedure is not simple. There are lots of required documents and procedures[3]:

- Required documents:
  - Transmittal letter
  - Specification
  - Claim
  - Abstract
  - Drawing
  - Declaration and Power of Attorney
  - Assignment
  - Priority documents
- Procedures:
  - Primary Amendments
  - First Office Action
  - Final Office Action
  - Notice of Allowance
  - Pay Registration Fee & Submit Formal Drawing
  - Letter Patent

All students of this class applied for patents with creative inventions successfully. Table 4 shows the information of patents that comes from this class.

Team #	Application Name	Application Number
Team 1	A Solar Powered Hover Craft	10-2006-0047880
Team 1	Solar Powered Balloon Toy to Propose Her	10-2006-0045514
Team 2	An Auto Watering Machine with Timer	10-2006-0046308
Team 3	A Bicycle with built-in a Fuel Cell Powered Charger	10-2006-0046089
Team 4	A Portable Capsule Shampoo	10-2006-0046312
Team 5	A Reversely Holding Umbrella	10-2006-0046342
Team 6	A Solar Powered Airship	10-2006-0047307
Team 7	A Nude Coffee Mix Bar	10-2006-0046805
Team 8	A Clothes Rack with Drying	10-2006-0046643
Team 9	A Ruler with a Sliding Pen and a Spot Removal Machine	10-2006-0046352
Team 10	A portable stain remover using a vacuum pump	10-2006-0045699

Table4. Information of Patents

3. Conclusions

In Creative Design Class, forty-two students applied for patents successfully. Briefly, Students followed four steps of this class. In the first step, all students understood their type of preference through MBTI (Myers-Briggs Type Indicator) test. They also could take their grade of creativity through TTCT (Torrance Tests of Creative Thinking) test. The second step, students studied lectures related with improvement of creativity such as engineering design, technical administration, patent, product design, optimization and TRIZ by using method knowledge expansions in improvement of creativity. In third step, students made products with creative invention. For the last step, students finally applied for patents. In this class, students could get realistic experiences and upgrade their creativity as applying for patents.

References

1. Myers-Briggs Type Indicator, Wikipedia, the free encyclopedia, from http://en.wikipedia.org/wiki/Myers-Briggs_Type_Indicator
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3. United States Patent and Trademark Office, from http://www.uspto.gov/