Suggestion of Teaching-Learning Methods to Cultivate Creative Design Capacities

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ABSTRACT

This study suggests a teaching-learning method to improve creative design abilities of students majoring in design. By suggesting a creative design-inducing (CDI) teaching-learning method process and a creative design-inducing (CDI) teaching-learning method, this study aims to expand creative thinking among students with the aim of producing produce creative output as well as improving the effectiveness of design teaching. It also presents a case of the teaching-learning method in a design-related department, the process of teaching where the new method is applied is also examined. The teaching method this study suggests has the following merits: First, it allows the teacher to use various tools depending on the creative thinking abilities of individuals. By providing students with custom-made teaching, the method motivates and focuses students during the lesson. Second, it is easier for students to generate creative ideas than with other teaching methods.

Key words: Creative Design-Inducing (CDI), Teaching-Learning Methods, Thinking Ability

1. PREFACE

To respond actively to the rapidly changing educational environment caused by social changes, one needs to be equipped with creative thinking. To cultivate human resources responding actively to changing situations of the age, the country is pursuing diversification of curriculum. It has become a common sense that creativity is the core capacity global talents who will lead the future society should be equipped with. Corresponding to a new trend where creative talents decide national competitiveness, Korea as well redefines core capacity and potential of future talents. While in the past growth-oriented society the human capital which is good at copying was important, the creative human capital is very important in the future [1].

The education focuses on cultivating problem-solving capacity, based on the establishment of a system purposed to cultivate fusing and blending thoughts and problem-solving capacity following the revision of the curriculum. Especially, to be equipped with capacities suitable to the image of talent required for global social change and demanded by companies, students should cultivate the capacity to construct individual

meanings corresponding with the environment, the capacity to solve problems in self-motivated ways, and the capacity to generate creative and innovative solutions by performing them [2]. A series of activities where individuals or a team generate a creative idea and an innovative solution through interaction or suggest an innovative way of solving existing problems are called creative problem-solving activities [3].

While the objective of existing design education was mainly to produce designers who are required in the industrial society, a new objective focuses on response to and adjustment with the changing trend of the age [4]. Today, the most important role of the designer is to solve problems quickly and effectively [5], [6]. Since product designer are problem solvers, generating innovative ideas are the most important part of the design process. Bob Pike, in his Creative Training Techniques [7], citing the saying of Confucius, "What I hear I forget. What I see I remember. But what I do I understand," emphasizes what one experiences directly, and says that, since the focus of education is to help students get results, one can get actively pleasure of learning by participation. Therefore, this study, based on creative design-inducing teaching-learning method process and creative design-inducing teaching-learning method, suggests a case of curriculum of the design-related department and a process which was applied in class teaching.

2. CREATIVE DESIGN-INDUCING (CDI) TEACHING-LEARNING METHOD PROCESS AND STRUCTURE TO CULTIVATE CREATIVE DESIGN CAPACITIES

This study, as ways to cultivate creative design capacities, suggests creative design-inducing (CDI) teaching-learning method process Figure 1 and structure Fig. 2. This program is made for professors to work more efficiently by choosing tools appropriate for lectures themselves.

CDI teaching-learning method was made to be applied optimally to various design education areas, by using creative techniques used to induce designs. It is divided into two stages: main teaching stage and preparation stage before class teaching.

The preparatory stage before class teaching is the stage where the teacher creates an atmosphere which can be helpful for students to expand their thinking and generate creative ideas by easing tension in the preparatory stage with quiz, game and meditation.

In the main class teaching, the teacher induces creativity generation of students by applying various tools to various types of students in different weeks, and sorts out teachings by using review with window panning or self-reflection diary. A creative learning method used in a wide range of fields is specifically developed to be applicable to the field of design.
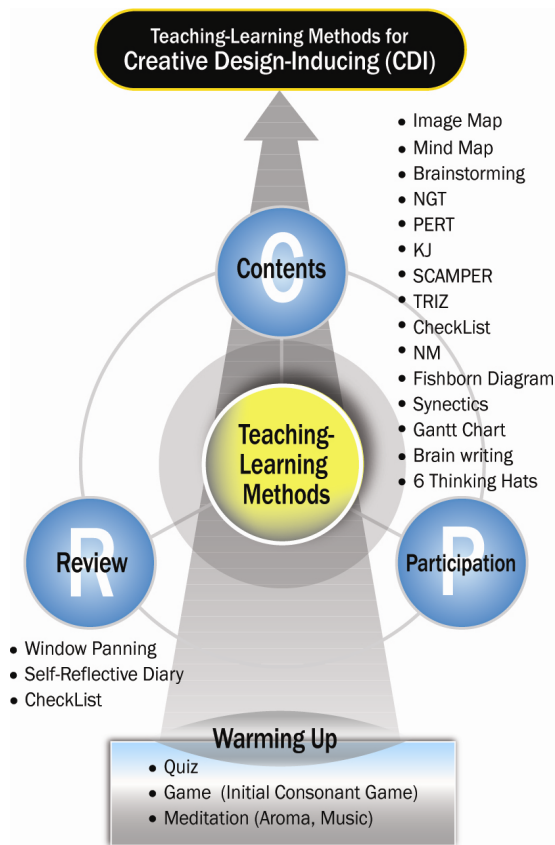

Fig. 1. Creative design-inducing (CDI) teaching-learning method process

This study suggests a process where learners can activate creative learning experiences and solve problems, and 5 step

CDI teaching-learning method which can enhance educational efficiency [8].

Step 1 is the time when, with fact findings, learners can grasp goals and visualizing them. Step 2 is the time when, with problem findings, learners can recognize problems and list them. Step 3 is the time when, with idea findings, learners can list solutions. Step 4 is the time when, with solution findings, learners can selects one of various solutions and expands it. Finally, step 5 is the time when, with application findings, learners can apply the best idea and produce a result.

5 step CDI teaching-learning method allows the teacher freely select Type A or Type B depending on learning capacity of a learner or the type of project.

Type A is a kind where learners go through all five steps and generate their own designs, as explained above. Since this type starts from the fact finding step, it usually takes longer time to develop a project. In contrast, Type B, a few week project type, starts from problem finding with given fact finding.
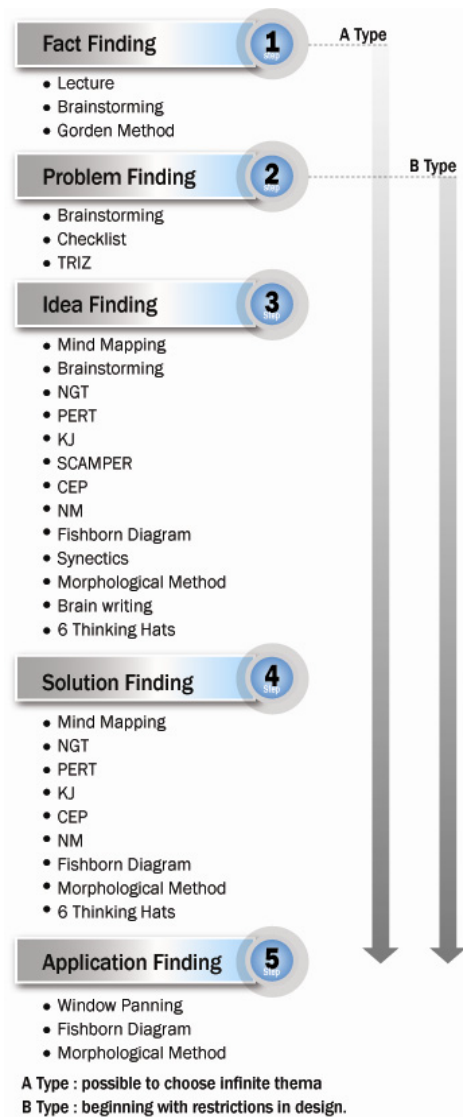

Fig. 2. Creative design-inducing (CDI) teaching-learning method structure

3. SUGGESTION OF CASES OF CREATIVE DESIGN-INDUCING (CDI) TEACHING-LEARNING METHOD PROCESS

This study, using CDI teaching-learning method process and structure, suggests a curriculum. I developed two types of CDI teaching-learning method, and applied those two methods to the game character design course of Game Engineering Department and the art mask course for the junior year students of Beauty Care Department, Tongmyong University.

3.1. 'Art mask' course applying Type A

Table 1 is the art mask course for the junior year students of Beauty Care Department applying Type A among two types. The art mask course is a design project course where each student should do his or her own project. This study suggests Checklist, Mind Map, Image Map, and SCAMPER techniques in the participation stage, and Window Panning, Self-Reflective Diary, and Checklist techniques in the review stage.

Table 1. 'Art mask' course applying Type A

	Week	Lecture contents	Tool
Step 1	1	Recognition of teaching goals	
Step 1	2	Visualization of running process of recognized teaching goals	
Step 2	3	Data gathering to induce concepts	Checklist
Step 2	4	Setting up of concepts	Mind Map
Step 2	5	Visualization of set concepts	Image Map
Step 3	6	Deduction of creative ideas fitting the concepts	SCAMPER
Step 3	7	Expansion of deduced ideas	SCAMPER
Step 4	8	Making a list of selected ideas	Checklist
Step 4	9	Evaluation and selection of listed ideas	Checklist
Step 5	10	Selection of materials which can be applied to selected art mask design	
Step 5	11	Basic works for art mask	
Step 5	12	Expression of texture and cubic effect of art mask	
Step 5	13	Production of creative art mask	

3.2 . 'Game Character Design' course applying Type B

Table 2 is the game character design course provided to junior year students of the Game Engineering Department, Tongmyong University. It is the case where Type B is applied among two types of CDI teaching-learning method. The game character design course is to ask each team of students to develop a design project. In the participation stage, NGT, Mind Map, SCAMPER, and Checklist techniques are suggested, and, in the review stage, Window Panning, and Self-Reflective Diary techniques are suggested.

Table 2. 'Game Character Design' course applying Type B

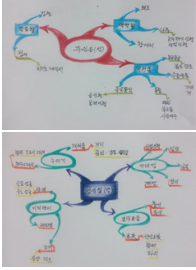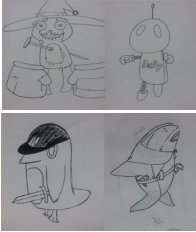|	Week	Lecture contents	Tool
Step 2	1	Planning of production process which fits the project theme	Window Panning
Step 2	2	Deducing design concepts through the process of recognizing problems and making a list of them	NGT
Step 3	3	Unfolding of creative ideas suitable to design concepts	Mind Map
Step 3	4	Expansion of creative ideas	SCAMPER
Step 3	5	Production of various idea sketches	SCAMPER
Step 4	6	Selection of a tentative character	Checklist
Step 4	7	Embodiment and diversification of a tentative character	
Step 5	8	Drawing of basic movements of the character	
Step 5	9	Drawing of applied movements of the character	
Step 5	10	Drawing using computer	
Step 5	11	Character coloring using computer	
Step 5	12	Expression of texture and cubic effect of character using computer	
Step 5	13	Production of game character design	Checklist

4. SUGGESTED A CURRICULUM CASE

The Game Engineering Department, Tongmyong University is divided into three majors - Game Programming Major, Game Planning Major, and Game Graphic Major - and the game character design course is run for students majoring in game graphic. Consequently, even if it is a design course, most of students taking the course are not very excellent in

their design capacities. The analytical results of the case study applying Type B of the two CDI teaching-learning methods are shown in Table 3.

The descriptions of each step of the participation stage are as follows: In step 2 (problem finding), character background is set using the NGT (Nominal Group Technique), an expansive thinking technique; In step 3 (idea finding), character characteristics are set and the design concept is concretized using Mind Map, and SCAMPER, expansive thinking techniques; In step 4 (solution finding), tentative characters suitable to character background, characteristics, and design concept are chosen using Checklist, a convergent thinking technique.

The descriptions of each step of the review stage are as follows: In step 2 (problem finding), Window Panning is used; In step 4 (solution finding), Self-Reflective Diary is used along with Window Panning; In step 5 (application finding), the teacher leads learners to know the contents of learning activities and participate in next lectures.

Table 3. Curriculum case process

Setting character background [NGT]		Students submited ideas suitable to the theme and the teacher sorted out those ideas. NGT (Nominal Group Technique) was used where students are asked to vote among sorted-out ideas to choose high-ranking ideas.
Setting character characteristics [Mind Map]		Mind-map was made to sort out thinking and make them images.
Design concepts [SCAMPER] [Checklist]		Ideas were concretized using SCAMPER, an expansive thinking technique.
		It was confirmed whether the ideas were made into images fitting to design concepts.
Character deduction [Checklist]		It was confirmed whether character background and character characteristics were set, and the products became designs satisfying all design concepts.

5. CONCLUSION

This study is to suggest a teaching-learning method which can contribute to improvement of creative design capacities of students who major in design. By revising and compensating for the existing CDI teaching-learning method process and 5-step CDI teaching-learning method developed for design education, this study intended to improve efficiency of design teaching by expanding students' creative thinking and letting them generate creative products. In addition, this study suggested teaching-learning methods in related departments and actual processes of teaching cases. The teaching methods suggested in this study seem to have the following merits: First, by allowing the teacher to use various tools depending on the capacities of students in creative thinking, the teacher can run the class by adjusting the lecture contents suitable to student levels, making student focus more on class teaching and motivate them more than the case of existing curriculum. Second, those methods allow students who want to generate creative designs to access more easily to the materials than the case of existing curriculum. The proposed CDI learning method will be further modified after verifying its effects by consistently applying it in design majors.

REFERENCES

[1] Y. J. Jeong and W. T. Kim, "Study on Design Education Method According to the Educational Course for Creativity and Character," Journal of the Communication Design, vol. 41, no. 1, 2012, pp. 166-175.

[2] M. H. Kang and J. K. Go, "Developing A Conceptual Framework for Individual Knowledge Construction Based on Literature Review," Korea Society for Learning Research, vol. 4, no. 1, 2002, pp. 5-34.

[3] C. S. Park, S. H. Park, and S. Y. Jeong, "Research on applicability of Teaching-Learning Methods for Creative Problem Solving to a Course in University", Journal of Engineering Education Research, vol. 13, no. 1, 2010, pp. 23-37.

[4] Y. M. Park, "A Study on the Effects of Applying PBL in Class Design," Korean Society of Basic Design & Art, vol. 12, no. 5, 2011, pp. 189-197.

[5] A. R. Han and D. Y. Kwak, "A Study on Design Idea Generation Utilizing TRIZ Concept," Journal of the

Korean Society of Design Culture, vol. 18, no. 2, 2012, pp. 512-525.

[6] S. J. Lee, J. W. Kim, W. J. Chu, S. Z. Chae, and S. H. Yoon, "A study on Design Education Re-engineering by Multi-disciplinary Approach", Journal of Korean Society of Design Science, vol. 71, 2007, pp. 299-314.

[7] Bob Pike, Kim Kyung Seuop, Trans, *Creative Training Techniques*, Kimyoungsa, Korea, 2004.

[8] A. K. Kim and M. R. Seo, "Developing Creative Problem Solving teaching-learning process for using in design education in university," The 3rd International Conference on Convergence Technology (ICCT) 2013, 2013, pp.1629-1630.

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