

The Effects of Creative Problem-Solving Instruction Model on the Development of Creativity in Clothing Education

의생활교육의 창의적 문제해결 수업모형 적용이 창의성 증진에 미치는 효과

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Abstract

이 연구의 목적은 중학교 의생활수업에 대한 창의적 문제해결 수업모형 적용에 있어 창의성 증진효과를 검증하는데 있다. 연구는 중학교 1학년 2개 학급의 남·녀 81명의 학생을 대상으로 하였으며, 가정과 의복의 재활용 단원 수업을 실험반과 비교반으로 나누어 동일한 교사에 의해 주당 2시간씩 4회 실시하였다. 실험반에는 창의적 문제 해결 수업모형이 적용되었으며, 비교반에는 전통적 수업이 적용되었다. 창의성검사는 한국창의성연구소의 창의성 검사지를 사용하였으며, 사전검사와 사후검사가 동일 검사지로 이루어졌다. 자료의 분석은 사전검사에서 두 학급간의 창의성에 의미있는 차이가 나타나, 두 학급간의 창의성의 차검증에서 사전검사의 영향력을 배제하기 위하여 ANCOVA분석을 실시하였다. 분석 결과 창의성의 유창성, 융통성, 독창성 세 개의 하위요인 점수와 이를 합산한 전체 창의성 점수에서 모두 창의적 문제해결 수업 모형을 적용한 실험반의 점수가 통계적으로 의미 있게 높은 것으로 나타났다. 이러한 결과를 통하여 볼 때 창의적 문제해결 수업모형을 의생활 수업에 적용하였을 때 창의성이 증진된다고 할 수 있으며, 중학교 뿐 아니라 고등학교 및 초등학교에서의 창의성 증진을 목표로 하는 의생활 수업에도 적용 가능할 것으로 보며 후속 연구의 수행을 제안하는 바이다.

Key words: creative problem-solving instruction model, creativity, fluency, flexibility, originality, clothing education; 창의적 문제해결 수업모형, 창의성, 유창성, 융통성, 독창성, 의생활 교육

I. Introduction

It is widely recognized that developing creativity is more important than teaching knowledges in the school education. There are many definitions of creativity. But, creativity is commonly defined as

the skill of bringing about something new and valuable(Young, 1985).

A review of the literature has overwhelmingly shown that creative thinking skills can be taught. Opinion varied to the degree to which these skills can be taught, the methodology that should be used, and how successful the teaching program

has been(Forsyth, 1990; Finkas, 1992).

The creative problem-solving instruction(CPS) model is one of the most effective teaching and learning models for the development of creativity which was developed by Osborn(1963), and extended later by Isaksen and Treffinger(1985), Parnes(1992), and Elwell(1993). The purpose of CPS model is to develop the creativity and problem-solving skills through the teaching of creative thinking process.

The effectiveness of CPS model was tested in many school subjects in Korea and other countries(Chung & Kim, 1999). But, there is no study with effectiveness of CPS model in the clothing instruction. It is said that clothing education can develop the creativity and problem-solving as the subject consisted of dressing, preparation of clothing, management of clothing, design and production of clothing and living utensils. The home economics including clothing education is a practical subject which students can experience various thinking process by analyzing, planning, making, and evaluating actual daily lives. It is clearly stated in the 'Interpretation of Seventh Educational Curriculum' (MOE, 1999) that clothing education could develop understanding of concepts and principles, ability to make decisions, problem-solving skills, and creativity.

The contents of this study reviewed the literature about concepts, significance, and procedures of CPS model to develop instruction plan of CPS model applied to clothing education, and to test the effectiveness of CPS model in clothing education for the secondary school.

II. Purpose

The purpose of this study was to investigate the effects of creative problem-solving instruction

model to develop creativity in clothing education of the secondary school.

III. Research Hypotheses

1. There is a significant effect of creative problem-solving instruction on the development of fluency.
2. There is a significant effect of creative problem-solving instruction on the development of flexibility.
3. There is a significant effect of creative problem-solving instruction on the development of originality.
4. There is a significant effect of creative problem-solving instruction on the development of total creativity.

IV. Methods

1. Subjects

Eighty-one students of 7th grade were sampled from KyungBuk-Province as target group of this study, and they were divided to an experimental group and a control group. The creative problem-solving instruction for two hours a week was treated to a experimental group and the typical instruction were treated to a control group for same contents of home economics subject. The demographic information of subjects for this study was shown in Table 1.

Table 1. The sexual distribution of subjects in this study

Group	Male	Female	Total
Experimental	22	19	41
Control	21	19	40
Total	43	38	81

2. Research Design

This study is to prove the progress of creativity in the experimental group and the control group after the experimental group received creative problem-solving instruction while the control group received typical instruction. Thus, the independent variables in this study were, as instructional methods, creative problem-solving instruction (for the experimental group) and typical instruction (for the control group). And the dependent variables were the post-test scores of the creativity test. The following Table 2 is a diagram of the nonequivalent pre-test post-test control group design to examine the assumptions of this study.

Table 2. The nonequivalent pre-test post-test control group design

G ₁	O ₁	X ₁	O ₂
G ₂	O ₃	X ₂	O ₄
G ₁ : experimental group		X ₁ : CPS instruction	
	O ₁ , O ₃ : pre-test		
G ₂ : control group		X ₂ : typical instruction	
	O ₂ , O ₄ : post-test		

3. Instrumentation

The 'Creativity Test' developed by Korean Creativity Research Institute (1998) was used both to experimental group and control group for the pre-test and post-test to test the effects of creative problem-solving instruction. This creativity test was developed for the secondary school students, and reliability of the test was .91 of Cronbach's α , and measurement factors and test contents are shown in Table 3.

4. Procedure

For the experimental treatment, the teaching plan was developed by the researcher based on the

Table 3. Creativity measurement factors and test contents

Factors	Test Contents
Fluency	As many imaginary words as possible to a given word should be written down within the limit (3 minutes)
Flexibility	As many arithmetic expressions to make number 10 as possible to using a given number 1, 2, 3, 4, 5, and 6 should be written down within the limit (3 minutes)
Originality	By using the given shape, a student is required to draw a certain shape, and put down its name below it within the limit(4 minutes). The score is given only when the shape is unique. The drawing is graded according to the content of the shape.

theory of CPS model, and consulted by professors majoring in clothing and education, teachers in home economics of secondary school, and graduate students majoring in clothing education. The creative problem-solving instruction and typical instruction plan are presented in Table 4. The steps and practical activities of which educational unit was the recycling clothes for a creative problem-solving instruction presented by Osborn and Parnes are shown in Figure 1. And the applicated activities to clothing education are shown in Figure 2.

Table 4. Comparison between creative problem-solving instruction and typical instruction plan

Creative Problem -Solving Instruction	Typical Instruction
Step 1. Data Finding	Introduction: Recalling the previous learning
Step 2. Problem Finding	
Step 3. Idea Finding	Development: Teacher-centered development of the current lesson
Step 4. Solution Finding	
Step 5. Acceptance Finding	
	Consolidation: Consolidating the current lesson

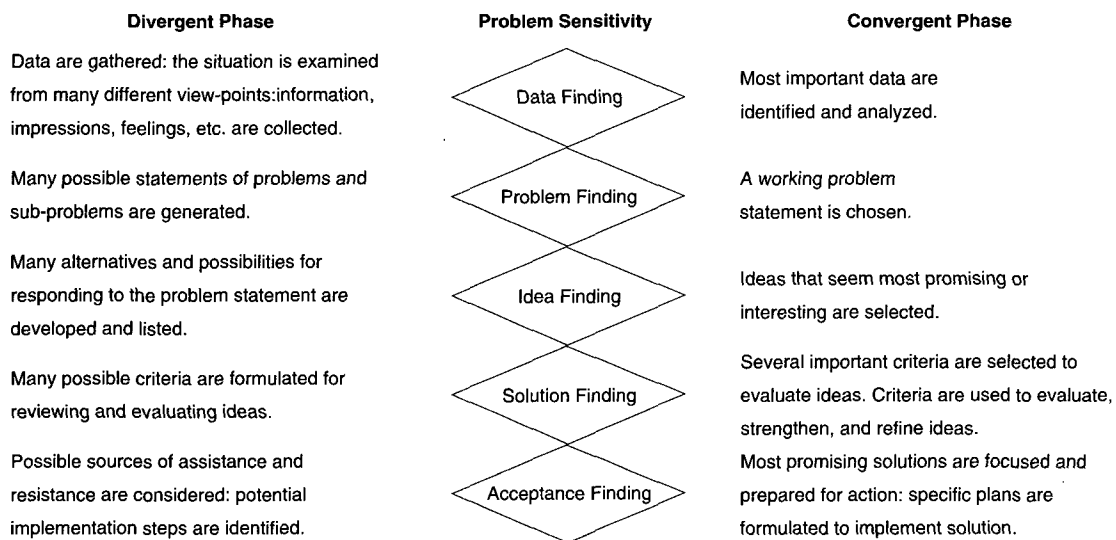


Fig. 1. Five steps of CPS Model

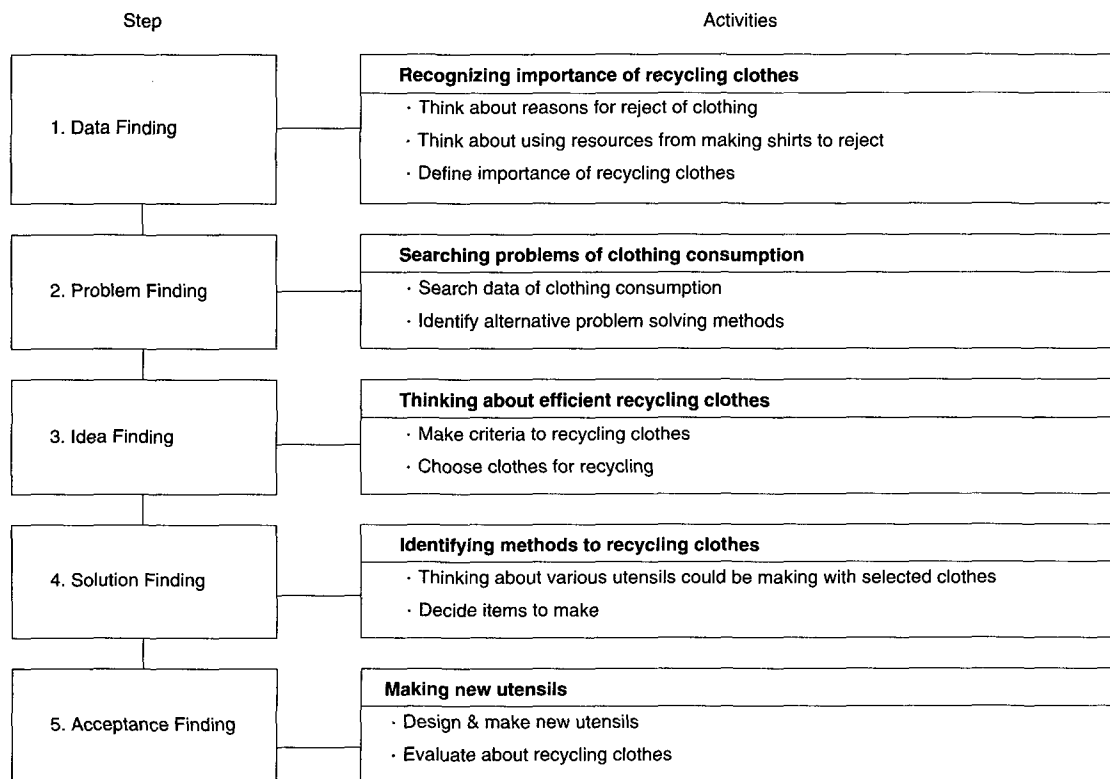


Fig. 2. Activities of CPS instruction in this study

Table 5. The pre-test and the post-test scores for experimental group and control group M(SD)

Factors	Pre-test			Post-test		
	Experimental	Control	t	Experimental	Control	t
Fluency	8.50 (3.84)	8.20 (3.11)	0.39	14.68 (5.40)	12.49 (4.31)	2.02*
Flexibility	6.10 (2.24)	7.78 (3.58)	2.53*	9.28 (3.04)	6.71 (2.69)	4.02**
Originality	13.03 (8.62)	14.44 (7.48)	0.79	19.08 (9.25)	14.17 (6.65)	2.74**
Total	27.63(10.79)	30.41(10.54)	1.18	43.03(12.99)	33.37 (9.70)	3.79**

*p<.05 **p<.01

Four weeks of creative problem-solving instruction were treated to the experimental group, and typical instruction were treated to the control group in February, 2001. And, the pre-test and the post-test were administered to the experimental group and control group before and after the experiment.

5. Data Analysis

The collected data were analyzed by SPSSPC WINDOWS 8.0 version. The mean and standard deviation of the pre-test and the post-test were calculated, and the homogeneity of the pre-test between the experimental group and the control group was tested. A statistically significant difference in the pre-test between the experimental group and the control group was found, so the post-test scores were analyzed by Analysis of Covariance (ANCOVA) with covariate of the pre-test to test effectiveness of CPS model in clothing education.

V. Results

1. Homogeneity Test

An initial pre-test was administered to determine whether the experimental and control group had comparable creativity before the treatment was begun. And, the post-test was administered to determine that the experimental group had significant improvement in creativity after the

treatment. Table 5 shows the results of the pre-test and post-test scores for experimental and control group.

The pre-test scores of experimental group and control group in fluency [t(79)=0.39, p>.05], originality [t(79)=0.79, p>.05], and total creativity [t(79)=1.18, p>.05] were not significantly different, but there was a statistically significant difference between experimental group (M=6.10, SD=2.24) and control group(M=7.78, SD=3.58) in pre-test score of flexibility[t(79)=2.53, p<.05].

For this reason, analysis of covariance test(ANCOVA) were needed to compare the post-test scores between two groups after four weeks' treatment.

2. Effects of CPS instruction on fluency

After four weeks' treatment, the results of ANCOVA to compare the difference between two groups of the post-test score with covariate of the pre-test score in fluency are shown in Table 6.

Table 6 shows that the difference between two groups of the post-test score with covariate of the

Table 6. Results of ANCOVA for the post-test of fluency

Source	Sum of Squares	DF	Mean Square	F
Covariate	537.65	1	537.65	31.26**
Group	77.56	1	77.56	4.51*
Error	1341.37	78	17.20	
Total	1975.88	80		

*p<.05 **p<.01

pre-test score in fluency was statistically significant [$F(1,80)=4.51, p<.05$]. As shown in Table 5, the mean score for the experimental group in the post-test of fluency was 14.68, and the control group had a mean of 12.49. The experimental group had a greater increase($D=6.18$) in mean scores from the pre-test to the post-test than the control group($D=4.29$).

3. Effects of CPS instruction on flexibility

After four weeks' treatment, the results of ANCOVA to compare the difference between two groups of the post-test score with covariate of the pre-test score in flexibility are shown in Table 7.

Table 7 shows that the difference between two groups of the post-test score with covariate of the pre-test score in flexibility was statistically significant [$F(1,80)=49.47, p<.01$]. As shown in Table 5, the mean score for the experimental group in the post-test of flexibility was 9.28, and the control group had a mean of 6.71. The experimental group had a greater increase($D=3.18$) in mean scores from the pre-test to the post-test than the control group($D=-1.07$).

4. Effects of CPS instruction on originality

After four weeks' treatment, the results of ANCOVA to compare the difference between two groups of the post-test score with covariate of the pre-test score in originality are shown in Table 8.

Table 8 shows that the difference between two

Table 7. Results of ANCOVA for the post-test of flexibility

Source	Sum of Squares	DF	Mean Square	F
Covariate	266.13	1	266.13	54.29**
Group	242.48	1	242.48	49.47**
Error	382.33	78	4.90	
Total	781.95	80		

** $p<.01$

Table 8. Results of ANCOVA for the post-test of originality

Source	Sum of Squares	DF	Mean Square	F
Covariate	2263.80	1	2263.80	62.16**
Group	685.91	1	685.91	18.83**
Error	2840.78	78	36.42	
Total	5591.56	80		

** $p<.01$

groups of the post-test score with covariate of the pre-test score in originality was statistically significant [$F(1,80)=18.83, p<.01$]. As shown in Table 5, the mean score for the experimental group in the post-test of originality was 19.08, and the control group had a mean of 14.17. The experimental group had a greater increase($D=6.05$) in mean scores from the pre-test to the post-test than the control group($D=-0.27$).

5. Effects of CPS instruction on total creativity

After four weeks treatment, the results of ANCOVA to compare the difference between two groups of the post-test score with covariate of the pre-test score in total creativity are shown in Table 9.

Table 9 shows that the difference between two groups of the post-test score with covariate of the pre-test score in total creativity was statistically significant [$F(1,80)=41.51, p<.05$]. As shown in Table 5, the mean score for the experimental group in the post-test of total creativity was 43.03, and the control group had a mean of 33.37. The

Table 9. Results of ANCOVA for the post-test of total creativity

Source	Sum of Squares	DF	Mean Square	F
Covariate	5164.95	1	5164.95	77.72**
Group	2758.38	1	2758.38	41.51**
Error	5183.54	78	66.46	
Total	12237.51	80		

** $p<.01$

experimental group had a greater increase ($D=15.40$) in mean scores from the pre-test to the post-test than the control group ($D=2.96$).

VI. Discussion

This study investigated the possible effects of creative problem-solving instruction on the development of creativity in clothing education of the secondary school. To achieve the purpose, eighty-one 7th grade students were sampled as a target group of this study, and they were divided to an experimental group and a control group. After 4 weeks of treatment, the Creativity Test was administered to the experimental group and the control group for the pre-test and the post-test. The collected data were analyzed by ANCOVA to test research hypotheses.

The results of this study showed that the post-test scores of the experimental group significantly increased more than that of the control group in fluency, flexibility, originality, and total creativity.

It was concluded that the creative problem-solving instruction was very effective on the development of creativity in clothing education. This conclusion is supported by experts in the area of creative problem solving and/or creativity, who would agree that creative thinking skills could be taught.

Parnes (1981, 1992) and many other researchers (Elwell, 1993; Faux, 1992; Forsyth, 1990; Isaksen & Treffinger, 1985; Trainer, 1996) took Osborn's intuitive work and set out to validate, through research, the thesis that creative thinking skills could be stimulated through a teaching-learning process. He and others researched the myriad of ever changing theories, constructs, variables and factors that seemed to be associated with human creativity. As a result of his very significant

contributions to the study of human creativity, and his extension of Osborn's intuitive three-step process, which was known as the Osborn creative problem solving process evolved into the five-step Osborn-Parnes creative problem solving process. The process is recognized as a legitimate process model for teaching and learning creative problem solving.

The results of this study lead to some implications for educators concerning not only with clothing education, but with creative thinking and problem solving. That is, students need an opportunity to use the skills in creative problem-solving and/or creative thinking. The methods and results of this study present the guideline of application plan of CPS instruction to clothing education for secondary education as well as for elementary education.

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