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Analysis of Instruction Fostering Affective Creativity in Prospective Teachers in Natural Sciences and Engineering

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Abstract. This study aims to explore whether differences exist between a teacher's ability to foster affective creativity through their instruction and teaching of prospective secondary school teachers depending on their alma mater, major, student teacher's year of study and gender. According to research results, the ability to facilitate a affective creative class differs depending on teaching methods, the classroom environment, and class content could also be an influence depending on the content.

Keywords: Affective Creativity, Prospective Teachers, Instruction, Teaching Method, Teacher's ability

1 Introduction

One of the goals of education around the world, including South Korea, is to increase the student's creativity. Early studies proposed teachers with high affective creative capabilities had positive influences on fostering affective creativity in learners, placing focus on the affective creativity of the teacher. However, research since the 1990s places a greater emphasis on the teacher's ability to foster student's creativity through teaching skills and techniques. In other words, research (Csikszentmihlyi, 2000[1]; Halliwell, 1993[2]; Soh, 2000[3]; Wood, 1990[4]) advising the teacher's ability to encourage creativity in a classroom environment by teaching methods that stimulate creativity became the prevailing opinion.

For teachers to teach affective creativity, it is important that the teacher has appropriate plans or strategies for teaching, as well as appropriate training. Jeong Beom Mo (2001: 6-7)[5] asserts teachers need to be dedicated to learning during their years of training for a teacher to conduct a creative class. Therefore, this study aims to explore whether differences exist in a teacher's ability to foster affective creativity of prospective secondary school teachers of natural sciences and engineering depending on their alma mater, major, student's year of study and gender. This study also aims to offer plans for teacher training schemes to improve the quality of their teaching to foster affective creativity.

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2 Research Methodology and Content

2.1 Research Target and Methodology

A total of 75 prospective natural sciences and engineering middle school teachers enrolled in 'Teaching Practices' and 'Teaching Methods and Engineering' classes in the second semester of 2013 were selected for the sample target of this study. 47 students were enrolled in University D located in Seoul, and 28 students were enrolled at University K situated in Gyeonggi-do.

2.2 Research Tools

To measure the student teachers' ability to foster creativity through their instruction, this study uses the tools and criteria developed by Ji Eun Choi and Jin Young Im (2010)[6] to measure middle school teacher behavior. This tool is comprised of 45 questions and each question has two main variables: affective and cognitive variables, and each main variable is comprised of three sub-variables. Each question has six possible responses varying from "strongly agree" to "strongly disagree". Based on the measured results, these five principal components can explain 78.17% of the total variation. The Cronbach α was calculated to check the reliability of the extracted factors, and the results are presented in Table 1.

Table 1. Factor analysis of results and reliability of measurement criteria for student teachers' ability to foster creativity

Criteria	Question Number	Reliability (Cronbach's α)	
Support in openness (11 questions 66 points)	5, 6, 37, 38, 39, 40, 41, 42, 43, 44, 45	.891	.879
Support for assignment completion and focus (3 questions 18 points)	4, 23, 28	.755	
Support in motivation (3 questions 18 points)	7, 31, 34	.693	
Support for general knowledge and thinking (3 questions 18 points)	3, 10, 21	.706	.766
Support for divergent thinking (3 questions 18 points)	3, 7, 30	.672	
Total	23 questions 138 points		.895

3 Research Results

3.1 Affective Variables in the Ability to Foster Creativity in Prospective Teachers of Natural Sciences and Engineering

Affective factors in the ability to foster creativity through their instruction and teaching in prospective natural sciences and engineering teachers' depending on their university, major, year of study and gender were analyzed (See Table 2).

Table 2. Analysis of Differences in Affective Creative Instruction

		N	Affective Levels in Creative Instruction							
			Support in openness		Support for assignment completion		Support in motivation		TOTAL	
			M(SD)	F	M(SD)	F	M(SD)	F	M(SD)	F
University	D	47	37.16 (10.11)	.20	10.16 (2.61)	.19	8.64 (2.48)	1.59	55.97 (12.57)	.51
	K	*28*	35.50 (5.53)		9.75 (1.75)		7.50 (1.60)		52.75 (2.73)	
Major	Math	48	35.02 (8.53)	3.10	10.13 (2.55)	0.37	8.75 (2.36)	6.49 **	53.90 (10.60)	1.40
	Science	22	39.91 (11.97)		9.91 (2.78)		8.82 (2.26)		58.64 (15.41)	
	Computer	5	43.00 (0.0)		11.00 (0.0)		5.00 (0.0)		59.00 (0.0)	
Year	Sophomore	36	36.11 (8.49)	5.42 **	10.11 (2.08)	3.99 *	8.67 (1.94)	6.40 **	54.89 (8.50)	3.05
	Junior	29	35.03 (10.75)		9.48 (2.89)		9.14 (2.53)		53.66 (15.00)	
	Senior	10	45.80 (5.90)		12.00 (2.11)		6.20 (2.53)		64.00 (10.54)	
Gender	Male	47	37.23 (9.17)	0.08 1	9.72	3.19	9.09 (2.08)	7.43 **	56.04 (11.33)	0.15
	Female	28	36.57 (10.73)		10.79 (2.78)		7.57 (2.78)		54.93 (13.25)	

***p<.5, **p<.01, ***p<.001**

There are no significant differences in affective variables in the ability to foster creativity in prospective natural sciences and engineering teachers based on the variables of university attended, major studied, year of study or gender. However, significant differences can be seen in when examining affective sub-variables of creative instruction.

The sub-variables "support in openness" and "support for assignment completion and focus" was highest among seniors, "support in motivation" was highest among sophomores, and was high among male science majors in their junior year.

4 Conclusion

The conclusion for this study is as follows. The ability to foster affective creativity in student teachers may be influenced by teaching methods and the classroom environment. When examining the affective sub-variables of creative instruction, “supporting openness” and “Support for assignment completion and focus” is higher in senior student teachers than sophomore and junior student teachers. On the other hand, sophomore and junior student teachers scored higher “Support in motivation” than seniors. The reason for this because the primary focus is on practicum, hands-on training or internships in major related classes for seniors. In other words, project-based classes for student teachers increase the focus on assignments and the willingness to complete assignments. On the other hand, it can be seen that prolonged interest in ones major spurs on motivation in the junior years.

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