Antecedents Concerning Student's Identity and Role Performance in the Development and Promotion of Science and Technology Talents Project (DPST)

Pinyapan Roamchart[1], Assoc.Prof.Dr.Dusadee Yoelao, Dr.Somsak Seedakulrit
Behavioral Science Research Institute, Srinakharinwirot University Bangkok, Thailand

Abstract

The purposes of this study were 1) to develop linear structural relations among antecedents concerning student's identity and role performance in the development and promotion of science and technology talents project (DPST), 2) to examine co-interaction between interaction commitment and affective commitment for the explanation of identity salience, and 3) to compare identity salience and esteem between different periods of participating in the DPST project and they were studying in universities in Thailand. The study sample was 188 third-year and fourth-year science students in the DPST project. Instruments for collecting data were questionnaires. SPSS for window and LISREL program were used to analyze data. The results showed that linear structural relation model among antecedents concerning student's identity and role performance in the DPST project was fitted with the empirical data. Regarding interaction between interactional commitment and affective commitment, no interaction between these two variables was found. Finally, it was demonstrated that there were no significant differences in identity salience and esteem between different periods of participating in the DPST project.

Keywords : identity, role performance, interaction commitment, affective commitment, identity salience

Introduction

Science is important for the development in a country because it helps create technology and facilities to improve people's quality of life. Therefore, if people have more scientific knowledge, their country will be growth, be able to reduce dependence. From other countries and have competitive advantages especially economic competition. (Thongkwaw, 1999; Chewprecha, 1999; Office of the National Education Commission, 2000) The science and technology development of Thailand hasn't been success for because it is limited by lack of human force in science and technology field. (Ministry of Science and Technology, 1996: 8) The government recognized the problem. In1984, the Development and Promotion of Science and Technology Talents Project (DPST) was set to solve. The project's objectives were to produce persons who have science and technology talents to educate, research, explore and publish academics, including to gain 120 researchers and scientists per year who had science and technology talents in science fields to face lacking of human force and urgent need of Thailand.

Identity theory of Stryker explained that identity was the cognition about role and position in social relation of individual. Individual would behave role performance up to level of identity salience.

[1] Ph.D. Candidate (Applied Behavioral Science Research), Research Advisors: Assoc. Prof. Dusadee Yoelao, Ph.D., Somsak Seedakulrit, Ph.D.

Although, individual has many identities, the highest identity salience was possible to behave. (Stryker, 1987:95; 1992 : 873). Therefore, the problem of lacking science human force may be caused by improper development of science students' identity in the class. As it is expected, science student should behave in the role of a scientist in the future.

Review literature found that science students' identity was socialized by family consisting of love - oriented rearing, and the role model of parent affected their interest , attention and desire to be scientist (Wejchasart, 2004; Komsan, 2004; Uthit, 1996). Besides, socialization of education institutes was explained that if individual had interaction in professional socialization with referent person such as teachers and friends , it affected to professional identity of student. (Namfon, 1993). Role commitment affected to identity. (Seedagulrit, 2002) Identity affected to role commitment. (Stryker & Serpe, 1994; Seedagulrit, 2002) It shown that socialization by family and education institute and role commitment were the important factors that affected the identity and identity effected to role performance.

Therefore, this research wanted to explain what are the antecedents that concern science student's identity and role performance and to examine interaction between affective commitment for the explanation of identity salience. These objectives based on identity theory (Stryker, 1987: 98-100; Stryker & Serpe, 1994: 16-35) that declared that co-interaction between interaction commitment and affective commitment affected to identity salience. It meant that if both dimensions of role commitment was higher or lower, individual's identity salience also varied to higher or lower. However, some situations led individual who had affective commitment being positive and higher but interaction commitment being lower , had identity salience being lower. In addition, according to the Development and Promotion of Science and Technology Talents Project (DPST) accepted students to study in upper secondary school and undergraduate degree, I was interested in comparison identity salience and esteem between different periods of participating in the DPST project, when they were studying in upper secondary school and universities.

Research Objectives

1. to develop linear structural relations among antecedents concerning student's identity and role performance in the Development and promotion of science and technology talents project (DPST)
2. to examine co-interaction between interaction commitment and affective commitment for the explanation of identity salience
3. to compare identity salience and esteem between different periods of participating in the DPST project

Research Framework

The research framework of this study based on Stryker's identity theory and research literature.

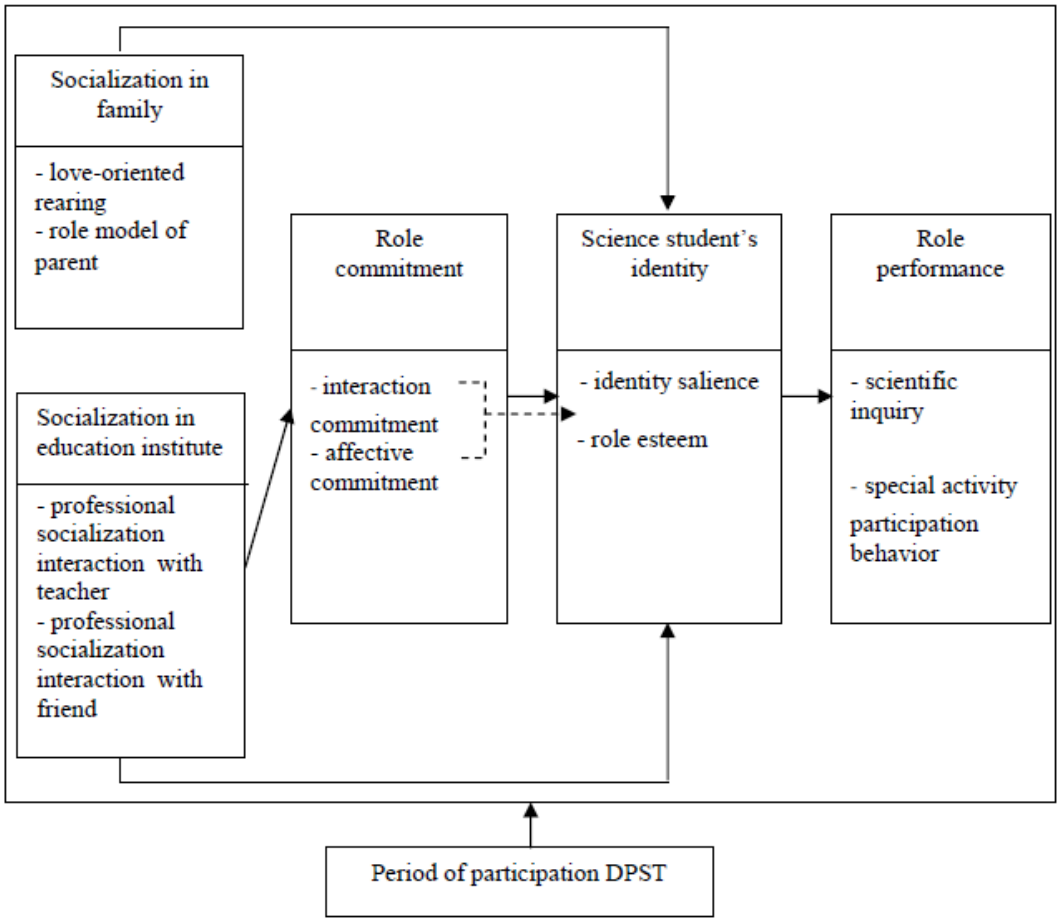

Figure 1 Research Framework

Research Hypothesis

1. Hypothesis Model was fitted with the empirical data. There are four sub hypothesis :

1.1 Socialization in family and education institute would directly effect to science student's role commitment.

1.2 Socialization in family and education institute would directly effect to science student's identity and would indirectly effect to science student's identity through science student's role commitment.

1.3 Science student's role commitment would directly effect to science student's identity and would indirectly effect to role performance through science student's identity.

1.4 Science student's identity would directly effect to role performance.

2. Co-interaction between interaction commitment and affective commitment would directly to identity salience.

3. DPST upper secondary science students' identity salience and esteem were different from DPST undergraduate students.

Research Method

Population

Population of this research were third-year and fourth-year science students of domestic universities in 2007 academy year participating the DPST project. There were 201 students.

Sampling

Sampling was the total population because it was suitable to analyze linear structural model according to rules of thumb identified that 10 subjects per variable or 20 subjects per variable. (Schumacker & Lomax, 2004: 49) This research might have 110 – 220 samplings. There were 188 collected samplings, 93 third-year and 95 fourth-year science students.

Instrument

Instrument for data collection was one questionnaire consisted of 10 parts : biosocial data and special activity participation behavior, love - oriented rearing, role model of parent , professional socialization interaction with teacher, professional socialization interaction with friend, interaction commitment , affective commitment, Science student's identity salience, esteem in Science student's role and scientific inquiry. Their discrimination were .2446 - .7334 and alpha coefficient were .8156 - .9104.

Data Collection

Researcher asked coordinator of DPST project in universities to collect data.

Data Analysis

Data were analyzed by Descriptive statistic , Two- way ANOVA, Hotelling's T^2 test and LISREL program for linear structural equation model.

Research Results

1. Results of the causal linear structural model of antecedents concerning identity and role performance

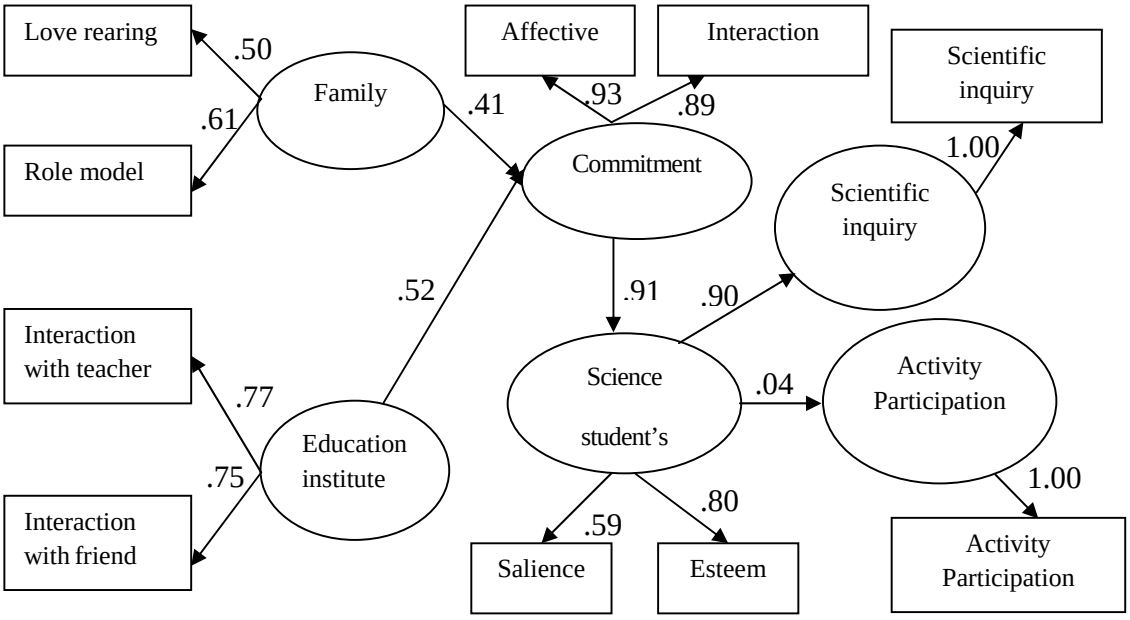

Figure 2 Modification causal model of Science student's identity and role

The results revealed that the proposed model was modified to fit the empirical data. (χ^2 = 20.61, df = 22 ,p = 0.54, GFI = 0.98, AGFI = 0.95, CN =358.94, RMSEA = 0.0, SRMR = 0.030)

1.1 The Socialization in education institute had the highest total effect to role commitment (coefficient = .52) and the next variable was socialization in family (coefficient = .41). Both variables had direct effect to role commitment (coefficient = .52, .41) and could predicted the variance of role commitment 74 percent.

1.2 Role commitment had the highest total effect to science student's Identity (coefficient = .91) and the next variable was socialization in education institute (coefficient = .47), socialization in family (coefficient = .38) . Role commitment had direct effect to science student's identity (coefficient = .91). Socialization in education institute had indirect effect to science student's identity through role commitment (coefficient = .47). Socialization in family had indirect effect to science student's identity through role commitment (coefficient = .38) They could predicted the variance of science student's identity 82 percent.

1.3 Science student's identity had the highest total effect to scientific inquiry (coefficient = .90) and the next variable was role commitment (coefficient = .81), socialization in education institute (coefficient = .42), socialization in family (coefficient = .34). Science student's identity had direct effect to science knowledge seeking behavior (coefficient = .90). Role commitment had indirect effect to scientific inquiry through science student's identity (coefficient = .81). Socialization in education institute had indirect effect to science knowledge seeking behavior through role commitment and science student's identity (coefficient = .42). socialization in family had indirect effect to scientific inquiry through role commitment and science student's identity (coefficient = .34). They could predicted the variance of scientific inquiry 44 percent. For special activity participation behavior, It was found that Socialization in education institute , socialization in family, role commitment and science student's identity had not direct and indirect effect to special activity participation behavior.

2. Results of Two- way ANOVA in science student's identity salience Test.

Table 1 Two- way ANOVA in science student's identity salience Test

Source	SS	df	MS	F
Interaction commitment	284.96	1	284.96	6.161*
Affective commitment	664.94	1	664.94	14.375***
interaction	34.79	1	34.79	.752
error	8511.00	184	46.26	
Total	10237.21	187		

As Shown in Table 1 :

2.1 Science student who had high interaction commitment , had science student's identity salience differentiate from science student who had low interaction commitment.

2.2 Science student who had high affective commitment, had science student's identity salience differentiate from science student who had low affective commitment.

2.3 There was no interaction between interaction commitment and affective commitment effecting to science student's identity salience.

3. Results of Hotelling's T^2 test in science student's identity salience and esteem in role test between different periods of participating in the DPST project.

Table 2 Multivariate and Univariate Analyses of Variance for science student's identity salience and esteem in role

Statistics	Multivariate	Univariate	
		science student's identity salience	esteem in role
F	.674	.534	.211
MS		29.301	12.034

Note: Multivariate F-ratios were generated from Wilks' Lambda.Multivariate df = 2, 185, Univariate df = 1, 186

As shown in table 2, There were no significant differences in identity salience and esteem between different periods of participating in the DPST project.

Discussion

The research results indicated that :

1. According to socialization in education institute and socialization in family had direct effect to science student's role commitment , it shown that socialization was important variable to role commitment. It also confirmed Stryker's identity theory that socialization led individual to increase commitment in relation with social network.

2. The research results was that socialization in education institute and socialization in family had indirect effect to science student's identity through role commitment. It partly supported in Hypothesis 1.2 and confirmed identity theory that identity salience was the result of role commitment that based on network of social relation. (Stryker, 1987: 98; 1992: 873-874; Stryker & Burke, 2000: 286) Therefore, socialization in education institute and family was social network to promote science students to play role and have science student's identity and finally they could choose science student's identity to interact with others in social network more than other identities. This result supported identity theory concerning indirect effect of socialization to identity through role commitment. Besides, the result found that socialization in education institute and socialization in family had no direct effect to science student's identity because past research such as research of Wejchasart. (2004) had objective to educate the process to be physicist. His research based on symbolic interaction theory and qualitative method. It was different from this research using quantitative method by linear structural model analysis. It was possible to reject hypothesis.

3. The result was that role commitment had direct effect to science student's identity and had indirect effect to role performance through science student's identity in science knowledge seeking behavior. It partly supported in Hypothesis 1.3. It followed to Stryker's identity theory explained that identity salience led to role performance. For identity salience, it was caused by role commitment which based on network of social relation. (Stryker, 1992: 873) In addition, role commitment had no indirect effect to special activity participation behavior through science student's identity because special activity participation behavior was

defined that frequent and duty of science student to participate in science academic conference, it was possible that some factors might cause such as structure and role were identified about science academic conference of arrangement committee and student was assigned to join including limitation in frequent of conference founded in students' area , location of conference and period of conference facilitating to join. Finally, the measurement of special activity participation behavior was different from past research measured the variable by asking about period and frequent of action while this research measured frequent and duty of science student to participate in science academic conference.

4. Science student's identity had direct effect to role performance in science knowledge seeking behavior. It confirmed Stryker's identity theory declared that role performance was caused by identity salience (Stryker, 1992: 873). For reason to explain why Science student's identity had no direct effect to special activity participation behavior, it was the same reason which were explained above.

5. The results shown that science student's identity salience did not vary on co-interaction between interaction commitment and affective commitment but varied on each variable. It did not support in hypothesis 2 and was consistent with research result of Banchong, (2008) found that teaching student's identity salience did not vary on co-interaction between both commitment but vary on each commitment.

6. There were no significant differences in identity salience and esteem between different periods of participating in the DPST project. It did not support in hypothesis 6. For the 62 upper secondary students and 126 undergraduate students, it shown that sampling of both groups were different, so it is possible to found no significant.

Suggestion

1. For DPST project and universities, science student's identity could be developed by activities that support students to participate with important agents such as family members , science teachers and friends. Activities were found to create positive affective , for example, it made students feel close and happy when they interacted with important agents. It created student's esteem in science student's role and teacher had good relation; care , encourage and listen to opinion , with students including to be scientist's role model.

2. For students, they had good relation with friends , for example, to help and encourage during study, exchange about science knowledge , attitude and experience , join together in science activities and be science's role model.

3. For parents, they should socialize , focus on love - oriented rearing and be knowledge seeking 's role model.

4. For research suggestion, researchers might educate the development and change by longitudinal study and repeated measurement in science student's identity of first-year to fourth-year science students to confirm Stryker's identity theory. Some variables was possible to effect to role performance, might be educated. Finally, measurement of special activity participation behavior variable should be improved.

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