

RELATIONSHIP BETWEEN COGNITIVE STYLE AND ACADEMIC ACHIEVEMENT OF PROSPECTIVE TEACHERS OF BIOLOGICAL SCIENCE

Research
Paper

ABSTRACT

The main objective of the study is to find out the significant relationship between cognitive style and academic achievement of prospective teachers of biological science. The survey method is adopted in this study. The sample consists of 500 prospective teachers of biological science studying in colleges of education in Tirunelveli, Kanyakumari and Thoothukudi districts affiliated to Tamil Nadu Teachers Education University, Chennai, India. The Cognitive Style Inventory (CSI) developed by Praveen Kumar Jha (2001) has been used for collection data; t' test, ANOVA and Pearson Product Moment Correlation are used for analyzing the data. It was found that biological science prospective teachers differ in their cognitive style and academic achievement. This study revealed that there was significant relationship between cognitive style and academic achievement of prospective teachers with reference to certain background variables.

INTRODUCTION

The growth and development of the mental abilities and capacities which helps an individual to adjust his behaviour to the ever changing environmental conditions is referred to as mental or cognitive development. The process of mental growth and development is responsible for the development of an individual's cognitive, mental or intellectual abilities like sensation, perception, imagination, memory, reasoning, understanding, intelligence, generalization, interpretation, language ability, conceptual ability, problem-solving ability and decision-making ability. These abilities are interrelated and interdependent. Cognition is a general term used to describe various aspects of higher mental processes like thinking, reasoning, decision making, memory and problem solving (Robert and Baron 2000). Cognitive style refers to information processing habits such as perceiving, thinking, remembering and problem solving (Goldstein and Black Man, 1978). In education, cognitive style refers to how the students acquire knowledge (cognition), how they process information (conceptualization) and how it is applied in problem solving. Therefore, it is meaningful to take the individual difference in cognitive style to explain the difference in the academic achievement of prospective teachers in the colleges of education.

REVIEW OF RELATED LITERATURE

The investigators have reviewed a good quantum of research findings related to the present investigation.

Abdul Gatoor K. and Lavanya K.P. (2008) studied Interaction of thinking styles and intelligence effect on science achievement. Aruna P.K. and Usha P. (2006) conducted a study on Influence of cognitive style, intelligence and class room climate on process outcome in science. Bagchi K. (2004) examined Scholastic achievement in life science in relation to cognitive style, social disadvantages and interest of secondary students in Tripura. Banergee and Debasri (2003) studied self concept and cognitive style of creative and non-creative students in Calcutta University. Bessick and Sherlynn (2008) conducted a study on Improvised critical thinking skills as a result of direct instruction and their relationship to academic achievement. The survey of related studies has revealed clearly that, not much work has been carried out on the relationship between cognitive style and academic achievement of prospective teachers of biological science.

SIGNIFICANCE OF THE STUDY

A prospective biology teacher is ever to be a learner and needs the cognitive style framed and formulated in his

M. Maria Saroja

Associate Professor,
St. Ignatius' College of Education,
Palayamkottai

Dr. A. Amalraj

Principal, Sri Sarada College of Education,
Tirunelveli

mental structure so as to update the skills required for creating the right milieu for learning and teaching. Cognitive style is discussed in relation to two different types, namely systematic style and intuitive style. Teaching and learning of biology becomes goal oriented and objective based, only when the systematic style operates in the learning process. Achievement in biology measured by acquisition of instructional objectives depends much on the systematic cognitive style. The intuitive style is the second type of cognitive style which comprises of instantaneous, quick and correct decision which is experienced based heuristic skill in solving problems. Unlike other subjects, biology is mastered by individuals not merely by learning it, but by relating oneself to it. Therefore, it is meaningful to investigate the relationship between cognitive style and academic achievement of prospective teachers of biological science.

OBJECTIVES OF THE STUDY

1. To find out the difference if any in cognitive style and its dimensions and the academic achievement of biological science prospective teachers with reference to background variables.
2. To find out the significant difference in the academic achievement of prospective teachers with reference to background variables.
3. To find out the significant relationship if any between cognitive style and its dimensions and the academic achievement of prospective teachers with reference to background variables.

HYPOTHESES OF THE STUDY

1. There is no significant difference in cognitive style and its dimensions of biological science prospective teachers with reference to background variables.
2. There is no significant difference in the academic achievement of prospective teachers with reference to background variables.
3. There is no significant relationship between cognitive style and its dimensions and academic achievement of prospective teachers with reference to background variables.

POPULATION OF THE STUDY

The population includes biological science prospective teachers of Kanyakumari, Tirunelveli and Tuticorin Districts.

SAMPLE

The investigator has used the simple random sampling technique and randomly selected 500 prospective teachers from Kanyakumari, Tirunelveli and Thoothukudi Districts.

TOOLS

1. Cognitive Style Inventory developed and validated by Praveen Kumar Jha (2001)
2. Academic achievement test in biological science constructed and validated by the investigator.

STATISTICAL TECHNIQUES USED

Mean, Standard Deviation, 't' test and correlation were used to analyze the data.

ANALYSIS OF DATA

Null hypothesis 1 : There is no significant difference in cognitive style and its dimensions of biological science prospective teachers in terms of background variables.

Table 1

DIFFERENCE IN COGNITIVE STYLE OF BIOLOGICAL SCIENCE PROSPECTIVE TEACHERS IN TERMS OF BACKGROUND VARIABLES

Dimen- sions	Variables	Categ- ories	N	Mean	SD	Calc ulate	Table Value	Rema rk
Systematic style	Gender	Male	117	77.22	10.26	0.8	1.96	NS
		Female	383	78.08	9.73			
	Educational Qualification	UG	189	76.26	9.48	2.93		S
		PG	311	78.87	9.96			
	Nature of College	Women	100	75.38	10.12	2.79		S
		Co-Ed.	400	78.51	9.7			
Internet Usage	Yes	122	76.74	10.19	1.44	NS		
	No	378	78.25	9.73				
Intuitive style	Gender	Male	117	76.4	9.87	0.52	1.96	NS
		Female	383	76.45	10.46			
	Educational Qualification	UG	189	75.08	11.05	2.23		S
		PG	311	77.26	9.77			
	Nature of College	Women	100	72.44	9.9	4.5		S
		Co-Ed.	400	77.44	10.18			
Internet Usage	Yes	122	73.99	9.36	3.23	S		
	No	378	77.23	10.49				
Cognitive style	Gender	Male	117	153.62	15.64	0.55	1.96	NS
		Female	383	154.54	16.16			
	Educational Qualification	UG	189	151.34	16.73	3.2		S
		PG	311	156.13	15.33			
	Nature of College	Women	100	147.82	16.63	4.43		S
		Co-Ed.	400	155.95	15.47			
Internet Usage	Yes	122	150.72	16.17	2.84	S		
	No	378	155.48	15.83				

It is inferred from table 1 that, there is no significant difference between male and female prospective teachers in their systematic, intuitive and cognitive style, whereas results show significant difference between UG & PG biological science prospective teachers in their systematic, intuitive and cognitive style. There is significant difference between women and coeducation college biological science prospective teachers in their systematic, intuitive and cognitive style. Further, there is no significant difference in systematic style of biological science prospective teachers using internet and those not using internet; however there exists significant difference in their intuitive and cognitive style.

Null hypothesis 2: There is no significant difference in the academic achievement of biological science prospective teachers in terms of background variables.

Table 2

DIFFERENCE IN ACADEMIC ACHIEVEMENT OF BIOLOGICAL SCIENCE PROSPECTIVE TEACHERS IN TERMS OF BACKGROUND VARIABLES

Sl. No.	Variables	Categories	N	Mean	SD	Calculated 't' Value	Table Value	Remark	
1	Gender	Male	117	36.5385	4.91574	0.91	1.96	NS	
		Fem	383	36.0444	5.74644				
2	Educational Qualification	UG	189	35.4709	6.95697	1.96		1.96	S
		PG	311	36.5788	4.47063				
3	Nature of College	Wo	100	36.38	6.77008	0.38	1.96		NS
		Co-Ed	400	36.105	5.22563				
4	Internet Usage	Yes	122	35.7049	6.25847	0.96		1.96	NS
		No	378	36.3069	5.32				

It is inferred from table 2 that there is no significant difference between male and female, women and coeducation college and internet using and not using prospective teachers in their academic achievement. Whereas significant difference is observed between UG and PG biological science prospective teachers.

Null hypothesis 3: There is no significant relationship between cognitive style and its dimensions and academic achievement of biological science prospective teachers in terms of background variables.

Table 3

RELATIONSHIP BETWEEN COGNITIVE STYLE & ITS DIMENSION AND ACADEMIC ACHIEVEMENT OF PROSPECTIVE TEACHERS IN TERMS OF BACKGROUND VARIABLE

Sl.No.	Variables	Categories	N	Calculated 't' Value	Table Value	Remark
Systematic style	Gender	Male	117	0.144	0.195	NS
		Female	383	0.182	0.098	S
	Educational Qualification	UG	189	0.241	0.138	S
		PG	311	0.099	0.113	NS
	Nature of College	Women	100	0.296	0.195	S
		Co-Education	400	0.136	0.098	S
Day to day internet user	Yes	122	0.134	0.174	NS	
	No	378	0.184	0.098	S	
Intuitive style	Gender	Male	117	-0.097	0.195	NS
		Female	383	0.137	0.098	S
	Educational Qualification	UG	189	0.031	0.138	NS
		PG	311	0.138	0.113	S
	Nature of College	Women	100	0.204	0.195	S
		Co-Education	400	0.06	0.098	NS
Day to day internet user	Yes	122	0.009	0.174	NS	
	No	378	0.112	0.098	S	
Cognitive style	Gender	Male	117	0.033	0.195	NS
		Female	383	0.199	0.098	S
	Educational Qualification	UG	189	0.157	0.138	S
		PG	311	0.152	0.113	S
	Nature of College	Women	100	0.302	0.195	S
		Co-Education	400	0.12	0.098	S
Day to day internet user	Yes	122	0.09	0.174	NS	
	No	378	0.187	0.098	S	

It is inferred from table 3 that there is significant relationship between systematic style and academic achievement, intuitive style and academic achievement and cognitive style and academic achievement of female biological science prospective teachers. The analysis shows significant relationship between systematic style and academic achievement of UG prospective teachers; intuitive style and academic achievement of PG prospective teachers and cognitive style and academic achievement of both UG and PG prospective teachers. Further, it is observed that significant relationship exists between

systematic style and academic achievement and cognitive style and academic achievement of women and coeducation college prospective teachers; intuitive style and academic achievement of women college prospective teachers; and between systematic style and academic achievement, intuitive style and academic achievement and cognitive style and academic achievement of prospective teachers not using internet.

FINDINGS AND DISCUSSION

Significant relationship between systematic style and academic achievement; intuitive style and academic achievement and cognitive style and academic achievement of female prospective teachers indicates that, women generally have less exposure to external influences that tend to distract their thought process. They are able to channelize their mental process, thinking ability, learning style and retention of learning on academic achievement. The result is justified that there is significant correlation between systematic style and academic achievement of women prospective teachers. With respect to intuitive style, women prospective teachers apply their quick decision making pattern and problem solving ability in coping with the theory aspects of the B.Ed. curriculum and hence their academic achievement is significantly influenced by their intuitive style.

The prospective teachers with UG degree have their academic achievement significantly influenced by their cognitive style and systematic style. UG prospective teachers have less theoretical basis and practical skills related to biology than PG prospective teachers. They find it imperative to adopt step by step procedure and decision making style in forming their learning habit and coping with the prescribed syllabus. Their systematic style places a significant role in their academic achievement. Whereas the prospective teachers with PG degree have deeper knowledge in their subjects and more skill in practical application as intuitive style influences their academic achievement.

The academic achievement of prospective teachers of women colleges is significantly influenced by cognitive style as a whole and its dimensions, systematic and intuitive style. Women are equipped with deeper intuition, wider practice of tackling problems in their own systematic way

and at the same time quick decision making skills, deeper involvement in performing their responsibilities and affective impulse in approaching new situations. All these qualities specific to women prospective teachers influence significantly their tackling the curriculum and practical aspects prescribed for the B.Ed course and hence, their academic achievement is significantly influenced by cognitive style and its dimensions.

Prospective teachers, who are not depending upon internet facilities rely on their own thought process, apply their own problem solving skills (either systematic or intuitive) decision making skills and cope with the prescribed curriculum. It is valid that their academic achievement is significantly influenced by their cognitive style, systematic style and intuitive style.

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