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SCIENCE TEACHERS' INFORMATION PROCESSING BEHAVIOURS IN NEPAL: A REFLECTIVE COMPARATIVE STUDY

Abstract: This study examines the investigation of the information processing behaviours of secondary level science teachers. It is based on the data collected from 50 secondary level school science teachers working in Kathmandy valley. The simple random sampling and the Cognitive Style Inventory have been used respectively as the technique and tool to collect the data. The results indicate that the secondary level science teachers possess three types of information processing behaviours, namely, split cognitive style, undifferentiated cognitive style and integrated cognitive style. It has also been found that there exists a difference in cognitive behaviours of science teachers based on the variation in their type of schools while there is no significant difference in information processing behaviours based on type the of activities, qualification, instructional method used and their castes.

Key Words: Information processing, Science teachers, Learning strategies.

Introduction

Information processing is a term used in cognitive psychology to describe the way to think, perceive and remember the information of science content and pedagogical strategies. Cognition is a regular process of thinking in day-to-day human life. It is the basic process that helps human beings conduct their lives. Information processing is a universal process that occurs in human beings. However, it also varies from person to person. Therefore, it is construed as ways of cognition and is psychologically known as cognitive style. Perception is the first component process of information processing. Perception takes place through senses. Information processing takes place by means of perceptual matching with previous information available in the memory. It is a type of learning style that refers to an individuals' characteristics, and a preferred way of gathering, interpreting, organizing and thinking about information (Wang, 2008: 30).

According to Cornett (2005), cognitive style is a predictable pattern of behaviour within a range of individual variability. In this context, Messick (2001) adds that information processing style deals with the manner in which people prefer to make sense out of their world by

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collecting, analyzing, evaluating, and interpreting data. Paivio (1971) indicated that cognitive style assesses whether an individual tends to think in verbal terms, using the sequential processing of information, or in visual terms, using parallel processing. The information processing style has to be considered as a holistic process of cognition that begins with perception, and mediated by analyzing, and the resultant retrieval; it varies from person to person and it is affected by various personality factors, such as, previous information, heredity and environment, interest, thinking, attitude, value system, intelligence, creativity, social and economic status, etc. (Srinivas, 2011). Learning strategies in science do not operate by themselves, but rather are directly linked to the learner's innate learning behaviours and other personality related factors (Li, 2006: 68). This study aims at comparing the science teachers' information behaviours at the schools of Nepal.

Objectives

The objectives of this study are:

- to find out the information processing behaviours of the secondary school science teachers;
- to explore the nature of cognitive behaviours available among the secondary level science teachers;
- to compare the cognitive behaviours of science teachers in terms of their instructional activities, qualification, type of activities, type of school, techniques of their institutions and caste.

Materials and Methods

This study used the survey method to explore and investigate the school science teachers' information behaviours in order to analyse the information processing behaviours that exist among the secondary level science teachers in Nepal and also to find out the levels of job satisfaction among them. The science teachers who are teaching in the secondary schools in Kathmandu Valley are regarded as the population of the study and a sample of 50 science teachers working in secondary schools located in Kathmandu Valley have been selected by means of the simple random sampling technique.

For the purpose of the investigation of the research topic, the Cognitive Behaviours Inventory (CSI) has been used. CSI is used to find out the types of cognitive behaviours based on the information processing criteria. It is an inventory of the ways of thinking, judging, remembering, storing information, decision making, and believing in interpersonal relationships. The CSI comprises 40 statements from which 20 statements are related to the systematic style and the other 20 statements to the intuitive style and are to be responded on the five-point Likert scale i.e., strongly agree, agree, undecided, disagree and strongly disagree which better enables the assessment of the five-behaviour information processing, namely, systematic style, intuitive style, integrated style, undifferentiated style, and split style.

Analysis of the Data

The collected data were analysed using the SPSS programme that shows the following:

Chi-square test value for the information processing behaviours among the science teachers (N=50) due to the variation in their instructional activities

Activities	N	Systematic style	Intuitive style	Integrated style	Undifferentiated style	Split style	Chi-square test value
Hands-on	25	4	2	03	9	16	
		(5)	(2)	(5)	(9)	(15)	2.235@
Minds-on	25	3	2	7	9	14	
		(4)	(2)	(5)	(9)	(15)	

The table value is 9.48 at 0.05 level for df= 4 @ not significant

As the data indicate there is no any significant difference in the types of cognitive style among the secondary level science teachers due to variation in their instructional activities. The calculated Chi-square test value (2.235) is less than the table value (9.48) at 0.05 level. It shows that there is no significant difference between cognitive behaviours among the secondary school science teachers due to variation in their type of instructional strategies.

Chi-square test value for the information processing behaviours among science teachers (N=50) due to variation in their qualification

Qualification	N	Systematic style	Intuitive style	Integrated style	Undifferentiated style	Split style	Chi-square test value
B.Ed.	25	6	3	05	20	11	
		(5.14)	(2.57)	(6.4)	(19.28)	(11.57)	1.63@
B.Sc.	25	2	1	5	20	7	
		(2.85)	(1.42)	(3.57)	(10.71)	(6.42)	

The table value is 9.48 at 0.05 level for df = 4@ not significant at qualification

Similarly, as the analysis reveals, there is no any significant difference in the types of cognitive style among the secondary level school science teachers' variation in their academic qualification.

The calculated Chi-square test value (1.63) is less than the table value (9.48) at 0.05 level and, therefore, the null hypothesis is accepted. There is no significant difference between the cognitive behaviours among the secondary school science teachers caused by their varying academic qualifications.

Chi-square test value for the information processing behaviours among science teachers (N=50) due to variation in their method of instruction

Method used	N	Systematic style	Intuitive style	Integrate Style	Undifferentiated style	Split style	Chi-square test value
Lecture	5 9	7 (6.74)	4 (3.37)	08 (8.42)	13 (15.17)	27 (25.8)	3.82@
Student centered	1 1	1 (1.25)	0 (0.62)	02 (1.57)	5 (2.85)	3 (4.71)	

The table value is 9.48 at 0.05 level for df = 4 @ not significant

The calculated chi-square value (3.82) is less than the table value (9.48) at 0.05 levels and as a result the null hypothesis is accepted. There is no significant difference between cognitive behaviours of the secondary level school science teachers due to variation in their method of teaching.

Chi-square test value for the information processing behaviours among science teachers (N=50) due to variation in their type of school

Type of school	N	Systematic style	Intuitive style	Integrated style	Undifferentiated style	Split style	Chi-square test value
Public	25	2 (3.88)	3 (1.94)	7 (4.85)	10 (8.74)	12 (14)	9.82@
Private	25	6 (4.11)	1 (2.05)	3 (5.14)	8 (9.25)	18 (15)	

The table value 9.48 at 0.05 level for df=4 @ significant

There is significant difference in the types of cognitive behaviours among the secondary school science teachers variation in their type of school i.e., public and private. The calculated Chi-square test value (9.82) is more than the table value (9.48) at 0.05 level and as a result the null hypothesis is accepted. There is significant difference between cognitive behaviours among the secondary school science teachers due to variation in their type of school i.e., public and private.

Chi-square test value for the information processing behaviours among science teachers (N=50) due to variation in their caste

Caste	N	Systematic Style	Intuitive style	Integrated style	Undifferentiated style	Split style	Chi-quare test value
Brahmin	25	5 (3.42)	1 (1.71)	3 (4.28)	5 (7.71)	16 (12)	5.45@
Non-brahmin	25	3 (4.57)	3 (2.28)	7 (5.71)	13 (10.2)	14 (17)	

The table value is 9.48 at 0.05 level for df = 4 @ not significant

There may not be any significant difference in the types of cognitive style among the secondary level school science teachers variation according to their caste. The calculated Chi-square test value (5.45) is less than the table (9.48) at 0.05 levels. It indicates that the null hypothesis is accepted. There is no significant difference between cognitive behaviours among the secondary level school science teachers due to the variation in their caste.

Result and Discussion

The result is based on the information processing criteria on cognitive behaviours in teaching and learning science of the secondary level science teachers. It has been found that a majority (18 out of 50 or 36%) of them possess the Split Cognitive Style (SCS). The result of Undifferentiated Cognitive Style (UCS) is (14 out of 50 or 28%), and the Integrated Cognitive Style (ICS) is (10 out of 50 or 20%). Interestingly, a minor chunk of them (5 out of 50 or 10%) have Systematic Cognitive Style (SCS) and only a small portion of the teachers (4 out of 50 or 8%) have been found to fall under Intuitive Cognitive Style (ICS). Further, the following results have been obtained in respect of cognitive behaviours, namely, Systematic Style, Intuitive Style, Integrated Style, Un-differentiated Style, and Split Style, due to the variations in their instructional activities, qualification, method of instruction, types of school (public or private) and their cases. The Chi-square test has been used for testing the hypotheses set for the investigation. The calculated Chi-square test value (2.235) is less than the table value (9.48) at 0.05 level of significance and hence, the null-hypotheses are accepted. There is no significant difference between cognitive behaviours among the secondary level science teachers due to the variations in their instructional activities.

Conclusion

It is dramatic that a very minor number of the science teachers tend to demonstrate the systematic and intuitive behaviours during teaching and learning science in the schools of Nepal. Conceptually, the split cognitive style is a combination of the intuitive style and the systematic style. This characteristic feature points towards their ability to perceive and operate in a context-based manner either systematically or intuitively. The second large segment of the sample of science teachers has been found to fall under the category of undifferentiated cognitive style, which is an unusual dimension among them. Because a person with such a style appears not to differentiate between the two style extremes, that is, systematic and intuitive, and therefore, appears not to display a style. In a problem-solving situation, he/she looks for instructions or guidelines from outside sources. Undifferentiated individuals tend to be withdrawn, passive and reflective and often look to others for problem solving strategies. Probably, such a result appeared because of some other significant factors like their thought processes, interests, value-system, attitudes, social and economic statuses, inhibitions, etc., which have a bearing on the cognitive style of an individual. The results further indicate that the third major portion of the secondary level school science teachers possess the integrated cognitive style. It is indicative of their ability to change the behaviours very rapidly between systematic and intuitive and to use them in an integrated manner as is required in a situation. It is also an indicator of their problem seeking and problem-solving ability. The remaining minority of them are seen to possess two cognitive behaviours: systematic and intuitive, which is again unusual. It shows that the information processing behaviours of the school science teachers in Nepal is surprisingly interesting during teaching and learning science in the theory and practical classes.

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