

Cognitive Styles of Rural Senior Secondary School Students in Relation to their Gender and Stream

Dr. Parkash Chandra Jena,
Lovely School of Education,
Lovely Professional University, Punjab (India)
drpcjena@gmail.com

Abstract: The present study is descriptive in nature and survey method has been used. The investigator has taken 300 rural senior secondary school students from Pulwama and Anantnag district of Jammu and Kashmir as sample by using simple random sampling technique. For collection of data the investigator have been used Cognitive Style Inventory (CSI) constructed and standardized by Praveen Kumar Jha in 2001. For result analysis the investigator has used t-test and Analysis of Variance (one-way). The finding of the study revealed that the group difference between male and female undergraduate students on systematic cognitive style as well as on intuitive cognitive style is found to be insignificant.

Keywords: Cognitive Style, Systematic style, Intuitive style, Rural Senior School Students

I. Introduction

Cognition is an act or process of knowing and a collection of mental processes that includes awareness, perception, reasoning, and judgment. The study of cognitive processes has its roots in the Gestalt psychology of Wertheimer, Kohler, and Koffka and in the studies of cognitive development in children by Piaget during the 19th century. At the beginning of the 20th century, it was considered that personality is comprised of three facets each with a continuum descriptor. The first facet, attitude, can range from extraversion, those personalities that are outgoing, to introversion, those personalities that are focused inward. The second facet, perception, deals with a person's method of understanding stimuli; an intuitive person is meaning-oriented while a sensory person is detail-oriented. Judgment is the final facet of personality and deals with a person's approach to making decisions; a thinking person tends to be analytical and logical while a feeling person tends to judge based on values. Curry (1983) regards cognitive style as the individual's approach to adapting and assimilating information, which does not interact directly with the environment, but is an underlying and relatively permanent personality dimension that is observed across many learning instances. Cognitive style is considered here as static, relatively in-built, and fairly fixed characteristic of an individual. Individuals may vary their learning strategy or approach to learning as required, but the underlying cognitive style will remain fairly constant.

Cognitive style is an aspect of overall personality and cognitive processes. It is a bridge between cognition or intelligence measures and personality measures (Grigorenko & Sternberg, 1997; Cheema & Ridding, 1991). Cognitive styles are constructs developed to describe perceptual traits of individuals, have their origins in studies of human cognition in the differential perspective (Lemes, 1988). Learning style is sometimes synonymous with cognitive style (Pask, 1976). However, various authors draw a distinction between cognitive and learning style. Learning styles refer to ways that people learn information, and cognitive styles are more global, referring to the way that people see the world around them and interact with it. Learning style is a preferred strategy, thereby implying that a person's learning style can change, while cognitive style is an immutable characteristic of personality (Cheema & Ridding, 1991; Curry, 1983).

II. Characteristics of cognitive style

Kolb (1984) has given converger, diverger, assimilator and accommodator cognitive styles. Their characteristics are described as:

1) Converger: The convergent style depends mainly on the dominant learning capacities of active experimentation and abstract conceptualization. This style has great advantages in decision making, problem solving, traditional intelligence tests, and practical applications of theories. Knowledge is organized in a way of hypothetical-deductive reasoning. Therefore, persons with this style are superior in technical tasks and problems and inferior in social and interpersonal matters.

2) Diverger: The divergent cognitive style has the opposite learning advantages over converger. This style depends mainly on concrete experience and reflective observation. It has great advantages in imaginative abilities and awareness of meaning and values. Therefore, persons with this style tend to organize concrete situations from different perspectives and to structure their relationships into a meaningful whole; they focus on adaptation by observation instead of by action; they are superior in generating alternative hypothesis and ideas, and tend to be imaginative people or feeling-oriented; they tend to choose to specialize in liberal arts and humanities.

3) Assimilator: The assimilative style depends mainly on abstract conceptualization and reflective observation. This style has great advantages in inductive reasoning, creating theoretical models, and assimilating different observations into an integrative entity. Similar to converger, persons with this style tend to be more concerned about abstract concepts and ideas, and less concerned about people. However, persons with this style tend to focus more on the logical soundness and preciseness of the ideas, rather than their practical values; they tend to choose to work in research and planning units.

4) Accommodator: The accommodative style has the opposite learning advantages over assimilation. This style depends mainly on active experimentation and concrete experience. It has great advantages in doing things, implementing plans, and engaging in new tasks. Therefore, persons with this style focus on risk taking, opportunity seeking, and action. They tend to be superior in adapting themselves to changing immediate solutions in which the plan or theory does not fit the facts. They also tend to intuitively solve problems in a trial- and –error manner, depending mainly on other people for information rather than on their own thinking. Therefore, persons with this style tend to deal with people easily. They tend to specialize in action-oriented jobs, such as marketing and sales.

III. Dimensions of cognitive style

Systematic style

An individual identified as having a systematic style is one who rates high on the systematic scale and low on the intuitive scale. The systematic style is associated with logical, rational behaviour that uses a well-defined step-by-step approach to thinking, learning, and overall plan for problem solving.

Intuitive style

An individual who rates low on the systematic scale and high on the intuitive scale is described as having an intuitive style. Someone, whose style is intuitive, uses an unpredictable ordering of analytical steps when solving a problem, relies on experience patterns, and explores and abandons alternatives quickly.

Integrated style

A person with an integrated style rates high on both scales and is able to change styles quickly and easily. Such style changes seem to be unconscious and take place in a matter of seconds. In fact, integrated

people are often referred to as problem seekers because they consistently attempt to identify potential problems as well as opportunities in order to find better ways of doing things.

Undifferentiated style

An individual rating low on both the systematic and the intuitive scale is described as having undifferentiated cognitive behavior. Such a person appears not to distinguish or differentiate between the two style extremes; i.e.; systematic and intuitive and, therefore, appears not to display a style. In fact, in a problem-solving or learning situation, he or she may exhibit receptivity to instructions or guidelines from outside sources. Undifferentiated individuals tend to be withdrawn, passive, and reflective and often look to others for problem-solving strategies.

Split style

An individual rating in the middle range on both the systematic and the intuitive scale is considered to have a split style involving fairly equal (average) degrees of systematic and intuitive specialization. However, people with a split style do not possess an integrated behavioral response; instead, they exhibit each separate dimension in completely different settings; using only one style at a time based on the nature of their tasks or their work groups. In other words, they consciously respond to problem-solving and learning situations by selecting appropriate style.

IV. Review of related literatures

Dwyer and Moore (1995) investigated the effect of cognitive style on student's achievement and found that the field independent learners to be superior than field dependent learners on tests measuring different educational objectives.

Tinajero and Paramo (1997) investigated the relationship between cognitive styles and student achievement in several subject domains (English, mathematics, natural science, social science, Spanish, and Galician) and asserted that cognitive style was a significant source of variation in overall performance of students. That is, field independent subjects outperformed their field dependent counterparts.

Murphy, Casey, Day, & Young (1997) conducted a study to find out relationship between academic achievement and cognitive style in information management program and found that field independent students performed better than field dependent subjects only on one of the technical courses. For the other three courses the two groups performed similarly.

Grimley & Riding (1999) explored the relationship between cognitive style and performance and gender. They found gender effect when they compared performance between the three formats of the lesson: pictures plus sound (PS), pictures plus text (PT), and pictures plus sound plus text (PTS). For PS and PT condition, males perform better with the PS version than with the PT version and females performed better with the PT version. However performance was the best for all gender groups when lesson was presented with PTS version.

Tanova (2002) conducted a study on cognitive styles and learning preferences of undergraduate business students. Findings indicated that students with analytical cognitive styles were more likely to prefer teacher-dependent and collaborative learning settings. Furthermore, students who had completed more credits towards the completion of their degrees had a higher mean score.

Riding et al (2003) explored that both working memory capacity and cognitive style have independently been found to affect performance on school type tasks, but their effects on interactions have not been considered. The aim of the study was to find out effect of working memory capacity, cognitive styles and

gender differences on overall learning behavior and performance on a range of school subjects. It was found that for overall learning behavior, there was an interaction between working memory capacity and cognitive styles. With the holistic-analytic style dimension, memory made a remarked difference from analytics but had little effect for holistic and with the verbal imagery dimension, verbalizes were affected but not imagers. With the school subjects, these differed in terms of their sensitivity to gender memory and style.

Alomyan (2004) conducted a study with undergraduate university students to investigate the effect of students' cognitive styles, achievement motivation, prior knowledge, and attitudes on achievement in a web based environment and found that no differences between students' attitudes towards web-based learning and their field dependencies.

Peterson, Deary and Austin (2005) explored the question of whether intelligence is related to cognitive style and concluded that both intelligence and cognitive style will affect performance on a given task. The difference is that as intelligence increases, so does performance, while style exerts either a positive or negative effect depending on the nature of the task.

Scott et al. (2007) investigated the role of negative cognitive style in predicting the occurrence of negative life events. Results showed that the individuals with negative cognitive styles generated more negative life events (dependent events and interpersonal events, but not more independent or achievement-related events) than individuals with more positive cognitive styles. These results appear to be unique to women.

Friedel et. al. (2009) conducted study to determine if the dissimilarity of cognitive style between the instructor and the student was related to student engagement in nine undergraduate classes. Findings indicated that dissimilarity of cognitive style between course instructor and student had little or no relationship with student engagement in these nine classes. However, it may be that these students were exhibiting enough coping behavior to overcome the cognitive-style gap because they were motivated to learn.

Significance of the study

Cognitive style refers to the preferred way individual processes information. It describes a person's typical mode of thinking, remembering or problem solving. Cognition is considered as part of conscious perceiving, learning and thinking by cognitive psychologists. There are different cognitive learning styles for each person. Each of us has our own styles of learning and thinking. Knowledge of these similarities and differences is crucial in education. While accepting that students will interact with, and deal with, curricular learning experiences in their own individual manner, curriculum is often based upon understanding of the shared elements of the learning processes. One important strategy is to address the instructional implications for cognitive learning styles. So the study may provide some information for curriculum designers and classroom teachers in order to utilize relevant approaches to enhance meaningful and effective learning. The present study is an attempt to find out the differences in cognitive styles of rural senior secondary school students and such type of study has not been conducted in Jammu and Kashmir focusing on rural students. Moreover the study would be helpful for people like school administrators, policy makers and teachers for designing their teaching styles which would help in maximizing students learning and students in particular, to know how they can adjust themselves in today's competitive society as well as.

V. Objective of the study

To study the difference in cognitive style of rural secondary school students with respect to their gender and stream

Hypotheses

- There exists a significant difference in cognitive styles of male and female rural senior secondary school students
- There exists a significant difference in cognitive styles of the rural senior secondary school arts students
- There exists a significant difference in cognitive styles of the rural senior secondary school science students
- There exists a significant difference in cognitive styles of the rural senior secondary school commerce students

VI. Methodology

The present study is descriptive in nature and survey method has been used. All rural senior secondary school students of Pulwama and Anantnag districts of Jammu and Kashmir constitute the population for the present investigation. The investigator has taken 300 rural senior secondary school students as sample by using simple random sampling technique.

Tools Used

For collection of data the investigator have been used Cognitive Style Inventory (CSI) constructed and standardized by Praveen Kumar Jha in 2001.

Statistical Techniques Used

For the statistical treatment of data the investigator has used t-test and Analysis of Variance (one-way)

Result Analysis

Result pertaining to the difference in systematic cognitive style of rural male and female senior secondary school students

To find out the difference in systematic cognitive style of rural male and female senior secondary school students, t-test was applied and the result is presented in table no.1

Table 1

Gender	N	M	SD	df	SEd	't' ratio
Male	150	73.79	7.57	298	0.79	0.81
Female	150	74.44	6.15			

Table value at 0.05 and 0.01 level of significance is 1.97 and 2.59

The table no.1 shows that calculated t-value is 0.81 which is found to be insignificant at both the levels. Therefore, it can be interpreted that there exists no significant difference in systematic cognitive style among rural male and female senior secondary school students. Thus, the proposed hypothesis is not accepted.

Result pertaining to the difference in intuitive cognitive style of rural male and female senior secondary school students

To find out the difference in intuitive cognitive style among rural male and female senior secondary school students, t-test was applied and the result is presented in table no. 2

Table 2

Gender	N	M	SD	df	SEd	't' ratio
Male	150	63.47	6.51	298	0.67	1.25
Female	150	64.64	6.73			

Table value at 0.05 and 0.01 level of significance is 1.97 and 2.59

The table no. 2 depicts that calculated t-value is 0.76 which is found insignificant at both the levels. So it can be interpreted that there exists no significant difference in intuitive cognitive style among rural male and female senior secondary school students. Therefore, the proposed hypothesis is rejected.

Result pertaining to the difference in systematic cognitive style of rural arts, science and commerce rural senior secondary school students

To find out the difference in systematic cognitive style of arts, science and commerce senior secondary school, ANOVA (one-way) was applied and the result is presented in table no. 3

Table 3

Sources of Variance	SS	df	MS	F-ratio
Between Group	131.68	2	65.84	1.38
Within Group	14089.23	297	47.43	
Total	14220.91	299		

The table no. 3 depicts that the main effect of stream is not significant on systematic cognitive style at both levels. It means that there is no significant difference in mean score of systematic cognitive style of arts, science and commerce undergraduate students. Therefore, the proposed hypothesis is rejected.

Result pertaining to difference in intuitive style among rural senior secondary school arts, science and commerce students

To find out the difference in intuitive cognitive style of senior secondary school arts, science and commerce students, ANOVA (one-way) was applied and the result is presented in table no. 4.

Table 4

Sources of Variance	SS	df	MS	F-ratio
Between Group	21.44	2	10.72	0.24
Within Group	13164.59	297	44.32	
Total	14220.91	299		

The table no.4 depicts that the main effect of stream on intuitive cognitive style is insignificant at both levels. It means that there is no significant difference in mean score of intuitive cognitive style of rural secondary school arts, science and commerce students. Therefore, the proposed hypothesis is rejected.

Main finding

- Group difference between male and female undergraduate students on systematic cognitive style as well as on intuitive cognitive style is found to be insignificant. Witkin (1977) found a slight difference among the sexes on the mean score of cognitive style, but Goldstein & Blackman (1978) do not found any such difference of cognitive style among gender.
- The main effect of stream on systematic and intuitive cognitive style is insignificant for undergraduate students. Kumar (1984); Dani (1984) & also Frank (1986) found the significant effect of stream on cognitive style. Contrary to this, students do not differ in learning ability but may respond differently to the content being presented as well as the learning environment (Witkin, Moore, Goodenough & Cox, 1977; Cakan, 2000).

Suggestions for further research

- Similar study can be conducted with predominant one group of gender is encouraged.
- Similar study can be conducted taking into account other variables and at primary and higher levels of education.
- A variety of learning content presentation methods addressing learners' different cognitive styles should be employed (i.e, visuals, video, audio, interactive exercises etc.) with well-guided instructions and scaffolding activities.
- Administration should supervise properly the needs of the children and performance of the teachers. They should take proper action to improve it if there is need to improve.
- The school and college should have guidance and counseling centre for the students to solve their psychological and social problems.
- The government should also improve the policies, schemes and interventions to improve the quality of education.
- Similar study can be analyzed by different statistical techniques for verifying the results.

VII. References

- Alba, J. W. & Weisberg, R. W. (1981). Gestalt theory, Insight and Past Experience: Reply to Dominowski. *Journal of Experimental Psychology*, 110(2), 193-198.
- Alomyan , H. (2004). Exploration of Instructional Strategies and Individual Differences within the Context of Web-Based Learning: *International Education Journal*, 4(4), 86-91.
- Ausburn, L. J., & Ausburn, F. B. (1978). Cognitive styles: Some information and implications for instructional design. *Educational Communications and Technology Journal*, 26, 337-354.
- Cakan, M. (2000). Interaction Between Cognitive Styles and Assessment Approaches: *Unpublished Doctoral Dissertation*, Louisiana State University, USA Baton Rouge.
- Curry, L. (1983). An Organization of Learning Styles Theory & Constructs: Retrieved from ERIC Database, 235-185.
- Dani, D. N. (1984). Scientific attitude and Cognitive style of Higher Secondary Students, *Ph. D Education*.
- Douglas, G., & Riding, R. (1993). The Effect of Cognitive Style & Mode of Presentation on Learning Performance: *British Journal of Educational Psychology*, 63, 297-307.
- Ford, N., Wilson, T. D., Foster, A., Ellis, D., Spink, A. (2002). Cognitive Styles in Information Seeking. *Journal of the American Society for Information Science and Technology*, 53(9), 728 – 735.

- Goldstein, K.M, Blackman, S. (1978). *Cognitive Styles: Five Approaches and Relevant Research*. New York: Wiley & Sons.
- Greenberger, E. & Sorenson, Knerr, C. B. Kner & Brown, J. B. (1974). The Measurement and Structure of Psycho-Social Maturity: *Baltimore Report No. 170*, Centre for Social Organization of Schools, Johns Hopkins University.
- Grigorenko, E.L., & Sternberg, R.J (1997). Are Cognitive Styles Still the Style? *American Psychologist*, 52(7), 700 – 712.
- Grimley & Riding. R. (1999). Relationship Between Cognitive Style and Performance and Gender. *Ph.D Thesis*, University of Pretoria.
- Martinsen, O. (1995). Cognitive Style and Experience in Solving Insight Problems: Replication and extension. *Creativity Research Journal*, 8(3), 291-298.
- Palmquist, R. A. (2001). Cognitive Style and Users' Metaphors for the Web: An Exploratory Study: *Journal of Academic Librarianship*, 27(1), 24-32.
- Peters, A. M. (1977). Verbalizer-Visualizer: A Cognitive Style Dimension: *Journal of Mental Imagery*, 1(1), 109-126.
- Riding, R. J., & Buckle, C. F. (2003). *Learning Styles & Training Performance*: Sheffield: Training Agency.
- Yadav, G. L. (1992). Impact of teacher-training on certain personality characteristics of trainees: *Fifth Survey of Educational Research*, II, Buch, M.B. (Ed.), New Delhi: NCERT.
- Zalewski, L. J., Sink, C. A., & Yachimowicz, D. J. (1992). Using Cerebral Dominance for Educational Programs: *The Journal of General Psychology*, 119(1), 45-57.