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Cognitive Styles, Academic Achievement and Gender: A Study of Higher Education

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Abstract

Cognitive Style is a term used in cognitive psychology to describe the way individuals think, perceive and remember information or their preferred approach to using such information to solve problems. The current study aims to examine the difference in cognitive styles and academic qualification on the basis of the gender. Consequently a sample of 397 students from the 3rd semester students University of Kashmir and Central University of Kashmir. Cognitive Style Inventory Standardised by Praveen Kumar Jha was used to measure the cognitive styles. Correlational analysis showed that academic achievement is positively correlated with the cognitive styles, whereas t-test analysis demonstrated that there were no gender differences in cognitive style and academic qualification.

Key Words

Cognitive style, academic achievement, higher education, gender

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Introduction

Literally, the concept of cognitive styles is fairly new-fangled. It developed out of research on how people perceive and organize information. Variances in cognitive styles partake with "characteristic models of perceiving, remembering, thinking, problem solving and decision making, reflective of information, processing regularities that develop around underlying personality trends" (Messick, 1994) and not with intelligence. For example, certain individuals respond very quickly in most situations, others are more reflective and slower to respond even though both types of people may be equally knowledgeable about the task on hand.

Term Cognitive style is used in cognitive psychology to describe the way individuals think, perceive and remember information to solve problems. It differs from cognitive ability/level being measured by aptitude tests or intelligence tests. There is a disagreement over the exact meaning of the term cognitive style in addition to that there is also discrepancy whether it is a single or multiple dimension of the human personality; nevertheless it remains a key concept in the areas of education.

Primarily, Cognitive style refers to an ideal way of an individual' to process information. Unlike individual differences (e.g., Gardner, Guilford, and Sternberg) describe peak performance in abilities, while as styles describe a person's typical mode of thinking, remembering and problem solving. In addition, styles are usually considered as a bipolar dimensions whereas abilities are viewed as unipolar (ranging from zero to a maximum value). Having more abilities is usually considered beneficial while having a particular cognitive style simply denotes a tendency to behave in a certain manner. Therefore we can say that Cognitive style is a usually described as a personality dimension which influences attitudes, values, and social interaction.

Cognitive styles that have been identified include

- **Scanning**- differences in the extent and intensity of attention resulting in variations in the vividness of experience and the span of awareness
- **Levelling** versus **Sharpening**- individual variations in remembering that pertain to the distinctiveness of memories and the tendency to merge similar events.

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- **Reflection** versus **Impulsivity**- individual consistencies in the speed and adequacy with which alternative hypotheses are formed and responses made.
- **Conceptual Differentiation**- differences in the tendency to categorize perceived similarities among stimuli in terms of separate concepts or dimensions.

In addition to the above mentioned styles, a number of cognitive styles have been identified and studied overtime. **Field independence** versus **field dependence** is probably the most well-known style. It refers to a tendency to approach the environment in an analytical, as opposed to global, fashion. At a perceptual level, field independent personalities are able to distinguish figures as discrete from their backgrounds compared to field dependent individuals who experience events in an undifferentiated way. In addition, field dependent individuals have a greater social orientation relative to field independent personalities. Studies have identified a number connections between this cognitive style and learning (Messick, 1978). For example, field independent individuals are likely to learn more effectively under conditions of intrinsic motivation (e.g., self-study) and are influenced less by social reinforcement.

Defintions of the Terms Used

Cognitive Styles

Cognitive style is defined as a person's preferred way of gathering, processing and evaluating information. It influences how people scan their environment for information, how they organize and interpret this information, and how they integrate their interpretations into the mental model and subjective theories that guide their actions (Hayes &Allinson, 1998).

The term cognitive style refers to the ways in which the information is processed, stored, remembered and used; and it is considered under two dimensions, namely systematic and intuitive styles. In the Systematic style, individual who typically operates with a systematic style uses a well-defined step-by-step approach when solving a problem. In intuitive style, individual whose style is intuitive uses an unpredictable ordering of analytical steps when solving a problem.

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Academic Achievement

Academic achievement can be defined as an amalgamation of brilliance in all curricular and extracurricular activities. It includes excellence in sporting, behaviour, confidence, communication skills, punctuality, arts, culture and the like. Operationally,

Rational of the Study

Cognitive style addresses an individual preferred approach to gather, process and evaluate information.Cognitive styles are pattern of thoughts and behaviour, which influences learning and problem solving techniques of an individual and are reflected in one's personality and performance.

While learning, students deal with a number of cognitive tasks regarding information processing, they are confronted withgathering, storing, remembering, comprehending, evaluating information; in addition they analyse and examine decisions to solve problems and find conclusions to a particular problem. Cognitive styles of individual can be modified to a certain extent by means of training, direction, instruction, guidance and it depends on the sex, age, place of residence, marital status of an individual. Our educational institutions should take into account basic human differences regarding their studying, thinking, comprehension, problem solving, intelligence etc., to seek better means of individualized instruction. Here the investigator thought that student's academic achievement and their excellence in studies depends mainly on their cognitive styles, which is very much influential in their learning process. Hence, the investigator has tried to study cognitive styles, academic achievement and gender of the students of higher educations.

"Cognitive Styles, Academic Achievement and Gender: A Study of Higher Education"

Objectives of the Study

The investigator conducted the present study based on the following objectives.

Objective 1. ***To study the difference between Cognitive Styles and Gender Among Students of Higher Education***

Objective 2. ***To study the difference between Academic Achievement and Gender Among Students of Higher Education***

Objective 3. ***To study the relationship between Cognitive styles and Academic Achievement Among Students of Higher Education***

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Null Hypothesis (Ho1)

On the basis of the review of the related literature and on the basis of stated objectives following null hypothesis were formulated.

- **Ho1.** There will be no significant difference between Cognitive Styles and Gender Among Students of Higher Education
- **Ho2.** There will be no significant difference between Academic Achievement and Gender Among Students of Higher Education
- **Ho3.** There will be no relationship between Cognitive styles and Academic Achievement Among Students of Higher Education

Design of the Study

Research Design in the sense of the word usually implies decisions, which are takenbefore hand to ensure that potential mistakes in research are eliminated, thereby maintainingthe lowest possible cost (Nadaf, 2017).Moreover, the research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. Research design stands for advance planning of the methods to be adopted for collecting the relevant data and the techniques to be used for their analysis keeping in view of the research objectives. A descriptive research design is adopted by the researcher in order to meet the objectives of the study.

Population

The present study was carried out on all the 3rd semester students amongUniversity of Kashmir and Central University of Kashmir students. The researcher selected the population due to operational ease because it was not possible to collect the data from the entire population, so the researcher selected randomly 3rd semester students from the two Universities. The impediments which came in studying of the entire population are cost, time and other factors. According to **DavidS. Fox (1969)**, "It is not possible to collect data from every respondent relevant to our study, but only from some fractional part of the respondents. This process of selecting the fractional part is called sampling." Therefore sampling is an important and crucial part of behavioural research.

Sample

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The process of drawing out the sample from the population is known as Sampling. It is a technique of selecting a representative part from the population for the purpose of determining characteristics of the population. Sampling is necessary because we usually cannot gather data from the entire population due to large or inaccessible population or lack of resources. Even in relatively small populations, we can't obtain information from the whole population, to serve the purpose we employ sampling technique, which is the only method used universally to gather data from respondents. It is a method which makes the research feasible within the available resources.

A **simplerandom sample** is a subset of a statistical population in which each member of the subset has an equal probability of being chosen. Consequently a sample of 397 students was selected randomly from of the 3rd semester students among University of Kashmirand Central University of Kashmir.

Operational Definitions of the Key Terms

For the sake of clarity the important terms used in the title have been defined below:

Cognitive Style

It is the way individuals think, perceive and remember information, or their preferred approach to using such information to solve problems. Cognitive style is an expression of psychological differentiation within characteristic modes of information processing. In the present study, the cognitive style is defined as the scores obtained by the subjects in Cognitive Style Inventory (Standardised by Praveen Kumar Jha).

Academic achievement

Academic achievement is the outcome of the extent to which a student has achieved their educational goals. In the present study, academic achievement is the aggregate marks percentage obtained by the subjects in their last semesters.

Tools

The following tools were used for collecting data for the study

Cognitive Style Inventory (CSI)

CSI designed and standardised by Dr. Praveen Kumar Jha (2001) measures the ways of thinking, judging, remembering, storing information, decision making and believing in interpersonal relationship. The CSI is designed on the basis of the rationale as conceived by

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Martin (1983) that implies cognitive style as preferred and consistent patterns of responses. The inventory consists of five dimensions of cognitive style viz. systematic, intuitive, integrated, undifferentiated and split cognitive style. The Inventory consists of 40 items which measure systematic cognitive style and intuitive cognitive style consisting of 20 items each on a five point Likert scale. Five responses categorized as totally disagree (1), disagree (2), undecided (3), agree (4), and totally agree (5).

Academic Achievement

Academic Achievement refers to the total grades/marks secured by students which they have secured during their 1st and 2nd semester examinations.

Data Collection

The data for the present study was collected by the investigator through his personal visits to both the Universities of Kashmir. Prior permission from the Heads of respective Schools and Departments was sought for data collection. Data from students was collected at the initial stage of the academic session 2017-18. Before administering tools, the investigator told the purpose of the tools to the students. They were requested to give their true and free responses. It was also made clear to them that their responses would be kept strictly confidential. They were also assured that the information collected would be used only for research purpose. After establishing rapport with students, test booklet were distributed and asked them to write personal information on the title page and then instructions were given to them as given in the manual of the test. They were also requested to go through the instructions printed at the cover page of the booklet. There was no time limit to complete the test but students were asked to respond as quickly as possible. On completion of the test, the booklets as well as response sheets were collected.

Data Analysis

After collection of data, the researcher with the help suitable statistical methods analyses and interprets the data in order to arrive at empirical solution to the problem. The data analysis of the current study was carried quantitatively with the help of both descriptive and inferential statistics. The descriptive statistical techniques like mean, standard deviation and for the inferential statistics correlation were used during data analysis.

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Analysis of data is an action of transforming data with an aim to extract the usefulinformation and conclusions (Nadaf, 2017). Data analysis is considered as the heart of the research work. "Data analysis is the process of bringing order, structure and meaning to the mass of collected data. It is a messy, ambiguous, time consuming, creative, and fascinating process. It does not proceed in a linear fashion; it is not neat. Data analysis is a search for answers about relationships among categories of data." (Marshall and Rossman, 1990:111).

In the commencement the researcher arranges the collected data, which was in raw format in a certain order, so that it became information. After that, the researcher with help of SPSS (Statistical Package for Social Science) Version 25 analyses the data in order to reach a conclusion. Soon after analysis the researcher interprets the analysed data in order to make a sense out of it. Interpretation can be defined as the device through which a researcher tries to explain what has been observed by him in due course of time. It enables the researcher to have an in-depth knowledge about the abstract principle behind his own findings.

Keeping these things in mind, the researcher has made an attempt to analysis and interprets the results on the basis of collected data. The following results have been retrieved after analysing the data, keeping in mind the objectives of the study.

Objective 1. To study the difference between Cognitive Styles and Gender among Students of Higher Education.

Ho1. There will be no significant difference between Cognitive Styles and Gender among Students of Higher Education.

Table 1 Differences between Cognitive Styles and Gender

	Gender	N	Mean	SD	t
Cognitive Styles	**Male**	188	**134.26**	30.27	**.18^{NS}**
	Female	209	**133.74**	25.70	

^{NS} insignificant

Interpretation of Table 1

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Table 1 delineates the estimation of the responses, which was used to assess the difference between Cognitive Styles and Gender. The said table describes the mean score and the t-value between Cognitive Style and Gender among Students of Higher Education.

The stated table displays that there is insignificant difference between cognitive styles of male and female on Cognitive Style Inventory (CSI) as the as the calculated t value is **.86; (p >.05).** Therefore Ho1 is accepted.

Discussion of Cognitive Styles and Gender

In the present study an attempt has been made to find out the difference between cognitive style and gender among Students of Higher Education. It is clear from the result of the objective 1 that there is insignificant difference between the cognitive styles of male and female students of CUK. The access to equal opportunities to education has set their mind free, made them informative of thyself, world, nature and people. That iswhy they are able to communicate, motivate, persuade, behave, and react in the same manneras their counterpart.

The findings are in consonance with the findings of Bigelow (1971), Perny (1976), Hughes (1978), Saracho (1980), Devi (1982), Tharakan (1987) and Arrington (1987) also reported the absence of sex differences in cognitive styles.

But in several other studies it has been found that boys and girls differ significantly regarding their cognitive style. Witkin et al. (1962) and Talukdar (2003) reported that boys and men tend to be more proficient than girls and women, while Riding and Fuirhurst (2001) found females behaving better than males on cognitive style tasks.

Objective 2. To study the difference between Academic Achievement and Gender among Students of Higher Education.

Ho2. There will be no significant difference between Academic Achievement and Gender among Students of Higher Education.

Table 2 Difference between Academic Achievement and Gender

	Gender	N	Mean	SD	t
Academic Achievement	**Male**	188	**70.50**	6.03	**.58^{NS}**
	Female	209	**70.86**	6.80	

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[NS] insignificant

Interpretation of Table 2

Table 2 describes the estimation of the responses, which was used to assess the mean difference between Academic Achievement and Gender. The said table describes the mean score and the t-value between Academic Achievement and Gender of CUK Students.

The stated table displays that there is insignificant difference between Gender and Academic Achievement: the calculated t value is **.17; (p >.05).** Therefore Ho3 is accepted. The mean of the stated table has been graphically presented in pictorial form in Figure 2

Discussion of Academic Achievement and Gender

In the present study an attempt has been made to study the difference between Academic Achievement and Gender. It is clear from the result of the objective 2 that there is insignificant difference between Academic Achievement and Gender.

The reason for the insignificant difference in academic achievement among male male and female is due to improvedcommitment to the studies by both sexes. In addition, the concept of Modernization has brought women at such level, where they didn'tfind themselves far behind men. Equal opportunities to education has not only opened her mind andpossibilities but also allowed her to break all the obstacles- religious, cultural, political,gender and geographical.Education thathas set their mind free, made them informative of thyself, world, nature and people. That iswhy they are able to communicate, motivate, persuade, behave, and react in the same manneras their counterpart. The findings of the study are in accordance in with the findings of Goni,Wali, Ali&Bularafa, (2015) who also found that there is no significant difference between academic achievements of male and female students. Hyde (1990) pointed out; meta-analyses have consistently shown that there are no significant gender differences in general cognitive abilities. Thus, although cognitive abilities are significantly and positively related to school achievement, they cannot explain gender differences in school achievement (Spinath, Freudenthaler, Neubauer, 2010)

Objective 3. To study the relationship between Cognitive styles and Academic Achievement among Students of Higher Education

Ho3. There will be no relationship between Cognitive styles and Academic Achievement among Students of Higher Education.

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Table 3 Correlation between Academic Achievement and Cognitive Styles				
Cognitive Styles	**N**	**Mean**	**SD**	**r**
Academic Achievement	**397**	**1347**	**27.92**	**.20****
		0.69	**6.44**	

***** Significant at 0.01 level***

Interpretation of the Table 3

Table 4.3 delineates the estimation of the responses, which was used to assess the relationship between cognitive styles and academic achievement. The said table describes the mean score, standard deviation and Pearson product moment correlation (r).

As depicted in the stated Table a Significant and positive correlation as a whole was found between cognitive style and academic achievement among Students of Higher Education (r = .20; **p < .01**). Therefore, the Ho3 is rejected.

Discussion between Cognitive Stylesand Academic Achievement

In the present study an attempt has been made to study the relationship between Cognitive Style and Academic Achievement. It is clear from the result of the objective 3 that there is a significant relationship between the two.This is in line with the findings of Yaghubi (2006), Hosseini (2002), and Mokhtarian (2003). Yaghubi (2006) concluded that the individuals who score higher in their cognitive styles are better in learning and comprehension. The cognitive styles are directly in touch with the memory, motivation and performance. The persons with higher Cognitive style scores tend to be analytic, have intrinsic motivation for learning social issues, are not receptive to criticism, are not often influenced by the environment, and play an active role in the learning process.

Recommendations

A key recommendation is that the college curricula for Teacher Education need to include courses on learning/cognitive style and preference theory. Butler (1986) noted that "every classroom operates on the energy created by the interaction between the teacher and the students" (p. 61), and further that this interactive process is influenced by the style of learning

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of the teacher and the student. It was pointed out also that "teacher and student styles act and react together to permit student learning to be more or less successful" (p. 61). Thus, the instructor's style and his or her knowledge of the learning/cognitive style and preferences of students are vital in analysing classroom dynamics and student achievement. Along this line of thought, Blakeslee (1986) contended that to improve the quality of education, the teacher must understand his or her style of thinking as well as the students' styles of thinking. Schultz (1977) discussed the need to adjust teaching methods to the different ways in which individuals learn, and further that instructors should become aware of the concept of learning/cognitive styles and prepare themselves to become diagnosticians, prescribers, and educational designers.

Concerning teacher education, Thomson (1986) pointed out that, for the most part, little attention has been focused on the understanding of individual differences of information processing. Given the numerous publications on the subject of learning/cognitive style and preferences, it has been well established that traditional approaches (instructional modalities the same for every student) to education are insufficient. Consideration should therefore be given to include courses in teacher education programs on learning/cognitive style and preference theories. It is advocated that such courses should be structured to teach not only the theoretical concepts but also the practical aspects of applying these learning theories in the classroom. He also stated that teachers should be concerned with questions like, What is the student's diagnosed preference for the learning environment? What are his/her underlying strengths for the cognitive processing of information? And, what teaching approaches can be applied to match the learning environment to the student's natural predispositions for learning? (Thomson 1986, p. 220).

To address such questions teachers need to be knowledgeable of the concepts of learning/cognitive styles and preferences which can only be brought about by formal education. Thomson (1986) predicted that competent teachers in the future will be able to assess the learning/cognitive styles and preferences of their students and structure the learning environment to match the learning predispositions of their students. Appropriate methods of instruction would not be based on hunches, good intentions, or the vogue, but rather on an objective approach based on one's natural ways of thinking and learning.

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A second recommendation involves using student learning/cognitive style and preference data when planning a curriculum. The traditional approach to curriculum planning, however, does not emphasize the importance of identifying a student's learning/cognitive style or preferences. Following a careful needs assessment (an educational need is a discrepancy between what is and what should be) of the educational environment, the traditional curriculum planning process as described by Tyler (1975), for example, included the following major steps: identification of educational goals and objectives, selection and organization of learning experiences, and evaluation and feedback.

Unfortunately, this comprehensive process is based on the orthodox approach of teaching all students in the same manner. As noted earlier, Levine (1978) contended that uniform types of instruction produce widely divergent results in different students. For this reason, Cross (1976) posited that students would be happier and more productive if the curriculum was designed to allow them to learn in a manner that was compatible with their natural ways of learning. Thus, it is advocated that the curriculum building process should be amended to include an additional step, i.e., the identification of the learning/cognitive styles and preferences of students in order to modify the curriculum appropriately to accommodate student differences.

A final recommendation is an educationally administrative one regarding the application of learning/cognitive style theory. Claxton and Murrell (1987) advanced four recommendations for institutions interested in applying the concepts of learning/cognitive styles: (1) Conduct professional development activities on the use of learning style in improving teaching and student development. (2) Promote classroom research and make data about learning style an important part of it. (3) Establish curricular experiences that focus on helping students to learn how to learn. (4) In hiring new faculty members, take into account the candidates having understanding of teaching-learning practices that recognize individual differences, including style. (p. 77)

These recommendations could serve as basic guidelines for educational leaders for implementing a teaching-learning approach based on a student's natural learning abilities.

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Conclusion

In the stated stud, the researcher observed that there is significant relationship between cognitive styles while as insignificant differenceswere observed between Cognitive Styles of male and female students moreover insignificant differences were also observed between Academic Achievements of Male and Female students of CUK.

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