Philosophical Mathematics reasoning ability, problem solving, logical thinking, and academic achievement among eighth standard students

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***Abstract*: The investigation of individual contrasts comprehends not just what makes people like each other, yet additionally what makes them unique. By considering the varieties that can occur starting with one individual then onto the next, one can more readily comprehend the full scope of human conduct. Every student is unique in his/her strengths and challenges, and it is the prime duty of the teacher to encourage highly individualized learning in response to the student. Not the other way around It is basic to comprehend that the possibility of individual contrasts is the premise whereupon one tyke is contrasted with another. A comprehension of individual contrasts gives the foundation to perceiving ordinary varieties and in addition extraordinary contrasts among kids and, in this way, for distinguishing youngsters may have uncommon necessities. When all is said in done, comprehension of the different formative dimensions is improved by recognition with the idea of individual contrasts in students. Therefore, the study of learning, thinking and cognitive style is based upon the same theory. Present study explores the eighth standard students' learning, thinking and cognitive style and develops the training program, according to the profile of eighth standard students based on their learning, thinking and cognitive style. To investigate the effect of learning, thinking and cognitive style on students' problem-solving ability, logical thinking, creative thinking, reasoning ability and academic achievement. For this purpose, experimental controlled research methods were used. The further Experimental and controlled pre-post research design and suitable research methodology was applied to present research.**

***Keywords*: Learning Thinking Problem -solving skill, logical and academic achievement**

Introduction

To design a training program based on learning, thinking, and cognitive style and measuring its effect on reasoning ability, creativity, problem solving, logical thinking, and academic achievement among eighth standard students. The problem of the study was to design a training program based on learning, thinking, and cognitive style and measuring its effect on reasoning ability, creativity, problem solving, logical thinking, and academic achievement among eighth standard students. The study also intends to find out the difference between the experimental group and controlled group to their scores on the post-test objectives of the study the effect of the training program on reasoning ability; explore the effect of the training program on creativity; effect of the training program on problem solving; examine the effect of the training program on logical thinking; training program on academic achievement; find out the difference between experimental and controlled group (post-test) to their reasoning ability; explore the difference between experimental and controlled group (post-test) to their creativity; examine the difference between experimental and controlled group (post-test) to their problem solving; assess the difference between experimental and controlled group (post-test) to their logical thinking; evaluate the difference between experimental and controlled group (post-test) to their academic achievement; differences among various dependent variables due to treatment in experimental group of eighth standard students.

Hypothesis

1.The study significant effect of the training program on reasoning ability.
2. The training program will be significantly effects of on creativity.
3. There is a significant effect of the training program on problem solving.
4. There is a significant effect of the training program on logical thinking.

Methodology

Sample: There was a total sample of 120 students of Eighth Standard for this study selected from at Niwari district. Total 120 samples were divided into two groups. The first group of 60 students includes the experimental group from Govt Excellence Higher secondary School, Niwari (M.P.). There was another group of 60 students considered as controlled group of Govt. Girls Higher Secondary School Niwari (M.P.). The sample was selected through random sampling method to collect data. Their age ranges between 14 to 15years. Actual research has been completed with 80 students of eighth standard. The number of students who voluntary participated and completed the program was 40 in the both Experimental and Controlled group. Controlled group initially had 76 students but there were some students absent to other testing procedure. Due to absence and response error, 36 students were automatically omitted. The experimental initial group had 68 students but due to the same reason of absence and response error, there were 28 students had omitted. The final sample of experimental group was 40 and controlled group also had 40 students included in the research.

Psychological Tools and Techniques:

1. Immediate Memory Span (IMS): IMS Just as there is a span of attention, there is a limit to the number of objects or stimuli which can be immediately apprehended and remembered. This is called 'memory span'. In fact, a span of immediate memory correlates

very much with span of apprehension or attention. The immediate memory span has lots of practical implications in determining the rate dictation is the aim of this research. The IMS was implementing to determine the immediate memory span for auditory stimuli. For this purpose a list of numbers ranging from 5 to 12 digits each was used to collect the information. At each stage there should be two numbers, making a total of 12 numbers materials and apparatus was used. Procedure: Instructions were given to individual student: 'I will speak out certain numbers and you will have to repeat them as soon as I finish reading them.' Researcher makes the students sit in a comfortable position with a divided board between himself and student. Keeping the list of numbers in front, the researcher reads out the first number with 5 digits in a clear tone and notes down the responses given by the student. If the student repeats the number correctly the next 5-digit number of the list is omitted and the researcher reads the first 6-digit number. This procedure is continued until the student fails to reproduce both the numbers of any particular length. Researcher calculates the Mean and SD of class on the basis of the number of digits just preceding the one at which he fails on both the occasions.

2. Revans' Standard Progressive Matrices (SPM): This matrix was constructed in 1930 on the from the earlier suspicion the if Spearman's standards of neogenesis were right, it ought to give a test appropriate to contrasting individuals with deference with their prompt capacities with regards to perceptions and reliable discernment. Announced examinations demonstrate how far, and under what conditions, these two correlative tests give a down to earth method for surveying an individual's scholarly improvement, trainability or mental disability. The Standard Progressive Matrices Sets A, B, C, D, and E is a trial of an individual's ability at the season of the test to capture aimless figures displayed for his perception, see the relations between them, imagine the idea of the figure finishing every arrangement of relations exhibited, and by so doing, build up a methodical strategy for thinking. The scale comprises 5 sets of 60 issues each have twelve. The separate scoring sheet has been provided to score the correct responses. The scale has a test retest reliability varying with from 0.83 to 0.93; it associates 0.86 with the Terman – Merrill scale, and has been found to have a "g" immersion of 0.82.
3. Thinking Styles Test: For the measurement of Thinking Styles of the eighth standard students, a Thinking Styles Test was developed and standardized by the investigator with the help of the research guide. Thinking Styles Test was produced based on the Mental Self-Government Theory of Thinking Styles by Sternberg (1997). Sternberg in his theory has known thirteen totally different dimensions of Thinking Styles underneath 5 classes. People are described based on perceptions of their favored capacities, types of association, levels they work at, extension and leanings. People operate at totally different levels, such as Global and Local level. People with Global Thinking Style prefer generalities and abstractions whereas people with Local Thinking Style like to deal with details, specifics and concrete examples. Each individual is assumed to have some extended of each characteristic. The distinction is just within strength of preference. All have a style profile having varying amounts of each style, but not locked into any one profile. Thinking Styles Test is a test of four written tests designed for group administration. Marathi version of the tests was administered to the pupils. Test is prepared to measure the levels of thinking which includes Global and Local dimensions.
4. Learning style inventory: Fleming (1995) developed Learning Style Inventory. Test developer expresses that learning includes the obtaining of unique ideas that can be drilled adaptability in a 162 scope of circumstances. In his hypothesis, the development for the advancement of imaginative ideas is given by new encounters. Learning is the procedure whereby information is made through the change of understanding (Fleming, 1995). There are twenty-four items in the test. Each item has three alternative options. Out of these three options only one is chosen by respondents. There is no right or wrong answer during this form. The test has a split-half reliability 0.76 and Kuder-Richardson formula has 0.74 reliability was found. The validity of the test is found approximately sound.
5. Cognitive Style Inventory: Cognitive Style Inventory was standardized by Praveen Kumar Jha (2010). It was self-detailed proportion of the mindsets, judging, recollecting, putting away data, basic leadership, and having faith in social relationship. Cognition is a mediating process that is the centre of a resurgence of interest. The inventory has resulted in three cognitive styles. 1. Systematic Cognitive Style refers to person who commonly works with a precise style utilizes an all-around inferred well-ordered methodology when tackling an issue; searches for a general technique or realistic methodology; and after that makes a general arrangement for taking care of the issue. 2. Intuitive Cognitive Style refers to the person whose style in instinctive, utilizes a capricious requesting of investigative advances when taking care of an issue, depends on experience designs described by unverbalized regions or hunches and investigates and forsakes options rapidly. 3. Integrated Cognitive Style refers to an individual with a coordinated style can change styles rapidly and effortlessly. Such style changes have all the earmarks of being oblivious and guarantee amid only seconds. The consequences of this fast hearth capacity are that it appears thought of vitality and a proactive way to deal with critical thinking. Truth be told, coordinated understudies are regularly alluded to as issue searchers since they reliably endeavor to recognize potential and additionally openings so as to discover better methods for getting things done. The full-length split-half reliability to cognitive style inventory was found 0.653 and for systematic cognitive style - 0.70; intuitive cognitive style - 0.67 and integrated cognitive style was found 0.56. The validity method as judges' validity, concurrent validity, internal validity was examined for this inventory. Cognitive Style Inventory is a self-respondent work took which gives a estimate of psychological style of a person in five point likert design. Strongly agree; disagree; undecided; agree and strongly agree are five response category. A respondent who rates high on the precise scale and low on the instinctive scale are distinguished systematic style. A respondent who rates high on the intuitive scale and low on the systematic scale are identified an intuitive style. The student with an integrated style rates high on both scales and rates low on both scale was defined as undifferentiated. Yadav, R. (2015).
6. Verbal Test of Creative Thinking: This test has developed by Baqer Mehdi (2005) there are four factors in this test. Each factor has provided the situation to the student for their creative thing process. I) Consequences Test- the outcomes test comprise of three theoretical circumstances: a) What might occur if man could fly like fowls? b) What might occur if our schools had wheels? and c) What might occur if man does not have any requirement for nourishment? The understudies are required to think the greatest number of outcomes of these circumstances as they can, and keep in touch with them under every circumstance in the space gave. The circumstances will be theoretical and limit the impact of understanding and furthermore furnish the understudy with a boundless

chance to make reactions. The test energizes free play of creative ability and innovation. A model is given on the test booklet to familiarize the understudy with the idea of the test. The time took into account the three issues is 4 minutes each. II) Unusual Uses Test-This test gives the understudies the names of three normal protests a bit of stone, a wooden stick, and water – and expects him to compose the same number of novel, intriguing and strange employments of these items as he may judge. The precedent given on the test booklet legitimately familiarizes the understudies with the idea of the activity. This test estimates the understudy's capacity to recover things of data from his own data away. Clearly, it likewise measures the understudy's capacity to move edges of reference to utilize nature in a unique way. The time took into consideration the three activitys is 5 minutes each. III) New Relationships Test-This test gives the understudies three sets of words obviously unique tree and house, seat and stepping stool, air and water, and expects 164 him to think and compose however many novel connections as could be allowed between the two objects of each combine in the space gave. The test gives a chance to the free play of creative energy and inventiveness. A precedent is given on the test booklet to familiarize the understudy with the idea of the test. The time took into account each combine is 5 minutes each. IV) Product Improvement Test-In this test, the understudy is solicited to think from a straightforward wooden toy of a steed and recommend the expansion of new things to it to make it all the more intriguing for the understudies to play. The time permitted is 6 minutes. This test has a test retest reliability interval varying with from 0.89 to 0.96 for various internal factors, and validity of the test is varies from 0.77 to 0.96. Scoring of the test has each item to be scored for fluency, flexibility, and originality. Separate list has been provided with scoring of each item with appropriate suggestions and originality weights are given to them.

7. Problem Solving Ability Test: This test was developed by Sujeet L. N. Dubey (2008) and there are twenty issues in the test. Every issue has four elective answers. Out of these four answers just a single is right. In the event that the understudy composes the right answer, he/she ought to be given one stamp, and if understudy composes a wrong answer, zero ought to be given. This test has a split-half reliability 0.78 and Kuder-Richardson formula has 0.76 reliability found. The validity of the test on the basis of reasoning ability was 0.85 was found. The scoring system of this test has separate key provided in the manual. H) Reasoning Ability Test: This test was developed by Sadhna Bhatnagar (2001). There are 35 items in the test. Each problem has four alternative options. Out of these four choices, there is one correct option. On the off chance that the students compose the right answer, he/she ought to be given one check, and if understudy composes a wrong answer, zero ought to be given. This test has a split-half reliability 0.87 and Kuder-Richardson formula has 0.83 reliability found. Validity of the test on the basis of problem-solving ability was 0.89 found. 165 I) Logical Thinking: This test was developed by Sujeet Kumar and Shikha Tiwari (2012). There are fifty items given in it and four alternatives are given with each item. There is only one is correct option out of four On the off chance that the understudy composes the right answer, he/she ought to be given one check, and if understudy composes a wrong answer, zero ought to be given. Reliability coefficient with the split half method was found to be 0.82 in this test. This test was developed for secondary school children. J) Academic Achievement: Academic achievement scores measures in two ways. The first method to assess the academic achievement of student, to measure the overall academic achievement of the previous year scores. The second method to assess through the percentage of marks achieved at final year examinations. In the present study, both methods have been used to determine the academic achievement of the participated students.

Variables:

A) Independent Variables:

1. Learning Styles (LS)
2. Thinking Styles (TS)
3. Cognitive Styles (CS)

The training program was developed with the help of learning, thinking and cognitive style score of eighth standard students. The profiles of individual students were developed on the bases of their scores on learning, thinking and cognitive style tests. The students' profiles help teachers to handle the students in their teaching learning process. The learning experience, assignment, teaching aids and also evaluation was related to a student's profile for the experimental group students only.

B) Dependent variables:

1. Reasoning ability
2. Creativity
3. Problem solving
4. Logical thinking
5. Academic achievement

C) Controlled Variables:

1. Immediate Memory Span
2. Intelligence Quotient
3. Academic Achievement

Research Design:

The pre-post experimental research design has been used for this study. There were two groups 'A' experimental group (Implementation of the training program as treatment) and 'B' controlled group (there is no special treatment).

Statistical treatment of the data:

Appropriate statistical techniques such as means, standard deviation, Carl Pearson's product moment co-relation, Homogeneity test for normality, independent and paired student's' test, Cohen's d and ANCOVA was used for the analysis of the collected data.

Conclusions:

There is no significant difference between Pre and post test of eighth standard students from controlled group of reasoning ability test but there is significant difference between Pre and post test of eighth standard students from experimental group for reasoning ability test. Significantly difference found in experimental group because of treatment has given to them. There is no significant difference between Pre and post test of eighth students from controlled group of verbal creativity test but there is significant difference between Pre and post test of eighth students from experimental group for verbal creativity test. This difference due to training program applied on experimental group. There is significant difference between Pre and post-test of eighth students from controlled group of Problem-solving Ability Test and there is significant difference between Pre and post-test of eighth students from experimental group for Problem solving ability Test. The difference between Pre and post-test of eighth students from controlled group of Logical thinking test is not significant but there is significant difference between Pre and post-test of eighth students from experimental group for logical thinking test.

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