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Effectiveness of Inductive Thinking Model of Teaching on History Learning

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Abstract*: The present study is an attempt to make the teachers and curriculum planners realize the impact of Inductive Thinking Model of Teaching (ITMT), a model that supposed to train learners thinking ability to process learning information more effectively. The study was of quasi experimental research type with non-equivalent control group design. Effectiveness of ITMT was studied on learners' achievement in History by `teaching the experimental and control group through ITMT and traditional method of teaching respectively and by analyzing the pre-tests & post test scores in History of both the groups through tests of Analysis of co-variance. The study established Inductive thinking model of teaching to have better impact on learners' achievement in History than the traditional method of teaching.*

Keywords: *Inductive Thinking Model of Teaching, Traditional Method of Teaching, Information Processing*

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The Rationale

Man is disposed to be active, searching and inquiring more than is to be placid, quiescent and stationary. Such psychological consideration is applicable to man as a living being and a learner as well. Man as an organism responds to events and elements in the environment for which he is active. So the range of human behavior including learning can be shaped if those events and sequence of their presentation can be controlled. Learning as a complex cognitive task demands a great deal of resources in terms of environmental stimuli or information to act upon and for processing such information it involves a sequential order of cognitive processes through the use of one or more mental operations. It induces that learning behavior

can be controlled, changed and modified by manipulating and designing the stimuli and by improving the information processing ability of the learner. Inductive Thinking Model of Teaching (ITMT), developed by Taba (1966) is a model under Information Processing family of teaching models designed to enhance the process of using information and environmental stimuli through training of mental operations. Its three phases of teaching (i) Concept formation, (ii) Interpretation of Data and (iii) Application of Principles suggest an multipurpose approach that can teach how to think, how to act on the given discrete facts and how to apply them for solving learning problems.

But a detail probe into the studies conducted in the field of models of teaching reveals that most of the studies focus on Advance Organizer Model and Concept Attainment Model. Though some of the studies are conducted on Inductive Thinking Model of Teaching and its impact on academic achievement and other cognitive variables by Bhattacharya (1984) Singh (1988), Baveja (1989), Gupta (1991), Singh (1994), Hota (2000), Billing (2013) the result were found inconsistent. Taba (1966) developed Inductive Thinking Model of Teaching (ITMT) on the curricular subjects of social studies. But a very limited number of studies were conducted in this subject area and no study was found to be conducted to study the impact of ITMT on learners' achievement in history. Thus, the present study is undertaken with the following objectives.

Objectives of the Study

The study under investigation proceeds with the following objectives;

1. To assess the effectiveness of Inductive Thinking Model of Teaching (ITMT) on learners' achievement in History.
2. To compare the impact of Inductive Thinking Model of Teaching (ITMT) and traditional method of teaching on learners' achievement in History.

Hypothesis of the Study

Data concerning the assessment study of effectiveness of ITMT as stated in objective 1 were analyzed through certain descriptive statistics and decision concerning result was taken through logical discussion. The following hypothesis was formulated in null form to be tested relating to the remaining objective.

$H0_1$. The adjusted mean achievement score on history of the learners taught through Inductive Thinking Model of Teaching (ITMT) does not differ significantly from that of the learners taught through the traditional method of teaching.

Design of the Study

The non-equivalent control group design of experimental research was employed for studying the effectiveness of independent variable on dependent variable which made the study quasi experimental in nature.

Sample of the Study

Two secondary schools of Sambalpur Municipality area, Odisha were selected purposively by the investigator for the experimentation purpose. Schools were selected purposively to ensure

their equal status with the purpose of keeping experimentation free from the effect of school status. The selected schools were almost of equal status with regard to their location, management, infrastructural facilities, medium of instruction and syllabus followed. Out of the stated two schools one school was randomly selected as the experimental school and all the 35 students of Class VIII of that school were considered as the experiment group. The other school having 34 VIII grade students was taken as the control group in the study. No matching was made to make the groups homogeneous rather intact groups were made subject to experimentation.

Tools used for data collection

For Treatment Purpose:

1. Six Lesson Plans on different six concepts of prescribed History syllabus were developed by following ITMT strategy to be taught to the experimental group.
2. Six Lesson Plans on the same six concepts of History syllabus were developed by following traditional teaching strategy to be taught to the control group.

For pre-test and post- test purpose:

1. Six learning attainment tests were developed on each of the selected concepts of History to assess the effectiveness of ITMT strategy.
2. Two parallel forms (Form 'A' for pretest purpose and Form 'B' for post test purpose) of Comprehensive achievement tests on History were developed to obtain scores for study of comparative effectiveness of two strategies under study.

All the Lesson Plans, Learning attainment tests and Comprehensive achievement tests were developed by the investigator by following the principles of test construction as suggested by Gronlund and Linn (1990) and Ebel and Frisbee (1991). Tests were tested for content validity. Expert opinion and suggestion was taken on each test from subject experts, experts in test and measurement and experts in psychological tests.

The Experimentation

Being a quasi experimental study with pretest–post test control group design, the process of experimentation was undertaken in three phases. In the first phase both Experimental and control group were pre-tested on the criterion variable of achievement in History by administering the Form 'A' of comprehensive test on History. Second phase of the experimentation process was the treatment phase at which the experimental group was taught the selected six concepts of History by following the sequential phases of ITMT strategy and the same concepts were taught to the Control group through the traditional method of teaching. Each lesson was followed by administration of the learning attainment test on the next day of treatment. At the third phase of experimentation both experimental and control group were post tested on the same dependent variable of achievement in History by administering Form 'B' of comprehensive achievement test in History.

Statistical Techniques followed

i. To study the nature of score distribution, mean and standard deviation were calculated and the data were tested for normality.

ii. To assess the effectiveness of ITMT, scores on leaning attainment tests on History were analyzed through the descriptive statistical measures of mean and percentiles.

iii. To study the comparative impact of ITMT and traditional method of teaching on the dependent variable, test of analysis of covariance (ANCOVA) was employed. Comparison of performances of the control and experimental groups on the Criterion variable was determined through comparison of adjusted mean scores (My.x) as an additional step of ANCOVA.

Analysis of Data and Decision regarding Major Findings

As the first step of analysis of data, nature of distribution of pre and post test scores of both control and experimental groups were studied in terms of certain descriptive statistical measures like mean and SD. The scores were tested for normality and found to be almost normal on Skewness and Kurtosis measures.

Table-1: Nature of distribution of scores on comprehensive achievement test in History

Curricular subject	Groups	Tests	N	Mean	SD
History	Control	Pre-Test	34	14.853	5.153
		Post-Test	34	17.853	5.153
	Experimental	Pre-Test	35	18.914	6.109
		Post-Test	35	22.629	5.325

Effectiveness of Inductive thinking model of Teaching (ITMT) on learners' achievement in History

Effectiveness of ITMT on learners' achievement in History was determined by analyzing the scores on the six learning attainment tests in terms of mean and percentile measures.

Table-2: Mean and Percentile measures on the six Learning Attainment tests in History

Leaning Attainments / Percentiles	Learning Attainment test-I	Learning Attainment test-II	Learning Attainment test-III	Learning Attainment Test-IV	Learning Attainment Test-V	Learning Attainment Test-VI
P90	58.48	60.5	62.03	70.4	68.75	73.25
P75	54.62	51.91	53.83	51.7	61.61	71.20
P50	42.75	40.32	47.5	44.7	67.25	67.75
P25	34.83	37.33	33.75	35.83	42.43	58.83
P10	30.5	32.75	31.16	29.83	34.83	42.75
Mean	41.83	40.20	45.86	43.45	55.21	64.83
SD	2.91	2.78	3.06	3.72	3.09	3.8

N.B. The Percentile values are presented in percentage.

Result presented in Table 2 depicts the following observations with regard to effectiveness of ITMT on learners' achievement in History.

i. The mean achievement score in History of the learners taught through ITMT is found to be more than 40.2% in all of the six leaning attainment tests which may fairly be considered as a satisfactory performance.
ii. 90% of students are found to secure more than 30.5% marks in five out of six learning attainment tests.
iii. 75% of students have secured more than 33.75% marks in all tests which may be considered as a good performance as 33% mark is considered as the pass mark in most of the achievement tests.
iv. 50% students have obtained more than 40.32% marks in all learning attainment tests which is quite satisfactory.
v. The best 25% students achieved more than 51.7% marks in six learning attainment tests.
vi. The upper 10% students achieved score more than 58.48% scores in all six learning attainment tests.

Decision

Students taught through ITMT are found to improve their performance as an increasing trend in achievement of scores is observed. Scores secured in Learning Attainment test VI is quite better than that of the test I & II which establishes the effectiveness of ITMT to enhance learners' performance in History. ITMT seems to be a comparatively better strategy for average and high achiever group students than their counterpart below average and poor students. A good average in performance establishes the effectiveness of ITMT on earners' achievement in History.

Comparative Impact of Inductive Thinking Model of Teaching (ITMT) on learners' achievement in History

With regard to the second objective of the study, the pretest and post test scores of both experimental and Control group on the comprehensive achievement tests on History were analysed. Since the study involved non-equivalent groups for experimentation purpose the test of analysis of covariance (ANCOVA) was employed for analysis of the stated data. Result of the test of ANCOVA is presented in Table-3.

Table-3: The Summary Table of ANCOVA Test on Comprehensive Achievement Test in History

Sources of variation	df	SS_X	SS_y	S_{XY}	$SS_{Y.X}$	$MS_{Y.X}$	F
Between groups	1	284.47	393.332	344.501	24.88	24.88	6.573
Within groups	66	2145.008	1840.436	1847.151	249.781	3.785	
Total	67	2429.478	2233.768	2191.652	274.661		

As it is presented in Table 3, the obtained 'F' value is found to be 6.573. When compared with the critical F value of 3.99 at 0.05 level of significance with df= 1/66, the obtained F value is found to be greater. As such the F value may be considered significant at P<.05.

Testing of Null Hypothesis (Ho_1)

As the obtained 'F' value yield through the test of ANCOVA is found to be significant at P<.05, the related null hypotheses H_{01} "the adjusted mean achievement score in History of the learners taught through Inductive Thinking Model of Teaching (ITMT) does not differ significantly from that of the learners taught through traditional method of teaching" was considered to be rejected. On the basis of such result of hypothesis testing it is inferred that the mean achievement scores of the experimental and control group differs. It indicates the existence of significant difference in the impact of ITMT and traditional method of teaching on learners' achievement in History.

However, such an inference does not establish which strategy has a comparatively better impact on achievement score in History. In order to ascertain the comparative impact of the two teaching strategies the adjusted mean scores were compared. The summary of such comparison is presented in Table 4.

Table- 4: Adjusted Mean scores of the Control and Experimental Groups on Comprehensive Achievement Tests on History

Groups	N	M_x	M_y	b within	$M_{y.x}$
Control	34	14.85	17.85	0.86	16.076
Experimental	35	18.91	22.63		22.913
General	69	16.913	20.275		

Table 4 depicts that the Experimental group has a higher adjusted mean score on comprehensive achievement test on History.

Findings

On the basis of the result of ANCOVA test and Comparison of the adjusted mean scores of both the groups, it may be inferred that achievement score on History of experimental group is higher than that of the control group. Since the test of ANCOVA is employed for analysis of data, such difference cannot be attributed to the initial differences between the groups. Thus such difference is justifiably attributed to the impact of experimental treatment that is teaching through Inductive Thinking Model of Teaching (ITMT).

Therefore it may be fairly concluded that Inductive Thinking Model of Teaching (ITMT) as a teaching strategy has a comparatively higher impact on learners' achievement in History than the traditional method of teaching. Further it is established through the scores on Criterion tests that Inductive thinking model of teaching (ITMT) is an effective teaching method for teaching the curricular subject of History.

Educational Implications

For Teachers

Findings of the study imply the need of adopting ITMT in classroom teaching in History and other curricular subjects of social studies. Teachers may use ITMT as a composite teaching

strategy or one of its component strategies of Concept formation, Interpretation of data and Application of principles when the teaching concept and condition necessitates so.

For Teacher Educators

The teacher education curriculum is still almost untouched regarding models of teaching. Teachers must be oriented and trained in use of the composite strategy of ITMT and its component strategies both at in service and pre service training programmes to provide effective and quality teaching in History and other subjects. Teachers must be trained in the skills involved in ITMT like asking eliciting questions, selecting teaching moves, hypothesizing, explaining, initiating thinking and the like. Such training programmes may be conducted in collaboration of the NCTE, NCERT, SCERT, RIEs, CTEs, IASEs and BSEs.

For Curriculum Workers & Test book writers

Curriculum workers and text book writers can follow the suggestions of ITMT to present the teaching concept in a manner to enhance the cognitive skills of their users. Suggestions related to the nine steps/ phases of ITMT may be incorporated in the text concept for enhancing the learning achievement of the students in History and other curricular subjects.

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