REASONING ABILITY OF HIGHER SECONDARY STUDENTS IN PUDUCHERRY REGION
By

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ABSTRACT

The main objective of the study was to find out the level of reasoning ability of the higher secondary students with respect to gender, type of school, subject group and locality of school. The sample size for the study comprised of seven hundred and twenty four students. The investigator used the reasoning ability scale prepared and validated by Joshi and Mahapatra (1994). The findings of the study indicated that i) Significant difference is found between male and female higher secondary students in their reasoning ability in analogical reasoning, classification as reasoning, electic reasoning, deductive reasoning and inductive reasoning. ii) Significant difference is found among government, aided and unaided schools of higher secondary students in their reasoning ability in classification as reasoning and electic reasoning. iii) Significant difference is found among pure science, mathematics and computer science group higher secondary students in their reasoning ability in inductive reasoning. iv) Significant difference is found among rural, semi-urban and urban school locality of higher secondary students in their reasoning ability in analogical reasoning, classification as reasoning, inductive reasoning and deductive reasoning.

INTRODUCTION

Solving problems through reason is called reasoning. Gate says, "Reasoning is productive thinking, in which previous experiences are organised and combined in new ways to solve a problem" (Kulshretha, 2005). Reasoning is a process of delaying response until data are arranged in a new combination so that a clearly perceived goal can be reached.

The mental exercise or the power of mind to deduce inferences from premises concerning all the information of sciences to argue, to examine, to think out, to bring by rationale is called scientific reasoning.

Scientific reasoning can be defined as: "Consistent logical thought patterns which are employed during the process of scientific inquiry that enables individuals to propose relationships between observed phenomena; to design experiments which test hypotheses concerning the proposed relationships; to determine all possible alternatives and outcomes; to consider probabilities of occurrences; to predict logical consequences; to weigh evidence, or proof; and to use a number of instances to justify a particular conclusion" (Steussy , 1984).

Studies on scientific reasoning have shown that a student's prior level of scientific reasoning is a good predictor of achievement in science classes (Johnson & Lawson, 1998). Scientific reasoning also greatly increases when students learn under inquiry instruction (Johnson & Lawson, 1998), and when students take multiple science courses (Rifkin &Georgakakos, 1996). Students were also found more likely to develop scientific thinking abilities in open-inquiry classes, than when taught in traditional science classes (Shepardson, 1997).

SIGNIFICANCE OF THE STUDY

Reasoning ability is recognised as the core element of human nature, whether it is in the teaching of Socrates or of Confucius (Chen, 2000). The goal of education is to prepare citizens with reasoning skills and to create a society with more rational. Reasoning skills are recognised as the key ability of a human being to create, learn and exploit knowledge. Therefore, reasoning ability has been of great concern in educational settings and the world of work. Reasoning ability is important to improve lifelong learning in response to challenges and lead a meaningful life and construct a rational better world. Therefore, current educational systems across the world have recognised the need to enhance students' reasoning ability (Bandana & Darshana, 2007).

OBJECTIVES OF THE STUDY

1. To find out whether there is any significant difference in the reasoning ability of higher secondary students with regard to gender.
2. To find out whether there is any significant difference among the reasoning ability of higher secondary students with regard to type of school, subject group and locality of school.

HYPOTHESES OF THE STUDY

1. There is no significant difference between male and female higher secondary students in their reasoning ability.
2. There is no significant difference among government, aided and unaided school higher secondary students in their reasoning ability.
3. There is no significant difference among higher secondary students of pure science, mathematics and computer science in their reasoning ability.
4. There is no significant difference among rural, semi urban and urban school higher secondary students in their reasoning ability.

RESEARCH DESIGN

The investigator adopted the survey method to study the influence of reasoning ability of higher secondary students. The survey method gathers data from a relatively large number of cases at a particular time. It attempts to describe and interpret what exists at present the conditions, practices, processes, trends, effects, attitudes and beliefs for which the survey type of research would be more relevant and useful.

POPULATION AND SAMPLE

The population for the present study consisted of higher secondary students in Puducherry region. The sample comprised of seven hundred and twenty four eleventh and twelfth standard students from 12 schools - government (4), government aided (5) and unaided (3) schools from Puducherry region.

TOOLS USED

The investigator used the reasoning ability scale prepared and validated by Joshi and Mahapatra (1994). It consists of 30 items with five dimensions namely analogy, classification, electic, deductive and inductive reasoning. Each item is provided with multiple choices. The minimum and maximum scores were 0-30 respectively.

ANALYSIS OF DATA

Hypothesis 1

There is no significant difference between male and female higher secondary students in their reasoning ability.

Table 1

DIFFERENCE BETWEEN MALE AND FEMALE HIGHER SECONDARY STUDENTS IN THEIR REASONING ABILITY

Dimensions of Reasoning ability	Male (N-427)		Female (N-297)		Calculated 't' value	Remark
	Mean	SD	Mean	SD		
Analogical reasoning	2.66	1.62	2.35	1.33	2.81	S
Classification as reasoning	3.02	1.64	2.58	1.34	3.97	S
Electic reasoning	2.50	1.62	2.12	1.03	3.86	S
Deductive reasoning	2.28	1.60	1.78	1.28	4.62	S
Inductive reasoning	2.10	1.86	1.39	1.31	6.05	S
Reasoning ability (Total)	12.65	6.69	10.23	3.97	6.09	S

S-Significant

It is inferred from the above table that the calculated 't' value is greater than the table value (1.96) for df of 722, at 5% level of significance. It shows that there is significant difference between male and female higher secondary students in their analogical reasoning, classification as reasoning, electic, deductive and inductive reasoning and its total.

Hypothesis 2

There is no significant difference among government, aided and unaided school higher secondary students in reasoning ability.

Table 2
DIFFERENCE AMONG GOVERNMENT, AIDED AND UNAIDED SCHOOL HIGHER SECONDARY STUDENTS IN THEIR REASONING ABILITY

Dimensions of Reasoning ability	Categories	Source of variance	Sum of squares	MSV	F-value	Remark
Analogical reasoning	Government Aided Unaided	Between Within	5.45 1648.82	2.73 2.29	1.19	NS
Classification as reasoning	Government Aided Unaided	Between Within	44.11 1671.33	22.06 2.32	9.52	S
Electic reasoning	Government Aided Unaided	Between Within	13.84 1443.84	6.92 2.00	3.46	S
Deductive reasoning	Government Aided Unaided	Between Within	1.45 1617.67	0.72 2.24	0.32	NS
Inductive reasoning	Government Aided Unaided	Between Within	1.11 2077.97	0.56 2.88	0.19	NS
Reasoning ability (Total)	Government Aided Unaided	Between Within	97.57 24732.42	48.79 34.30	1.42	NS

S-Significant, NS-Not significant   df (2,722), the table value of 'F' is 2.99

The above table shows that the significant difference is found among government, aided and unaided school higher secondary students in their classification as reasoning and electic reasoning. But there is no significant difference among government, aided and unaided school higher secondary students in their analogical reasoning, deductive and inductive reasoning.

Hypothesis 3

There is no significant difference among higher secondary students of pure science, mathematics and computer science in their reasoning ability.

Table 3
DIFFERENCE AMONG HIGHER SECONDARY STUDENTS OF PURE SCIENCE, MATHEMATICS AND COMPUTER SCIENCE IN THEIR REASONING ABILITY

Dimensions of Reasoning ability	Categories	Source of variance	Sum of squares	MSV	F-value	Remarks
Analogical reasoning	Pure science	Between	1.00	0.50		
	Mathematics				0.22	NS
	Comp.science	Within	1653.27	2.29		
Classification as reasoning	Pure science	Between	1.98	0.99		
	Mathematics				0.42	NS
	Comp.science	Within	1713.46	2.38		
Electic reasoning	Pure science	Between	6.85	3.42		
	Mathematics				1.70	NS
	Comp.science	Within	1450.83	2.01		
Deductive reasoning	Pure science	Between	11.39	5.70		
	Mathematics				2.55	NS
	Comp.science	Within	1607.73	2.23		
Inductive reasoning	Pure science	Between	26.20	13.10		
	Mathematics				4.60	S
	Comp.science	Within	2052.88	2.85		
Reasoning ability (Total)	Pure science	Between	104.16	52.08		
	Mathematics				1.52	NS
	Comp.science	Within	2472.82	34.29		

S- Significant   NS- Not Significant   df (2,722)   The table value of 'F' is 2.99

The above table shows that there is significant difference among pure science, mathematics and computer science subject group of higher secondary students in their inductive reasoning. But there is no significant difference in their analogical reasoning, classification as reasoning, electic reasoning, deductive and in total.

Hypothesis 4

There is no significant difference among rural, semi urban and urban school higher secondary students in their reasoning ability.

Table 4

DIFFERENCE AMONG RURAL, SEMI-URBAN AND URBAN SCHOOL HIGHER SECONDARY STUDENTS IN THEIR REASONING ABILITY

Dimensions of Reasoning ability	Categories	Source of variance	Sum of squares	MSV	F-value	Remarks
Analogical reasoning	Rural Semi-urban Urban	Between Within	66.33 1587.94	33.17 2.20	15.06	S
Classification as reasoning	Rural Semi-urban Urban	Between Within	143.78 1571.66	71.89 2.18	32.98	S
Electic reasoning	Rural Semi-urban Urban	Between Within	9.45 1448.23	4.72 2.01	2.35	NS
Deductive reasoning	Rural Semi-urban Urban	Between Within	27.11 1592.01	13.56 2.21	6.14	S
Inductive reasoning	Rural Semi-urban Urban	Between Within	25.08 2054.00	12.54 2.85	4.40	S
Reasoning ability (Total)	Rural Semi-urban Urban	Between Within	1042.38 23787.61	521.19 32.99	15.80	S

S-Significant   df (2,722)   The table value - 2.99

The above table shows that there is significant difference among rural, semi urban and urban school higher secondary students in their analogical reasoning, classification as reasoning, deductive reasoning, inductive reasoning and reasoning ability. But there is no significant difference in their electic reasoning.

FINDINGS AND DISCUSSION

1. Significant difference is found between male and female higher secondary students in their reasoning ability on analogical reasoning, classification as reasoning, electic reasoning, deductive reasoning and inductive reasoning. The male students have received better reasoning ability than female students. This may be due to the fact that the male students are much more curious to learn about science and scientific facts. Male students usually get more opportunities to go to science exhibitions and science fairs, symposiums, and workshops than female students.

2. Significant difference is found among higher secondary students of government, aided and unaided schools in their reasoning ability in classification as reasoning and electic reasoning. The higher secondary students of aided schools are found to be significantly better receiving reasoning ability on classification as reasoning and electic reasoning. This may be due to the fact that aided school students are provided with very good library facilities and are encouraged by the teachers for wide reading, so that the students may get wider thinking and reasoning power.

3. Significant difference is found among pure science, mathematics and computer science subject groups of higher secondary students in their reasoning ability in inductive reasoning. The higher secondary students of pure science groups are found to be significantly better in receiving reasoning ability in deductive reasoning and inductive reasoning. This may be due to the fact that pure science students learn many facts about physics, chemistry, and biology. So they are capable of analysing and synthesising things.

4. Significant difference is found among rural, semi-urban and urban school higher secondary students in their reasoning ability in analogical reasoning, classification as reasoning, inductive reasoning and deductive reasoning. The higher secondary students of semi-urban schools are found to be significantly better receiving reasoning ability in analogical reasoning, classification as reasoning, electic reasoning, inductive reasoning and deductive reasoning. This may be due to the fact that the semi urban school localities are well planned and they are capable of fixing their aspiration level. So the teachers and students are enthusiastically studying and experiencing scientific facts and concepts more clearly than urban and rural school students.

CONCLUSION

Reasoning ability is essential for problem solving and decision making. It enables people to make logical assessments, differentiate the good from the bad and understand simple and complex situations presented to them. Reasoning is therefore a very important aspect of human existence. Reasoning helps to generate new knowledge and to organise existing knowledge, rendering it more usable for future mental work. Moreover, reasoning is central to many forms of thought such as scientific, critical and creative thinking, argumentation, problem solving and decision making.

REFERENCE

1. Aseema and Gakher (2004). Social stress, locality and gender affecting academic achievement and reasoning ability, Journal of educational research and extension, 41(4), 60-66.

2. Bandhana and Darshana (2012). A study of home environment and reasoning ability among secondary school students, Developing country studies, 2 (1), 73 - 79.

3. Chen(2000).Extension of the TOPSIS for group decision making under fuzzy environment,114(1), 1-9.

4. Johnson and Lawson(1998). What are the relative effects of reasoning ability and prior knowledge on biology achievement in expository and inquiry classes, 35(1), 89-103.

5. Joshi (1994).Manual for reasoning ability. National psychological corporation, Agra 1.

6. Murugan and Thilagavathy (2014). A study on higher secondary students' reasoning ability and home environment, Research and reflections on education, 12 (4), 11 - 13.

7. Rifkin and Georgakakos (1996). Science reasoning ability of community college students, Ericdigests.org.

8. Shepardson and Britsch (1997). Children's science journals: Tools for teaching, learning and assessing. Science and children, 34, 13-17, 46-47.