

COMPARISON OF NATURALISTIC INTELLIGENCE OF SECONDARY SCHOOL STUDENTS

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It is the intrinsic quality of man to get attracted by the elements of nature and the various natural phenomena that occur in the surroundings. People are curious about the changes taking place in the world around them and try to establish cause and effect relationship between these changes. Almost every person is attracted towards the wonders and beauty of nature but there are some who are more sensitive towards nature as compared to others. These people are capable of noticing even miniscule changes taking place around them and are able to understand nature and its phenomena better than others. What is the cause behind this difference of human perception of nature? It simply happens because some people are more nature smart than others and possess a special type of intelligence in them termed as 'Naturalistic Intelligence'.

The concept of naturalistic intelligence was given by Prof. Howard Gardner in 2000 as the eighth intelligence added to his original theory of multiple intelligences. Naturalistic intelligence deals with sensing patterns in nature and making connections to elements in nature. Children possessing this type of intelligence may have strong affinity to the outside world or to animals, and this interest often begins at an early age. They may enjoy subjects, shows and stories that deal with animals or natural phenomena or they may show unusual interest in subjects like biology, zoology, botany, geology, meteorology, paleontology, or astronomy. People called nature smart are keenly aware of their surroundings and changes in their environment, even if these changes are at minute or subtle levels. Often this is due to their highly-developed levels of sensory perception. Their heightened senses may help them notice similarities, differences and changes in their surroundings more rapidly than others. People with naturalistic intelligence may be able to categorize or catalogue things easily too. Frequently, they may notice things others might not be aware of. As children these people often like to collect, classify, or read about things from nature - rocks, fossils, butterflies, feathers, shells, and the like.

During pre-historic times, hunter-gatherers used to rely on naturalistic intelligence to identify edible and non-edible flora and fauna. Today, naturalistic intelligence may be seen in the way we relate to our surroundings and the role that each part of our surrounding plays. People who are sensitive to changes in weather patterns or are adept at distinguishing nuances between large numbers of similar

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objects may be expressing naturalistic intelligence abilities. Naturalistic Intelligence allows people to distinguish among, classify and use features of the environment. The nature smarts may work as farmers, gardeners, botanists, geologists, florists, archaeologists, FBI agents who distinguish fingerprints and other such occupations.

Naturalistic intelligence can be defined as the ability to recognize plants, animals, and other parts of natural environment such as rocks, trees, flowers, clouds. These people may like doing activities related to nature such as fishing, hiking, camping. According to Gardner, individuals who are high in this type of intelligence are more in tune with nature and are often interested in nurturing, exploring the environment and learning about other species. These individuals are said to be highly aware of even subtle changes to their environments.

Naturalistic Intelligence is an intelligence that has been identified only recently. Those with this intelligence enjoy the earth's physical environment, are good at distinguishing among, classifying, and using features of the environment. Children with naturalistic intelligence have a strong connection to the outside world or to animals and enjoy outdoor activities. They notice patterns and things from nature easily. They love collecting flowers, rocks, shells etc. They may enjoy stories, shows or any subjects that deal with animals or natural happenings (events). They are interested in natural objects and care about animals or plants. The nature smarts may show interest in biology, astronomy, meteorology, and zoology. They also show an interest towards endangered species. They learn the characteristics, names, any information about species found in the world easily. Students with naturalistic intelligence are explorers, experimenters, classifiers, and ecologists who learn best by drawing conclusions upon known data.

The urban dwelling children of today lack experiences in the outside world as they spend much of their holidays in air-conditioned malls or playing organized sports or computer games, and have little chance to become acquainted with nature (Hoerr, 1997). The organized sports and structured outdoor activities, that they are likely to get engaged lack opportunities for self-direction, discovery or contemplative time in natural settings. Increasing urbanization and the centralized role of technology in 21st century households and schools are also associated with children's disconnection with the natural world. Children are increasingly engaged in 'virtual reality' and 'screen time' in the form of digital media including television, video games, computers and the Internet (Kaiser Foundation 2003, 2005). Thus they lack the intrinsic quality of being attracted by nature and its phenomenon. The quality of life on this planet requires that our children have experience with nature. We must provide the best educational learning opportunities for the Naturalist Intelligence. As electronic technologies become increasingly available and part of

our lives, it is essential to recognize that they do not replace human interaction and experience in the natural world. Therefore it is important to develop "naturalistic intelligence" of present generation and help them to make sense of the world of plants and animals.

Children by birth have a natural attraction towards nature and its phenomenon. If this natural instinct in them is supported by right opportunities in their growth years, we can help them become nature smart. A naturalist feels connected to his surroundings. John Muir puts this concept vital for the survival of all living things in the following words "We are related to everything in our environment. Understanding the naturalistic intelligence and cultivating it within our students is our responsibility not only as teachers but also as human beings". There is a need to aware our students towards threats from the natural environment which is the outcome of human greed and over-exploitation of natural resources.

If the present trend of resource depletion continues, soon certain finite threshold limit will be crossed and the survival of human civilization will be in jeopardy. In order to ensure active involvement of our future citizens towards conservation of biodiversity we need to bring about attitudinal change in them which is only possible by making them nature smart. This can shape them into individuals who will care, appreciate and respect the environmental resources. It will help in developing a close bond between man and nature as is seen in many tribal societies and indigenous people.

Further, it is self evident fact that whenever society needs to develop awareness it takes the help of education. "What society is and what societies want is evident in the way society educates its young" (Havighurst and Neugarten, 1957). Therefore this big task obviously comes to the age old agency of education. To the context of environment, school comes as a driving force which facilitates students to adjust in the newer environment. School is a basic agency which provides effective citizenship for the society. It is always viewed as a mini society to imbibe and nurture the basic values, virtues and the habit of positive progressive thinking. Thus it is the right place to sensitize our students towards global concerns so that they can play their effective role to drive away all such concerns.

It is a well known fact that organizational climate of schools run by different educational agencies vary greatly. As the organizational climate of the school affects the learners, the need for the present study was felt to ascertain whether the naturalistic intelligence of adolescents studying in schools run by the Government, Minorities and those recognized by the government differ or not? Thus the present study was conducted under the title- "Comparison of Naturalistic Intelligence of Secondary School Students studying in schools run by various educational

agencies."

Objectives

To compare the naturalistic intelligence of the tenth grade students studying in different types of schools:

- Government and Minority schools
- Government and Recognized schools
- Recognized and Minority schools

Methodology

The present study belongs to the category of descriptive field research and includes composite characteristics of causal comparative research.

Population and Sample: The Population of the study comprised of all the students studying in class X in the urban schools run by Government, recognized and minorities. 600 adolescents drawn from 18 Secondary and Senior Secondary schools of Varanasi City run by various educational agencies, constituted the sample for the present study. 200 students each from government, recognized and minority schools were selected on the basis of multi stage random cum cluster sampling technique.

Tool Used: Self constructed naturalistic intelligence test (NIT) was used to measure the naturalistic intelligence of the students. It consists of 50 multiple choice questions based on the environmental awareness and understanding of the students. The reliability of the tool obtained using KR 21 formula was found to be 0.76 and split half reliability using odd-even split was 0.81. The validity of the tool was determined by finding its face validity and predictive validity. The face validity of the tool was found on the basis of expert judgment given by ten experts. On the basis of the literature review of naturalistic intelligence prediction was made that naturalistic intelligence is positively related to the achievement of the students. Keeping this assumption in view the predictive validity of the tool was determined by correlating the NIT scores of 600 students with that of their achievement scores. The Karl Pearson's product moment correlation was found to be 0.65 which is significant at .01 level, proving the test as a valid one. Thus the test named as NIT was found to be valid.

Statistics used: Keeping the nature of the distribution under consideration it was decided to apply non-parametric statistics for analyzing the data collected. As the size of the sample was large Mann Whitney U Test was used to find out the difference between the groups and Kruskal Wallis one way analysis of variance by ranks was used to ensure that the sub groups under study were independent of each other and the difference between them is not due to chance factor.

Data Analysis and Interpretation

Table-1. Showing the comparison between the groups applying Kruskal Wallis one way analysis of variance by ranks

Sl.No.	Types of Schools	Mean Rank (N=200)	H	Level of significance
1	Government	312.19	19.397	.05 (H value = 5.99)
2	Recognized	330.86		
3	Minorities	257.70		

Observation of table-1 shows that the obtained value of H for the three groups under study is 19.397. This value of H is greater than the value required for significance at .05 level (0.599). Hence we can conclude that the specified three groups of educational agencies differ significantly in their naturalistic intelligence. The result also suggests that all these groups are independent of each other and have not been drawn from the same population.

The objective of the study was to compare the naturalistic intelligence of tenth grade students studying in schools run by various educational agencies. This objective has three sub objectives; results of which have been presented in tables-2 to 4. The first sub-objective attempts to make a comparison between the tenth grade students studying in government and recognized schools.

Table-2 Comparison of naturalistic intelligence scores of tenth grade students studying in government and recognized schools

Type of School	No. of Students	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	P value (2 tailed)
Government	200	194.34	38867.50	18767.5	-1.067	0.286
Recognized	200	206.66	41332.50			

It is clear from table-2 that the observed value of P (0.286) is greater than α value .05, hence the p value is not significant at .05. So, the null hypothesis stating there is no significant difference in the naturalistic intelligence of tenth grade students studying in government and recognized schools is accepted. The result establishes the fact that the tenth grade students of government and recognized schools do not differ in their naturalistic intelligence.

The second sub-objective was to compare the naturalistic intelligence of tenth grade students studying in government and minority schools.

Table-3 Comparison of naturalistic intelligence scores of tenth grade students studying in government and minority schools

Type of School	No. of Students	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	P value (2 tailed)
Government	200	219.01	43801.50	16298.5	-3.205	0.001
Minority	200	181.99	36398.50			

Observation of table-3 reveals that the value of P (0.001) for $z \leq -3.205$ is less than α value .05; hence p is significant at .05 level for any two-tailed test. So, the null hypothesis is rejected. Hence we can conclude that there exists a significant difference between the naturalistic intelligence of tenth grade students studying in government and minority schools and the difference is in favour of government schools. It means that the naturalistic intelligence of tenth grade students studying in government schools is higher than their minority counterparts.

The third sub-objective was to compare the naturalistic intelligence of tenth grade students studying in minority and recognized schools.

Table-4 Comparison of naturalistic intelligence scores of tenth grade students studying in minority and recognized schools

Type of School	No. of Students	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	P value (2 tailed)
Minority	200	176.25	35249	15149	-4.200	0.000
Recognized	200	224.76	44951			

Observation of table-4 reveals that the value of P (0.000) for $z \leq -4.2$ is smaller than α value .05; hence p is significant at .05 level for any two-tailed test. So, the null hypothesis stating there is no significant difference in the naturalistic intelligence of students studying in minority and recognized schools is rejected. Hence we can conclude that the tenth grade students of minority and recognized schools significantly differ in their naturalistic intelligence and the difference is in favour of recognized schools. It means that the naturalistic intelligence of tenth grade students studying in recognized schools is higher than their minority counterparts.

Discussion:

The first sub-objective attempts to make a comparison between the tenth grade students studying in government and recognized schools. So, the null hypothesis stating there is no significant difference in the naturalistic intelligence of tenth grade students studying in government and recognized schools is accepted. The result establishes the fact that the tenth grade students of government and recognized schools do not differ in their naturalistic intelligence. This finding may adhere to the teaching learning situation present in government and recognized schools although there is a marked difference in their organizational climate. The mean NIT score of both the schools differed only marginally and is just average. The low value of naturalistic intelligence is supported by the fact that the urban dwelling children lack experiences in the natural world. This indicates that the teaching methodologies followed in both the groups of institutions are not conducive for the development of naturalistic intelligence of the students.

The second sub-objective was to compare the naturalistic intelligence of tenth grade students studying in government and minority schools. Findings revealed that there exists a significant difference between the naturalistic intelligence of tenth grade students studying in government and minority schools and the difference is in favour of government schools.

The probable reason for this finding lies in the organizational climate and teaching-learning strategies followed in these schools. Although both government and minority schools receive government funds the co-curricular activities are better and frequently being organized in government schools as compared to the minority schools. Government school teachers are also better qualified as they have to go through stringent process of selection while the minority schools appoint teachers who do not have professional experience at low salaries. This causes the difference in teaching methodologies of these schools. The third sub-objective of the first subsidiary objective was to compare the naturalistic intelligence of tenth grade students studying in minority and recognized schools. Findings revealed that the tenth grade students of minority and recognized schools significantly differ in their naturalistic intelligence and the difference is in favour of recognized schools. The probable reason for this finding is due to the difference in the organizational climate of minority and recognized schools. As the minority schools receive funds from the government the managerial boards of these schools do not feel the need to raise public funds. So, they do not focus on following innovative practices to attract more admissions and lay more stress on the academic development of the students. They mostly follow traditional methods of teaching which is more or less teacher dominant. The children studying in these schools get little chance to explore through various co-curricular activities and innovative learning practices prevalent in the modern days. The teachers working in these schools get paid lesser in comparison to their government counterparts and lack professional qualification as well as the motivation needed for implementing innovative strategies of teaching. On the contrary, the recognized schools do not receive any fund from the government and are profit making organizations. So, they focus on attracting more admissions. In order to gain publicity and get more admissions they frequently revise their teaching methodologies and organize in-service trainings, workshops, and interaction program for their teachers. They use audio-visual technologies, role plays, visits, group discussion, power-point assignments etc. to enhance the learning capacities of their students. They also involve the children in various co-curricular activities and take initiatives to increase the participation of students in these activities. This helps to enhance the naturalistic intelligence of the students of recognized schools and also helps in increasing their adjustment to the surroundings in congruence with the previous finding.

This finding can be of major significance for the school managerial boards of minority schools. The managerial board of minority schools should review their organizational climate once every year and try to make it conducive to inculcate naturalistic intelligence in the students.

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