The Impact of Parents’ Education towards the Science Aptitude of the Students at Elementary Level in Southern Punjab

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Abstract
This study analyzes the impact of parents’ education towards the science aptitude of the students at elementary level in Southern Punjab. To study the impact of parents’ education towards the science aptitude of the students at elementary level, the technique of correlation was used. The students were divided into two groups on the basis of parents’ education. The students having both fathers and mothers graduate or above qualification were scored 1 while the students having uneducated both fathers and mothers were scored 0. There were 1127 students whose fathers and mothers were graduates or above while there were 3641 students whose fathers and mothers were uneducated. The correlation coefficient (r) between science aptitude score and parents’ education score calculated by Pearson Product Moment Correlation was 0.63. The mean of science aptitude score of students having parents with graduate or above education is 20.05 and mean of science aptitude score of students having uneducated parents is 15.98. There is positive magnitude, high relationship and 40% variance between students having parents with graduate and above education shows and students having uneducated parents. So, at the time of admission in secondary classes in science education, parents’ education should be seriously considered with other factors.

I. Introduction
To get maximum output from young generation, their skills should be identified and enhanced especially for economic growth of the country. Abilities of a child should be tested continuously for guidance. In start, they should be provided conductive environment for mental growth and capabilities of leadership and innovativeness. For example, in the formative years, the education should focus on morality, discipline healthy sports, games and 'the general meaning on good'. In the age of 5 to 10, the education should focus culture, concepts of religion, history, geography, language, science and mathematics. After this, there is a need to test the aptitudes of the students to decide future education keeping in mind individual aptitude and capabilities. In the age of 11 to 18, students should be taken to check whether the child is correctly responding to the course properly and after 18 students need to check professions of their aptitude and specializations (Chatterjee, 2007). Aptitude is a natural ability or skill in learning that varies from individual to individual. It indicates individual’s interests and helps
individual to choose his profession according to his capacities. Aptitude is variously defined as innate learning ability (Ramsay, 2008), the specific ability needed to facilitate learning a job, aptness, suitability, readiness, tendency, or natural or acquired disposition or capacity for a particular activity (Reeves, 2002), degree of readiness to learn and perform well in a particular situation or in a fixed domain (Corno et. al., 2002), any characteristic that is a forerunner of success (Reed and Wolniak, 2005). According to Salkind & Rasmussen (2007, p. 39), aptitude can be defined as:

“Therefore, aptitudes are described as a set of characteristics that relate to an individual’s ability to acquire knowledge or skills in the context of some training or educational program.”

Salkind and Rasmussen (2008, p. 47) further say:

“Aptitude is the individual differences that are related to subsequent learning during a fixed time frame. The learning or acquisition of knowledge or skills can occur in formal intervention (training or education) or in informal setting (experience or mentoring).”

It means aptitude for a specific characteristic may occur for a time period and may vary with time. This definition reflects current capabilities and tendencies that develop through learning opportunities and environmental influences. Salkind & Rasmussen (2008, p. 47) further say:

“Aptitude comprises individual differences that are innate and largely unchangeable and immutable in normal circumstances.”

This definition supports the concept that aptitude will remain unchanged under the same conditions. According to Kubiszyn and Borich (2003):

“Aptitude is another name for potential or ability. In such system students are compared neither to other students nor to established standards.”

Each individual may have different aptitude. So, comparison of aptitude will have no value. Score in academic aptitude test is the expectation form the student. According to Answer.com (2009, p. 1), aptitude is:

“Intellectual ability of an individual to learn material sufficiently so that he can properly perform the business task required on the job. Some individuals have a natural talent and tendency for specific business areas.”

Aptitude indicates the natural ability of an individual that may be scholastic, vocational or about a business. So, an aptitude is an innate (About.com, 2007), acquired or learned or developed component of a competency to do a certain kind of work at a certain level, natural ability to acquire knowledge (Wikipedia, the free encyclopedia, 2007), capability or ability (Brainy Quote, 2008), innate or acquired capacity for learning (Merriam – Webster Online dictionary, 2008), readiness or quickness (The Free Dictionary, 2008) in learning, the state or quality of being apt (Accurate and Reliable Dictionary, 2008). Aptitudes may be physical or mental. The innate nature of aptitude is
in contrast with achievement (Doctormassy.com, 2007) that represents knowledge or ability that is gained (Absolute Astronomy.Com, 2009).

Aptitudes may be physical or mental. Aptitude and intelligence quotient have effects on one another positive or negative. Intelligence quotient considered intelligence the only measurable latent trait and aptitude divides mental ability into many different characteristics, which are independent to each other. A casual analysis of any group of test scores will prove the high correlation between aptitude and intelligence (ScienceDaily, 2008). There are two aspects of aptitude; first, the aptitudes are present conditions and inherence and environmental factors are not in the concept of aptitude. Aptitude cannot measure directly the future success of an individual but can be used as indicator of future success (Salkind & Rasmussen, 2007). Second, aptitude relates with the individual differences that is the combination of innate and environmental influences. Aptitude reflects current behaviors and tendency of learning. Learning includes cognitive abilities, personality traits, interests and values. All these can be considered aptitude and can be evaluated. Researchers have proved that aptitude is the combination of heritable and environmental components and is unchangeable in normal circumstances. So Aptitude and situations are correlated (Salkind & Rasmussen, 2008). According to this conceptualization, specific cognitive skills, as well as specific forms of social and cultural capital constitute aptitudes (Bourdieu, 1986). But inborn characteristics have also impact on aptitude but it is described on present skills (Coleman, 1988). The concept of aptitudes has implications for practices like student grouping. The concept of aptitudes negates the concept of problem for slow learner and boring for high achiever. Given the proper situation, according to the aptitude, higher achieving students would be able to role model and lower achieving students would be able to relearn and rethink. So, aptitude grouped the students heterogeneously, would require trust and respect from every student (Braddock II and Williams, 1996). Human capital theory and concept of aptitudes both have very different origins. Human capital theory explains investment decisions in higher education and on-the-job training. According to human capital theory, education raises earnings (Becker, 1993). Human capital theory believes that decision-making for individual capacities should be based on economics while the concept of aptitudes is expressed in social context (Reed & Wolnaik, 2005). One of the most powerful implications of the concept of aptitudes is that every individual has equal opportunity to learn. For example, the concept of aptitudes empowers the use of OTL (Opportunity to learn) standards. Aptitude tests assess the readiness to learn and what kinds of opportunities to learn. An individual that is not adjustable in an educational field but may be active in an educational filed that is according to his aptitude. So every individual has equal opportunity to learn according to his aptitude (Braddock II and Williams, 1996). Aptitude in specific field of an individual helps the individual in high achievements in that field.

Aptitude is used to predict future performance (Reeves, 2002) while achievement is a characteristic that is an indication of past instruction and experience that is planned changes in cognitive behavior (Haladyna, 2004) and ability is a measure of current competence Yesterday’s achievement is today’s ability and tomorrow’s aptitude (Assessment, 2008; About Intelligence, 2008). Aptitude is the potential to attain ability and achievement is an improvement in ability (Salkind & Rasmussen, 2008). Aptitude is considered as synonymous with intelligence but aptitude has broader perspective (Salkind
Aptitude enables a person to perform a task while attitude determines how well the person performs that task (Nobles and Thompson, 2001). A person, who has very good aptitude, may have failed because of his attitude (Yahoo Answers, 2008). One can train a person to have the aptitude but cannot train him to have the traits above or to have a positive attitude (Notowidigdo, 2007). An employee’s aptitude is often tested for the recruitment or selection but evaluation of attitude is necessary for selecting a suitable person (Nobles and Thompson, 2001).

Aptitude and interest are often thought of as being equivalent but these are different concepts (Karmal & Karmal, 1978). Interest cannot be measured directly but it related to general intelligence and special aptitude and is determined by social environment and activities of an individual. Interest is not as consistent as a aptitude (Shahid et al., 2003). Aptitude and interests are essential. Next are values. Personality encompasses some of interest and values. So, aptitude and interest have relation and have effect on each other. Both aptitude and interest are helpful in future educational and career decisions but are different terms (Career Vision, 2006). In term future education or career, no one can neglect the importance of science. Science helps students to apply varied set of skills (About Intelligence, 2008). Science aptitude is the potential for success in future in the field of science. An individual having science aptitude must enter in science or technical education otherwise he or she will not be successful in the field of science. Certain study skills, science and heredity background are helpful in determining science aptitude. Other factors like physical, social, emotional developments, moral character, interests, abilities and attitudes may also be considered for the development of science aptitude (Digumarti, 1994). Measurement of science aptitude is a challenge (Employment Equity & Diversity, 2005).

II. Purpose of the Study

A number of factors may affect the aptitude of an individual especially in young age and the present study aims at “Impact of Parents Education towards the Scientific Aptitude of the Students at Elementary Level” The purpose of the study was to help in making decision about the students entering science at secondary level while keeping their parents’ education in view.

III. Population

All students of class VIII of each sex of government high schools of Southern Punjab were treated as population of the study. Total number of students in government high schools of Southern Punjab was 114526 in January 2008 (Punjab Examination Commission, 2008).

IV. Sampling

High schools of Southern Punjab were selected randomly, considering the possible access of researcher but schools of each Tehsil (Urban and rural as well as male and female) were included in sample. The students of class VIII of these schools were treated as sample of the study. Students of class VIII were selected by calling their roll numbers randomly (e.g. 1, 5, 6, 9, 20, 26 etc.). However, in the case of small number of students in the class, whole of the class was selected for the sample. High schools Southern Punjab were randomly selected and then 11239 students of class VIII of each sex of these schools of were treated as sample of the study. The crucial aspect of standardization is sampling including two important variables: size and representativeness. The sampling
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must accurately reflect the target population and it must be sufficiently large to reduce standard error of normative data to negligible propositions. No statement can be made about sampling without relating with population from which it is derived. A small but representative normative sample is far superior to a large but bias sample. Large samples minimize sample errors (Kline, 1986). To decide the target population and sample; mean age and range should be given where possible (Loewnthal, 2003). To make population homogenous, the population was selected from Southern Punjab where there are 14 districts and same language is spoken almost in all areas (Lonely Planet, 2008; Mapsoft.Net, 2008). Similarly to make sample homogenous, students of class VIII between the age of 13 and 14 years were taken in sample.

V. Methodology

To study the impact of parents’ education towards the scientific aptitude of the students at elementary level, the technique of correlation was used. The students were divided into two groups on the basis of parents’ education. The students having both fathers and mothers graduate or above qualification were scored 1 while the students having uneducated both fathers and mothers were scored 0. There were 1127 students whose both fathers and mothers were graduates or above while there were 3641 students whose both fathers and mothers were uneducated. The correlation coefficient (r) was calculated between science aptitude score and parents’ education score by Pearson Product Moment Correlation as:

\[ r = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\{N\sum X^2 - (\sum X)^2\} \{N\sum Y^2 - (\sum Y)^2\}}} \]

Where
- \( r \) = correlation coefficient
- \( N \) = number of students
- \( X \) = students Score
- \( Y \) = parents’ education score

(Blerkom, 2009)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Parents’ Education Category</th>
<th>No. of Students</th>
<th>Parents’ Education Score</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Graduate and above</td>
<td>1127</td>
<td>1</td>
<td>0.63</td>
</tr>
<tr>
<td>2</td>
<td>Uneducated</td>
<td>3641</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

N = 4768

Table 1 shows that the coefficient correlation (r) between parents’ education score and science aptitude score is 0.63

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Parents’ Education Category</th>
<th>No. of Students</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Graduate and above</td>
<td>1127</td>
<td>20.05</td>
</tr>
<tr>
<td>2</td>
<td>Uneducated</td>
<td>3641</td>
<td>15.98</td>
</tr>
</tbody>
</table>

N = 4768

Table 2 shows that the mean of science aptitude score of students having parents with graduate or above education is 20.05 and mean of science aptitude score of students having uneducated parents is 15.98.
VI. Findings
i. Table 1 shows that the coefficient correlation (r) between parents’ education score and science aptitude score is 0.63.
ii. Table 2 shows that the mean of science aptitude score of students having parents with graduate or above education is 20.05.
iii. Table 2 shows that the mean of science aptitude score of students having uneducated parents is 15.98.

VII. Conclusion
i. In term of magnitude, a positive magnitude indicates that with the increase of one score, other also increases. Students with graduate parents have more score in science aptitude test than the score of students with uneducated parents.
ii. For strength, the correlation coefficient 0.63 shows the high relationship.
iii. Variance is the square of the r that is 0.40. So amount of overlap between two variables is 40 percent (Magno and Ouano, 2009).
iv. High mean of the students having parents with graduate and above education shows high science aptitude than students having uneducated parents. (Blerkom, 2009)

VIII. Recommendations
There is positive magnitude, high relationship and 40% variance between students having parents with graduate and above education shows and students having uneducated parents. So, at the time of admission in secondary classes in science education, parents’ education should be seriously considered with other factors.

High mean of the students having parents with graduate and above education shows high science aptitude than students having uneducated parents. So, students with high science aptitude may allow entering in science education at secondary level whether their parents are educated or uneducated.

References


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Magno, C. and Ouano, J. (2009). Designing the Written Assessment of Student Learning, Manila: De La Salle University.


