ISSN - 0973 - 8614

VOLUME 8 NUMBER 2 April - June, 2013

# VETRI EDUCATION

(QUARTERLY JOURNAL)


VETRI PUBLICATIONS
VENKATESWARA COLLEGE OF EDUCATION
PUDUCHERRY

# Vetri Education (Quarterly Journal in Education)


| | | | |
|---|---|---|---|
| 1. | Name of the Journal | : | **VETRI EDUCATION** |
| 2. | Language | : | English |
| 3. | Periodicity | : | Quarterly |
| 4. | Printer, Publisher and Owner | : | Er. **G. GANESH**, B.Tech. |
| 5. | Chief Editor | : | Prof. Dr. **MAMOTA DAS**, M.A., (Psychology) M.Ed., Ph.D. |
| 6. | Full address of the place | : | (Vetri) Venkateswara College of Education, Rada Boobalan Educational Campus, 2nd Cross, J.J. Nagar Extension, Moolakulam, Puducherry-605 010. E-mail:vetriorgpondy@gmail.com |


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# VETRI EDUCATION

**Volume 8** **Number 2** **April-June, 2013**

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# Editor's Note

**Dear Readers,**

We are presenting you the second issue of the electronic form of our Journal Vetri Education, Vol. VIII (2013) after removing the shortcomings in the first issue and improving in style and appearance. The title and name(s) of authors of articles of Volumes I-VIII are given after the articles. As usual the issues will be available by the middle of the first month in the quarter at: www.vetrieducation.com Authors and subscribers can receive a PDF file of the Journal on request, providing e-mail address. The Vetri Group looks forward to the continued support and encouragement to the new format.

The first article in this issue: *Effect of Problem Solving Teaching Method on Elementary School Students' Learning of Physics* by **Asrat Dagnew** describes the effects of problem-solving teaching method on elementary school students' physics achievement at Dudmgne elementary school, Ethiopia and reveals its advantage over conventional methods.

*Handling Learning Disabled in Class Rooms* by **Asha Gopalan** and **Amruth G. Kumar**, second article of the issue, highlights the pitfalls of the existing training programmes and emphasises the desirability of training by effectively addressing learning disabled in the regular class.

**Ram Mohan Tripathi** and **Gagandeep Kaur** describe their study leading to the finding that there is significant effect of stress on intelligence of adolescents, in their article: *Impact of Stress on Intelligence of Adolescence,* third of the issue.

*Study of the Teacher's Perception about the Mathematical Behaviour of the Child and Achievement,* the fourth article of the issue by **Subha Anantharaj**, concludes that teachers' perception about their students' mathematical behaviour does not contribute to the achievement in the case of high achievers; but does contribute significantly in the case of low achievers.

The fifth article, *Multiple Intelligence and Mathematics Achievement* by **R. D. Padmavathy**, conveys that interpersonal intelligence is the highest and the most common intelligence among students. Also, there is no significant relationship between achievement in mathematics and multiple intelligences.

The sixth and last article: *Risk Taking Behaviour in relation to Emotional Intelligence of Adolescents* by **Amardeep Kaur** and **Sonika** presents the observation from their study that there is significant correlation between risk taking behaviour and emotional intelligence; but exhibited no change influenced by difference in sex.

**Vetri Education** expresses sincere appreciation and thanks for the valuable contributions and encouragement from authors, subscribers and all our well wishers, along with the earnest services of Mr. P. R. Anebarassane Rada and Mr. N. R. Prabu for their inputs for the successful and timely publication of the issues of the Journal.

**Academic Editor,**
**Vetri Education**

Vetri Education, Quarterly Journal (ISSN-0973-8614), VIII (2), 2013, 7-15

# Effect of Problem Solving Teaching Method on Elementary School Students' Learning of Physics

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## Abstract

This study describes the effects of problem-solving teaching method on elementary school students' physics achievement at Dudmgne elementary school, Woreta Administrative Town, South Gondar Zone. In this investigation an experimental research procedure was used. For this, a sample of sixty students was drawn from a total of three hundred and seventy eight students, using lottery method of sampling technique. Physics achievement test (pre-test and post-test) covering the unit: Introduction to Electronics was used as measuring instrument. Based on the pre-test scores, mixed ability groups such as fifteen high and fifteen low scoring 30 students were assigned as experimental (13Fand17M) and control (15F and15M) groups, again using lottery method. Students in the experimental group were taught employing problem solving teaching method while those in the control group were instructed with conventional lecture method. Both groups were taught the unit (Introduction to electronics) for a month, 40 minutes per period, totally ten periods each. The post-test constructed by the author in the sample unit taught was administrated to both groups immediately after the treatment was over. The research data were collected from both groups through physics achievement test (PAT) pre-test before and post-test after treatment with video observations at the time of treatment. Independent sample t-test was applied to check the meaningful differences between the averages accordingly. The results of the study revealed that problem solving teaching method was more effective in teaching physics, compared with lecture method, at elementary school level.

**Key words: Elementary school, problem solving, teaching method, achievement**

## Introduction

Technology and science have become bench marks for measuring the rate of economic development and advancement of all countries which are reflected in the various aspects of their national cultures and practices. By now, when technology is thought, the primary thing that comes to mind is physics because its principles applied in information technology have reduced the world into a global village through the use of satellites and computers.

In this respect, physics - one of the natural sciences – receiving much emphasis from government, is taught independently starting from grade 7 and students are enabled to learn it at a high level of proficiency in achieving those goals by seeing, living, creating and relating their previous knowledge and experiences with the new learned information, leading to breeding individuals who can reach, research for information and can produce new information as well as create individuals who question the problems they face and bring solution using qualitative sketches, diagrams and figures etc. that make the problem easier to solve. Piaget (1969) explained knowledge as acquired from others by means of social interactions in their culture.

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This interaction focuses on interpreting and understanding, not just memorizing. Thus, the two important goals of physics instruction are to help students achieve a deep conceptual understanding of it and develop powerful problem solving skills. Likewise, problem-solving is an investigative activity that the problem-solvers explore the solution path to reach a goal based on the given information (Woolfolk, 1993)

Besides, problems typically used in traditional physics teaching are frequently goal-directed, narrow, disconnected as well as simplistic. By goal-directed, it is meant that students are given problems, very specific objectives, such as calculating physical quantities.

In Ethiopia, particularly, at Woreta Administrative Town (WAT), the analysis made on the results of Amhara Regional Examinations in the years 2002 E.C. and 2003 E.C. revealed that grade eight students achieved in physics far below what was expected in the primary school leaving certificate physics examinations at Dudmegne, Woreta, Workmeda and Sheleko full cycle elementary schools. Surprisingly, at Sheleko, no one had scored 50% and above in the years mentioned.

Further, classroom observations and information gathered from physics teachers, students, supervisors and school principals revealed similar achievement problem in this subject due to various factors. This seemed to happen as students' solutions to problems were entirely formula centred devoid of qualitative sketches, diagrams and figures that contribute in understanding this subject. In this case, students keep away from physics since it has been perceived as difficult. As a result, they become unable to solve problems at the required level of proficiency. Among other factors, the reason includes students' perception that physics is too hard (Smithers and Robinson, 2007).

Hence, to alleviate such problems, various teacher supportive activities have been undertaken at elementary as well as secondary school levels to improve their qualities aimed at promoting problem solving and quality education. For instance, The Teacher Education System Overhaul (TESO) Program is undertaking a thorough revision and modernization of the teacher education system. Continuous Professional Development (CPD) has been introduced with two components: the first is a two-year induction program for new teachers while the second one is for those who are already in the system. English Language Improvement Program (ELIP) is also introduced to improve the quality of teaching.

Hence, the blame is most often levelled on those elementary school physics teachers who used wrong approaches in teaching this subject, particularly the traditional chalk and talk method which is teacher-centred, along with other factors such as school facilities, students' interest, motivation, background, availability of instructional materials and the like. As Duferra (2006) reported, lecture method - teachers talk and students listen – dominates most classroom activities.

Scholars, therefore, suggested that employing appropriate and effective teaching methods are critical in achieving grasp in physics successfully. To identify the most suitable teaching method for physics, scholars suggested and students at elementary level desired for conducting an experimental research.

Similarly, the central qualities of problem-solving rest on its potential to facilitate the construction of knowledge and its transfer of learning from one context to another as well as to encourage the transfer of responsibility for learning from teacher to student. On this, Newton (2008) believed that problem-solving is an approach that presents what is to be learned as a scientific problem; possible solutions or explanations are normally investigated practically.

However, many research findings indicated that most teachers in primary schools are not competent enough to divert from usually employed traditional teaching methods (ICDR, 1999). Teachers use chalk and talk method of teaching in which they are active and students are restricted to listen to what teachers talk about. This pushes students to memorize information and facts from their text books. While Shibeshi (2009) considered rote memorization as the most effective method of teaching, even though it results in serious knowledge deficits in students in science, beginning from the lower grades, Bueche (1988) discounted it as a fruitless way to try to learn physics.

In the background of these facts and against the existing situation of a large number of students failing or earning less than 50 % of marks in physics in full cycle elementary schools of Woreta, Dudmegne, Workmeda and Sheleko regions in the past few years, the researcher desired to investigate the effects of problem solving teaching method on elementary school students' physics achievement at Dudmgn full cycle elementary school.

## Discussion

This study attempts to answer the following research questions:

1. Is there any statistically significant difference in physics achievement between students taught through problem solving teaching method and those taught using lecture method at elementary school level?

2. Do students in the experimental group participate actively in the classes of the sample unit?

*Research Design*

*Subject*

The study employs an experimental research methodology where students are sampled as experimental and control groups. Based on their pre-test results, lottery method of random sampling technique is used. Besides, pre-test and post- test, comparisons were made in actual experimental design by detecting mean score differences between those groups before and after treatment using t-test. Both the experimental and the control groups of students as well as video recorded classroom observations form the sources of data.

The population of this study comprised all 'grade eight' students of Dudmgn, Woreta, Sheleko and Workmeda full cycle elementary schools at Woreta Administrative town, South Gondar Zone. The total population, therefore, was 1063(556Fand 507M) grade 8 physics students in the four similar full cycle elementary schools of the same town. Among these full cycle elementary schools, Dudmgn was selected purposely as a sample since it is around the work place of the researcher to access relevant information easily. Based on the pre-test results, mixed ability groups (30) such as fifteen high and fifteen low scoring students each were considered as experimental (13Fand17M) and control (15Fand15M) groups. (Five students, who scored medium score in the pre-test, were excluded from the study).

*Instruments*

Based on the requirement, the pre-test and post–test as well as video recorded classroom observations on the interaction among the experimental group of students (and with the researcher) were used as data gathering tools. In this respect, Physics Achievement Test (PAT) was constructed by the researcher in grade 8 physics text book, in the unit: Introduction to electronics, to measure sample students' knowledge of fundamental concepts, skills on recalling the relationships between (or among) concepts as well as the application of those skills to problems.

A pre-test consisting of 25 closed ended questions was constructed in the sample unit by the researcher. Each item was made to have four alternatives, one point each as well as to represent the contents of the unit equally; to know the knowledge of sample students in the subject area selected.

While the treatment was conducted at the target school, the unit introduction to electronics was taught for both the experimental and control groups by the researcher using the same time schedule with different teaching methods. In this manner, students in the control group were taught using lecture method, whereas students in the experimental group were taught through problem solving teaching method. Both groups were taught for a month, in 40 minute periods, for ten periods (400 min.) each, using ten lesson plans for each group as indicated in the syllabus and the teacher's guide.

Along with this, video classroom observations were undertaken while students in the experimental group were taught the sample unit through problem solving approach to collect detailed data. In doing this, video camera was adjusted and raised on a long table facing those students and recorded what were observed and heard in the class for about 15 to 20 minutes in each lesson, totally 150 to 200 minutes. Later, the records were observed and the strong sides as well as gaps about students learning were identified daily by the researcher. In the next period, the strong sides were encouraged while the gaps were filled through interactions until the lesson was completed.

Finally, a post-test (different from the pre-test, in content but the same in form), constructed in the unit taught by the researcher was prepared and validated was administered to both groups after treatment. It had 25 closed ended questions with four alternatives, one point each, and properly representing the contents of the unit taught. The data thus collected from the tests and video recorded classroom observations were subjected to statistical analysis and word narration respectively.

*Method of data analysis*

The data collected, based on the research questions, formulated and tests, conducted were analyzed using mean score, standard deviation, and independent samples' 't'-test accordingly. The video recorded data on classroom observations' were subjected to word narration. Finally, analysis and interpretation of data, discussion, summary, conclusion and recommendations were made.

*Results of the study*

Based on the research questions and study requirement, results obtained through pre-test and post-test as well as video recorded classroom observations were analysed. Primarily, the pre-test and post-test data were loaded in to a computer via SPSS for windows package. Then, the differences of the means between the experimental and control groups were tested at alpha 0.05 before and after treatment using two-tailed independent sample t-test since the leading questions formulated were non-directional. In this manner, the data were presented in three parts: first, characteristics of sample students; second, analysis and interpretation of pre-test and post-test scores and third, discussion on the results and video recorded data.

*Characteristics of sample students*

The minimum and maximum age, the standard deviation of age and the mean of age, sex frequency and sex percentage of sample students as well as the mean ages and the standard deviation of ages for the control and experimental groups are calculated and presented in Table-1.

**Table 1: Age and sex related statistics for sample students**

| Groups | N | Min. age | Max. age | Mean age | S. D. age | Sex frequency m | Sex frequency f | Sex(%) m | Sex(%) f |
|---|---|---|---|---|---|---|---|---|---|
| Sample students | 60 | 13 | 18 | 15.47 | 1.17 | 32 | 28 | 53.3 | 46.7 |
| Control Group | 30 | 14 | 17 | 15.50 | 1.07 | 15 | 15 | 50 | 50 |
| Experimental Group | 30 | 13 | 18 | 15.43 | 1.27 | 17 | 13 | 56.7 | 43.3 |

The standard deviation of age and the mean age of sample students were found to be 1.17 and 15.47 respectively. These exhibited that students involved in the sample seemed to have homogeneous age because their standard deviation of age was very close to their mean age either below or above as it is indicated in the table.

The mean ages and standard deviation of ages of the control and experimental groups also revealed the homogeneous age of sample students of this study. Sex frequency exhibited the number of female (28) and male (32) students represented in the total sample involved in the study. These were found valid statistically.

Similarly, sex percentage revealed the percentage size of female (46.7) and male (53.3) students from the total number of sample students involved in the study. These were also found valid statistically.

*Analysis and interpretation of data*

Both the pre-test and the post-test scores of the experimental and control group of students were gathered before and after treatment, arranged and analyzed using mean scores (M), standard deviations (S. D.) as well as independent samples' t-test as statistical tools at alpha level 0.05 to interpret the results accordingly.

Further, the pre-test means, the standard deviations as well as the t-test values were calculated and presented in Table 2. In this case, a 't'-test was applied to check the difference between the pre-test averages of the experimental and control groups to see if it was meaningful or not as shown in the Table.

**Table 2: 't' Of the expert-test pre-test result of expmt. and control groups**

| Groups | N | M | S. D. | df | t-cal. | 't'- Critical | P- value |
|---|---|---|---|---|---|---|---|
| Experimental Group | 30 | 7.63 | 2.72 | 58 | 0.00 | 2.01 | 0.999 |
| Control Group | 30 | 7.63 | 2.41 | | | | |

df, degree of freedom; S. D. standard deviation

The achievement mean scores of the experimental group (M=7.63) and control group (M=7.63) were found exactly the same out of a maximum possible mean score of 25. This exhibited the non-existence of mean score achievement difference between those groups before treatment. In a similar way, there was only a small difference in standard deviations between experimental group (S.D., 2.72) and the control group (S.D., 2.41). This revealed that students in both groups had almost homogeneous features before treatment.

Likewise, the calculated t-value (t= 0.00) at $p>0.05$ was found smaller than the standard t-critical table value (t-critical = 2.01) after the analyzed results were compared and thereby the difference between the averages was not statistically significant with t-test at (df, 58, t-calculated, 0.00, t- Critical, 2.01 with $p >0.05$. In this case, the null hypothesis was accepted, as it was an indicator for the absence of statistical significant difference between the mean scores of physics students involved in the sample groups. Similarly, the greater p-value than 0.05 alpha level proved that there was no statistically significant difference obtained between the mean scores of those groups with respect to their pre-test results as shown in Table 2.

Thus, those statistical values in table 2 demonstrated that the physics achievement levels of both groups were found to be the same before treatment. This indicated that sample students involved in the study exhibited comparable characteristics which were important in comparing the effects of problem solving teaching method and lecture method on students' achievement in physics.

The post-test means, the standard deviations as well as the t-test value were calculated and presented in Table 3. In this regard, a't'-test was applied to check the difference between the post-test averages of the experimental and control groups to ascertain true significance.

**Table 3: 't' - test for post-test results of the experimental and control groups**

| Groups | N | M | S. D. | df | t-cal. | 't'- Critical | P- value |
|---|---|---|---|---|---|---|---|
| Experimental Group | 30 | 15.97 | 2.03 | 58 | 5.11 | 2.00 | <0.0001 |
| Control Group | 30 | 12.97 | 2.49 | | | | |

Significant at $p<0.05$ alpha level

As can be seen from the results in Table 3, the achievement average of the experimental group (M, 15.97) was found higher than the average of the control group (M, 12.97). This revealed that students exposed to problem solving teaching method achieved better mean score in the sample unit than those subjected to lecture method. In a similar way, the standard deviation of the experimental group (S.D., 2.03) was found smaller than the standard deviation of the control group (S.D., 2.49). This also revealed that students in the experimental group have homogeneous features while those in the control group heterogeneous.

Likewise, a 't'-test was applied to check whether these groups differed significantly on physics achievement test (PAT) post-test mean scores or not. As a result, the analyzed results in table 3 illustrated that students instructed by problem solving approach received higher achievement mean score in the sample unit than those instructed by lecture method and thereby a statistically significant difference was maintained with a t-test since the calculated t-value (t-cal, 5.11) was higher than the standard t-critical table value (t-critical, 2.01) that favoured the experimental group over the control group from the statistical aspect of (df58, t cal(5.11), t-critical, 2.01) with $p<0.0001$. Besides, the smaller p-value than 0.05 alpha confirmed the statistically significant difference obtained between the means of those groups with respect to the post-test scores.

Ultimately, all the aforementioned statistical values in table 3 revealed that students exposed to problem solving approach achieved better mean score and standard deviation in the sample unit, compared with those instructed through lecture method because the mean scores difference between the experimental and control groups was found statistically significant with a t- test at (df=58, t(5.11), (t-crit, 2.01), with $p<0.0001$. This showed that the problem solving strategies applied in the study have helped students in the experimental group to learn the sample unit better than those in the control group subjected to lecture method.

*Discussion of results*

The current study aimed at investigating the effects of problem solving teaching method on elementary school students' achievement in physics. For this, mean scores and standard deviations comparisons were made in the performance in physics before and after treatment for the experimental and control groups.

Inference on the analysis of data from Table 2 led to that there was no statistically significant difference in the pre- test measures of the experimental and control groups. On the other hand, as the post-test achievement mean scores as well as standard deviations were compared, it was found that students taught by problem solving teaching method had better achievement than those taught by lecture teaching method as shown in table 3; where the difference was found statistically significant with a 't'-test. As a result, it was determined that problem solving teaching method had increased the achievement of physics students at a higher level than lecture teaching method with both groups exposed to identical situations except the difference in teaching method.

This implied that problem solving teaching method had positive effects on the achievements of physics students in the experimental group as compared with the achievement of the control group subjected to lecture teaching method. It indicated that the use of problem solving teaching method helped students to have a deeper understanding of fundamental concepts, skills on recalling the relationships between (or among) concepts as well as the application of those skills to solve problems in the sample unit taught than those who were instructed through lecture method. In contrast to this, teaching students to solve problems is based on the hypothesis that knowledge is organized and stored in memory in sequential and logical networks (Anderson, 1992) and thereby retrieved step by step in a sequential manner to solve problems.

Problem solving strategies taught to the experimental group as checked through camera recorded observations have induced positive effects in achieving the sample unit through experience sharing, identifying and correcting misunderstandings, working in team, interacting with friends as well as with the teacher (researcher), applying strategies in the right place and time, realizing weak points in team discussions and taking corrective measures, supporting each other, relating prior knowledge and experiences with the new learned information. In this case, knowledge is something unified, coherent and inter-related rather than being made up of separate bits and pieces of information (Leu, 2000).

Results from Table 3 exhibited the difference between the achievement averages of those groups analyzed with independent samples 't'-test was found to be in favour of the experimental group of students from statistical aspect (df=58, 't' (5.11) =2.01), $p<0.0001$) which likely played a significant role in reducing students prior perception that physics is too hard, since prior conceptions of learners determine to a large extent what each individual can learn from a particular situation (Hestenes, 1996). According to Newton (2008), problem-solving is an approach that presents what is to be learned as a scientific problem, possible solutions or usually possible explanations are generally investigated practically.

## Conclusion

Physics teaching, employing problem solving method, has been found by reliable experimental and statistically significant analytical method as superior to conventional class room lecture method and thus becomes worthy of adoption in as many schools as possible. Also, this method should be tried in teaching other science subjects and incorporated in the curriculum and text books for school students from primary level. Teaching general problem solving strategies during schooling enhances students' problem solving skills in their daily life situations, a bonus teachers can offer and students can earn, in addition to learning more effectively the difficult subjects.

## Recommendations

Based on the findings, the following suggestions are presented:

- Physics teachers had to adopt the use of problem solving strategies at elementary schools in order to facilitate students' proper learning of physics
- Curriculum developers should make use of the present finding while planning design of syllabi and textbooks for elementary school physics to encourage problem solving teaching method
- Wider research (comprising other science subjects) and more intense research in the field to develop more efficient teaching methodologies have to be supported and encouraged

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**CURIOUS FACTS, MATERIALS, PROCESSES AND BIOACTIVITIES**

## Just add water (In Chemical Reactions, Water adds Speed without Heat)

Forget a spoonful of sugar, a drop or two of water is what makes the reaction go down. For reactions in which hydrogen is one of the reactants such as a hydrogenation or a hydrogenolysis the addition of a trace quantity of water can accelerate the process, according to international researchers. Writing in the journal Science, teams led by Manos Mavrikakis of the University of Wisconsin-Madison and Flemming Besenbacher at the University of Aarhus, Denmark, explain for the first time how water can speed up such reactions without requiring the heat to be turned up, even if it is added at the parts per million level. The team investigated experimentally and theoretically the effects of water on metal oxide catalysts and demonstrated tiny numbers of water molecules can increase the diffusion of hydrogen atoms by 16 orders of magnitude by acting as a medium for proton hopping.

## Cholesterol confusion (Statins 'could benefit the healthy')

175,000 patients from 27 separate trials suggests that even healthy people could lower their risk of heart disease by taking regular statin drugs to lower the levels of "bad" LDL (low-density lipoprotein) cholesterol. The second paper reveals that raising levels of "good" HDL (high-density lipoprotein) cholesterol does not necessarily reduce the risk of heart disease. This latter finding runs counter to the pharmaceutical industry's motivation for find drugs to raise HDL cholesterol.

## Sleepy orphan finds new home in cancer treatment ('Orphan Drug' Used to Treat Sleep Disorders May Be a Potent Cancer-Fighting Agent for Many Malignancies)

Researchers at the Fred Hutchinson Cancer Research Center in Seattle and their colleagues have demonstrated that an inexpensive "orphan drug" previously tested for treating sleep disorders is also a potent inhibitor of cancer cell growth.

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# Impact of Stress on Intelligence of Adolescence

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## Abstract

Stress plays an important role in the development of intelligence and personality of individuals especially the adolescents; its influence is steadily increasing with increase in stress promoters in the life and environment of the modern population. Thus, impact of stress in adolescence and ways to control and regulate it for productive purposes gain importance. Stress is a force / pressure in one's efforts to maintain the balanced and beneficial mental state and in the process the individual suffers some degree of discomfort, not sparing adolescents too. The present study is conducted on a sample of 100 students of Ferozepur district. General Mental Ability Intelligence Test (Jalota, 1972) and Bisht Battery of Stress Scales (Bisht, 1987) have been employed as the major tools for data collection. Our study reveals that there is significant effect of stress on intelligence of adolescents. Our finding of the influence of stress on intelligence of adolescents needs to be taken note of by parents, teachers and educational administrators to help them develop proper education and human resource development through intelligence, providing opportunities in the curriculum and favourable environment.

**Key words: Intelligence, adolescence, impact of stress**

## Introduction

"Education is the key that opens the eyes of a person towards the brightness of the world": says Dr. S. Radhakrishnan, the philosopher, teacher and former President of India.

Education is the process by which individual is encouraged to fully develop his or her potential. It may also serve the purpose of the individual with what is necessary to be productive members of society. Education is a field where knowledge passes through all walks of life from person to person with verifying degrees. It helps an individual to move towards the goal set and it may be said that people search these goal through clear-cut paths. Education, in real sense, is to humanize and to make life progressive, cultured and civilized. Education is concerned with continuous human resource development and civilization.

The success of an individual does not merely depend upon imbibing of knowledge, information and techniques only in the present scenario, but also on many aspects like his/her behavior, personality, attitude, home environment, family background, academic achievement, stress, adjustment, anxiety and emotional intelligence etc. It is observed that the state of adolescence is the transitional stage between late childhood and adulthood. During the phase of adolescence the individual is neither a child nor a grown up. Adolescence is characterized by absence of sufficient emotional stability and is thus, known as the period of strain and emotional instability. Life's stress contributes negatively in maintaining mental health and consequently physical health. It affects every human being from the time of birth till death.

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Students are not exception to it; some level of stress within the class room is inevitable. When there is stress that the students cannot cope with, the teacher must try to help overcome or lessen the same. More over, the student has to learn the art of dealing with many kinds of stresses, inevitable in his life now and in future. It is found that gradually students acquire the skill to deal with this stress. Competence in dealing with stress comes from a series of successful performances and from the psychological and emotional reinforcement of self confidence. Innovation behavioral technique is one of such exercises, to help students to manage stress.

Although the concept of stress has maintained an important place in psychology for a long time, its importance has magnified against the general competition, indiscipline and confusion of the present time. Stress is a strain or force for the student in his efforts to maintain his original state and, in the process suffer some degree of discomfort. Life would be simple, enjoyable and stress-free if one's physiological and psychological needs are automatically satisfied; but there are both environmental and other obstacles in the path towards fulfillment of desires, causing interference and stress. The effect of stress on intelligence is briefly studied in this article.

## Discussion

Warr and Well (1975) defined stress as a term for an individual's experiences of tension, anxiety, fear, discomfort and the associated physiological disorders, resulting from aspects of the work situation which deviates from the optimum.

*Intelligence*

In the description of an individual as successful in meeting general life situations, "What is there for intelligence to contribute towards his success?" is a question whose answer has been attempted by psychologists in different ways, resulting in so many varied definitions. Intelligence is an abstract quality, common to all intellectual processes: sensation, perception, memory, imagination and reasoning. Intelligence is the capacity for constructive thinking directed for the attainment of favourable end. In general terms it refers to the ability of an individual to adopt or adjust to learn or to carry out abstract thinking. Man is considered to be endowed with certain cognitive abilities, which make him a rational being. He can reason, discriminate, understand, adjust and face new situations and work up for the solution of problems while no other animals are capable to act likewise. All human beings are also not alike and individuals differ with each other. Some learn with good speed; others remain lingering too long. These differences, no doubt, can be attributed to interests, attitudes, aptitudes etc., but the main reason of it is attributed to a fact, which is known as intelligence. Since times immemorial, efforts have been made to understand the nature of intelligence but still there exists some fog around it.

Each individual develops values through his experiences in life. Such experiences are made for certain meaning, expectance and interpretation with values content, like small children attaching notation of good and bad, right and wrong to different behavior. Once they develop and apply their power of critical and constructive thinking, they should also be able to analyze situations, make judgment, generate appropriate feelings, formulate sound opinion and adopt desirable behavior with morality in particular and value in general. Adequate intellectualization, deep internalization and faith, strong feelings and a powerful will or commitment should mark mature value attainment.

*Adolescence*

Adolescence is the most crucial and significant period of an individual's life. This stage is between 14-18 years and separates childhood and youth. This is the time when the child starts realizing the self concept. During this stage the adolescent passes through various stresses like sociological, psychological and emotional and the one, mainly considered in this study: academic stress. The adolescents, realizing their self concept try to enhance confidence through their sense of humour.

During the period of adolescence development occurs rapidly. In this period understanding of complex social relationship, sex instruction and moral education through activities are needed. It is the period of revolutionary changes in the individual in physical, mental, moral, spiritual and social out look. Human personality develops new dimensions and intellectual-wise, cognitive development occurs in this period.

Mohanty (1982) studied occupational stress and mental health in executive's comparative study of the public and private schools. It was found that private sector executives, in general, experienced greater job stress, mental health problems and perceived greater organizational support than public sector executives.

Mirchindani (1976) found that the adolescents at the lower intelligence level were the worst adjusted and needed the greatest attention as compared to adolescents of higher intelligence level.

*Significance of the study*

Present age of science and technology has increased the complexities of life. Progress that human race made in science and technology has made life more fast, busy and mechanical. Living in the company of machines man has himself becomes a machine. The softness of human emotions is completely replaced by the advent of machinery. In modern times, everyone is busy and running after the comforts and luxuries that one doesn't have. Everyone desires more and more. This article is a limited study on the influence of stress on intelligence of the adolescence.

*Aim of the study*

Study on the impact of stress on intelligence of the adolescence

*Sample*

In research it is impossible to study the whole population for which the problem is investigated hence every research has to resort to sampling (Kothari, 2000). A sample is the representative position of the population selected for observation and analysis. A sample of 100 students was taken from the schools of Ferozepur district for this study.

*Objectives*

- To study the effect of different levels of stress on intelligence of adolescents
- To study the levels of stress in relation to their gender
- To study the intelligence in relation to their gender

*Hypotheses*

The hypotheses of the study are:

- There is no significant effect of stress on intelligence of adolescents
- There is no significant difference in intelligence by difference in gender of adolescents
- There is no significant difference of stress by difference in gender of adolescents.

*Tools used*

The selection of suitable tools is very important in the collection of data in any research work. Following tools were used for data collection in the present study: General Mental Ability Intelligence Test (Jalota, 1972) and Bisht Battery of Stress Scales (Bisht, 1987).

*Statistical techniques used*

Mean, Median, Standard Deviation, Coefficient of correlation are employed for the analysis of the data (Garrett, 2005).

*Procedure*

The present study is a descriptive survey, conducted on the sample of 100 adolescents, 50 each from two schools – Government Boys' Senior Secondary School and Government Girls' Senior Secondary School of Ferozepur district.

After scoring the research tools as per standard procedure, the obtained scores by the subjects were statistically analyzed in order to examine the validity of the hypotheses and attainment of the objective of the study. The use of T-test was made to assess the significance of mean difference in stress and intelligence among adolescents. The results are presented in tabular form (Tables: 1-3) for convenience and explanations are provided below each Table.

**Table 1: Data in relation to hypothesis 1**

| S. No. | Variable | N | Correlation value | Level of significance |
|---|---|---|---|---|
| 1 | Stress | 100 | 0.198 | Significant at |
| 2 | Intelligence | 100 | | 0.05 and 0.01 levels |

Table-1 shows that correlation of stress and intelligence of adolescents is 0.198. Compared to the table value at 0.05 level as 0.195 and 0.01 level as 0.254, experimental value 0.198 is large and highly significant; hypothesis 1 is thus, rejected. We can say that there is effect of stress on the intelligence of the adolescents.

## Table 2: Data in relation to hypothesis 2

| S. No. | Variable | N | Mean | S.D | S. Ed. | 't' - ratio | Level of Significance |
|---|---|---|---|---|---|---|---|
| 1 | Stress of males | 50 | 160.94 | 31.59 | 6.45 | 1.45 | Not significant at 0.05 and 0.01 level |
| 2 | Stress of females | 50 | 170.32 | 32.92 | | | |

Table-2 gives the mean scores of stress of male adolescents as 160.94 and female adolescents, 170. 32. S. D. of the stress of the male adolescents is 31.59 and S. D. of stress of female adolescents is 32.92 respectively. S. Ed. is 6.45 and critical ratio is 1.45. It shows that mean difference in stress scores of the male and female adolescents is not significant at both 0.01 and 0.05 levels. This shows that there is no significant difference in stress in relation to gender difference of adolescents. Hence the hypothesis: there is no significant difference in stress in relation to gender difference of adolescents, is accepted.

## Table 3: Data in relation to hypothesis 3

| S. No. | Variable | N | Mean | S.D | S. Ed. | 't' - ratio | Level of Significance |
|---|---|---|---|---|---|---|---|
| 1 | Intelligence of males | 50 | 46.22 | 10.64 | 2.30 | 0.73 | Not significant at 0.05 and 0.01 level |
| 2 | Intelligence of females | 50 | 44.54 | 12.26 | | | |

Table-3 shows that means scores of intelligence of male adolescents is 46.22 and for female adolescents 44.54. S. D. of intelligence of male adolescents is 10.64 and S. D. of intelligence of female adolescents is 12.26 respectively. S. Ed. is 2.30 and critical ratio is 0.73. It shows that male and female adolescents show no significant difference in the level of confidence at 0.01 and 0.05 level. It means that there is no difference in intelligence in relation to gender of adolescents; the hypothesis: there is no significant difference in intelligence in relation to difference of gender of adolescents is accepted.

*Main finding of the study*

Based on the data presented in Tables 1-3 and the analysis and interpretation thereof, the main findings of this limited study are:

- The correlation of stress and intelligence of adolescents is significant, suggesting the significant effect of stress on intelligence of adolescence
- Regarding the difference in intelligence, through gender difference, it is found that males and females have same intelligence level
- There is no significant difference in stress level caused by difference in gender; both males and females have same stress level

## Conclusion

In the light of the main finding of the study, the conclusion can be stated that Stress has been found to have a significant effect on the intelligence of adolescents. Minimizing stress will help improving intelligence and there by enhance educational capabilities. There is no significant difference in the intelligence of males and females and also in their level of stress, needing equal attention for both boys and girls from their parents, teachers and other contributors to their wisdom and studies.

## Suggestions

The present study undertaken for a limited sample of adolescents from a particular locality can be widened for a large sample as well as from different geographic regions to derive more reliable inferences on the effect of stress.

Similar studies can be made using students of Technical schools, Colleges and Polytechnics. Also, the effect of stress on language studies, spoken and writing skills and other types of communication and organisational skills can be examined and suitable suggestions offered to the authorities, for general improvement of students in intelligence and education.

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The study involved high-throughput robotic screening that focused on a specific gene associated with cancer to identify compounds in a database that can inhibit the protein expressed by the gene. The compound targets the products of the "Myc" gene which is over-active in brain, breast, lung, ovary and liver cancers. The same approach opens up a new route to finding drugs to fight cancer with the added advantage of identifying orphan drugs that have already gone through initial safety testing.

## Soon, Men Can also Pop Contraceptives

Scientists are a step close to developing a contraceptive pill for men, after identifying a new gene critical in the production of healthy sperm. Researchers have found the gene, Katnal 1, controls the final stages of sperm development and could result in temporary infertility, if blocked. The discovery could lead to the development of medicine to interrupt the production of fertile sperm without causing permanent damage, scientists believe. The study, at the centre for reproductive health at the University of Edinburgh, is thought to make the successful production of a contraceptive pill for men more likely in the near future. Dr. Lee Smith, from the University, said if the gene was blocked, the testes would continue to produce sperm, only releasing immature, ineffective sperm, which had not developed into the final stages. He told BBC: "If we can find a way to target this gene in the testes, we could potentially develop a non-hormonal contraceptive. The important thing is that the effects of such a drug would be reversible because Katnal 1 only affects sperm cells in the later stages of development, so it would not hinder the overall ability to produce sperm". He added that it would be "relatively difficult" to do as the protein lies inside cells, but there was "potential" to find another substance that protein worked with as an easier target.

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Vetri Education, Quarterly Journal (ISSN-0973-8614), VIII (2), 2013, 23-35

# Handling Learning Disabled in Class Rooms

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## Abstract

Responding to learning disabled (LD) requires a collaborative approach at the school level, focusing on the academic downfall together with its social and behavioural implications. All major policies on education suggest adaptations in teaching, teacher preparation and infrastructure that ensure no child is left out. The present study is an attempt to look into the ways learning disabled are handled in our class rooms. Eight teachers were interviewed with the help of their responses to a set of six open ended questions. Three basic themes emerged from analysis of participants' responses: identification of LD learner, LD learner in the classroom and teacher training. It was concluded that the identification strategies adopted by teachers lacked scientific support. The teaching strategies suggested by these teachers were in accordance with the literature collected. All the teachers highlighted the pitfall in ongoing training programmes but stressed the importance of training by effectively addressing learning disabled in the regular class.

**Key words: Learning disability, identification, class room handling, teacher training**

## Introduction

Learning disability (LD), the largest category of special need learners (Clark, 1997; Clark and Artiles, 2000) has attracted the concern of educationists and researchers especially in the inclusive culture of schooling that aims at identifying various categories of learners with special needs and addressing them in regular classrooms.

"Learning disability is a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. These disorders are intrinsic to the individual and presumed to be due to central nervous system dysfunction. Even though a learning disability may occur concomitantly with other handicapping conditions (sensory impairment, mental retardation, social and emotional disturbance) or environmental influences (cultural differences, in-sufficient/inappropriate instruction, psychogenic factors), it is not the direct result of those conditions or influences" (NJCLD, 1988).

LD is characterized by problems with processing of information and is marked by extreme discrepancy between actual ability and achievement with the cause of such a discrepancy not being apparent. Another concomitant condition of LD that often goes unaddressed is the psychosocial challenges faced by these children in schools (Morrison and Cosden, 1997; Shechtman and Pastor, 2005).

In India, learning disability studies geared up in late twentieth century (Ramaa, 2000). LD has so far not been able to find place in the list of disabilities mentioned in 'Persons with Disabilities Act 1995' probably due to non-observation of its severity; but it is being addressed in Indian schools through the Sarva Siksha Abhiyaan (SSA).

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The learning disabled tend to have low peer status and less preference by the teacher (Garrett and Crump, 1980) leaving the element of social integration unaddressed. This exigent situation requires framing of specialized strategies by teachers and educationists for the successful accommodation of learning disabled in the general classroom.

## Discussion

*How teachers handle learning disability – a global overview*

With the growing stress on mainstreaming learning disabled learner in the inclusive class, the general classroom teacher's perception of learning disabled and their treatment is significant. There have been differences among practitioners on the approaches for learning disabled. Some educators feel that direct instruction will be feasible for them (Camine *et al*., 2004; Ellis, 2005; Swanson, 1999) whereas some practitioners advocate learner-cantered approach as they think it will make learning need-based and so help in better assimilation (Bryson, 1993; Graham and Harris, 1989). Being actively involved in the learning process, learner-cantered approach helps in learning complex content (Gersten *et al.*, 2006) enhancing learning disabled learner's self concept and self determination (Wehmeyer *et al*., 2003). But most often the curriculum for learning disabled is graded down in complexity forbidding them from acquiring necessary skills for meeting their demands independently in adulthood (Ellis, 2002; Deshler and Lenz, 1989).

It can be summarized that choosing effective strategy for learners is dependent on the teacher. Teacher should have the necessary skills in adapting the curriculum to the academic and psychosocial needs of learning disabled learners and transacting it effectively to them with no risk to other learners, ensuring quality for their typically developing peers at the same time. The studies indicate that teacher is pivotal in moulding a bright future for children with learning disability. Need for specialized teachers is highlighted to identify and cater to the needs of learning disabled effectively. Present study is an attempt to look into the ways learning disabled are handled in our classrooms. Identifying teachers having learning disabled pupils in their class and then looking into the ways they are handled in the classroom was a difficult task for the investigators. As time was a major constraint, the investigators used their personal contacts with school teachers to identify those teachers who have pupils with learning disability in their class rooms. Eight such teachers were identified. Thus the investigators adopted a qualitative approach in the present study.

*Important aspects of the present study comprise:*

- How teachers identify learning disabled in their classrooms
- How are they addressed by teachers in the classrooms
- What are the inputs given to teachers during their in-service training programmes in this regard and their effectiveness for handling the issue

*Methodology*

The methodology outlines the research approach in the selection of participants, design of the study and materials and data collection for analysis.

*Participants*

There were 8 participants in this study with three male and five female. The participants included teachers from lower primary, upper primary and high school sections and a Block Resource Centre (BRC) trainer. All the teachers had more than ten years experience in school practices.

Participants were made aware of the nature of this study, their role in it and provisions for confidentiality. Participants' names were changed for the purpose of secrecy and pseudonyms were used in the results section of this paper.

*Design of the study*

The study employed Appreciative Inquiry (AI) as the methodological framework. AI involves the art and practice of asking questions that strengthen either a system's or a person's capacity to apprehend, anticipate and heighten positive potential (Cooperrider, Whitney and Stavros, 2003). It seeks to build upon achievements, unexplored potential, innovations, strengths, competencies, stories, lived values, traditions and visions. Taking all these together, AI seeks to link these positive insights directly to a change agenda.

*Materials*

Interview sessions were conducted for all the eight participants. All the sessions lasted 20 - 30 minutes. The session had a set of six open ended questions seeking free response from the participants; the questions are given below. All the responses from the participants were recorded with utmost care avoiding any subjectivity.

- Is it easy to identify LD learners?
- How will you respond to / treat LD learners in class room?
- Is it possible to rectify problems of LD learners?
- What are the difficulties, you face, in this regard?
- Are you getting training for handling LD learners as in-service input?
- Do you think that training can equip you to take care of their disability?

*Data analysis*

The process of data analysis was guided by objectives of the study and review of literature. All the responses of the participants were closely examined with the purpose of evolving some initial categories and underlying themes. The categories and themes identified are discussed in the discussion of results section.

*Discussion of results*

The conclusions made here are based on detailed analysis of participants' responses. The following themes were identified: identification of LD learner, LD learner in the classroom and teacher training. All the findings of the study are discussed under these three themes.

*Identification of LD learner*

Early identification is the key to addressing the problems of learning disabled. All the participants in this study have adopted observation as an important technique in their classroom for locating LD learners. This involves close and continuous observation of learner's activities in the classroom. LD learners are marked by slow and negative response in the classroom. For example, Sridevi says that when presenting a narrative in the class the child becomes very passive as it finds it very difficult to comprehend. The child becomes reclusive and never contributes to class discussion.

Sethumadhavan and Vilasini say that careful observation of answer sheets reveals their expressive writing disability. Fathima Bevi, a class II mathematics teacher recalls that there is a child in her class who finds it difficult to correctly count numbers up to 20.

Sara Mathew expresses her difficulty in identifying writing disability cases in class I. "No stress is laid on the strokes in alphabet formation. The new methodology emphasizing that child be given the opportunity to correct in due course of time, makes it very difficult to identify writing problems in the early stages."

While majority of participants believed that identification of LD learners is possible in general classroom, some teachers pointed out that irregular continuous evaluation practices in school and the new methodology adopted as the main factors, affecting the identification process. All the participants felt that the LD learners in their classes exhibited poor academic performance.

The identification strategies suggested by the participants were somewhat similar to previous findings. In their studies, Kirk and Elkins (1975) and Norman and Zigmond (1980) found academic underachievement to be the primary criteria for LD placement. Classroom observation has been used along with other tools like teacher rating scales and achievement test in various research studies (McKinney and Feagans, 1984; Bender, 1987).

Some studies suggest employing continuous progress monitoring for individual and classroom assessment. Englert *et al*. (1988) found that LD learners lack important skills in writing, like text organization and self monitoring one's writing process.

Awareness of this category of special need learners among most teachers is surely one milestone achieved in the inclusive education programme. After identification the child is referred to the Block Resource Centre (BRC) and medical professionals for further assessment. What is noticeable here is that the classroom teacher adopts the traditional discrepancy formula whereas the BRC trainer propounds identification strategy similar to the response-to-intervention formula. This lag in classroom teacher's demands increased professional orientation.

It is to be noted here that no input is given to teachers in pre-service training regarding the scientific process of identification of various types of disabilities. So the basis on which teachers carry out this complex process is questionable. LD is often confused with language impairments (McArthur *et al*., 2000) and co-occurrence of ADHD and autism. Also, difficulty in learning may sometimes occur due to anxiety, depression or emotional problems that affect learner's concentration. Inappropriate assessment may lead to misleading incidence rates for LD (NJCLD). Research emphasizes application of alternative approaches in addition to the traditional discrepancy formula for effective LD classification (Fletcher *et al*., 1998; Foorman *et al*., 1996; Francis *et al*., 2005; Stanovich and Siegel, 1994). Hence, classroom observation would not be sufficient as a tool in this regard. This is emphasized by the finding here that there was a mismatch in the number of LD cases identified by the classroom teachers and BRC personnel.

Diagnosis of a disability involves the complex process of testing, history taking and observation by trained specialist. So seeking assistance of specialists who can diagnose the specific problems of LD becomes necessary. Specialists like clinical psychologist, child psychiatrist, developmental psychologist, neurologist, occupational therapist, paediatrician, LD specialist and school psychologist should work collaboratively in obtaining accurate diagnosis and suggesting remedies.

*LD learner in the classroom*

Some of the strategies that emerged out of participants' views on responding to classroom need of LD learners were 'meaningful repetition', presenting concrete ideas, drill work and peer tutoring. All the participants stressed the need for special attention to the LD learner.

Uma Devi, a BRC trainer identifies that teaching should be provided on one- to-one basis. Their achievements should be appraised in the class while their weaknesses should be addressed personally. Their special talents should be nurtured thereby developing their self esteem and creating a feeling of worthiness. “I remember an occasion in GHSS Perungottukurussi, where the science teacher made a boy of her class who does extremely well in science but exhibits severe writing disability to inaugurate the ‘Workshop on science experiments’ by conducting an experiment before the audience. The child considered this as a great recognition among his peers.”

Each of the participants has their own methods and strategies in dealing with LD in the classroom. Sridevi puts forward the method of ‘graphic reading writing’ wherein the words are associated with their meaning rather than stressing on the alphabets involved in that word. For the child with reading disability the word appears as some graph. Sridevi says “I help the child to associate the word with its meaning and thereby accommodating it in his vocabulary. I help children generate their own sentences and give positive reinforcement for their efforts. The reading process for the reading disabled involves group reading followed by pair reading and individual reading. This helps the learner in improving his reading ability”. This strategy of group reading to individual reading is in line with the studies by Cunningham (2005), Durkin (1974) and Kuerbitz and Walker (1979) that oral reading to pupils by the teacher motivates reading habit and helps in developing vocabulary.

Gopinathan suggests his strategy of meaningful repetition and use of concrete examples. “I teach biology. I use concrete or real examples in my class. For example while describing ‘eyes’ I take a buffalo’s eye to the classroom and dissect it before the pupils. This leaves a long lasting impression on the learner and enables to give some output in the exam.”

However, most participants feel that equipping the learner with the basic knowledge will be desirable rather than burdening him with complex content. Sethumadhavan says “I teach history. I feel there is no point in stressing all the details of a chapter for such learners. I stress only on the content that is very basic and important from exam point of view.” This approach to LD is in congruence with the study by Schlichter and Brown (1985), stressing on basic skills over instruction in thinking skills for LD.

Strategies adopted by the participants were somewhat similar to the ones found in the literature, like need for one-to-one instruction and alternative curricula (DeLoach *et al*., 1981), small group discussions (Conway and Gow, 1988; Foorman and Torgeson, 2001; Polloway, Cronin and Patton, 1986; Samuels and Miller, 1985) and cooperative group teaching (Slavin 1996; Swanson and Hoskyn 1998).

Some participants' initiative in developing their own instructional strategies highlights the research tendencies in school teachers.

Avoiding the complexity of content for the assumed reason that LD learner cannot assimilate complex contents would be injustice to their right to cognitive and academic skill development in school. It is indeed significant that efforts are taken by teachers in addressing the academic needs of the LD learners but to what extent their innate talents are nurtured is still a question seeking answer. The innate abilities possessed by LD learners will manifest only when fine tuned and this can be instigated only by the teacher. But not all classrooms depict same picture. Vilasini reveals "I agree that they (LD learners) require special attention but I don't do that as other children of my class suffer. They require continuous attention which is not possible in regular classroom".

Some common difficulties identified by the participants in dealing with LD learners include class strength, syllabus completion, irregular attendance, lack of parental attention, meagre support from resource teachers and classroom adaptation for all types of learners.

An important problem discussed by all the participants was scarcity of resource teacher. The BRC trainer points out that though we have one resource teacher for each panchayat, there is no special teacher for LD. All the participants feel that the sessions provided by such resource teachers are of limited benefit to these learners because the resource teacher handles the session with all types of disability children sitting together. Besides, these sessions are not organized on regular basis also.

Parental interest in child's learning process is another factor that affects the efficiency of these learners. Most participants feel that all the efforts taken by them go in vain as there is no continuity of learning at home. Further, parent's anxiety on poor performance of the ward can produce a negative effect on child's self confidence.

Sarath points out the problem with textbooks that provides no scope for drill work. Sara Mathew says: "Each chapter in the textbook has some activities for special need learners but they do not address LD learners in the class."

As Hammill and Wiederholt (1972) acknowledge the role of LD specialist along with regular teacher in the education of LD learner, the viewpoints of classroom teachers also preach for increased professional assistance in dealing with LD learners. Taking shade under the limitations in terms of class strength and time bounding is not justifiable on the part of teacher. But this definitely throws light on the existing anxiety in teachers in approaching a special need learner.

From their experiments in the classroom, teachers have evolved some measures that can help in minimizing the problems of LD learners in classroom. Most of the participants believed that the problems of LD learners cannot be completely resolved but their performance can be improved to a certain extent. Some of the suggestions by the participants are listed below:

- Simplifying the content and evaluation process
- Use of 'Explanator' for 'LD learner' as 'scribe' for 'blind' in examination
- Budding their innate talents and abilities
- Creating awareness in parents about the needs of their ward
- Use of wide variety of learning materials
- Encouraging group work and peer tutoring
- Counselling and orientation for teachers

One participant admired the programs like 'Sayanthana vedi' – orientation program for parents of special need learners - and study tours for such learners organized by SSA as progressive step in this regard.

It can be concluded here that adapting instruction to the individual needs of learner, giving space for individual learner in the class, group activities and discussions to strengthen learning, involving parental participation in goals of schooling would be some ideal strategies towards addressing LD.

*Training aspect*

The responses of the participants to the question on identification of LD learners in their classrooms aroused investigators' curiosity about participants understanding of learning disability. Thus, the investigators were keen on knowing the nature of training provided in this regard. All the participants were of the view that not much input was provided during in-service training and it hardly helped in increasing their efficiency. Only the teacher in charge of the Integrated Education of Disabled Children (IEDC) gets a one day orientation. Sridevi comments: "During the in-service training there is a half an hour theoretical session on this issue (including all disabilities together) but no practical sessions are provided". Sarath who had limited information on learning disability confesses that the training provided has no quality; "The only advantage is that we share our insight amongst us", he says.

Fathima Bevi recalls that she was provided with some learning materials for LD in the cluster meeting organized months back. She felt that the last two meetings were not beneficial due to lack of resource personnel.

All the above views are contrary to what BRC trainer Uma Devi has to say. "Training is given to the school teachers where teachers are thoroughly oriented regarding identification and planning of instruction for LD learners". She agrees that practical sessions lack in the training program. But what she identifies as the main hindrance is the attitude of teachers towards inclusion. Not all teachers are ready to accept the special need learners in their class. Another major limitation is the unavailability of expert guidance in learning disability related issues.

In-service training is a means for professional development and enhancing knowledge (Brady *et al*., 2009; Mather, Bos and Babur 2001; Podhajski *et al*., 2009), thereby guiding towards better instructional choices (Bos *et al*., 1999). But with limitations in terms of resources and quality training, one cannot expect unprecedented efforts from these teachers for satisfying this section of grappling learners.

## Conclusion

The conclusions of the study are:

- Observation is the most commonly used technique in the identification of LD learners in the classroom
- Teaching on a one- to –one basis, group work, peer tutoring and drill work have emerged as major teaching strategies. Teachers feel that developing the self esteem of the LD learners is primary to their education process. Continuous efforts of the teacher will help in resolving their problems to a greater extent
- Professional support and expert assistance will provide background support to teachers in dealing with LD pupils in their classroom.

## Implications

The teachers in the general classroom are making their efforts in the assessment and educational process of learning disabled. But the plight here is the lack of professional training. Setting up of expert panel at the district level would definitely help schools with the identification and assessment process. Research on LD should aim at guiding policies for best accommodation of this population in the society. Often a gap is found between these designed policies and actual classroom practices. To bridge this gap an appropriate approach to research would be taking hints from classroom practices and teacher policies thereby evolving with optimum solutions. Another implication would be to integrate available research findings from various disciplines with strategies rather treating them in water tight compartments, that is, promoting collaborative research across disciplines. The failure of teacher preparation programme and professional development programmes in creating a positive attitude toward LD would call for transdisciplinary model in teacher training rather than being multi-disciplinary. This transdisciplinary model would mean collaboration of the training programme with disability study centres and state education board in designing of pedagogy. Such a restructuring would help in maintaining the standards of future teachers for facing the changing demands in school education. The study also suggests setting up of professional training centres, specific to learning disability so as to create an efficient work force that will render services at the school level or panchayat level. Parent Teacher Association (PTA) that forms the core of school functioning has a key role in providing technical assistance in terms of man and material, policy making and parental orientation towards such issues. In short the study suggests that the education process involving learning disabled be given a professional stance.

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## 'Smart Bomb' to bust Breast Cancer

Doctors have successfully dropped the first "smart bomb" on breast cancer, using drug to deliver a toxic payload to tumor cells while leaving healthy ones alone.

In a key test involving nearly 1,000 women with very advanced disease, the experimental treatment extended by several months the time lived without their cancer getting worse, doctors planned to report on Sunday at a Cancer conference in Chicago.

The treatment seems likely to improve survival; it will take more time to know for sure. After two yrs, 65% of women who received it were still alive versus 47% of those in a comparison group given two standard cancer drugs.

The margin fell short of the very strict criteria researchers set for stopping the study and declaring the new treatment a winner, and they hope that the benefit becomes clearer with time.

The treatment builds on herceptin, the first gene targeted therapy for breast cancer. Researchers combined herceptin with a highly toxic chemotherapy, plus a chemical to keep the two linked until they reach a cancer cell where the poison can be released to kill it. This concoction, called T-DM1, is the smart bomb.

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Vetri Education, Quarterly Journal (ISSN-0973-8614), VIII (2), 2013, 36-45

# Study of the Teacher's Perception about the Mathematical Behaviour of the Child and Achievement

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## Abstract

Perception is critical because it influences the information that enters working memory. Eggen and Kauchak (2001) gave cognitive dimension of perception, as the process by which people attach meaning to experiences. They explained that after people attend to certain stimuli in their sensory memories, processing continues with perception. Teacher plays a key role in educating the child. Teacher perception about a child holds a major role as it would instil self esteem, confidence and remain as a great motivating force for high achievement. The present study analyses if the affinity, aversion, indifference and involvement towards mathematics and the mathematical learning difficulty of the learners which are assumed to be internal to decide the mathematical ability of the learner, and other external behavioural abilities as perceived by teachers have any significant correlation with the achievement in mathematics of the learner. The study was conducted using a random sample of 110 students and 11 teachers. The analysis of the data reveals that teachers' perception about their students' mathematical behaviour does not contribute to the achievement in the case of high achievers; but does contribute significantly in the case of low achievers and the achievement is not due to the activity oriented instructional strategy alone. Also, strangely teachers have a negative idea about the learning disability toward mathematics in case of all the learners.

**Keywords: Teacher perception, mathematical behaviour, achievement**

## Introduction

Perception is defined as acuity of stimuli to modify ones ideas and to frame conceptual structure of a personality of an individual peripherally. Perception may be defined from physical, psychological and physiological perspectives. For the purpose of this study, it shall be limited to its scope as postulated by Allport (1996), which is the way we judge or evaluate others and the way individuals evaluate people with whom they are familiar in everyday life. As teachers play an important role in shaping up the destiny of a student, teacher perception about a child is a major component as it would instil self esteem, confidence and remain as a greater or high achievement. The present study analyses if the affinity, aversion, indifference and involvement towards mathematics and the mathematical learning difficulty of the learners which are assumed to be internal to decide the mathematical ability of the learner and other external behavioural abilities as perceived by teachers have any significant correlation with the achievement in mathematics of the learner. To quote our great philosopher, J. Krishnamurthy, who says that we always form a mental image whenever we meet with a person and we always relate with the image that we have formed in our mind about the other person and not exactly with the real person. It is apparent that almost all the teachers observe their wards and frame an opinion about them. Especially mathematics teachers perceive their learners critically to analyse whether they like or dislike the subject or if they have any mathematical learning difficulty. The real goal of mathematical education is that of developing appropriate mathematical meaning through learner oriented mathematical activities, communication and negotiation.

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The first and foremost aim of teaching mathematics is to ensure appreciation of the subject. The aesthetic awareness of mathematical shapes and patterns in nature, as well as in the products of our civilization can be elicited in the class only by a teacher whose perception about his/her students is positive, infusing interest and confidence in the minds of the learners.

## Discussion

In the present study teacher's perception on the mathematical ability of the learner forms the independent variable and the achievement, in mathematics using activity oriented teaching forms the dependent variable.

*Operational definition*

*Independent variable - Teacher's perception on the mathematical ability of the child*

Teacher's perception is how a teacher perceives the learner on his/her mathematical ability pertaining to the learning habit. The components of teacher's perceptions about the mathematical behaviour of the learners are:

- Affinity towards mathematics, which refers to a strong feeling of liking towards the subject
- Aversion towards mathematics, which refers to a strong feeling of dislike to the subject
- Indifference towards mathematics, which refers to lack of interest, feeling or reaction towards the subject
- Involvement in mathematics, which refers to the sustained effort of perseverance and desire to achieve the goal
- Learning difficulty in mathematics of the learner refers to the inability to do certain mathematical skills specifically but normal otherwise in other subjects

Teacher's perception is operationally defined as the score that is awarded to the learner by their respective teacher in the three-point scale validated tool prepared to identify the components.

*Dependent variable –achievement of the learner*

The criterion reference test may be defined as one in which the test performance is linked or related to some behavioural measures or referents and a major criterion for referencing a test is the training, which results in an increase in the skill or proficiency. Achievement of the learner is operationally defined as the score that the student gets in the criterion reference test after undergoing the experimental teaching on the topic 'fraction', in mathematics using activity oriented instructional strategy.

*Objectives of the study*

1. To assess the perception of teachers about the mathematical behaviour of their students of class VI
2. To evaluate the achievement score of the students of class VI after the experimental teaching on the topic 'fraction', in mathematics using activity oriented instructional strategy
3. To study the relationship between teacher's perception about the mathematical behaviour of the child and achievement

*Hypotheses of the study*

1. When the students learn fraction by activity oriented instructional strategy there will be no significant relationship in terms of their achievement mean score between high and low achieving learners in relation to the following perception:

• Teacher's perception –as a whole

1. Attachment score
2. Aversion score
3. Involvement score
4. Indifference score
5. Learning difficulty score

2. When the students learn fraction by activity oriented instructional strategy there will be no significant difference in terms of their achievement score between high and low achievers in relation to the following variables:

• Teacher's perception –as a whole and the same 5 subunits under hypothesis 1

3. When the students learn fraction by activity oriented instructional strategy there will be no significant difference between the achievement mean score and the mean scores in the subunits of teacher perception on the mathematical ability of low achievers

*Delimitation of the study*

The sample was restricted to 110 students of class VI and 11 teachers from Secunderabad region of Andhra Pradesh only.

*Related literature on perception of teachers*

The National Policy of Education (NPE, 1986) has suggested reviewing mathematical education strategies. It recommends that mathematics should be taught as a vehicle to promote thinking, reasoning, analyzing and articulating logically.

In a research where mathematics teachers were asked to consider boys' and girls' achievement in about fifty elementary school classes (Tiedemann, 2000) the findings are that the teachers thought that their average achieving girls were less talented than equally achieving boys. Girls were thought to profit less than boys from additional effort and to exert relatively more effort to achieve the level of actual performance in mathematics. Teachers rated mathematics as more difficult for average achieving girls than for equally achieving boys. With regard to girls, teachers attributed unexpected failure more to low ability and less to lack of effort than with boys and hence teachers hold gender-differentiated views of their students' academic abilities even at elementary school. (Fennema *et al*., 1990; Tiedemann and Faber, 1994)

Eggen and Kauchak (2001) identified a number of teachers' attitudes such as enthusiasm, caring, firm, democratic practices to promote students' responsibility, use of time for lesson effectively, establishment of efficient routines, and free interaction with students and motivation for them to facilitate a caring and supportive classroom environment.

Durojaiye (1976) supported the idea that teachers' positive attitude and good personal qualities bolster students' academic performance. As a result of these, arises the questions: Does teachers' perception of students has a relationship with academic performance of students? Would there be a relationship between teachers' perception of students' attitude to work and students' academic performance? This study was designed to investigate the relationship between teachers' perceptions of students' academic performance.

*Sample of the study*

As the present study is confined only to the state of Andhra Pradesh, learners from high schools located in Secunderabad form the population. Mathematics, though optional in ICSE syllabus after IX, it is a compulsory subject at class VI in almost all the schools. Therefore the high schools that have class VI in Secunderabad city formed the population. From the many high schools of class VI, only four schools were selected for the experiment using randomized stratified sampling technique (Best and Khan, 2006; Kothari, 2010). Each of them is unique in their own way and they are geographically distributed widely in the city. Since the experiment is teaching the topic 'fraction', in mathematics using activity oriented teaching, the infrastructural facilities, the co-operation and the co-ordination of the school management and staff played a key role while selecting the sample school. Maximum care was taken to see that the sample students were not exposed to the particular instructional strategy prior to the experiment.

*Administration of experiment*

Prior permission was taken from the selected schools and they were informed of the date of the scheduled activity well in advance so that the unit was reserved for experiment and also to motivate the students to look forward to a new instructional strategy. The platform for the present study comprised Sample (Class VI students of age 9 plus), *Duration* (1 hr. for 7 days), *Topic* (Fraction – unit in mathematics; base of arithmetic) and *Strategy* (activity oriented teaching)

The strategy employed in the experiment consisted of one activity per day for each concept. The following points were classified consulting the management and prior permission obtained to conduct the experiment in a smooth manner with:

Physical facilities such as, room, furniture computer facilities, organization and electrical facilities,
Allotment of time and rescheduling the time table for the sample to sit through one complete activity to note the learning time and the test time, and
Co-operation and co-ordination by the staff to administer the questionnaire and various in struments prepared by the researcher.

In every school the concerned teacher and the students were informed well about the experiment. Necessary skills were explained to the students with continuous guidance and support by the researcher. Answer sheets were distributed to the students to jot down anything needed and also to write down the answers for paper pencil tests, incorporated in the activity, if required.

On day one, students were administered pre-test of the achievement to assess their entry level. From second day, the students were subjected to the experiment of learning the unit – Fraction - using activity oriented teaching. As there were five modules in the instructional package, students were given the chance to go through each module, continuously for five days.

*Reliability and validity of the tools of the study (Teacher perception questionnaire)*

Reliability is the degree to which measures are free from error and therefore yield consistent results. To identify the components to be incorporated in the questionnaire, effective discussion with few mathematics educators was made. The components of the mathematical behaviour of the learner as perceived by the teacher were listed out. After pooling the entire items, they were sieved for adoption based on the objective set, keeping in mind the delineated factors as perceived by the teacher about the learner namely: Attraction, Aversion, Indifference, Involvement and Learning disability towards learning mathematics.

Twenty-five items were selected and the statements were written in likert style. For each statement, the respondents were expected to mark any one of the best choices - strongly agree (SA), agree (A), disagree (DA) and strongly disagree (SD). A note of clear instruction directing the mode of answering was given. The items were tried out on five samples, as pilot testing. Based on their opinions, twenty relevant items were chosen and the final draft was prepared which was considered as the yardstick to measure teacher's perception about the mathematical behaviour of the learner.

*Reliability and validity of the achievement test*

Split half method was used to measure the degree of internal consistency. Odd numbered items were given to a set of students and even numbered items were given to another set of students, comparison of scores enabled to delete some questions and sequence them logically. According to split half reliability method, responses to the items of the instrument are divided and scores are correlated. The degree of correlations indicates the degree of reliability of measurement. The correlation is then connected to step up the reliability of the whole test. Reliability coefficient has been found out using rational equivalence method for the tool that is employed in the study. The Rational equivalent KR-21 for achievement test is noted as 0. 75.

*Validity*

Validity helps to assess the usefulness of the test for a particular purpose. The content requirement for the criterion referenced mastery for the six units was checked by the panel of judges and the level of mastery was fixed as 70%, which is the acceptable performance level.

**Table 1: Data in relation to hypothesis 3**

| S. No. | Blooms level | No of items |
|---|---|---|
| 1 | Knowledge | 2 |
| 2 | Comprehension | 2 |
| 3 | Application | 7 |
| 4 | Analysis | 5 |
| 5 | Synthesis | 2 |
| 6 | Evaluation | 2 |

*Statistical techniques*

To find the relation between the variables Pearson's coefficient of correlation has been used (Garrett, 2005). Mean, standard deviation and 't' test are some of the techniques used to analyse the data statistically to test the hypotheses.

*Analysis and discussion of the results*
*Teacher's perception on the mathematical ability of the learner and his achievement score*

The relevant data generated to test hypothesis 1 are presented in Tables-2A and 2B.

**Table 2 A: Correlation coefficient of teacher's perception and achievement**

| S. No. | Teacher perception as a whole and sub-units of teacher's perception | Achievement of learner | |
|---|---|---|---|
| | | High achievers | Low achievers |
| 1 | Teachers perception as a whole | 0.4531 | 0.2136 |
| 2 | Attachment | -0.3926 | 0.2742 |
| 3 | Aversion | -0.4093 | -0.0455 |
| 4 | Involvement | -0.1388 | -0.1039 |
| 5 | Indifference | -0.0101 | 0.2560 |
| 6 | Learning disability | 0.0235 | -0.1104 |

**Table 2 B: Correlation coefficient of teacher's perception and achievement**

| S. No. | Teacher perception as a whole and sub-units of teacher's perception | Achievement of learner | |
|---|---|---|---|
| | | High achievers | Low achievers |
| 1 | Teachers perception as a whole | Significant correlation | Moderately significant correlation |
| 2 | Attachment | Significant moderately negative correlation | Moderately significant correlation |
| 3 | Aversion | Significant correlation | Insignificant negative correlation |
| 4 | Involvement | Significant moderately negative correlation | Significant moderately negative correlation |
| 5 | Indifference | Insignificant negative correlation | Moderately significant correlation |
| 6 | Learning disability | Insignificant negative correlation | Insignificant negative correlation |

*Important findings*

Among the sub-units of teachers' perception, it was found:
- Teachers have a significant understanding about the attachment to the mathematics in case of low achievers.
- Teachers have a significant idea on the indifference towards mathematics in case of low achievers.
- Strangely, teachers have a negative idea about the learning disability towards mathematics in case of all learners.

Data obtained to test hypothesis 2 are presented in Table- 3.

**Table 3: Difference between the achievement mean score and the mean scores in the subunits of teacher perception on the mathematical ability of high achievers**

| Scores on sub-units of teachers perception | Mean-1 | Acievement score Mean-2 | S.D.1 | Achievement score S.D.2 | t-value | Level |
|---|---|---|---|---|---|---|
| Teachers perception as a whole | 61.61 | 70.49 | 10.11 | 4.81 | 8.93 | Sig |
| Attachment score | 65.2 | 70.49 | 9.7 | 4.81 | 5.47 | Sig |
| Aversion score | 62.59 | 70.49 | 7.4 | 4.81 | 9.63 | Sig |
| Involvement score | 63.29 | 70.49 | 10.52 | 4.81 | 7.04 | Sig |
| Indifference score | 60.16 | 70.49 | 8.62 | 4.81 | 11.52 | Sig |
| Learning difficulty score | 63.29 | 70.49 | 4.3 | 4.81 | 10.96 | Sig |

The mean score in the teachers' perception (61.61) and achievement (70.49) of the high achievers show a significant difference as reflected in the 't' value (8.93 with df 29) at 0.01 level of significance, while the table value of ' t ' is 2.59.

The mean score in the teachers' perception (61.61) and achievement (70.49) of the high achievers show a significant difference as reflected in the 't' value (8.93 with df 29) at 0.01 level of significance, while the table value of ' t ' is 2.59.

The mean score in the sub unit passion (65.2) and achievement (70.49) of the high achievers also show a significant difference as reflected in the 't ' value (5.47 with df 29) at 0.01 level of significance. The difference between the mean score of the subunit aversion (62.59) and the achievement (70.49) of the high achievers is significantly high as indicated by the 't ' value 9.63 with df 29. The mean score in the sub unit participation (63.29) and achievement (70.49) of the high achievers also show a significant difference as reflected in the 't ' value (7.04 with df 29) at 0.01 level of significance.

The difference between the mean score of the subunit indifference (60.16) and the achievement (70.49) of the high achievers is significantly high as indicated by the ‘t ’value 11.52 with df 29.The mean score in the sub unit learning difficulty (63.29) and achievement (70.49) of the high achievers also show a significant difference as reflected in the ‘ t ‘ value (10.96 with df 29) at 0.01 level of significance.

Hence the null hypothesis is rejected in all the cases at 0. 01 level of significance. Therefore we note that teachers’ perception about their students’ mathematical behaviour do not contribute much to the achievement in the case of high achievers and the achievement is solely due to the activity oriented instructional strategy.

The data in relation to hypothesis 3 are detailed in Table-4.

**Table 4: Difference between the achievement mean score and the mean scores in the subunits of teacher perception on the mathematical ability of low achievers**

| Scores on sub-units of teachers perception | Mean-1 | Acievement score Mean-2 | S.D.1 | Achievement score S.D.2 | t-value | Level |
|---|---|---|---|---|---|---|
| Teachers perception as a whole | 60.21 | 66.59 | 4.56 | 14.01 | 3.84 | Sig |
| Attachment score | 59.97 | 66.59 | 9.18 | 14.01 | 3.71 | Sig |
| Aversion score | 60.1 | 66.59 | 10.28 | 14.01 | 3.56 | Sig |
| Involvement score | 61.16 | 66.59 | 10.71 | 14.01 | 2.95 | Sig |
| Indifference score | 64.38 | 66.59 | 10.25 | 14.01 | 1.21 | Not Sig |
| Learning difficulty score | 65.45 | 66.59 | 8.9 | 14.01 | 0.64 | Not Sig |

The mean score in teachers’ perception (60.21) and achievement (66.59) of the low achievers show a significant difference as reflected in the ‘ t ‘ value (3.84 with df 27) at 0.01 level of significance, while the table value of ‘ t ’ is 2.59. The mean score in the sub unit passion (59.97) and achievement (66.59) of the low achievers also show a significant difference as reflected in the ‘ t ‘ value (3.71 with df 27) at 0.01 level of significance.

The difference between the mean score of indifference (64.38) and the achievement (66.59) of the low achievers do not show any significant difference as indicated by the ‘t ’ value 1.21 with df 27. The mean score in the sub unit learning difficulty (65.45) and achievement (66.59) of the low achievers do not show a significant difference as reflected in the ‘ t ‘ value (0.64 with df 27) at 0.01 level of significance.

Hence the null hypothesis is rejected in all the cases except the two components namely, indifference and learning difficulty of teachers' perception about the learner, at 0.01 level of significance. Therefore we note that teachers' perception about their students' mathematical behaviour do contribute to the achievement in the case of low achievers and the achievement is not only due to the activity oriented instructional strategy.

*Inference*

When the students learn 'fraction' by activity oriented instructional strategy there is a significant relationship in terms of their achievement mean score between high and low achieving learners in relation to the teacher's perception on the whole as shown in table 2A. Teachers' perception on the expected academic achievement of his students, on maths learning behaviour for low achievers is not so perfect as compared to high achievers. Probably, the teacher may fail to pay more attention and critically observe the low achiever, compared to the counter group.

Among the sub-units of teachers' perception the following observations could be made:

- Teachers have significant understanding about the attachment to the mathematics in case of low achievers.
- Teachers have significant idea on the indifference towards mathematics in case of low achievers.
- Strangely, teachers have a negative idea about the learning disability toward mathematics incase of all the learners as shown by the results in table 2A.

The issue of association or relation or influence of one variable on the dependent variable that is the achievement of the learner is studied by level of difference between them using the 't'- value calculation. It is found that the teacher perception as a whole and its sub-components are found to be independent and not a part of the components. It exists as an independent variable and has a bearing on the prediction of the teacher on the expected achievement of the high achiever. One can note that teachers' perception about their students' mathematical behaviour do not contribute much to the achievement in the case of high achievers and the achievement is solely due to the activity oriented instructional strategy (Table-3). It is worthy of note that teachers' perception about their students' mathematical behaviour does contribute to the achievement in the case of low achievers and the achievement is not due to the activity oriented instructional strategy alone (Table-4).

## Conclusion

The analyses and discussions clearly indicate that the hypothesis: "when the students learn 'fraction' by activity oriented instructional strategy there will not be a significant relationship in terms of their achievement mean score between high and low achieving learners in relation to teacher's perception" is partially true and acceptable. Also, teachers have a significant understanding about the attachment to the mathematics and also about the indifference towards mathematics in case of low achievers.

But strangely, teachers have a negative idea about the learning disability toward mathematics in case of all the learners. Further, teachers' perception about their students' mathematical behaviour not contributing much to the achievement in the case of high achievers, does contribute to the achievement in the case of low achievers; the achievement is thus, not due to the activity oriented instructional strategy alone. This study reveals that there is a partial influence of teacher's perception about the mathematical behaviour of the student and his academic achievement.

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Vetri Education, Quarterly Journal (ISSN-0973-8614), VIII (2), 2013, 46-53

# Multiple Intelligence and Mathematics Achievement

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## Abstract

The present study examines the relationship between mathematics achievement and multiple intelligences and also finds whether one of the intelligence types or a combination of intelligences is predictor for achievement in mathematics. The required data were gathered using multiple intelligence tests, based on Howard Gardner's MI model proposed by Chislett and Chapman (2005). The participants of this study were 300 high school students. Data were analyzed using central tendency, dispersion and correlation. The results indicated that interpersonal intelligence is the highest and the most common intelligence among students in this group; kinaesthetic, musical, spatial, logical \ mathematical, intra-personal and linguistic intelligences following it in that order. This study also revealed the absence of any significant relationship between achievement in mathematics and multiple intelligences.

**Key words: Multiple intelligences, mathematics, achievement**

## Introduction

"Mathematics is an organized body of knowledge, an abstract system of ideas, a useful tool, a key to understanding the world, a way of thinking, a deductive system, an intellectual challenge, a language, the purest possible logic, an aesthetic experience, a creation of human mind, where the utility of the subject is the only major aspect"( Orton, 1994).

Every one in the present world, who functions intelligently higher than others, had general thinking skills and development of any nation depends on the citizens of scientifically and technologically skilled people. Mathematics is the only subject which trains the minds of the learners and helps learners to think, reason, analyse, articulate logically and improve the problem solving skills. Such a wonderful subject can be applied in real life only when it is understand properly. A meaningful learning of any concept is the base for better understanding; but students in mathematics classroom face many difficulties due to the lack of meaningful learning and these difficulties create mathematics phobia in the minds of the learners. To facilitate meaningful learning different instructional strategies must be adopted by the teachers; but in the present scenario teaching becomes a complex process and teachers face individuals with heterogeneous background, taste and other differences, prompting Van Sciver (2005) to state: "Teachers are now dealing with a must needed ability to identify the skills from students, for solving problems in mathematics; the academic diversity in the classrooms reaching a level unheard of just a decade ago". The role of teaching methods is very significant for many students to overcome their present negative attitudes towards courses (Kuloğlu, 2005). To teach mathematics, teachers must be aware of their students' individual strength and weakness, unique and distinct characteristics, abilities and capabilities, talents, learning style, level of learning, etc.

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In teaching mathematics, teachers *discovery and reasoning (logical-mathematical intelligence), theory building (intrapersonal and body-kinaesthetic intelligence), discussing of cause (linguistic intelligence),* finding harmony and relationship between concepts (*musical* intelligence), identifying path (*spatial intelligence*) all are important (Nasrini karamikabir, 2012). To understand the diversity of learners and to improve mathematics achievement, multiple intelligence theory provides an important role.

## Discussion

*Intelligence*

Gardner (1999) defined intelligence as "a bio psychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture".

Gardner (2006) defines intelligence as "a computational capacity- a capacity to process a certain kind of information. Intelligence builds the ability to solve problems or fashion products that are of consequence in a particular cultural setting or community".

*The theory of multiple intelligences*

According to Gardner (1983, 1993, 1996) and the theory of multiple intelligence described in his book: Frames of Mind: The Theory of Multiple Intelligences, the mind is made up of several distinct intelligences through which people perceive the world around them and each intelligence is independent of the others; yet all can work together to perform a task and also believe that most real-world activities require a combination of different intelligences working in concert for success. Gardner (1983) first offered the MI theory with seven different intelligences, and based on his research studies, added naturalist intelligence (Gardner, 1999a). Also, it has been suggested that an existential intelligence might exist, but a hypothesized spiritual intelligence does not (Gardner, 1999). The nine types of intelligences are thus: linguistic, logical-mathematical, spatial, bodily-kinaesthetic, musical, interpersonal, intrapersonal, naturalistic and existential. Every person possesses each of the nine intelligences; however, some may exhibit favouring one type of intelligence over another (Gardner, 2006).

Gardner (1983; 1999a) describes the nine intelligences as follows:

1. Logical-mathematical intelligence - consists of the capacity to analyze problems logically, per form mathematical operations and investigate issues scientifically. This intelligence is most often associated with scientific and mathematical thinking.

2. Linguistic intelligence - includes the ability to effectively use language to express oneself rhetorically or poetically, and employ language as a means to remember information

3. Spatial intelligence - gives the ability to manipulate and create mental images in order to solve problems. This intelligence is not limited to visual domains.

4. Musical intelligence - involves skill in the performance, composition and appreciation of musical patterns. It encompasses the capacity to recognize and compose musical pitches, tones and rhythms.

5. Bodily-Kinaesthetic intelligence - entails the potential of using one's whole body or parts of the body to solve problems. It is the ability to use mental abilities to coordinate bodily movements.

6. Interpersonal intelligence - ability to notice and make distinctions among individuals and, in particular, among their moods, temperaments, motivations and intentions with the capacity to understand the intentions, motivations and desires of other people. It allows people to work effectively with others.

7. Intrapersonal intelligence - ability to distinguish and identify various personal thoughts and feelings and to use them to understand one's own behaviour.

8. Naturalist intelligence - ability to discern similarities and differences and make classifications among the living organisms in one's environment.

9. Existential intelligence - ability to think about the big picture and why things or people exist. Students with the strength of this intelligence may ponder questions such as "Who are we? Why do we die? How did we get here? "(Nicholson-Nelson, 1998).

*Review of literature*

Many studies reveal that *"MI theory has positive effect and males rated themselves higher on overall, mathematical, spatial, intrapersonal, spiritual and naturalistic IQ compared with females whereas females preferred learning activities involving intrapersonal intelligence"*. Studies of Loori (2005), Yuen and Furnham (2005), Netoa, Ruiza and Furnhamb (2008) and Gaines and Lehmann (2002a) found that students taught by methods based on MI are more successful and highly motivated than students taught by traditional teaching methods. Baş (2010) found use of MI strategies to improve the students' reading comprehension ability as well as enhancement of their academic performance. Mettetal, Jordan and Harper (1997) investigated the impact of a MI curriculum in an elementary school and highlighted the importance of MI in changing the attitudes of both teachers and students in mathematics. Mbuva (2003) focused on the implementation of the MI theory and concluded: "Traditional ways of understanding pedagogy and static methods of teaching are giving way to the new classroom examination and application of the MI".

*Significance of the study*

This study is important because it will help the educationists and teachers to understand better individual differences among students, recognize the most common types of intelligences which act as predictors for mathematics achievement and to modify their instructional strategies to suit the minds of the learners.

*Objectives*

The present study aims to examine the relationship of the role of multiple intelligences (MI) in achievement in mathematics.

Hypotheses

- There is no significant relationship between multiple intelligences and achievement in mathematics
- There is no significant relationship between achievement in mathematics and any of the seven types of intelligence:

i. Logic - mathematical intelligence,
ii. Verbal - linguistic intelligence,
iii. Musical intelligence,
iv. Bodily-kinaesthetic intelligence,
v. Spatial/visual intelligence,
vi. Inter –personal intelligence and
vii. Intra-personal intelligence.

*Limitations of the study*

In this study only seven multiple intelligences proposed by Gardner - linguistic, logical\ mathematical, musical, bodily-kinesthetic, spatial/visual, inter-personal and intra-personal – were chosen and the participants of the study comprised standard IX students of English medium high schools only.

*Methodology*

In this section are presented: sample, variables, tools and data collection procedure. Normative Survey Method was adopted for data collection (Kothari, 2000).

*Sample*

The participants of this study were 300 standard IX students from six English medium schools - 2 each of government, aided and private.

*Variables of the study*

Independent variable: Achievement in mathematics
Dependent variable: Multiple intelligences

*Tool used*
*Multiple intelligence tests*

Multiple intelligence test, based on Gardner's MI model proposed by Chislett and Chapman (2005) was used. For this MI test, 35 items were selected - each type of 7 intelligences having 5 statements, and each statement carrying a score of 1 (minimum) and 4 (maximum). Items (statements) in the questionnaire had four choices: Mostly disagree, Slightly disagree, Slightly agree and Mostly agree with increasing score from 1 to 4; total score being 35-140. The distribution is shown in Table 1.

**Table 1: Distribution of Questionnaire items with Nos. for diff. types**

| **Intelligence dimensions items in the questionnaire** | |
|---|---|
| Verbal-linguistic intelligence | 2, 6, 10, 14, 30 |
| Logical-mathematical intelligence | 13, 15, 18, 23, 26 |
| Visual-spatial intelligence | 1, 3, 5, 24, 33 |
| Musical-rhythmic intelligence | 4, 7, 16, 21, 25 |
| Bodily-kinaesthetic intelligence | 10, 12, 13, 22, 29 |
| Intrapersonal intelligence | 8, 20, 31, 32, 35 |
| Interpersonal intelligence | 17, 19, 27, 28, 34 |

*Mathematics achievement test*

IThis test was piloted on 300 ninth standard students. The achievement test for mathematics consisting of 188 items was developed by the researcher and administered to determine the students' achievement on mathematics. Content reliability and validity for this achievement test were ascertained with the help of two professors, eight assistant professors and two mathematics teachers in education having above 15 years of experience in teaching mathematics. The help of four mathematics teachers, currently teaching students of 9th standard in government schools was also utilized. Thus, the test to assess achievement consisted of 188 items and assessment of achievement made awarding 1 point for every correct answer in the multiple choice questions. Consequently, the possible achievement scores of the participants ranged from 0 to 188.

*Data collection, administration of instrument and scoring*

This study was conducted during the academic year 2012-2013. Permission was secured from Department of Education, U.T. of Puducherry and the concerned Principals of schools for conducting the study.

Researcher provided detailed procedure followed by explanation on the aim, objective and the proper sequence of answering to all the participants, before providing the instruments.

Students were instructed to be ready with pen, pencil and the data sheets - Information schedule and Multiple intelligence questionnaire. Sufficient time was given to read, understand and mark the response to the questions. Once completed answering (3 hr.), the questionnaire was collected back. (The test had 188 multiple choice items, based on the Text book of Tamil Nadu Syllabus of class IX, covering topics of set theory, algebra, geometry, mensuration, statistics, probability and trigonometry)

*Variables of the study*

Independent variable: Achievement in mathematics
Dependent variable: Multiple intelligences

*Data analysis, findings and discussion*

The findings of the study are presented in Table-2. Findings were analyzed through SPSS 17.0 program. Mean, standard deviation and correlation (Radhamohan, 2010) was used to obtain the result.

**Table 2: Relationship between maths achievement and multiple intelligence dimensions**

| Intelligence dimension | Mean | S.D. | Rank | Mathematics Achievement | |
|---|---|---|---|---|---|
| | | | | N | 'r' |
| Linguistic intelligence | 14.79 | 2.543 | 7 | 300 | -0.174 |
| Mathematical-logical intelligence | 15.05 | 2.665 | 5 | 300 | 0.008 |
| Musical | 16.61 | 2.568 | 3 | 300 | -0.101 |
| Bodily-kinaesthetic | 16.86 | 2.358 | 2 | 300 | -0.066 |
| Spatial/visual | 16.04 | 2.585 | 4 | 300 | -0.028 |
| Interpersonal | 17.65 | 2.486 | 1 | 300 | -0.018 |
| Intrapersonal | 14.96 | 2.694 | 6 | 300 | 0.042 |
| Total multiple intelligence | 111.9 | 9.614 | | 300 | -0.087 |
| Achievement in mathematics | 98.62 | 36.93 | | | |

Table-2 shows that students' mean scores are highest in interpersonal intelligence with 17.65 and in bodily-kinaesthetic intelligence with 16.86, while they are weak in linguistic intelligence with 14.79. This indicated that students are heterogeneous in their dominant types of intelligences. The study has revealed that interpersonal intelligence is the highest and the most common intelligence among students in this group, and students of this group work effectively with others.

Less significant are kinesthetic, musical, spatial, logical\mathematical, intra-personal and linguistic intelligences respectively. Also, there is a positive correlation among mathematics achievement, mathematical-logical intelligence and intrapersonal intelligence; but no significant relationship between the last two. Remaining types of intelligences have negative correlation with mathematics achievement. Multiple intelligences place an important role in mathematics achievement but the calculated 'r' value is -0.087 showing no significant relationship between multiple intelligence and mathematics achievement of the high school students.

## Conclusion

This study reveals the positive relationship between achievement in mathematics and the two types of intelligences (mathematical-logical and intrapersonal) in 9th STD students. These students also exhibited desirable level of interpersonal intelligence, indispensable for social life and co-operation. It is quite possible that the study holds good for students of other standards and also for other media of instruction in place of English.

The assessment of multiple intelligences as well as the dominance of the type of intelligence in a student can be quite beneficial for the students for choosing their career and for teachers, administrators and the family members to understand their wards' ability and skill in advising and guiding them in their studies and employments. Teachers, armed with the assessment are able to identify the need, taste/interest of the learners and look beyond the narrow confines in mathematics and integrate curriculum with real life situation. Also, they can improve their teaching strategies and help improve their students' mathematics achievement to make them more efficient citizens. Using proper assessment of different types of multiple intelligences of their students, teachers can easily handle the different types of academic diversity among students and are able to improve the required mathematical skills for effective teaching. By understanding learners multiple intelligence teachers can encourage their strength and capability, students in their turn can develop positive attitude towards life and become more successful and enterprising in their path of human resource development.

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## Einstein was right after all, Scientists admit

Scientists on Friday said that an experiment, which challenged Einstein's theory on the speed of light, had been flawed and that sub-atomic particles - like everything else – are indeed bound by the universe's speed limit.

Researchers working at the European Centre for Nuclear Research (CERN) caused a storm last year when they published experimental results showing that neutrinos could out pace light by some 6 Km per second.

The findings threatened to upend modern physics and smash a hole in Albert Einstein's 1905 theory of special relativity, which described the velocity of light as the maximum speed in the cosmos. But CERN now says that the earlier results were wrong and faulty kit was to blame. "Although this result isn't as exciting as some would have liked, it's what we all expected deep down", said the centre's research director Sergio Bertolucci.

The neutrinos were timed on the journey from CERN's giant underground lab near Geneva to the Gran Sasso Laboratory in Italy, after travelling 732 m through the earth's crust. To do the trip, the neutrinos should have taken 0. 0024 seconds. Instead, the particles were recorded as hitting the detectors in Italy 0. 00000006 seconds sooner than expected, the preliminary experiment had shown. Researchers updated the science community on Friday at the International Conference on Neutrino Physics and Astrophysics, in Kyoto.

## Aspirin by any other name (McMaster Researchers Find Potential for New Uses of Old Drug)

An international research program has revealed once more that the earliest of commercial pharmaceuticals, aspirin, has yet more roles to play in medicine. The researchers have demonstrated that salicylate, the active metabolite, directly increases the activity of AMP-activated protein kinase. This enzyme is key player in the regulation of cell growth and metabolism and is, figuratively speaking, the cellular fuel-gauge.

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Vetri Education, Quarterly Journal (ISSN-0973-8614), VIII (2), 2013, 54-63

# Risk Taking Behaviour in relation to Emotional Intelligence of Adolescents

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## Abstract

The present study has been conducted to investigate the risk taking behaviour of adolescents in relation to their Emotional Intelligence. The study was made on a random sample of two hundred adolescents, with equal number of boys and girls, from senior secondary and high schools of Kotkapura city in Faridkot district of Punjab. RTQ by Sinha and Arora (1982) and Mangal Emotional Intelligence Inventory by Mangal and Mangal (2004) were used to collect the data. The analysis of data revealed no significant difference in the risk taking behaviour and emotional intelligence of adolescent boys and girls. The investigators also observed that there was significant correlation between risk taking behaviour and emotional intelligence.

**Key words: Risk taking behaviour, Emotional intelligence, adolescents**

## Introduction

The main aim of education is to modify the behaviour of the child according to its needs and expectations of the society. Behaviour is modified at home and in society. It is the way we react to the situations. Behaviour is composed of many attributes. Two of these attributes are risk taking behaviour and emotional intelligence. Our behaviour is to a great degree dependent upon our own risk taking behaviour and emotional intelligence.

Risk Taking Behaviour is that behaviour in which the individual exposes himself or herself to the possibilities of bodily injury or death. Although risk taking behaviour applies to both necessary and unnecessary risks, personal orientations towards risk taking are formed from one's experiences in life. Successes, failures and one's perceptions about what one has to gain or lose. As one becomes more and less secure, one's risk taking orientations may change, the degree to which one's associations supporting risk taking behaviour also influences this orientation.

There are four categories of risks. One category of risk entails financial gambler, taking chances where financial gain is involved, such as stocks, land investments or gambling, and also in terms of job security or other form of speculation on one's own future. A second category is concerned with taking chances in situations involving bodily harm or physical risk to a person, and may be labelled physical risk taking. Third dimension involves taking chances in situation in which normative ethical values are involved and may be called ethical risk taking. Finally there is social risk taking which involves situation in which the esteem of a person in the eye of others is at stake.

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# Discussion

People can change their styles in that they can decide whether or not to take more risk and to try out new ideas and behaviour. This is easiest to do if one can also place oneself in a supportive environment.

Collins English Dictionary (2002) explains Risk as:

1. The possibility of incurring misfortune or loss
2. Undertaking an action without regard to the possibility of danger involved in it

*Types of risk taking behaviour*

There are two types of risk taking behaviour:

Healthy: Healthy risk taking is a positive tool in adolescents' life for discovering, developing and consolidating their identity; e.g. physically active, creative and social.

Unhealthy: Unhealthy risk taking is a negative experience of adolescents for discovering their identity e.g. drunkards, gamblers, delinquent personalities.

Hence risk taking behaviour refers to the tendency to engage in behaviour that has the potential to be harmful or dangerous, at the same time providing the opportunity for some kind of outcome that can be perceived as positive.

The term - Emotional Intelligence refers to the ability to identify, express and understand emotions; to assimilate emotions into thought; and to regulate both positive and negative emotions in self and in others.

Emotional intelligence, like general intelligence, is the product of one's heredity and its interaction with his environmental forces. Until recently, we have been led to believe that a person's 'general intelligence measure' as IQ or intelligence quotient is the greatest predictor of success in any walks of life - academic, social, vocational or professional. However, researches and experiments conducted in the 90's onwards have tried to challenge such over-dominance of the intelligence and its measure - intelligence quotient (IQ) by replacing it with the concept of emotional intelligence and its measure - emotional quotient (EQ). Emotional intelligence is the ability to understand emotions and their causes, the capability to effectively regulate these emotions in self and in others and most importantly being able to use the emotions as a source of information for problem solving, being creative and dealing with social situation. In simple terms, EQ can be defined as knowing what feels good, what feels bad and how to get from bad to good.

The emotionally intelligent person is skilled in four areas - identifying emotions, using emotions, understanding emotions and regulating emotions.

According to Goldman (1995) emotional intelligence is "Managing feelings so that they are expressed appropriately and effectively, enabling people to work together smoothly toward their common goals".

Dali Singh (2003) is of the view that emotional intelligence consists of psychological dimensions such as emotional competency, emotional maturity and emotional sensitivity which motivate an individual to manage and lead others as well as empathize with them.

National Level Interactive workshop organized by the Chamber of Commerce and Industry in New Delhi in 2002 to discuss the theme - Emotional Intelligence at Work, considered emotional intelligence as consisting of three Emotional dimensions - 1.Competency, 2.Emotional maturity and 3.Emotional sensitivity.

Adolescence is a very delicate stage of life affected by ample distraction in the surrounding. This stage is in midterm from 14 years to 19 years. This is the time when the child starts realizing his self concept. Stanley Hall (Ref?) describes the period of adolescence as: a period of stress and strain, storm and strife.

*Operational definitions*

*Risk taking behaviour*

Risk taking behaviour has been regarded as the action taken in a situation in which parameters of distribution of future events are fully known.

*Emotional intelligence*

Emotional intelligence is the accumulation of all cognitive, non-cognitive and non- physical capabilities, competencies and skills a person possesses, that help him to deal with the demands and pressure of everyday life.

*Adolescence*

Adolescence is the period between childhood and adulthood. It is a time of rapid development of growth towards sexual maturity, discovering one's real self and finding one's vocational and social directions.

*Details of the investigation*

*Objectives of the study*

- To study the risk taking behaviour of adolescent boys and girls
- To study the emotional intelligence of adolescent boys and girls
- To study the relationship between risk taking behaviour and emotional intelligence of: a) adolescent boys, b) adolescent girls and c) adolescents in general

*Hypotheses of the study*

- There is no significant difference between risk taking behaviour of adolescent boys and girls
- There is no significant difference between emotional intelligence of adolescent boys and girls
- There is no significant relationship between risk taking behaviour and emotional intelligence of: a) adolescent boys, b) adolescent girls and c) adolescents in general

*Delimitations of the study*

- The study was limited to urban school going adolescents only
- Adolescents from Kotkapura city were taken to study the problem
- The present study was delimited to study the risk taking behaviour of adolescent students in relation to emotional intelligence

*Review of related literature*

Paramjeet Kaur (2007) conducted a study of risk taking behaviour in relation to locus of control among adolescents, using random sampling procedure on a sample of 66 boys and 78 girls. It was found that there was no significant relationship between risk taking behaviour and locus of control among adolescents.

Sukhpreet Kaur (2009) reported a similar study of adjustment and risk taking behaviour of sports students and amateur sports students (80 students). It was found that there was difference in adjustment, risk taking behaviour of sports students and amateur sports students.

Rajveer Kaur (2010) conducted a study on risk taking behaviour in relation to stress among class IX students (100 students with equal number of male and female) and found that there was no significant relationship between risk taking behaviour and stress in them.

Todd (2007) studied 40 student teachers to explore the possibility of emotional intelligence to predict student teacher performance and found the two scores were related but not statistically significant.

Ashima's (2008) study on emotional intelligence in relation to mental health and adjustment on a sample of 100 students of class IX revealed that emotional intelligence was significantly correlated with mental health and adjustment.

Gurcharan Singh (2009) studied the relationship of emotional intelligence with effectiveness of school teachers in teaching and showed that there was significant relationship between emotional intelligence and teacher effectiveness in both female and male secondary school teachers.

*Design and sample of the study*

The present study is a descriptive survey (Kothari, 1990). It was conducted on a randomly selected sample of 200 adolescents from senior secondary and high schools of Kotkapura city. Out of the selected adolescents, 100 were males and 100 females.

*Tools used*

Risk taking questionnaire (RTQ) by Sinha and Arora (1982) as well as
Mangal emotional intelligence inventory by Mangal and Mangal (2004) were used during the present study.

Statistical techniques (Garrett, 2005)

1. Mean and Standard Deviation to study the nature of distribution of scores
2. Coefficient of correlation to analyze the relationship between risk taking behaviour and emotional intelligence

3. T-test to investigate the significance of difference between boys and girls in relation to risk taking behaviour and emotional intelligence

The study was conducted in two phases. In Phase I the investigators classified the sample into two randomly selected equal numbers of male and female adolescents. In the second phase of the investigation, the investigators measured the effect of emotional intelligence and risk taking behaviour of adolescents. Significance between means was worked out to know the effect of sex difference in the parameters among adolescents. t-ratio and co-efficient of correlation were also calculated.

Results and analysis

The gender based data generated during the investigation are conveniently grouped and presented in numbered and appropriately titled Tables (1-10) for convenience. Explanation and inferences on the table data are provided below each table.

**Table 1: The extent of risk taking behaviour of adolescent boys** (N=100)

| Scores | Frequency | Percentage | Category |
|---|---|---|---|
| 150 and above | 69 | 69% | High risk-takers |
| 80-149 | 31 | 31% | Moderate risk-takers |
| 79 and below | 0 | 0% | Non risk-takers |
| Total | 100 | | |

Mean = 155.03 S. D.= 16.15

Table-1 shows that mean scores of risk taking behaviour of adolescent boys as 155.03 with S. D., 16.15. Further analysis of the table shows that 69% of adolescent boys and 31% boys are high and moderate risk takers respectively; none in the non-risk taker category.

**Table 2: The extent of risk taking behaviour of adolescent girls** (N=100)

| Scores | Frequency | Percentage | Category |
|---|---|---|---|
| 150 and above | 60 | 60% | High risk-takers |
| 80-149 | 40 | 40% | Moderate risk-takers |
| 79 and below | 0 | 0% | Non risk-takers |
| Total | 100 | | |

Mean = 155.03 S. D.= 16.15

Table-2 depicts mean scores of risk taking behaviour of adolescent girls as 154.94 with S.D. 20.95. Further, it shows that 60% of adolescent girls are high and 40% girls are moderate risk takers, with none as non-risk taker.

**Table 3: The extent of risk taking behaviour of adolescent** (boys and girls)

| Scores | Frequency | Percentage | Category |
|---|---|---|---|
| 150 and above | 129 | 64.5% | High risk-takers |
| 80-149 | 71 | 35.5% | Moderate risk-takers |
| 79 and below | 0 | 0% | Non risk-takers |
| Total | 200 | | |

Mean = 154.98 S. D.= 18.66

Table-3 reveals that mean scores of risk taking behaviour of adolescents is 154.98 with S. D. 18.66. It shows also that 64.5% of adolescents are high risk takers, 35.5%, moderate risk takers and no no-risk taker.

**Table 4: The extent of emotional intelligence of adolescent boys** (N=100)

| Scores | Frequency | Percentage | Category |
|---|---|---|---|
| 90 and above | 0 | 0% | Very good |
| 77-89 | 1 | 1% | Good |
| 63-76 | 55 | 55% | Average |
| 49-62 | 41 | 41% | Poor |
| 49 and below | 3 | 3% | Very poor |
| Total | 100 | | |

Mean = 62.97 S. D.= 7.34

Table-4 shows the mean scores of emotional intelligence of adolescent boys as 62.97 with S. D. 7.34; it further shows that 0% of adolescent boys are having very good emotional intelligence, 1% is having good emotional intelligence, 55% are having average emotional intelligence, 41% are having poor emotional intelligence and 0% boys are having very poor emotional intelligence.

**Table 5: The extent of emotional intelligence of adolescent girls** (N=100)

| Scores | Frequency | Percentage | Category |
|---|---|---|---|
| 88 and above | 0 | 0% | Very good |
| 75-87 | 10 | 10% | Good |
| 61-74 | 54 | 54% | Average |
| 48-60 | 36 | 36% | Poor |
| 47 and below | 0 | 0% | Very poor |
| Total | 100 | | |

Mean = 64.25 S. D.= 7.59

Table-5 depicts that mean scores of emotional intelligence of adolescent girls is 64.25 with S. D. 7.59. Also it indicates that none of the adolescent girls are with very good or very poor emotional intelligence, 10% are having good emotional intelligence, 54%, average emotional intelligence and36% are having poor emotional intelligence.

**Table 6: Comparative view of risk taking behaviour of adolescents** (both sex)

| S. No. | Gender | N | Mean | S. D. | S. $E._D$ | t-value | Significance level |
|---|---|---|---|---|---|---|---|
| 1 | Boys | 100 | 155.03 | 16.15 | 2.65 | 0.03 | Not significant at 0.05 and 0.01 levels |
| 2 | Girls | 100 | 154.94 | 20.95 | | | |

The t-value between the mean score of risk taking behaviour of adolescent boys and girls is found to be 0.03. The degree of freedom is 198 at 0.05 level; the table value 1.97 is greater than the calculated value 0.03. Therefore it is not significant at this level; at 0.01 level the table value 2.6 is greater than the calculated value 0.03.

These results thus show that hypothesis 1: There is no significant difference between risk taking behaviour of adolescent boys and girls, is accepted.

**Table 7: The comparative view of emotional intelligence of adolescents** (both sex)

| S. No. | Gender | N | Mean | S. D. | S. $E._D$ | t-value | Significance level |
|---|---|---|---|---|---|---|---|
| 1 | Boys | 100 | 62.97 | 7.34 | 1.06 | 1.21 | Not significant at 0.05 and 0.01 levels |
| 2 | Girls | 100 | 64.25 | 7.59 | | | |

The t-value between the mean score of emotional intelligence of adolescent boys and girls is 1.21. The degree of freedom is 198 at 0.05 level; the table value 1.97 is greater than the calculated value 1.21. Therefore it is not significant at this level; at 0.01 level the table value 2.6 is greater than the calculated value 1.21. The obtained t- value is not significant at both 0.05 and 0.01 level.

Hence hypothesis 1: There is no significant difference between emotional intelligence of adolescent boys and girls is accepted.

**Table 8: Significant relationship between risk taking behaviour and emotional intelligence of adolescent boys**

| S. No. | Variables | N | Correlation value (r) | Significance level |
|---|---|---|---|---|
| 1 | Boys | 100 | 0.98 | Significant at both 0.05 and 0.01 levels |
| 2 | Girls | 100 | | |

Table-8 shows the co-efficient of correlation 'r' between risk taking behaviour and emotional intelligence of boys. The 'r' is found to be 0.98, to be significant with 198 degree of freedom (df), should be 0.138 and 0.181 at 0.05 and 0.01 levels respectively. The obtained value, 0.98, is greater than the above table values.

These results clearly show that the obtained value of co-efficient of correlation is highly significant for the relationship between risk taking behaviour and emotional intelligence of adolescent boys. Therefore hypothesis 3: There is no significant relationship between risk taking behaviour and emotional intelligence of adolescent boys is rejected.

**Table 9: The significant relationship between risk-taking behaviour and emotional intelligence of adolescent girls**

| S. No. | Variables | N | Correlation value (r) | Significance level |
|---|---|---|---|---|
| 1 | Risk taking behaviour | 100 | 0.96 | Significant at both 0.05 and 0.01 levels |
| 2 | Emotional intelligence | 100 | | |

Table-9 shows the co-efficient of correlation 'r' between risk taking behaviour and emotional intelligence of girls. The 'r' is 0.96; to be significant with 198 degree of freedom (df) should be 0.138 and 0.181 at 0.05 level and 0.01 level respectively. The obtained value, 0.96, is greater than the above table values. Thus, it is clear that the obtained value of co-efficient of correlation is highly significant for the relationship between risk taking behaviour and emotional intelligence of adolescent girls.

Therefore hypothesis4: There is no significant relationship between risk taking behaviour and emotional intelligence of adolescent girls is rejected.

**Table 10: Significant relationship between risk-taking behaviour and emotional intelligence of adolescent**

| S. No. | Variables | N | Correlation value (r) | Significance level |
|---|---|---|---|---|
| 1 | Risk taking behaviour | 200 | 0.98 | Significant at both 0.05 and 0.01 levels |
| 2 | Emotional intelligence | 200 | | |

Table-10 shows the co-efficient of correlation 'r' between risk taking behaviour and emotional intelligence of adolescents. The 'r' found to be 0. 98, to be significant with 198 degree of freedom (df) should be 0.138 and 0.181 at 0.05 level and 0.01 level respectively. The obtained value 0.98 is greater than the above table values and thus shows as highly significant for the relationship between risk taking behaviour and emotional intelligence of adolescents.

Therefore hypothesis5: There is no significant relationship between risk taking behaviour and emotional intelligence of adolescents is rejected.

## Conclusion

The inference of the present investigation points to the significant correlation between risk taking behaviour and emotional intelligence. It also brings to the fore that there exists no significant difference in the risk taking behaviour and emotional intelligence of adolescent boys and girls. The results call for maximum efforts on the part of teachers and parents to develop an understanding to manage the risk taking behaviour and to help develop the emotional intelligence in difficult situations. Consequently a lot of opportunities should be provided in the curriculum for the students for their self development of emotional intelligence and thus to be better equipped for risk taking.

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It is triggered by exercise and by the anti-diabetic medication metformin, so understanding and modulating its activity could be relevant to overweight, obesity and type 2 diabetes. "We show that salicylate increases fat burning and reduces liver fat in obese mice," says McMaster University's Greg Steinberg who is a principal investigator on the project.

(Indebted to: Nature, Science, New Scientist, Online Daily Mail, Alchemist News Letter, The Science and Advanced Materials Journal, British J. Nutrition, Discover Newsletter, Agence France-Presse, Journal of Science transactional Medicine The daily telegraph, New Indian Express, Google and BBC)

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Approved by Puducherry State Govt. NOC No.1047/EDN/SECTT/E3/2003 dt.30.1.2004
NCTE recognition order No.F.PN-N/197/SRO/NCTE/2005-06/1597 DT.8.7.2005.
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