CHAPTER-II

REVIEW OF RELATED LITERATURE
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Review of related literature provides the investigator the means of getting to the frontiers in his / her particular field of knowledge. A careful review of the research journals, books, dissertations, thesis and other sources of information are important in the planning of any research study.

Study of the related literature implies locating, reading and evaluating reports of research as well as reports of causal observation and opinion that are related to the individual’s planned research project.

To understand the reasons for presenting the review of related literature, it would be worthwhile to note the importance of this review in research. According to Fox (62: 181-182), review of related literature serves five important purposes. They are:

1. It provides the conceptual frame of reference for contemplated research.
2. Provides clues to the research approach method, instrumentation and data analysis.
3. An understanding to the status of research in the problem area ensured.
4. An estimate of the probability of success of contemplated research and the significance of contemplated research and even the significance or usefulness of the findings can be made.
5. It enables to get the specific information needed to state the definitions, assumptions, limitations and hypotheses of the research.
The reviewed studies have been classified under three headings.

2.1 Studies related to Emotional Intelligence.
2.2 Studies related to Personality Factors
2.3 Studies related to Problem Solving Ability

2.1 Studies Related to Emotional Intelligence

2.1.1 Studies conducted in India

Md. Mahmood Alam (131:53-61) conducted a study with the following objectives in view.

Objectives of the study

1. To find out the relationship between emotional intelligence and academic achievement of adolescents.
2. To find out the relationship between academic stress and academic achievement of adolescents.
3. To find out if there is gender differences in emotional intelligence and academic stress and academic achievement of adolescents.

Hypotheses of the study

1. There will be significant positive relationship between emotional intelligence and academic achievement of adolescents.
2. There will be significant positive relationship between academic stress and academic achievement of adolescents.
3. There will be significant gender differences in terms of emotional intelligence, academic stress and academic achievement.

Methodology of the study

For the purpose of the present study, a sample of 250 students, 125 boys and 125 girls from different schools of Hyderabad city was selected using random sampling techniques. The age range of the students 15 to
17 years. For the collection of data Mangal Emotional Intelligence Inventory developed by S.K. Mangal and S. Mangal, Academic Stress and scale prepared by Asha Rani Bishti were used. For measuring academic success, the aggregate marks of annual examination of the students of class X collected from office records of the institutions concerned.

Findings of the study
1. There is a significant positive relationship between emotional intelligence and academic achievement of adolescents.
2. There is no significant relationship between academic stress and academic achievement of adolescents.
3. There is a significant gender differences exist in terms of emotional intelligence academic stress and academic achievement.

P. Usha and Rekha (203:25-29) conducted a study with the following objectives in view.

Objectives of the study
1. To study emotional competence of the secondary school pupils
2. To study the mental health of the secondary school pupils.
3. To find out the relationship between emotional competence with academic achievement of secondary school pupils.
4. To find out the relationship between mental health with academic achievement among secondary school pupils.
5. To study emotional competence and mental health as predictors of academic achievement among secondary school pupils.
Hypotheses of the study

1. There will be significant difference in the mean scores of emotional competence. Mental health and achievement in physics for the groups formed on the basis of i) Sex ii) Locality iii) Type of management of schools.

2. There will be significant relationship between emotional competence and achievement in physics for total sample and sub samples.

3. There will be significant relationship between mental health and achievement in physics for total sample and sub samples.

4. Achievement in physics can be predicted significantly in terms of the independent variables selected such as emotional competence and mental health.

Sample of the study

The study was carried on a sample of 530 secondary school students from the schools of Thirssur and Ernakuluma district of Kerala. The sample was selected using proportionate stratified sampling technique for ensuring the representation of the population.

Findings of the study

1. There is a significant gender difference does not exist in emotional competence, mental health and achievement in physics for the total sample. Girls show that they are superior in emotional competence, mental health and achievement in physics.

2. There is no difference between rural and urban pupils in emotional competence, mental health and achievement in physics. But urban pupils are found superior in emotional competence, mental health while rural pupils are superior in achievement in physics.
3. There is no significant difference, exist between government and private school pupils in emotional competence.

4. There is a significant difference was found between government and private school pupils in mental health and achievement in physics.

5. There is significant correlation co-efficient between emotional competence and achievement in physics for the total sample, boys, girls, rural, urban, government and private samples are 0.29, 0.31, 0.26, 0.24, 0.36, 0.30, 0.31 respectively.

6. There is significant correlation co-efficient mental health and achievement in physics for total sample and sub samples, girls, urban and private samples are 0.19, 0.18, 0.14 and 0.14 respectively. The correlation co-efficient between mental health and achievement in physics for boys, rural and government samples are 0.20, 0.23 and 0.29 respectively.

7. The best predictor variable emotional competence was found positively related to achievement in physics.

Subramanyam and Sreenivasa Rao (184:224-228) conducted a study with the following objectives in view.

Objectives of the investigation
1. To assess the impact of gender on emotional intelligence of secondary school students.
2. To assess the impact of gender on academic achievement of secondary school students.
3. To assess the relationship between emotional intelligence and academic achievement of secondary school students.
Hypotheses of the study
1. There would be significant difference between boys and girls on emotional intelligence of secondary school students.
2. There would be significant difference between boys and girls on academic achievement of secondary school students.
3. There would be significant relationship between emotional intelligence and academic achievement of secondary school students.

Sample of the study
The sample of 30 boys and 30 girls were randomly selected from class X of a municipal high school in Thirupathi town in Andhra Pradesh. Descriptive survey method was used for data collection.

Findings of the study
1. There is significance of difference between boys and girls with regard to their emotional intelligence.
2. There is no significance of difference between boys and girls with regard to their academic achievement.
3. There is no significant relationship between academic achievement and emotional intelligence among secondary school students.

Sridevi, K.V. and Lisha Parveen (180:38-49) conducted a study with the following objectives in view.

Objectives of the study
1. To examine the relationship among emotional intelligence, self concept and scholastic achievement of higher secondary students.
2. To find out whether there is significant difference in emotional intelligence of boys and girls.
3. To find out the whether there is significant difference in emotional intelligence among higher secondary students with respect to type of college.

Hypotheses of the study

The following hypotheses were formulated in the study

1. There exists a significant positive adjustment, self concept and scholastic achievement of higher secondary students.
2. There is no significant difference in emotional intelligence between boys and girls.
3. There is no significant difference in emotional intelligence among higher secondary students with respect to type of college.

Design of the study

Normative survey method was adopted for the present study. The sample for the study was drawn through stratified random sampling technique. The sample comprised of 200 students from 10 colleges.

Findings of the study

1. There exists a positive relationship among emotional intelligence, adjustment, self concept and achievement of higher secondary students.
2. Female students (158.80) possess higher emotional intelligence than the male students (144.01).
3. There is no significant difference in emotional intelligence of higher secondary students with respect to the type of college in which they are studying.
Darsana, M (40:25-31) conducted a study with the following objectives in view.

Objectives of the study
1. To find the relationship between emotional intelligence and achievement facilitating variables for the whole sample and relevant sub sample.
2. To compare emotional intelligence of groups in pairs classified on the basis of sex, locale of the school, nature of the school management and socio economic status (High SES, Low SES).

Hypotheses of the study
1. There will be significant relationship between emotional intelligence and achievement facilitating variables of the whole sample and relevant sub samples taken for the study.
2. There will be significant difference in emotional intelligence of groups classified in pairs on the basis of sex, locale of the school and nature of school management and low SES and high SES.

Design of the study
The investigator has adopted normative survey method for conducting the study. Stratified random sampling technique was adopted, due representation to factors like sex, local of the school and nature of school management. The investigator collected the data with help of tools and it analyzed the appropriate statistical techniques.

Findings of the study
1. There is substantial or marked relationship between emotional intelligence and socio-economic status for the whole sample and sub
samples boys, urban subjects, rural subjects and government institutions.

2. The relationship between emotional intelligence and self concept for the whole sample and relevant sub samples. The study reveals that there is no marked relationship between components of emotional intelligence and self-concept for the whole sample and sub samples boys, girls, urban subjects, rural subjects, government institutions and private institutions.

3. There is substantial relationship between components of emotional intelligence and achievement motivation for the whole sample and sub-samples boys, urban subjects, rural subjects, private institutions. There is marked relationship between emotional intelligence and achievement motivation for the whole sample and relevant sub samples.

4. There is marked relationship between emotional intelligence and examination anxiety for the whole sample and relevant sub samples.

5. There is significant difference between boys and girls in their emotional understanding and emotional intelligence, but there is no significant difference between boys and girls in their emotional perception, emotional facilitation of thought and emotional management.

6. There is no significant difference between rural and urban students in their emotional perception, emotional facilitation of thought, emotional understanding, emotional management. Emotional intelligence is high for rural students when compared with that of urban students.

7. There is significant difference between government and private school students in their emotional facilitation of thought, emotional perception and emotional intelligence, but there is no significant
difference between government and private school students in their emotional understanding, and emotional management. Means of emotional intelligence is high for private school students when compared with that of government school students.

8. There is a significant difference between low SES and high SES students in their emotional facilitation of thought, emotional management and emotional intelligence, but there is no significant difference between low SES and high SES students in their emotional understanding. Also it can be seen that means of emotional facilitation of thought and emotional intelligence are high for high SES students when compared with that of SES students.

Meenakshi Singh, O.P. Chaudhary and Madhu Asthana (132:175-179) conducted a study with the objective to assess the mental health status of high and low emotional intelligent adolescents.

Hypothesis of the study

It was hypothesized that high emotionally intelligent adolescents would show better mental health.

Design of the study

Normative survey method was adopted and to collect the data. For this purpose, a sample of 400 adolescents (200 male and 200 female) was taken from various schools and colleges of Varanasi.

Tools

Emotional intelligence scale by Hyde and Pethe (2002) and Mithil Mental Health Status (MMHSI) Inventory by Kumar and Thakur (1986) was used to collect the data over total sample and two extreme groups.
Results of the study

1. Mental health scores differ significantly on all the five subscales and on the total scale for low and high emotional intelligence groups.

2. High emotional intelligence group have better mental health in comparison to low emotional intelligence group as measured by ego-centrism dimension. On egocentrism scale, high emotional intelligence and low emotional intelligence groups differ significantly (t = 4.15, p < 0.01).

3. On Alienation scale both group differ significantly (t = 2.23, t < 0.05). Low emotional intelligence group is more alienated than high emotional intelligence group.

4. On expression scale high emotional intelligence and low emotional intelligence group differ significantly (t = 2.35, p < 0.05). It reveals that low emotional intelligence group of adolescents have comparatively better mental health than high emotional intelligence group.

5. On emotional instability scale high and low emotional intelligence groups differ significantly (t = 2.58, p < 0.05).

6. On social non conformity scale it was inspected that high emotional intelligence and low emotional intelligence group differ significantly (t = 2.12, p < 0.05).

Overall it is clear that high and low emotional intelligence group differ significantly all the dimensions of mental health.
Gakhar, S.C. and Manhas, K.D. (66:78-83) investigated a study with the following objectives in view.

Objectives of the study
1. To find the relationship of emotional intelligence with cognitive variables such as general intelligence, academic achievement and creativity.
2. To find significant difference in the emotional intelligence of male Vs female, government school Vs private school scheduled caste Vs non scheduled caste, rural Vs urban and arts Vs science students.

Methodology
The study was carried out as a descriptive survey method. It was conducted on 400 students of class XI studying in various private and government schools in both urban and rural areas of the districts of Jammu and Kashmir.

Tools used
Emotional Intelligence scale by Kaur and Kaur, Group Test of General Mental Ability by Tandon and Verbal Test of Creative Thinking by Baquer Mehendi. The class x board results were used as a measure of academic achievement. The data was analyzed using product movement correlation and t-test.

Findings
1. Significant and positive correlations were found between emotional intelligence and all the cognitive variables namely intelligence creativity and academic achievement.
2. No significant difference was observed between boys and girls with respect to emotional intelligence.
3. A significant difference was observed in the emotional intelligence of adolescents studying in private and government schools with the private school students scoring higher.

4. A significant difference was observed between the emotional intelligence of science and arts students with the science students scoring higher.

5. No significant difference was observed between adolescents of rural and urban areas and scheduled and non scheduled caste.

Umadevi and Romala Rayalu (202:22-25) conducted a study with the following objectives in view.

Objectives of the study
1. To find the emotional intelligence levels and intellectual abilities of adolescents.
2. To see the relationship of any between the emotional intelligence of adolescents and intellectual abilities.

Method of the study
The study was carried out in the city of Hyderabad co-educational institutions with plus two classes were selected for the purpose of the study. The sample consisted of 200 students who were in the age range of 15-18 years. Descriptive survey type research design was followed.

Tools used for the study
Family background information schedule to collect the personal profile of the respondents Raven’s Standard Progressive Matrices (1992) to study the intellectual abilities of adolescents and Emotional Intelligence Inventory by Uma Devi (2003).
Results of the study

The results of the study revealed that the total emotional intelligence and the intellectual abilities were significantly and positively related to each other. Also interesting to note that intellectual abilities were positively and significantly related to intrapersonal subscale. One of the five subscales of emotional intelligence. It is surprising to note that only two out of fifteen dimensions of emotional intelligence empathy and optimism were positively and significant related to intellectual abilities.

Chauhan V.L. and Bhatnagar, T. (32:157-167) conducted a study with the following objectives in view.

Objectives of the study
1. To prepare a scale on emotional expression.
2. To measure the effect of stages of adolescence on emotional maturity and emotional expressions.
3. To measure the effect of gender on emotional maturity and emotional expressions.
4. To measure the emotional quotient of the stage of adolescence and type of gender.

Method of the study
The study based on a sample of 120 male and female adolescents who were randomly assigned to all the experimental groups.

Tools used
Tools used for data collection were Emotional Maturity scale and a self prepared Emotional Expression scale. Statistical techniques like mean, standard deviation and F-Ratio were used to analyze the data.
Findings
1. Post adolescent males have higher emotional maturity than females and the stages of adolescence play a significant role upon emotional maturity.
2. Post adolescents have greater skill for emotional expression than the pre adolescents.
3. Females have higher skill for emotional expression than their male counter parts.
4. Post adolescents posses a higher degree of emotional quotient than their counter parts.
5. Females have a higher degree of emotional quotient than their male counter parts.

2.1.2 Studies conducted Abroad
D.A. Adeyemo (2:105-111) has conducted a study with the following objective in view.

The objective of this study was to examine the influence of emotional intelligence, gender and age on the academic self efficacy of distance learners in Ibadan.

Hypotheses of the study
1. There is no significant relationship between emotional intelligence, gender, and age on self-efficacy of the participants.
2. Emotional intelligence, gender and age do not predict academic self-efficacy of the distance learners.
3. There is no significant difference in the academic self-efficacy of male and female participants.
Design of the study

The study employed descriptive survey research design to carry out the investigation.

Findings of the study

1. There is a positive and significant correlation between the predictor variables and criterion measures.
2. It was also found that emotional intelligence, gender and age were fair predictors of academic self-efficacy.
3. There is significant difference was found in the academic self-efficacy of male and female participants. The female participants were superior to their male counter parts in terms of academic self-efficacy.

Drago, Judy, M (47) conducted a study with the following objectives in view.

Objectives of the study

1. To study the emotional intelligence of non-traditional college students.
2. To study the academic achievement of non-traditional college students.
3. To study the relationship between emotional intelligence and academic achievement of nontraditional college students.

Findings of the study

1. Results demonstrated that emotional intelligence is significantly related to student GPA scores, student cognitive ability scores, and student age. Additionally, student anxiety was related to certain emotional intelligence abilities.
2. No significant relationship however was found between emotional intelligence and achievement motivation. Overall, the results suggest that academic achievement is related to students ability to recognize, use and manage their emotions.

Nada, Abi Sambra (140:1-11) conducted a study with the following objectives in view.

The objectives of the study
1. To study relationship between emotional intelligence and academic achievement in eleventh graders.
2. To compare the emotional intelligence to eleventh graders.
3. To compare the academic achievement of eleventh graders with emotional intelligence.

Design of the study

The sample will be 500 school going 11th graders boys and girls from public and private schools in Montgomery, Alabama. Stratified sampling technique was adopted. Bar-On Emotional Quotient Inventory (EQ-I) was used to collect the data. Survey type design was followed for the collection of data.

Hypotheses of the study
1. There will be no significant relationship between emotional intelligence and academic achievement in eleventh graders.
2. There will be no significant difference in the emotional intelligence of eleventh graders boys and girls.
3. There will be no significant difference in the academic achievement of students with high, middle and low emotional intelligence groups.
Results of the study
1. There is a significant relationship was found between emotional intelligence and academic achievement of eleventh graders.
2. There is significant difference in the emotional intelligence of boys and girls.
3. Students with high, middle and low emotional intelligence differ in their academic achievement.

2.2 Studies Related to Personality Factors
2.2.1 Studies conducted in India

Gulam Qadir Sheikh (83:153-155) investigated a study with the objective to explore the personality traits, psychogenic needs and academic achievement of female adolescent students with reference to rural and urban residential background and cognitive style.

Methodology of the study

The present study was conducted through descriptive survey method of research and followed 2 x 2 factorial design. The design had 40 subjects in each cell.

Tools used

Urdu version of HSPQ of Cattell, Urdu version of Meenakshi Personality Inventory and Group Embedded Figures Test (GEPT) by Witkin et.al. were used to collect the data. For the analysis of data Two-way analysis of variance was employed. In case of ‘F’ ratio for interaction Tukey Test was used.

Findings of the study
1. Female adolescents belonging to rural and urban residential background do not differ significantly on 14 personality traits viz. ‘A’
(reserved Vs warmhearted); ‘B’ (less intelligent Vs more intelligent); ‘C’ (affected by feelings Vs emotionally stable); ‘D’ (undemonstrative Vs equal table); ‘E’ (obedient Vs assertive); ‘F’ (sober Vs enthusiastic); ‘G’ (disregards rules Vs conscientious); ‘H’ (shy Vs adventurous); ‘I’ (tough – minded Vs tender minded); ‘J’ (zestful Vs circumspect individualism); ‘Q’ (self assured Vs apprehensive); ‘Q’₂ (group dependent Vs self-sufficient); ‘Q’₃ (uncontrolled Vs controlled); ‘Q’₄ (relaxed Vs tense).

2. Female adolescents with field-independent and field dependent cognitive styles do not differ significantly or personality traits except on factor ‘B’ (less intelligent Vs more intelligent) and factor ‘Q₃’ (uncontrolled Vs controlled).

3. There is no interaction between residential background (rural / urban) and cognitive style of female adolescent students with regard to 13 personality traits. However, in case of ‘Q’₄ (relaxed Vs tense), there is significant interaction between residential back ground and cognitive style. Urban field-independent female adolescent students are significantly more ‘tense’ than their rural field-independent counterparts. But rural and urban field-dependent female adolescent students are more or less similar on factor ‘Q₄’.

4. Female adolescent students belonging to rural and urban residential back ground do not differ significantly on ten psychogenic needs viz. n-achievement; n-exhibition; n-autonomy; n-affiliation; n-succorance; n-dominance; n-abasement; n-nurturance; n-endurance and n-aggression.

5. Field – independent and field-dependent adolescent students differ significantly from each other in case of two psychogenic needs, n-autonomy and n-affiliation. Further, field-dependent female adolescent students have higher level of n-affiliation than their field-
independent counterparts on the other hand, field-independent female adolescents possess higher level of n-autonomy than field-dependent adolescents.

6. There is no significant interaction between residential back ground and cognitive style with respect to the psychogenic needs viz. n-achievement, n-exhibition, n-autonomy, n-affiliation, n-succorance, n-dominance, n-abasement, n-nurturance, n-endurance and n-aggression.

7. There is no significant difference in the mean academic achievement of rural and urban female adolescent students.

8. Female adolescent students with field-independent and field-dependent cognitive styles differ significantly with respect to their academic achievement. Field-independent female adolescent students achieve higher scores than their field-dependent counterparts.

9. There is no significant interaction between residential background and cognitive style of female adolescents with respect to their academic achievement.

Gill, Tejinderjit Kaur (75:1372) conducted a study with the following objectives in view.

Objectives of the study
1. To determine whether the training strategies affect creative problem solving skills and cerebral dominance.
2. To study whether intelligence, personality and cognitive style affect on cerebral dominance.

Methodology

By using the multi stage random sampling technique four schools were selected, and two schools were randomly assigned to one group
were and two to the other group. Sixty students were randomly selected from class IX from the four schools. Out of the total of 240 students, one hundred and twenty students were assigned to one group and 120 to the other. Tools used included, Achievement test, Torrence Test of Creative Thinking, General Mental Ability Test, Eysenck’s Maudsley Personality Inventory by Jalota and Kapoor and Group Embedded Figure Test by Witkin et. al., The collected data were treated using mean, SD, ANOVA and ‘t’ ratio.

Major findings
1. The right brain training strategy emerged as superior to the left-brain training strategy, so far as creative problem-solving skills in mathematics were concerned.
2. High intelligent subjects scored higher on originality than low-intelligent subjects irrespective of training strategy, where as fluency, flexibility and creative problem solving skills were not affected by levels of intelligence.
3. Introverts scored higher on originality in solving mathematical problems than extraverts, irrespective of the strategy of training.
4. The group having the field-independent cognitive style scored higher on creative problem solving test.
5. Introverts and field-independents used the integrated mode of learning as compared to extraverts and field-dependents, irrespective of training strategy types.
6. Personality type and cognitive style interacted with the training strategy types.
7. In most of the cases, field-independents having extravert personality and trained by the right hemisphere strategy were found to be superior
mathematical problem solvers than introverts having the dependent
cognitive style and trained through the left hemisphere strategy.

Singh, Chob (176:932) conducted a study with the following
objective in view.

Objective of the study

To study the separate and interactive influence of need
achievement, creativity components and second order personality factors
on anagram task learning of female college students.

Methodology

The sample comprised of 647 female adolescents of studying in
different colleges situated in Agra city. The tools used included need
Achievement motive test of Bhargava, Verbal Test of Creative Thinking
of Baquer Mehdi, Scrambled Word Task Test of Srivastava and Goel and
Cattell’s 16 Personality Factors Questionnaire (adaptation by S.D.
Kapoor).

Major findings
1. Need achievement was a significant determinant of the anagram task
   learning of female adolescents.
2. The success of female adolescents on anagram task learning was
   significantly influenced by their creativity components.
3. Female adolescents having low level of PFQ and PFQII had higher
   score on anagram task learning.
4. Female adolescents having high level of PFQIII, PFQIV, PFQV and
   PFQVI had higher score on anagram task learning.
5. The interactive effects of n-achievement, creativity components and personality factors on anagram task learning performance showed a lot of combination and variations.

Kohli, Om Prakash (105:896-897) investigated a study with the following objectives in view.

Objectives of the study
1. To study the effect of intelligence, socio-economic status and sex on the attitude of students towards religion.
2. To study the interaction effects (double and triple) of intelligence, socio-economic status and sex differences on the religious attitude of the students.
3. To work out the significance of difference between boys and girls in the relationship of attitude scores with each of the 14 personality dimensions given by Cattell.

Methodology
The sample consisted of 1,000 students (500 Boys and 500 Girls) selected from classes XI and XII of the higher secondary schools of four districts of Jammu Province. They were classified in to high and low groups on each of the two variables of intelligence and socio-economic status. The tools used included General Mental Ability Test by Jalota, H.S.P.Q. Test of Cattell, Religious Attitude Scale and Socio-Economic Status Questionnaire prepared by the investigator, the statistical techniques used were analysis of variance, correlation co-efficient and ‘t’ ratio.
Major findings
1. Students belonging to the high intelligence group and high socio-economic status were more religious in attitude than the students of the low intelligence group and low socio-economic status.
2. Girls were more inclined towards religion than boys.
3. Intelligence, socio-economic status and sex did not interact with each other to produce significant differences in the mean scores on religious attitude.
4. There were significant correlations between personality traits like intelligence, sober or enthusiastic, super-ego strength timid or venture-some, tough-mined or tender-minded group-dependent or self-sufficient, self-concept, control and the attitude scores of boys and girls in respect of religion. There were significant correlations also in the case of the traits of emotionality in boys and willingness to act in girls.

Qamar Jahan (152:89-93) conducted a study with the objective to identify the personality profiles of students of science, arts and commerce studying in Pre-university classes of Aligarh Muslim University.

Hypotheses of the study
1. The personality characteristics of over-achievers will be distinctly different from those of under-achievers in Science, Arts and Commerce streams.
2. The personality characteristics of over achievers of the Science stream will be distinctly different from the personality characteristics of over – achievers of the Arts stream.
3. The personality characteristics of over achievers of the Science stream will be distinctly different from those of over-achievers of the Commerce stream.

4. The personality characteristics of over achievers of the Arts stream will be distinctly different from those of over achievers of the Commerce stream.

Methodology

A total of 758 male and female students studying in the Pre-university class in Science, Arts and Commerce streams served as the sample of the study. Normative survey method was followed for the collection of data. Tools used. Mehat's Group Test of Intelligence and 14 factors of HSPQ prepared by Cattell served as a measure of personality.

Findings

1. The over-achievers of the Science stream are reserved, more intelligent, emotionally stable, obedient, sober, conscientious, shy, self-assured, self-sufficient, controlled and relaxed in comparison to the under –achievers of the Science stream while the under-achievers of the science stream are warmhearted, less intelligent, affected by feelings, undemonstrative, assertive, enthusiastic, disregard rules, adventurous, apprehensive, sociably-group-dependent, uncontrolled and tense in comparison to the over achievers of Science stream. But the over and under-achievers of the Science stream do not differ on tough-minded versus tender minded and zestful versus circumspect individualism dimensions of personality.

2. The overachievers of the Arts stream are warmhearted, more intelligent, affected by feelings, un-demonstrative, assertive,
enthusiastic, conscientious, adventurous, zestful, apprehensive and tense in comparison to the under-achievers of the Arts stream, while the under-achievers of the Arts stream are reserved less intelligent, emotionally stable, excitable, obedient, disregard rules, shy, circumspect in comparison to the over-achievers of the Arts stream. The over and under-achievers of the Arts stream do not differ on tough-minded versus tender - minded, socially-group-dependent versus self-sufficient and uncontrolled versus controlled dimensions of personality.

3. The over achievers of the Commerce stream are reserved, more intelligent, affected by feelings, sober, conscientious, self-assured in comparison to the under achievers of the Commerce stream, while the under achievers of the Commerce stream are warm-hearted, less intelligent, emotionally stable, enthusiastic, conscientious and apprehensive in comparison to the over-achievers. But the over and under-achievers of the Commerce stream do not differ on the remaining dimensions of personality (HSPQ).

4. The over achievers of the Science stream are reserved, emotionally stable, sober, conscientious, shy and self assured in comparison to the over-achievers of the Arts stream, while the over-achievers of the Arts stream are warm hearted, affected by feelings, enthusiastic, disregard rules, adventurous and apprehensive in comparison to the over achievers of the Science stream. But the over-achievers of the Science and Arts streams do not differ on less intelligent versus more intelligent, undemonstrative versus excitable, obedient versus assertive, tough-minded versus tender minded, zestful, versus circumspect individualism, sociably-group-dependent versus self sufficient, uncontrolled versus controlled and relaxed versus tense, dimensions of personality.
5. The over-achievers of the Science stream are excitable, assertive, conscientious, adventurous, tender-minded, having circumspect individualism and self-sufficient in comparison to the over-achievers of the Commerce stream, while the over-achievers of the Commerce stream are undemonstrative, obedient, disregard rules, shy, tough-minded, zestful and group dependent in comparison to the overachievers of the Science stream. The over achievers of the Science and Commerce streams do not differ on personality dimensions reserved versus warmhearted, less intelligent versus more intelligent, affected by feelings versus emotionally stable, sober versus enthusiastic, self-assured versus apprehensive, uncontrolled versus controlled and relaxed versus tense.

6. The over achievers of the Arts stream are warmhearted, assertive, adventurous, tender-minded, self-sufficient in comparison to the over-achievers of Commerce stream, while the over-achievers of the Commerce stream are reserved, obedient, shy, tough minded, sociably group dependent in comparison to the over-achievers of the Arts stream. But the over-achievers of the Arts and Commerce streams do not differ on less intelligent versus more intelligent, affected by feelings versus emotionally stable, undemonstrative versus excitable, sober versus circumspect versus excitable, sober versus circumspect individuals self assured versus conscientious, zestful versus circumspect individuals, self-assured versus apprehensive, uncontrolled versus controlled and relaxed versus tense, dimensions of personality.
Puri, K (151:845) conducted a study with the following objectives in view.

Objectives of the study
1. To study the personality traits of underachievers with respect to their socio-economic status.
2. To know the self-concept of underachievers with respect to their socio-economic status.

Methodology of the study
The sample consisted of 425 students (244 Boys and 181 Girls) of the 16-18 years age group, who had 90 or above per centile (DR) (PG) on the progressive matrices test and had secured less than 48 per cent marks in the high school examination. The sample was selected from 2147 class XI students of 12-intermediate colleges of Lucknow city.

Tools used
2. RPM test.
3. Cattell’s High School Personality Questionnaire.
4. Sherry, Verma and Goswami’s test of Self-Concept. The collected data were analysed using suitable statistical techniques.

The findings of the study
1. About 19.8 per cent of the intellectually gifted students did not come up to the expected level of academic performance.
2. The majority of the underachievers belonged to lower SES groups and had proper self-concept.
3. The underachievers generally tended to be warmhearted and easygoing, had comparatively lower scholastic capacity and were
inactive. They tended to be assertive, aggressive, stubborn and dominant, were impulsive, lively happy go-lucky and gay persons and tended to be socially bold. They were generally overprotected, sensitive, individualistic and reflective and were found to be apprehensive, worrying and troubled.

4. The under achiever girls tended to be more group dependent and were generally tense, over wrought and frustrated.

2.2.2 Studies conducted Abroad

Myers and Mc Caulley (139:221-222) studied the personality types are expressed by a four letter composite that represents an individual's preference on each of the four indices. The four personality dimensions based on Jung's attitude (extraversion and introversion) and functions (perception and judgment) are extraversion (E) Active involvement with people as a source of energy. Perception and judgment are focused on people and things. Introversion (I) A preference for solitude to recover energy, perceptions and judgment are focused on concepts and ideal. Seventy five Per cent of the general population prefers an extraverted orientation, while 25 Per cent prefer an introverted one.

K. Barton, T.E Dielman, and R.B. Cattell (16:398-404) conducted a study with the objective "personality and intelligence quotient (IQ) measures as predictors of school achievement".

One hundred and sixty-nine sixth graders and 142 seventh graders were given the High School Personality Questionnaire, the Culture Fair Intelligence Test, and then standardized achievement tests 2 months later. Regression analysis were performed to predict achievement from the personality and IQ variables. Findings were (a) the personality factor "Conscientiousness" and IQ predicted achievement in all areas (p > 0.01);
(b) grade-specific factors were important. (For example, "warm heartedness" predicted achievement in all areas in the sixth grade only $(p > 0.01)$; and (c) certain specific achievement areas had their own unique set predictor variables. For example, in mathematics ‘adventurousness’ was related to achievement in both grades $(p < 0.01)$.  

2.3 Studies Related to Problem Solving Ability

2.3.1 Studies conducted in India

Indira Sharma (90:68-69) conducted a study with the following objectives in view.

Objectives of the study
1. To study the scientific attitude of higher secondary students in relation to sex and three levels of achievements.
2. To study the relationship among academic achievement scientific attitude, and problem solving ability of higher secondary school students.

Hypotheses of the study
1. There is no significant difference in scientific attitude of higher secondary school students, sex and achievement wise.
2. There is no statistical difference in problem solving ability of higher secondary school students, sex and achievement wise.
3. There is no relationship among academic achievement, problem solving ability and scientific attitude of higher secondary students.

Methodology of the study

Descriptive survey method was followed and null hypothesis was framed. The sample consisted of 240 students of XI$^{th}$ class of government aided Hindi medium school governed by U.P. Board, Allahabad, selected
by multistage random sampling technique. The tools used: Scientific Attitude Scale by P.A. Greewal, Problem Solving Ability Test by L.N. Dubey. The marks of Xth class board examination were treated as academic achievement score of students. To analyze the data Mean, SD and ‘t’-test and product movement and multiple correlation were used.

Findings of the study
1. Higher secondary students have shown average problem solving ability as indicated by mean and insignificant ‘t’ value indicated no significant difference in problem solving ability of boys and girls.

2. The calculated ‘t’ value of male and female students of the three groups on the basis of achievement is found, significant at 0.01 level except average and low achievement in male group thus confirming the significant difference in problem solving ability among three levels of achievement.

3. It was found that the group had average scientific attitude and mean and insignificant ‘t’ values confirmed statistically no difference in the scientific attitude of boys and girls.

4. The calculated ‘t’ values of male and female students on the basis of three groups of achievement inferred the difference among HA and LA only. HA and AA did not differ in their scientific attitude as confirmed by insignificant ‘t’ values.

5. On the basis of value of co-efficient of correlation, it can be inferred that all the three variables achievement and problem solving ability, achievement and scientific attitude, scientific attitude and problem solving ability all are significantly correlated as all the values are significant at 0.01 level, but relationship is low in boys and not in girls.
T. Swaruparani (190:33-39) conducted a experimental study with the following objectives in view.

Objectives of the study
1. To find out the relative effectiveness of synthetic method in developing problem solving ability in the students of mathematics.
2. To find out the effectiveness of Poly’s method in developing problem solving ability in students of mathematics.
3. To find the relative advantage of one over the other in achieving the generalisable problem solving ability of the experimental research process.

Design of the study
In the present study on randomized intact experimental control groups pre-test, post-test design was suitably used.

Sample
In the present study intact classes were considered for reasons of administrative feasibility. Two different sections of students from two different schools in the same locality were chosen.

Results of the study
1. The synthetic group did not make any improvement from its initial position after the one month traditional teaching of the context matter.
2. The Poly’s group made spectacular gains after being taught using the new heuristic approach.
3. A significant difference could be seen between the synthetic method group Poly’s method on post-test scores.
4. A study of the gain scores differed significantly between synthetic and Poly’s method group.
5. The experimental students taught by Polya’s method are functioning well in the four problem solving stages.

6. The synthetic method students framed very dismally in these phases and stages except on the understanding of the problem solving.

7. The teachers who participated in the experiment have proved their competence to implement different methods and produce a significant results in a short time.

8. The high ability group did not get influence by any method differentially

9. The other two lower levels of students abilities are beneficially affected by the experiment method in Polya’s method.

Susai Mary (189:100-103) conducted a study with the following objectives in view.

Objectives of the study
1. To study the expectations about problem solving for students of standard XI and XII.
2. To study the strategies for preparing for exams for students of standards XI and XII.
3. To study the self assessment of their problem solving skills of students of standard XI and XII.
4. To study the appreciation of mathematics, physics, algebra word problems and puzzles.

Methodology

The sixteen item inventory was administered to 140 students of higher secondary schools. The population of the study comprised the higher secondary (Eleventh and Twelth Standard secondary) schools located in Thiruvallur district in Tamilnadu.
Tools used

A personal sheet survey on problem solving questionnaire developed by Charles F. Yokomoto was used to collect the data. The collected data was analyzed with suitable statistical tests.

Results of the study

1. There was no significant difference between XI and XII std students with regard to cognitive factors.

2. There was significance of the difference between the mean scores for the two sub groups such as physics and mathematics courses.

3. Those who said they enjoyed solving algebra word problems were more likely to say that they enjoyed their learning from drill problems, examples, and solution to homework problems than those who did not say the same.

4. Those who did not say the same mean i.e., (mean score = 1.64) (p < 0.05). The first item in this group appears to confirm to common sense. Solving algebra word problem requires deeper thinking than executing calculations and using formulas.

5. Those who strongly agreed that they were competent as problem solvers were less likely to say that they prepared for exams by memorizing the step by step calculations used to solve the homework problems (mean score = 2.3) than those who did not strongly agree (mean score = 1.99) (p < 0.01).

6. Those who strongly agreed that they were competent as problem solvers were more likely to say that they tried to solve as many drill and end of chapter problems as possible (mean score = 1.8) than those who did not strongly agree (mean score = 2.3) (p < 0.01).
James Anice, P.V. Marice (91:27-34) conducted a study with the following objectives in view.

Objectives of the study
1. To explore the relationship among the variables namely, Problem solving ability, reasoning ability and components of reasoning ability among XI standard science students.
2. To predict the problem solving ability of the students in science group in terms of the selected variables in the study viz., reasoning ability in science, gender, region, religion, school management type, socio economic status of the parents and brain hemisphericity.
3. To explore whether differences in demographic variables viz., gender, region, religion, school management type and socio economic status lead to differences in problem solving ability and reasoning ability.
4. To explore whether differences in brain hemisphericity result in differences in problem solving ability and reasoning ability.
5. To study whether students with right and left brain hemisphericity dominance differ in problem solving ability owing to variations in selected demographic variables.

Design of the study
Descriptive method of study was thought to be appropriate to analyze the impact of reasoning ability and hemisphericity on problem solving ability among XI standard students who opted for Science group. A random sample of 556 XI standard students who opted for science group drawn from 10 higher secondary schools of Palakkad district in Kerala constituted the sample.
Tools used

"Problem Solving Ability Test" prepared and standardized by Roopa Rekha Garg, "Reasoning Ability in Science" prepared and standardized by Anuradha Joshi and Bhuban Chandra Mahapatra (1994), ‘SOLAT’ test developed and standardized by Venkataraman (1994) and Personal data sheet prepared by the investigator to collect information on selected variables and to collect the data. After the data was collected and classified, it was subjected to statistical test of significant using SPSS for testing the hypothesis formulated. Differential analysis, correlation analysis and regression analysis were carried out.

Major findings

1. There is a significant relationship between problem solving ability and reasoning ability in science. All the components of reasoning ability are significantly related to problem solving ability and are found to be significant predictors of problem solving ability of students who opted for science group.

2. Reasoning ability and gender independently contribute towards problem solving ability and are significant predictors of problem solving ability.

3. There are significant gender differences in the students’ problem solving ability as well as reasoning ability in science favouring boys.

4. Students from rural and urban areas differ significantly in their problem solving ability and reasoning ability, favoring those from urban areas.

5. Students differ in reasoning ability owing to differences in brain hemisphericity dominance, favoring students with right brain hemisphericity dominance. However no significant difference in
PSA is found between students with right brain hemisphericity and left brain hemisphericity.

6. Students following different religions (i.e., Christians, Hindus and Muslims) show significant differences in their problem solving ability and reasoning ability, favoring Hindu students.

7. Students studying in government aided and unaided schools differ significantly in their problem solving ability and reasoning ability in science, favouring those studying in government schools.

8. Students of varying socio-economic status differ significantly in their problem solving ability and reasoning ability in science favoring those from high socio economic strata.

9. Students who have right brain hemisphericity dominance differ significantly in their problem solving ability owing to difference in gender, region, religion, school management type and socio economic status.

10. Students who have left brain hemisphericity dominance differ significantly in their problem solving ability owing to difference in gender, region, school management and socio economic status. However left-brain hemisphericity dominant students do not differ in PSA owing to variations in religious affiliations.

Sinha S.P. and Sharma (175:81-89) conducted a study with the objective to explore the effect of anxiety, sex and task complexity on verbally expressed preferences.

Method of the study

The sample consisted of 300 adolescent boys and girls (150 boys and girls) from Intermediate colleges of Agra city. Sinha’s Anxiety Scale
was used to select high and low anxiety subjects. The data was treated with 2 x 2 x 4 ANOVA techniques.

Findings
1. It was found that high anxiety subjects rated the task as slightly more interesting as compared to low anxiety subjects.
2. Task complexity was found to be an important variable affecting the verbally expressed preferences of the subjects in interaction with anxiety as well as sex.

Surinder Pal Kahlon (187:132-138) conducted a study with the following objectives in view.

Objectives of the study
1. To find out the overall differences as well as differences in the arithmetic problem solving ability of government and public school children.
2. To study the effect of parental education and occupation on problem solving ability of these children.

Methodology
The study was conducted in government and public schools of Ludhiana city. The sample constituted of 240 students (120 boys and 120 girls) of both sexes of 8th grade were selected randomly.

Results of the study
1. The government school children indicating superiority in problem solving ability of public school children over government school children.
2. There was no significant difference between the mathematical problem solving ability of government and public school boys.

3. There is a significant difference was found between the mean scores of girls students of government and public schools.

4. Girl students of both the government and public schools attained better scores in problem solving ability than boys revealing superior problem solving ability.

5. There is no significant difference between government and public school children mathematical problem solving ability w.r.t. father education. The education of the father had no impact on the problem solving ability of school children.

6. Education of the mothers of government school children affected the problem solving ability of children as the value of the Chi square (25.79; at 6 degrees of freedom, p>0.01) was found to be non significant in case of public school children indicating no association between mothers education and problem solving ability.

7. The mothers occupation showed no effect on problem solving ability of government and public school children.

Vijayi Pratap Singh (208:127-130) conducted a study with the following objectives in view.

Objectives of the study

1. To find out the predictive efficiency of intelligence in mathematical problem solving performance of high school students.

2. To find out the predictive efficiency of mathematical achievement in mathematical problem solving performance of high school students.

3. To search out the predictive efficiency of mathematical problem solving performance of high school students.
4. To develop regression equation between mathematical problem solving performance and intelligence. Mathematical achievement and mathematical creative thinking abilities of high school students.

Hypotheses of the study
1. Intelligence does not contribute significantly in the development of mathematical problem solving performance.
3. Mathematical creativity does not contribute significantly in the development of mathematical problem solving performance.
4. Intelligence, mathematics achievement and creativity do not contribute significantly in the development of mathematical problem solving performance when all the variables were considered together.

Methodology

The sample of the study consisted of 715 high school students (250 urban male, 265 female and 200 rural male). Data were collected randomly from Sultanpur, Faizabad, Gonda, Baharich and Barabanki districts of Avadh region.

Tools used

Raven’s Standard Progressive Matrices (sets A, B, C, D and E) developed by Raven (1983), Mathematical Creativity Test developed by Sing (1985), Hindi adaptation of Krutet skills Mathematical Problem Solving performance test developed by Krutet skill (1976) and Academic Achievement in Mathematics.
Statistical Treatment of data

Doolittle method was used to analyze the data. Multiple correlation, Beta co-efficient were computed, regression equation between mathematical problem solving performance and intelligence, mathematics achievement and mathematical creativity were developed.

Major findings of the study

1. Intelligence contributes about 43.98 per cent in the case of urban male sample, nearly 39.33 per cent in the case of female sample, about 18.60 per cent in the case of total sample in the development of mathematical problem solving performance.

2. Mathematics achievement contributes about 25.98 per cent in the case of urban male sample, 38.45 per cent in the case female sample, 22.13 per cent in the case of rural male sample and about 42.92 per cent in the case of total sample in the development of mathematical problem solving performance.

3. Mathematical creativity contributes about 76.76 per cent in the case of urban male sample, about 8.45 per cent in the case of female sample, 8.20 per cent in the case of female sample, 8.20 per cent in the case of rural male sample and nearly 6.24 per cent in the case of rural male sample in the development of mathematical problem solving performance.

4. The contribution of intelligence in the development of mathematical problem solving performance was found to significant at 0.01 level (F = 6.17 for urban male sample, dfs = 1,2049; F = 6.70 for female sample, dfs = 1,264; F = 4.895 for total sample, dfs = 1,714) and at 0.05 level (F = 4.35) for rural male sample, (dfs = 1,199).
5. The contribution of mathematics achievement in the development of mathematical problem solving performance was found significant at 0.05 level ($F = 44.14$ for urban male sample, $d.f.s = 1,249$; $F = 3.97$ for female sample) ($d.f.s = 1,264$; $F = 6.572$ for total sample, $d.f.s = 1,714$) and at 0.01 level ($F = 7.03$ for rural male sample, $d.f.s = 1,199$).

6. Mathematical creativity does not contribute significantly in the development of mathematical problem solving performance of high school students ($F = 1.39$, $d.f.s = 1,249$ for urban, male sample; $F = 0.079$, $d.f.s = 1,264$ for female sample, $F = 0.169$, $d.f.s = 1,199$ for rural male sample and $F = 1.459$, $d.f.s = 1,714$ for the rural total sample).

7. The contribution of intelligence, mathematics achievement and mathematical creativity in the development of mathematical problem solving performance was found significant at 0.01 level ($F = 5.37$ for urban male sample, $d.f.s = 3,247$; $F = 4.59$ for female sample, $d.f.s = 3,262$; $F = 4.17$ for rural male sample, $d.f.s = 3,19$) and $F = 475$ for the total sample, $d.f.s = 3,712$ when all the variable were taken together.

8. The following regression equations were developed to predict mathematical problem solving performance of high school students with the help of mathematical creativity, intelligence and mathematics achievement scores of the students.

   i) Regression equation for urban male sample: $X_i = -6.1668 + 0.08064 x_2 + 0.0802 x_3 + 0.0407 x_4$

   ii) Regression equation for female sample: $X_i = -2.1589 + 0.004 x_2 + 0.0575 x_3 + 0.1184 x_4$

   iii) Regression equation for rural male sample: $X_i = -12.5323 + 0.0272 X_2 + 0.1980 X_3 + 0.1632X_4$
iv) Regression equation for total sample: \( X_1 = 4.95 + 0.025 \times X_2 + 0.037 \times X_3 + 0.315 \times X_4 \)

Where \( X_1 = \text{Mathematical problem solving performance} \)
\( X_2 = \text{Mathematical creativity} \)
\( X_3 = \text{Intelligence} \)
\( X_4 = \text{Mathematics achievement} \)

Singh, Radha Charan (177:1074) conducted a study with the following objectives in view.

Objectives of the study
1. To develop and validate a test of scientific creativity, problem solving and risk taking behavior for children in the age group of 12 + residing in Madhya Pradesh.
2. To investigate the differences between tribal and urban students with respect to scientific creativity, problem solving ability and risk taking tendency.
3. To investigate the sex differences with respect to scientific creativity, problem solving ability and risk taking tendency.
4. To study the relationship between scientific creativity, problem solving ability and risk taking tendency.
5. To study the factor structure for tribal student and for urban students with respect to the component of scientific creativity, problem solving ability (with Greene’s classification) and risk taking in ten areas.

Methodology

Six hundred and fifty urban students framed the sample of the study. The tools used included scientific creativity, problem solving ability and risk taking tendency all developed by the investigator. Mean,
SD, ‘t’ test, ‘F’ and the Varimax techniques of factor analysis were used for the analysis of data.

Major findings
1. Urban students were significantly better than the tribal in fluency, flexibility and originality.
2. Urban students were superior to tribals in all the levels of Greens classification of problem solving ability and risk taking tendency.
3. There was no sex difference with respect to scientific creativity.
4. Girls were superior to boys in problem solving ability.
5. Boys were superior to girls in risk taking tendency.
6. There was a significant relationship between scientific creativity and risk taking; scientific creativity and problem solving; and problem solving and risk taking tendency.

Kumari, Vijaya M.P. (115:992) conducted a study with the following objectives in view.

Objectives of the study
1. To identify, analyze, describe and define a variety of problem solving strategies used by children of 10 to 12 years of age.
2. To assess the cognitive capabilities of children.
3. To examine the relationship with problem solving strategies.

Methodology of the study
The sample comprised of 100 boys and 100 girls drawn from Grades V and VI of two types of schools of Mysore city. The tools used were: Problem Solving Tasks, Tests of cognitive capabilities measuring conservation of area, mass and volume, combinational thinking, proportionality and probability.
Major findings of the study
1. The overall problem solving ability and success on different types of problems were significantly and positively related to each cognitive capability separately as well as globally.
2. There was evidence for some sequential steps in problem solving and different forms or levels of responses to be associated with the tactics used by children.
3. A wide range of meaningful variations in the tactics were evident in relation to the nature of problems.

Darchingupai (39:1239) investigated a study with the following objectives in view.

Objectives of the study
1. To study the science achievement, attitude towards science and problem solving ability of high school students.
2. To find the interrelationships of science achievement, attitude towards science vis-a-vis problem solving ability.
3. To examine the relative effect of sex, socio economic status, parental education, parental occupation, family facility and type of school on science achievement, science attitude and problem solving ability.

Methodology
The study comprised of 812 students of class IX selected randomly after giving importance to outside factors such as location and type of school attended. The tools used to collect the data were the Science Test developed by the investigator, Science Attitude Scale developed by Greewal and Problem Solving Ability Test developed by the investigator.
Major findings of the study
1. The study indicated significant relationships between scores on scientific attitude and achievement in science.
2. Significant sex differences in achievement in science and problem solving ability existed.
3. High socio economic status, family facility and type of school attended favored achievement in sciences, scientific attitudes and problem solving ability.

Ajwani J.K. (7:320-321) investigated a study with the following objectives in view.

Objectives of the study
1. To find out the effect of personality, intelligence, age, sex and their interactions on the problem solving behavior of students.
2. To investigate the directions intended to assist the individual to bring about any improvement in the problem solving ability.

Methodology of the study
The study was completed in two phases. In the first phase, the relationship between the problem solving ability and the different variables was worked out and in the second phase the effect of directions on the problem solving ability of the subjects was studied. The sample of the first phase consisted of 2400 subjects, representing three age groups i.e., 10-11 years, 14-16 years and 19-23 years. Of these, the subjects scoring in the top 12.5 per cent and bottom 12.5 per cent on factors B, C, I, O and Q4 of the personality tests were considered for the second phase – the experimental phase of the study. The tools used in the study were the sixteen personality factor questionnaire, the HSPQ, the CPQ, and the
Culture Fair Test, Scales 2 and 3. In order to measure the problem solving behavior of the subjects, four puzzles were selected. Of these, two were geometrical puzzles and two were mechanical. The two geometrical puzzles were the square puzzle and the match stick puzzle (the learning puzzles) while the two mechanical puzzles were the Ring Puzzle and the Leaf and String Puzzle (the experimental puzzles).

Following a randomized – control group design at the experimental phrase, three experimental groups and one control group with equal representation of different age groups under different experimental conditions were formed based upon the Klauseier's principles of improving the problem solving ability. The different subjects of experimental, group I were helped in stating and delimiting the problem with the help of specific direction in the experimental group II. The subjects were helped in findings out the methods of solution and the subjects of experimental group III were presented the learning puzzles before the experimental puzzles. No specific direction was given to the subjects of control group. The average time taken by the subjects of all the four treatment groups was recorded. The data were analyzed by applying the ‘t’ test and the analysis of variance.

Major findings of the study
1. The subjects with facilitatory personality traits proved better problem solvers than those having inhibitory personality traits.
2. The subjects with high intelligence proved to be better problem solvers than those with low intelligence.
3. The problem solving ability of the subjects increased with increase in age.
4. No significant sex differences were observed in the subject’s ability to solve problems.

5. The interaction between personality factors, intelligence, age and sex had no effect on the problem solving ability.

6. The subjects of these experimental groups performed significantly better than the control group, implying that the directions helped in increasing the problem solving ability of the subjects.

7. The assistance given in finding out the needed information and methods (experimental conditions II) proved to be the most effective set followed by the experimental conditions III and experimental condition I.

8. The effect of direction of the problem solving ability was found to be independent of other factors, i.e., facilitatory or inhibitory personality, high or low level of the intelligence, young or old age and male or female sex.

2.3.2 Studies conducted Abroad

Yimer, Asmamaw (213:1292) undertook a study with the objective to identify and characterize meta cognitive behaviors students exhibited during their engagement in non routine problem solving.

Findings of the study

1. The study identified a model which describes meta cognitive behaviors of college students during their engagement in mathematical problem solving.

2. Engagement, transformation–formulation, implementation, evaluation and internalization emerged as cognitive categories from task-based interviews. The model accommodates the range of meta cognitive approaches used by students as various pathways between the
categories are possible. Students viewed problem solving as a challenge but as essential in other disciplines and in life in general. No consistent pattern was found between students views and the corresponding metacognitive behaviors they employed.

Abdin, Shamseldin Zeinal (1:2979) undertook a experimental study to investigate the effects of three problem solving approaches for developing strategies and general coping skills for students when met with common problematic situations of college life. This laboratory experimental investigation was conducted employing a completely randomized counter balanced design. Specifically, problem solving skill performance was measured within four cognitive treatment conditions. These treatment conditions were:

i) Self instruction    ii) Cognitive restructuring,
iii) Problem solving model    iv) A Pseudo treatment (control).

Sample

Thirty two under graduate students, nineteen females and thirteen males, from a mid Western university were randomly assigned to three treatment groups and a control group.

Results

The results supported the efficacy of one treatment over another. The problem solving model was significantly more effective than cognitive restructuring. Other treatment comparisons were not significantly when looking at the effect of order, one order produced significantly better results than another indicating the superiority of one treatment order. The problem solving model when following cognitive restructuring which had been proceeded by self instruction was
significantly a superior order than cognitive restructuring followed by the problem solving model followed by self instruction.

Conclusion

Hence, review of related literature of the present study enabled the investigator to know the details of studies conducted in the area. But the literature on the relationship between emotional intelligence, personality traits and problem solving ability is scanty. Even though numbers of studies undertaken are many, the review develops an understanding about the status of the research in the problem area ensured. This enabled the investigator to finalize the need for present study. In view of inconclusive trend of findings of research studies, it helped the investigator to frame objectives, list out variables, formulate hypotheses, finalize tools and conclude the relevant statistical techniques to be used for making the study more fruitful, meaningful and interesting.

Perhaps the study at hand is a novel venture to see the relationship between emotional intelligence and personality traits with problem solving ability in mathematics among college going Pre-university science students of Bellary district.