PROCEDURE OF THE STUDY

3.1 DESIGN OF THE STUDY-

The investigator has tried to study of Self – Regulated Learning of high and low creative junior high school of girl students. The present study was carried out under the broad framework of descriptive method of research. The procedure of data collection and related aspects necessary for under the following sub-heads:

1. The sample
2. Tools
3. Data collection
4. Data analysis

3.2 The Sample

The Sample for the main study was selected through “Incidental Purposive sampling technique” (Guilford 1978). The term incidental sampling is applied when groups are selected because they are easily or readily obtainable (Garrett, 1971). Incidental purposive sampling is always resorted to when the objectives of the study are served even without taking random sample.

Moreover, it does not studies in west have been based on data obtained from samples selected by this method (Garret, 1971). This type of sample was also found to yield normal
distribution resulting in the yielding of generalizable result by number of Indian researches also (Joshi, 1960; Kapoor, 1963; Bhattacharya, 1978; Giri, 1987).

A population of class VIII girl students studying in recognized schools of Varanasi city was taken into consideration for the present study. It was assumed that this city being district head quarter has girl students from all sections of society and truly represents the junior high school population.

In the present study the sample was drawn in two stages. In the first stage a frame of all recognized junior high schools of Varanasi City was prepared. From which a sample of 5 schools, affiliated to U.P. Board was randomly drawn. These schools were recognized and the girl students were from different socioeconomic status group of the society. In the second stage all the girl students of class VIII from each of these schools were drawn out for this study. This technique has been common used in education researches and found to be practical, economical, yielding generalizable results.

Thus, a total sample of 400 junior high school girl students studying in class VIII and having a range of 12 to 16 years was drawn from 5 randomly selected schools. It was assumed that such a sample of girl students would fairly represent the population on the basis of the sample size which normally include subject representing the full range of socio-economic
environment. Schoolwise break up of the sample for the main study has been given in Table 3.1-

**Table 3.1-**

**Institution-wise break up of the sample**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the Institution</th>
<th>No. of Girl students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Govt. Girls Inter College, VNS</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Kasturba Gandhi Girls Inter College, VNS</td>
<td>100</td>
</tr>
<tr>
<td>3.</td>
<td>Rani Murar Girls Inter College, VNS</td>
<td>80</td>
</tr>
<tr>
<td>4.</td>
<td>Sudhakar Mahila Girls Inter College</td>
<td>80</td>
</tr>
<tr>
<td>5.</td>
<td>Raghav Ram Verma Girls Inter College, VNS</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

This sample of girl students was utilized for final study to obtain data on creativity, self- regulated learning and academic achievement.

3.3 **Tools**-

In order to quantify the variables under study, different tools were selected on the basis of scientific and practical considerations. The following tools have been used in the present study to collect data:

1. Torrance Test of Creative Thinking (Verbal form, Hindi version)

2. Self – Regulated Learning Inventory (SRLI)

A brief description of these tools have been presented here:
3.3.1 Description of Torrance Test of Creative Thinking (TTCT)-

The Torrance Tests of creative Thinking (Torrance, 1996) consist of two forms-verbal and figure (non-verbal). The research has used only the verbal form adapted in Hindi by the investigator herself for the purpose of creativity.


The types of tasks or activities chosen for the tests were those that could be most easily and economically administered and scored, and that had stood best the tests of reliability and validity, while at the same time sampling as many as different kinds of manifestations of Creative thinking ability as possible. The seven tasks are believed to bring into play somewhat different mental processes, yet all or them require the subjects to think in divergent direction, in terms of possibility.

1. Rationale and description of the test activity-

The development of the Torrance Test of Creative Thinking has, in general been guided by the definition of Creative give by the author of the tests. According to Torrance (1966), High Creative is “a process of becoming sensitive to problems, deficiencies, gaps in knowledge missing elements, disharmonies, and so on; identifying the difficulty; searching for
solutions, making guesses, or formulating hypotheses about the deficiencies, testing and retesting these hypotheses and possibly modifying and retesting them; and finally communication the results”. The author claims that she has tried to assemble batteries of figural and verbal activates that required kinds of thinking analogous to the thinking involved in recognized Creative achievements.

An Attempts will be made now to briefly describe and sketch the psychological rationale of the activities or test tasks contained in verbal from A (April, 1968, Revision).

**Ask-and-Guess activities**

The first three activities, Ask, Guess Causes, and Guess Consequences Activities are based on a drawing which the subjects are required to look at. The Ask Activity requires the subjects to write out all the questions they would need to ask to know for sure what is happening in the picture. In the Guess Causes Activity, the subjects are to enlist as many possible causes as they can think of the action shown in the picture, and in the Guess Consequence Activity, they are to enlist as many possibilities as they can of what might happen as result of what is taking place in the picture. Time allowed for each activity is five minutes.

As for rationale behind these activities, the Ask Activity is designed reveal the individual’s ability to sense what she cannot find out from looking at the picture and to ask questions
that will enable him to fill in the gaps in her knowledge. The Guess Cause and Guess Consequences Activates are designed to reveal the subject’s ability to formulate hypotheses concerning cause and effects.

As for rationale behind these activates, the Ask Activity is designed to reveal the individual’s ability to sense what she cannot find out from looking at the picture and to ask question that will enable him to fill in the gaps her knowledge. The Guess Cause and Guess Consequences Activities are designed to reveal the subject’s ability in to formulate hypotheses concerning cause and effect.

Three types of scores are derived. the number of relevant responses produced by a subject yields one measure of ideational fluency. The number of shift in thinking or number of different categories of questions causes, or consequences, give one measure of flexibility. The statistical the extent to which the response represents a mental leap or departure from the obvious and common place gives one measure of originality.

**Product improvement activity**

A sketch, as well as a standard model, of a stuffed toy elephant is exhibited to the subjects. They are required to give within 10 minutes the cleverest, most interesting and unusual ways they can think of for changing this toy elephant so that children will have more fun playing with it.
This activity permits most subjects at all age levels to “regress in the service of the ego” and enables them to play with ideas that they would not dare express in a more serious task.

There scores—fluency, flexibility and originality are derived. The fluency score for this activity is the number of relevant responses produced. The flexibility score is the number of different approaches used in producing ideas for improvement. The originality score is based on the statistical infrequency and appropriateness of the ideas produced.

Unusual uses activity-

This activity require the subjects to list within 10 minutes as many of interesting and unusual uses as they can think of the empty card board boxes.

The author of the tests recognized that card board boxes create in many individuals rigid sets that are difficult to overcome. It is to define a card board box as a “Container” and then to think of all the different things that can be put into card board boxes, making it difficult to produce other types of responses. Thus, the task is in part a test of ability to free one’s mind of a well-established set. The activity yields scores for fluency, flexibility and originality determined in a manner similar to that described for the Ask-and-Guess Activity.

Unusual question activity-

The subjects are required to think of, within five minutes, as many question as they can without card board boxes. These
questions should lead to a variety of different answers and might arose interest and curiosity concerning boxes in others.

This activity was from a technique devised by Burkhart (1963) to measure what Burkhart term as “Divergent Power” – a factor essential for high degree of Creative achievement and considered to be of critical importance for creativity in the determined for time being. Fluency is scored as in all other activity, but originality score is accomplished according to Torrance(1966b) Directions, Manual and Scoring Guide for Verbal Tests-A.

**Just Suppose Activity**-

An importance situation – Just suppose clouds had strings attached to them which hang down to earth-is presents to the subjects. They are required to test the consequences of this situation within five minutes.

This activity, a variation of the Guess Consequences Activity of the Ask-and-Guess series, was designed in an attempt to elicit a higher degree of spontaneity. In order to respond productively to this task, the subject must would happen as consequence. Scoring is similar to that descried for Ask-and Guess Activities.

**Reliability**-

Maintly two kinds of reliability of the Torrance Tests of Creative Thinking have been studied-interscorer reliability and test-retest reliability.
1. **Test-retest reliability**

Yammamoto (1963 a) studied the interscorer reliability of the Test of Imaging and the Ask-and-Guess Test for three scores (fluency, flexibility and originality) derived from the Test of Imagination and three scores derived from the Ask-and-Guess Test. She reported that the reliability coefficients based upon 64 protocols scored by two experienced scorers ranged from 0.84 to 1.00 for the various sub-scores and 0.99 for the total creativity score.

2. **Inter-scorer reliability**

The extent to which unselected and untrained classroom teachers could reliably score the test has been reported for six teachers ranging from 0.86 to 0.99 for fluency, flexibility and originality.

The reported reliabilities of the Torrance Tests of Creative Thinking indicate that the test is fairly reliable measure for appraising creativity.

**Validity:**

A large variety of content, concurrent and construct validity data have been reported by Torrance in the manual of the test.

1. **Content Validity**

To ensure content validity, a consistent and deliberate attempts has been made a by Torrance to base the test stimuli,
the test task, instructions and scoring procedures on the best theory and research presently available.

2. **Construct Validity**-
   After quoting several studies in her manual for the test, Torrance has remarked, “It was become clear that tests of Creative thinking indentify gifted children and adolescents who behave in ways which may be regarded as High Creative”.

3. **Concurrent Validity**-
   Employing the technique of nominated group, the test could significantly differentiate between the pupils nominated by teacher as most fluent, flexible, original and elaborate in their thinking and lowest on these dimensions by appropriate scores on the test of the Creative thinking.

4. **Predictive Validity**-
   Reviewing several researches on predictive validity of the test in her manual. Torrance has given two types of predictive validity: (a) short range and (b) long range predictive validities.
   
   Short range predictive validity studies have revealed that creativity test scores have predicted such Creative behavior of elementary and high school pupils and also of teachers as the production of Creative ideas, humor and fantasy, originality in imaginative stories, Creative science question, Creative teaching behavior, superior performance on subject matter test of productive thinking or High Creative applications in a
mental health course, and inventiveness of ideas in mental health.

Long range predictive validity studies, spread over a period ranging from 5 to 12 years, have demonstrated acceptable range of predictive validity Creative achievement out of school of seventh graders ($r = 0.51$); in quantity and quality of creative achievement of VII to XII graders ($r = 0.50$) in highest creative achievement ($r = 0.50$); in creative aspirations of XII grades ($r = 0.51$); in creative teaching behavior ($r = 0.62$) for originality and ($r = 0.57$) for total creativity.

As the present investigator has used the Indian adaptation provided by Jayaswal (1977) has been utilized. Jayaswal has reported the reliability of the test to be ranging from 0.84 to 0.96 for different samples of students. As such the suitability of the aforesaid Indian adaptation for the use of the present investigation is self-evident.

**Administration of the Creative Test**

The Torrance Test of creative Thinking (TTCT) verbal form was administered to VIIIth grades girl students in the batches of 25-30 girl students each. Proper care was taken to keep the testing situation free from anxiety and conductive environment was created for free play of imagination among the testees. Best efforts were made to reduce hindrances in the production of novel ideas. Instructions printed in test booklet were read loudly and explained. Answer-sheets were distributed
containing sufficient space (7 pages) for recording in the administration of creativity tests by different researchers (Fleischer, 1963; Verson, 1964; Middents, 1968) were kept in mind and possible measures were taken to overcome them. Time allotted was announced separately under each activity and examples were thoroughly explained. Total time consumed by each group in test administration including instructions, distribution and collection of test booklets and answer-sheets, clarification of examples, was approximately 80-minutes.

**Scoring of Answer-sheets (Creative Test)**

Scoring of answer-sheets of (TTCT) were accomplished as per instructions in the manual. On the verbal test of creativity, the three scores, viz., fluency, flexibility and originality were derived as per instructions given in the manual, but the total creativity score was obtained by using the method of weight scoring as suggested by Guilford (1956).

**Composite Creativity Score**

For obtaining a composite creativity score without converting the total raw (fluency, flexibility and originality) scores to standard scores could not be considered appropriate. Hence, a rational weighting method that was of applying to each one a weight inversely proportional to its standard deviation was used as suggested by Guilford to its standard (1956) and Brown (1970). Various steps involved in determining weights have been depicted in Table 3.2. First, means and standard deviations
of three component tests were calculated, individual standard deviations were divided into the largest on among them and the quotients were rounded to the nearest integer which are shown in the fourth lone. For the sake of convenience the maximum and minimum marks in individual test were also noted. Totals after applying weights have also been indicated the integral number so obtained were taken to be the corresponding weights to be applied to the three tests, to arrive at a composite creativity score (Table 3.2).

Table 3.2-
Showing the process of weighting components of creativity test inversely as their dispersions

<table>
<thead>
<tr>
<th>Variables</th>
<th>Fluencty</th>
<th>Flexibility</th>
<th>Originality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>35.68</td>
<td>20.67</td>
<td>26.18</td>
</tr>
<tr>
<td>S.D.</td>
<td>11.99</td>
<td>6.09</td>
<td>12.22</td>
</tr>
<tr>
<td>Integral weight (W)</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

2.3.2 Description of Self–Regulated Learning Inventory (SRLI)-

The Self-Regulated Learning Inventory constructed and standardized by Researcher (2015) has been used for measuring Self-Regulated Learning of girl students.

The Self-Regulated Learning Inventory comprises of seven dimensions of Self-Regulated Learning and nine items for
each Self-Regulated Learning. Which are arranged in a sequence as following in the Table 3.3.

**Table 3.3**

<table>
<thead>
<tr>
<th>No.</th>
<th>Self-Regulated Learning</th>
<th>Items Serial No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Flexibility vs Non-flexibility</td>
<td>1, 8, 15, 22, 29, 36, 43, 50, 57</td>
</tr>
<tr>
<td>2.</td>
<td>Individualistic vs Non-individualistic</td>
<td>2, 9, 16, 23, 30, 37, 44, 51, 58</td>
</tr>
<tr>
<td>3.</td>
<td>Visual vs Aural</td>
<td>3, 10, 17, 24, 32, 38, 45, 52, 59</td>
</tr>
<tr>
<td>4.</td>
<td>Field-independ vs Field-dependent</td>
<td>4, 11, 18, 25, 32, 39, 46, 53, 60</td>
</tr>
<tr>
<td>5.</td>
<td>Short-attention-span vs Long-attention-span</td>
<td>5, 12, 19, 26, 33, 40, 47, 54, 61</td>
</tr>
<tr>
<td>6.</td>
<td>Environmental-oriented vs Environmental-free</td>
<td>6, 13, 20, 27, 34, 41, 48, 55, 62</td>
</tr>
<tr>
<td>7.</td>
<td>Motivation centered vs Motivation non-centered</td>
<td>7, 14, 21, 28, 35, 42, 49, 56, 63</td>
</tr>
</tbody>
</table>

A brief description of these seven dimensions of Self-Regulated Learning is evident as follows:

**Flexibility vs flexibility**

Girl students who are not satisfied with the traditionally accepted solution to an educational task/problem and always try to arrive at unique responses, solutions etc., will be identified as
having flexibility Self-Regulated Learning. Girl students responses, will be classified as having non-flexibility.

**Individualistic vs non-individualistic**

Girl students, who enjoy working themselves at best on some educational task/assignment will be named as having individualistic Self-Regulated Learning. Whereas others, who prefer carrying out any educational task with group or in a team will be characterized as having non-individualistic Self-Regulated Learning.

**Visual vs aural (modality preference)**

Modality preference refers to Girl students ability to learn and retain information more efficiently when certain channels of communication are employed. Girl students, who rely upon, ‘eyes’ than ‘ear’ for learning i.e. word symbols that are printed, written of on observation and the like, will be classified as having visual Self-Regulated Learning. Similarly other Girl students, who rely upon ‘ear’ for learning i.e. when they hear human voice directly or indirectly will be named as having aural learning.

**Field-independent vs field-dependent**

Girl students, who do not enjoy working structured learning situation, will be called as having field-independent Self-Regulated Learning. On contrary, Girl students who prefer to work in structured leaning situations will be classified as having field-
Short-attention-span vs long-attention-span-

Girl students, who are not able to concentrate on some learning task for a longer period of time and may some time need some intake like (water, juice, tea etc.) to continue that task, will be taken as having short attention-span Self-Regulated Learning. Similarly Girl students, who can give long continuous sitting on doing some assignment without any intake, will be characterized as having long attention-span Self-Regulated Learning.

Motivation centred vs motivation non-centred-

Girl students, who are eager to learn more and more, are enthusiastic about exploiting the learning situations: are more conscious about demonstration their best to get high grade, praise etc., for their performance/achievement, will be characterized as having motivation-centred Self-Regulated Learning. Contrary to it will be taken as having motivation non-centred Self-Regulated Learning.

Environmental-orientation vs environmental-free-

Girl students while studying, if affected by environmental variables like heat, sound, light, will be identified as having environmental-orientation Self-Regulated Learning. Likewise, one whose learning is not interfered by any kind of environmental variables will be identified as having environmental-free Self-Regulated Learning.
Reliability-  
The reliability coefficient of Self-Regulated Learning Inventory ranged from 0.84 to 0.91. The test is highly reliable.

Validity-  
Objective validity was estimated of this tool due to unavailability of Indian tools which could serve as a criterion for determining its area. Experts were requested to rate each item in the inventory on 5 point scale according to the purposiveness of the items. The ratings of these 5 experts on five point scale about suitability of the items in each Self-Regulated Learning sub-set indicated that there is close agreement between the ratings of the experts on each item. Hence, Self-Regulated Learning Inventory has high validity.

Administration-  
After entering the classroom, the investigator told to the girl students about the purpose of inventory that she just want to know their preferences for self regulated learning. She then told them that for knowing their preferences, she will give them a booklet consisting of 63 items. She further told them that every item is bipolar in nature. Their agreement with an item will exhibit the preference for one Self-Regulated Learning. So they have to respond every item. In case they found undecided on certain items, they were told to respond either favourably or disfavourably towards which they feel more inclined.
Thereafter, the investigator gave the booklets and asked them to fill in the identification of data i.e. name, name of institution, class and section. Instructions were read loudly and enquired about the girl students whether they had understood the instruction. The queries made by girl students were replied to their satisfaction. The investigator, then asked girl students to open their booklets. They were instructed not to consult or copy others and to finish it as early as they can. Most of the girl students finished it in 20 minutes. Thus, the data was obtained.

**Scoring-**

Seven Self-Regulated Learning were considered in this inventory. Every style was measured by nine items and every items was bipolar in nature. If an individual showed agreement with an item, she was identified as having the first Self-Regulated Learning in every type of Self-Regulated Learning (e.g. flexibility Self-Regulated Learning) and the disagreement with an item showed that she has preferred the second Self-Regulated Learning in the same type of Self-Regulated Learning (e.g. non-flexibility Self-Regulated Learning). To be more specific if and individual showed agreement with an item-2 i.e. she had put on ‘Yes’ (✓) she had been identified as having individualistic Self-Regulated Learning and if she disagrees with item-2 i.e. she had put (✓) on ‘No’ she had been identified as having non-individualistic Self-Regulated Learning. Then her preference for particular Self-Regulated Learning has been
identified on the basis of total score on that learning has been identified on the basis of total score on that Self-Regulated Learning. The maximum score possible for every type of Self-Regulated Learning is ‘9’ and the minimum score as per scoring key of the Self-Regulated Learning, which has been given in Appendix. By comparing the individual responses by the scoring key, her total responses on all the seven Self-Regulated Learning were calculated. Thus, if a girl students responded ‘7’ out of ‘9’ responses of first type of Self-Regulated Learning in a manner given in scoring key, her score for that Self-Regulated Learning is ‘7’ in favour of flexibility Self-Regulated Learning. Likewise, a girl student who has given 3 responses out of ‘9’ on second type of Self-Regulated Learning, it will be counted as score of 3 in favour of individualistic Self-Regulated Learning.

In the same way, the scores on every Self-Regulated Learning for each girl student have been recorded. Thus, if an individual responded 5 of more responses on any Self-Regulated Learning in a manner given in scoring key, her score, in favor of one Self-Regulated Learning would be 5 or more score of 5 more would classify him having preference for that Self-Regulated Learning e.g. a girl student who has a score of 5 in favour of Self-Regulated Learning-1 (flexibility-non-flexibility) has been identified as having more inclination towards flexibility Self-Regulated Learning, she has been identified as having preference for the other Self-Regulated Learning e.g. a
girl student who has obtained for the other 3 on second type of Self-Regulated Learning (individualistic-non-individualistic) showed lesser inclination for individualistic Self-Regulated Learning, thus demonstrating her preference for non-individualistic Self-Regulated Learning.

This procedure of scoring has been followed in scoring the SRLI to get girl students scores on all seven types of Self-Regulated Learning. Thus, for every girl student 7 scores were found out (each score representing a separate Self-Regulated Learning). Composite score on SRLI was not calculated.

**Scoring-**

Seven dimensions of Self - Regulated Learning were considered in this inventory. Scoring was done according to scoring key based on 5 point scale giving the marks from 5 to 1 respectively.

**3.4 ACADEMIC ACHIEVEMENT**

The academic achievement of every girl students were found with their total marks of class VII.

**Data Collection :**

The final data for the present study was collected in two sessions by the researcher personally, so as to keep the testing situation constant and to ensure collection of valid and reliable data under the exiting circumstances. In the first session, after contacting the respective schools, Torrance Tests of Creative thinking was administered to the girl students and instructions
were given to them according to the manual of the test. Separate answer-sheets were given to each student, and were told to fill and write the correct answers. After an hour the answer-sheets were collected. After 10 minutes interval the final test of Self-Regulated Learning inventory was administered to each girl student and instructions were explained as printed on the first page of the test booklet. After 40 minutes the booklet were collected from the girl students.

3.5 SCORING AND TABBULATION-

All the answer-sheets were scored with the help of hand-made punched keys, except the answer-sheets of creativity test which was scored by “Differential Weight Scoring” method by the investigator herself. The scoring was rechecked for the mistakes, if any.

Before tabulation of the master-chart for statistical analysis. The entire sample was categorized into high creative and low creative groups on the basis of their scores of TTCT. For this purpose top 100 and to bottom 100 on the TTCT were kept in ‘high creative’ and ‘low creative’ groups respectively. From these master-charts requisite tables were then prepared for different statistical analyses as when necessary.
3.5 **DATA ANALYSIS**

In addition to the general descriptive statistics, following statistical techniques were utilized in this study for analyzing the obtained data and arriving at generalizable conclusions.

1. 2x2 Contingency tables were and Chi-square values were calculated for comparing the Self-Regulated Learning preferences of high creative and low creative girl students.
2. The ‘t’ test was applied to determine the significance of difference between achievement in the sample.
3. The statistical significance of all the results were considered at 0.05 and 0.01 levels of confidence. The Self-Regulated Learning were considered at 0.10 level also in order to show the sharp difference between the high creative and low creative group of girl students.
4. To find out the composite creativity scores, integral weights were determined by using the method of “Differential Weigh Scoring” by weighting measures inversely as their standard deviations as suggested by Guilford (1956).

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