CHAPTER V

DISCUSSION OF RESULTS

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5.1 Discussion of the Results

5.2 Conclusions

5.3 Educational Implications

5.3.1 Suggestions for Future Studies

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In the previous chapter the analysis and the interpretation of the results, which were obtained as a result of the experiment performed according to Latin Square Design were done. In the present chapter the discussion of these results will be presented in the light of the experiments and the hypotheses evolved earlier. For the convenience of the further presentation the hypotheses are once more reproduced below :

Hypotheses

1. There will be no significant difference between strategies St_1, St_2, St_3 and St_4 for promoting creative thinking in the pupils of seventh class.
2. There will be no significant difference between strategies St_1, St_2 , St_3 and St_4 for the achievement scores of the pupils of seventh class in science.
3. There will be no significant difference between strategies St_1, St_2 , St_3 and St_4 for the development of creative thinking in high or low achievers.
4. There will be no significant difference between strategies St_1, St_2 , St_3 and St_4 for the development of creative thinking in pupils having high or low intelligence.
5. There will be no significant difference between strategies St_1 , St_2 , St_3 and St_4 for the development of creative thinking in either boys or girls.
6. There will be no significant difference between strategies St_1 , St_2 , St_3 and St_4 for developing creative thinking among high or low creative pupils.

Now each hypothesis will be discussed in the light of analysis of the results.

H_1 = There will be no significant difference between strategies St_1 , St_2 , St_3 and St_4 for promoting creative thinking in the pupils of seventh class.

The effect of four strategies of teaching, that is, Strategy 1 (St_1 = Lecture), Strategy 2 (St_2 = Lecture and Discussion), St_3 (Lecture and Discussion and Practicals) and St_4 (Lecture + Discussion + Practical + A.V. aids) upon the total creative thinking scores of pupils of seventh class was found to be differential (F = 7.71 for df = 3/234, Significant at 0.01 level vide Table 4.5). The order of effectiveness of teaching strategies in terms of total creative thinking scores was observed as St_4 , St_2 , St_3 and St_1 with mean scores as 82.30, 79.03, 77.51 and 77.10 respectively (Table 4.6).

For establishing the difference between mean scores of each of the four selected strategies 't' values were found and this revealed that strategy St_4 was found to be highly effective than each St_1 and St_3. Hence it is quite evident that hypothesis 1 does not hold ground and so it is rejected.

Moreover, in order to study the effects of various selected strategies and its factors upon the scores of different

components of creative thinking i.e. originality, flexibility and fluency, comparison between means under each of the strategies was closely scrutinised. Thiss showed the following observations :

(1) Difference between means for total creative thinking scores under St_1 , St_2 and St_3 was not found significant. This means that none of these factors : Lecture, Discussion or Practical Work, has played a significant role for promoting creative thinking. But it is clear from comparison of mean scores of St_1 , St_2 and St_3 that order of the effectiveness was not in an ascending order though these were selected in an ascending order of superiority. Out of three strategies i.e. St_1, St_2, and St_3 , St_2 was found to be superior to St_1 and St_3. From this it can be concluded that in the pupils of seventh class, it is not possible to develop the creative thinking by merely giving practical work. Why does this happen, is also another problem of investigation. The present investigator believes that the present style of teaching science is responsible for this because at present the pupils of seventh class are hardly given any practical work and this attitude of teachers proves resistant to the culmination of the habit of performing practical work in science. Since the pupils do not avail of the opportunity of doing practical work, they show their inability of doing practical work. It may be

that pupils of seventh class are not matured enough to carry out the practical work. In short, one can safely conclude that for developing creative thinking in the pupils of seventh class St_4 proves to be the most useful strategy. In order second comes the strategy St_2 . It means that discussion and A.V. aids are useful.

(2) On close examination it is found that effectiveness of the strategies on the different components viz. originality, flexibility etc. is different. Say, as far as the development of originality is concerned St_4 is found to be more effective than either St_1 or St_3 at 0.01 level. From the mean scores for originality the order of effectiveness of selected four strategies is St_4, St_2 , St_3 and St_1 (Table 4.9). This result is similar to that of total creative thinking scores, whereas the effect of the strategies on the component of flexibility is found to be different (Table 4.12). The strategy St_4 is found to be superior and significant to the rest of the strategies even at 0.01 level, though the order of effectiveness is slightly different, and that is St_4 , St_2 , St_1 and St_3 . In other words the practical work is least useful as far as flexibility is concerned.

None of the selected four strategies proves to be significantly effective for the component of fluency of

thinking (Table 4.14). The comparison of mean scores reveals that the order of effectiveness is same as that for total creative thinking i.e. St_4, St_2 , St_3 and St_1. From this we can only conclude that for developing the component of fluency none of the selected strategies is found to be significant at any accepted level of significance, yet the use of A.V. aids is found to be beneficial.

The gist of the above discussion is that the St_4 is the most beneficial for developing the creative thinking and all of its components like originality, flexibility and fluency, while rest of the strategies are not found significant. From the mean scores of St_2, it can be deduced that it is more useful than other two strategies for the development of creativity. It is unfortunate that no parallel research works are available from the related literature so that the comparison could be made because from chapter II it could be seen that majority of the research workers have utilised only special strategies or models. To develop creativity the A.V. aids have been used which is made clear from the works of Belchar (1973) and his results corroborate the result of the present research. Belchar used films as A.V. aids to engender verbal originality. The present study also shows that the

strategy which made use of A.V. aids is found to be significant for developing the originality. The results found by Stern (1973) are rather contradictory. He found that the use of T.V. programmes in the experimental group was not found effective in developing creative thinking. One of the reasons for this contradiction may be the selected sample of Stern which consisted only gifted minors. While the present investigator selected average subjects in his experiment.

H_2 = 'There will be no significant difference between strategies St_1 , St_2 , St_3 and St_4 for the achievement scores of the pupils of seventh class.'

The effect of the strategies of teaching viz. St_1 (Lecture), St_2 (Lecture + Discussion), St_3 (Lecture + Discussion + Practicals) and St_4 (Lecture + Discussion + Practical + A.V. Aids) upon the achievement scores of the pupils of seventh class has been found differential ($F = 22.72$ for df 3/234, which is significant at 0.01 level, vide Table 4.2). The order of the effectiveness of teaching strategies interms of the achievement scores was St_4, St_3 , St_2 and St_1 with mean scores of 16.40, 15.31, 14.66 and 13.66 respectively (Table 4.3). In order to assess the significant difference of the mean scores for each strategy

t values were determined. The close scrutiny of the t values reveals that the effectiveness of the strategy St_4 is found to be significant compared to the others at 0.01 level, while the effectiveness of the strategies St_3 and St_2 is significantly higher than that of St_1 . Though the mean score for St_3 is slightly greater than that of St_2 yet it is not significant. Thus, the hypothesis 2 is rejected as the difference of mean scores of effectiveness for each of the strategies is found to be significant.

From the above discussion it can be safely concluded that the effectiveness of the selected four strategies is different and graded as far as the achievement is concerned. The strategy St_1, is the least effective, while St_4 is the most effective. In other words, if the lecture is accompanied by discussion or A.V. aids the achievement scores do rise significantly. However, the addition of practical work does not create any significant difference but the addition of A.V. aids brings out the best results.

Looking at the order of effectiveness of the selected four strategies one would see that (the order of effectiveness for creative thinking is St_4 - St_2 - St_3 - St_1 and that of achievement is St_4 - St_3 - St_2 - St_1 in developing creative

thinking St_3 is less effective than St_2, but for achievement order is reverse in effectiveness, though the effectiveness of St_3 over St_2 is only slightly superior. This proves that practical work is helpful in the gain of knowledge but the same is not useful in developing the high order mental faculty like creative thinking.

According to Flanders the strategy St_1 i.e. lecture involves direct teacher behaviour while his behaviour becomes gradually indirect in the rest of the strategies. Thus, these results bring forth another indirect deduction. The indirect behaviour of the teacher play important role in developing the creative thinking and in boosting up the achievement scores.

H_3 = There will be no significant difference between strategies St_1 , St_2 , St_3 and St_4 for the development of creative thinking in high or low achievers.

For testing this hypothesis on the basis of the results obtained by pre-test, 25 percent of high achievers and 25 percent low achievers were selected and the analysis of the creative thinking scores of them has been presented from Table 4.15 through 4.31. The close scrutiny of the tables shows that none of the four selected strategies St_1 (Lecture), St_2 (Lecture + Discussion), St_3 (Lecture +

Discussion + Practicals), and St_4 (Lecture + Discussion + Practical + A.V. aids) has any significant effect neither upon the creative thinking scores of high achievers (F = 0.88 for df = 3/19, not significant. Table 4.16) nor upon those of low achievers (F = 2.44 for df 3/19, not significant) (Table 4.24). Hence this hypothesis is upheld. The retention of this hypothesis means that the application of any of the selected four strategies has no differential effect whatsoever upon the development of creative thinking for the high or low achievers. Previous achievement of the pupils, whether it be high or low has no concern with the effectiveness of the selected strategies.

Whether any of the selected four strategies has any significant effect upon the development of particular component of creative thinking i.e. originality, flexibility and fluency, among the high or the low achievers further analysis of data was carried out. (See Tables 4.17 to 4.31). The analysis of the data can be summarised as follows :

1. For the development of the originality none of the selected four strategies is found to be significantly effective (Table 4.18 and 4.26) for high or low achievers.

2. For the development of flexibility none of the selected four strategies is found to be significantly effective for high achievers (Table 4.20) but St_4 is found more effective than the rest for low achievers in developing flexibility in thinking at 0.01 level (Table 4.29).

3. For the development of fluency none of the selected four strategies is found significantly effective neither for high achievers nor for low ones (Tables 4.22 and 4.31).

In short, the analysis of the data shows that none of the selected four strategies is found significantly effective for either developing the creative thinking or any of its components; Save St_4 which is found effective in enhancing the development of the component of flexibility in low achievers.

H_4 - There will be no significant difference between strategies St_1 , St_2 , St_3 and St_4 for the development of creative thinking in the pupils having high or low intelligence.

For testing this hypothesis on the basis of the scores of I.Q. test 25 percent of the sample having the highest I.Qs. and 25 percent of the sample having the lowest I.Qs. were selected. Their total creative thinking scores were separated and analysed. The analysis is shown from Table 4.32 through 4.54. The close study of the Table 4.33 reveals that the effect of all the four selected strategies i.e. St_1 (Lecture), St_2 (Lecture + Discussion), St_3(Lecture + Discussion + Practical Works), and St_4 (Lecture + Discussion + Practicals + A.V. aids) is found to be differential for pupils having high intelligence (F = 2.84 for df 3/19, which

is significant at 0.05 level) as well as pupils having low intelligence (F = 5.09 for df 3/19, significant at 0.01 level Table 4.44). The order of effectiveness of teaching strategies was observed as St_4 , St_1 , St_2 and St_3 in low intelligence pupils with mean scores of 60.45, 59.05, 57.45 and 51.95 respectively (Table 4.45) whereas in high intelligent pupils it was St_4 , St_2 , St_3 and St_1 with mean scores of 102.05, 102.05, 100.15 and 95.60 respectively (Table 4.34). Here accidently the mean scores of St_2 and St_4 are equal. To test the significance of the mean scores of each strategy t values were computed. The close scrutiny of t values shows that in the group of low intelligence, the mean scores of both St_4 and St_1 are found more significant than that of St_3 at 0.01 level, while the mean score of St_2 is found to be more significant than that of St_3 at 0.05 level. St_4 and St_1, also St_2 and St_1 are not significantly more effective when compared with each other. In the similar way in the group of high intelligent pupils St_4 and St_2 are found equally effective and both are found significantly more effective than St_1 at 0.05 level. Rest of the selected strategies are not significantly more effective when compared with each other. Thus each strategy has got significantly different effect on high as well as low intelligent groups of pupils and hence the hypothesis 4 cannot be accepted i.e. there is significant difference in

the effectiveness of selected teaching strategies on the development of creative thinking in high or low intelligent groups.

In addition, the analysis was also carried out to determine the effectiveness of the selected teaching strategies on the development of the various components of the creative thinking viz. originality, flexibility and fluency. The analysis of the scores of high and o low intelligent groups was carried out and is shown in Tables 4.35 to 4.54. The following are the logical deductions of the analysis :

1. As far as high intelligent group is concerned the selected strategies do differ significantly in developing originality and flexibility, while for fluency they do not differ significantly. The order of the effectiveness of the strategies is same for both the components and it is St_4 , St_2 , St_3 and St_1 . For developing the originality. The other three strategies are significantly more effective than that of St_1 but for the flexibility St_4 is superior to St_1 and St_3.

Briefly it can be concluded that in the high intelligent group of pupils to develop the originality and flexibility the strategies are found effective in the following descending order : St_4 , St_2 , St_3 and St_1 . In other words discussion and the use of A.V. aids are useful in boosting up the components of originality and flexibility among high intelligent pupils.

2. Among the low intelligent pupils the selected four strategies differ significantly in developing the components of originality, flexibility and fluency and the order of the effectiveness of these strategies is St_4 , St_1 , St_2 and St_3. In other words St_4 is the most effective and St_3 the least. One peculiar conclusion is worth noting. From the mean scores of St_1 and St_2 it is seen that St_1 is found to be more effective than St_2, St_1 is found even significantly more effective than St_3 in developing fluency, originality, and total creative thinking. Hence we can see that for developing creative thinking and its components in pupils having low intelligence even the lecture method is fruitful. But the Strategy St_3 which incorporates practical work does not prove to be effective for these pupils.

From the foregoing discussion one would see that the level of intelligence and the strategies play an important role in developing the creative thinking or its components, but the strategies which are effective for pupils with high intelligence do not prove to be effective for pupils with low intelligence. In addition, it is seen that the practical work has a significant effect on high intelligente group but has no significant effect on low intelligent group.

H_5 = There will be no significant difference between St_1 , St_2 , St_3 and St_4 for the development of creative thinking in either boys or girls.

For testing this hypothesis from each group equal number of boys and girls were selected at random to carry out the analysis for Latin Square Design. In each group the number of boys and girls was not the same. Thus, this selection rendered twelve boys and five girls, from each group, for the purpose of analysis. The analysis of the total creative thinking scores of twelve boys and five girls was done which is shown in Table 4.56 and 4.67. The analysis of the results shows that for boys all the four selected strategies differ in their effectiveness significantly at 0.01 level. While for girls this is not so. On checking the order of the effectiveness on the basis of mean scores it is found that it is same for both boys and girls and it is St_4 , St_2 , St_3 and St_1. For boys St_4 is found to be more effective than both St_1 and St_3 at 0.01 level. In short, this hypothesis is not completely tenable on the basis of the analysis of the results. Particularly in the case of boys it should be rejected.

Further analysis with respect to the testing of the effectiveness of the selected four strategies on the development of the different components of the creative

thinking the following observations are found.

(1) In boys the strategies differ significantly at 0.01 level for developing originality and flexibility but for fluency they do not differ. The order of effectiveness for the above two components is the same and it is St_4, St_2 , St_3 and St_1. The strategy St_4 is significantly more effective than St_1 and St_3 at 0.01 level while St_2 is more effective than St_1 at 0.05 level. As far as the component of flexibility is concerned St_4 is found more effective than the rest three at 0.01 level. Thus, for boys St_4 i.e. lecture + discussion + Practical + A.V. aids is the most superior to the rest; and St_1 is the least effective. Only lecture is totally ineffective for the development of creative thinking but to make it effective it should be corroborated by discussion and A.V. aids.

(2) For girls none of the selected four strategies is found to differ significantly in effectiveness with respect to the development of total creative thinking, originality or fluency. Only St_4 does differ significantly in its effectiveness from St_1 , St_2 and St_3 for developing flexibility in thinking. On the basis of their mean scores the order of effectiveness of the selected four strategies is St_4 , St_2 , St_1 and St_3, which shows that the strategy St_3 which is dominant by practical work is the least effective.

Here it would be interesting to recall that the similar deductions were also found in the case of pupils having low intelligence and those who were low achievers.

From the above discussion, one can say that the sex difference and the effectiveness of the strategies are directly related with each other; and the strategy which is effective for one sex is not found to be equally effective for the other sex too ; and so for the development of judicious creative thinking in both the sexes, proper and different strategies should be made use of.

H_6 'There will be no significant difference between strategies St_1 , St_2 , St_3 and St_4 for developing creative thinking among high or low creative pupils'.

To test this hypothesis pre-creative thinking test (T.T.C.T.) was administered in each group and on the basis of the scores obtained by the pupils upper 25 percent who were considered as high creative and lower 25 percent who were deemed as low creative were separated. These were taken as the sample for this purpose. The analysis of the scores of total creative thinking of the sample was carried out (See Table 4.76 and 4.86). The study of these tables shows that the effect of the selected four strategies on high creative group differs significantly (F = 10.67 for

df 3/19 , which is significant at 0.01 level) which so is not the case among low creative group of pupils. On the basis of the mean scores the order of effectiveness of the selected four strategies for high creative pupils is St_4 , St_3 , St_2 and St_1 or St_4 is the most effective and St_1 the least. One more point worth noting is that for this group, all other strategies than St_1 are significantly more effective at 0.01 level. In the low creative group the selected four strategies do not differ significantly from each other in their effectiveness. The order of the effectiveness determined from their mean scores is St_4 , St_2 , St_1 and St_3 , the result is being similar to low achievers and low intelligents. From the discussion it can be concluded that the hypothesis is untenable and hence it should be rejected i.e. there is significant difference in the effectiveness of St_1 , St_2 , St_3 and St_4 for developing creative thinking among high creative pupils.

The study of the scores obtained by these groups on the different components of creative thinking viz. originality, flexibility and fluency reveals the following facts; about the effectiveness of the selected four strategies on the development of the components of the creative thinking.

(1) For the high creative group and forthe components of originality and flexibility the strategies do differ significantly at 0.01 level but so is not the case with fluency (Tables 4.78 to 4.94). In developing originality St_4 , St_3 and St_2 are found more effective than St_1 at 0.01 level and the order of effectiveness is St_4 , St_3 , St_2 and St_1. St_4 is the most effective and St_1 the least. Similar results are obtained for the flexibility. However, the mean score of St_2 is greater than that of St_3. In short for developing originality total creative thinking and flexibility among high creative pupils St_4 is the most effective and lecture is the least effective.

(2) Among low creative pupils the selected four strategies do not differ significantly in either developing total creative thinking or its components - originality and fluency. Only in developing flexibility St_4 is found to differ significantly from the rest at 0.01 level. From the study of the means scores it could be seen that the strategy St_3 which is dominated by practical work is the least effective while St_4 is the most effective.

In short it can be deduced that for the development of creative thinking in high creative and low creative

pupils same method is not useful. Different methods are to be adopted for both the groups, say, for high creative pupils practical work would be beneficial and for low creative pupils the same method is not useful.

In conclusion, it can be summarized as the gist of the discussion. For the present experiment, as stated earlier, six null hypotheses were evolved. Each one has been discussed in details earlier. All hypotheses save hypothesis 3 have been rejected on the basis of the analysis of the data obtained. Selected four strategies are found to differ significantly in achievement and in developing creative thinking as well as its different components. From foregoing discussion, it could be concluded that none of the selected strategies is totally useless. Each of them has been found more or less useful in developing total creative thinking or any of its components. Yet on the whole, the Strategy St_4 is found to be the most effective and St_3 the least. If we arrange these strategies in descending order of their effectiveness the order would be St_4 , St_2 , St_1 and St_3. However, the same order is not prevelant among all groups.

Among pupils with high creativity or having high intelligence all the three strategies except lecture are found to be effective while in the low group the results are

different. Here the results are similar for all strategies save St_3 . If consider the strategies St_2 and St_4 then we see that they have proved themselve highly effective irrespective of the characteristics of the group i.e. the group is high or low is immaterial. Only St_3 and St_1 are found differently effective in different groups. It implies that whenever the problem arises before a teacher about the selection of the particular strategy he should first of all study his group of pupils in details, before selecting the strategy.

5.2 Conclusions

The researches carried out in science and technology have a great impact upon the social life and they bring about many changes in the social life. So is the case with the educational researches, though the changes come about very slowly. Sometimes the effects are very feeble yet the importance of educational researches cannot be overlooked. In educational researches, those carried out in experimental designs play important role in bringing about changes, because such researches are carried out in a scientific fashion. The results obtained through such researches sometimes bring about total and radical changes in the

educational world.

In the beginning of this chapter, the results of the experiment was discussed in the light of hypotheses evolved and as a result of this, the conclusions deduced were as follows :

1. The difference existed between the selected strategies for their effectiveness in developing creative thinking and achievement of seventh class pupils is significant at .01 level.
2. It was also found that the four strategies of teaching had significantly differential effects on the development ofo originality and flexibility of seventh class pupils but the F ratio for the effects of strategies was found to be not significant in the case of fluency.
3. On further analysis, it was found that the strategy St_4 produced significantly higher mean scores for achievements of the pupils than all other strategies could produce. Strategies St_3 and St_2 produced significantly higher mean scores than strategy St_1 , and there was no evidence of significant difference between strategy St_3 and St_2, though St_3 produced high mean scores.
4. Strategy St_4 was more effective in developing creative thinking and its components as compared to all other strategies.
5. Strategy St_2 was more effective than strategies St_1 and St_3 but the difference was not significant at all levels.

6. No difference existed between the effectiveness of strategies for developing creative thinking in high or low achievers, i.e. there was no relationship between achievement and the development of creative thinking with respect to these strategies.

7. The F ratio for the effects of strategies was found to be significant for developing creative thinking in both high and low intelligent groups and strategy St_4 was found to be better than other strategies for both groups.

8. It was observed that the effects of strategies were dependent upon the level of intelligence.

9. The scores gained by high intelligent pupils on the creative thinking tests were higher than those of low intelligents.

10. It was found that the relationship existed between sex and effectiveness of strategies for enhancement of creative thinking. Effectiveness of strategies differed significantly for boys in all aspects, but for girls generally there was no significant difference in the effectiveness of strategies for developing creative thinking.

11. For boys St_1 was less effective while for girls St_3 was less effective, but St_4 was more effective for both the sexes.

12. Effects of strategies was different for high creative pupils in promoting creative thinking while for low creative it was not different.

13. No sex difference was observed with respect to flexibility.

14. Boys with strategy St_3 displayed superiority over girls with strategy St_3 in their performance on creative thinking tests.

15. The high intelligents were found to be more creative than low intelligents.

16. The mean difference of the scores of fluency was not significant under any strategy.

17. Both sex and I.Q. were important determinants of the effectiveness of the strategies.

18. The strategy St_2 was found to be comparatively better and more effective than strategies St_1 and St_3.

19. Strategy St_3 did not show any significant superiority over St_1 with respect to lower groups.

20. The overall data supported that strategy St_4 was significantly superior to other three strategies.

21. The results highlighted the importance of having the maximum use of A.V. aids in the classroom teaching for enhancement of creative thinking.

5.3 Educational Implications and Suggestions

In the face of spiralling growth and need for developing science and technology, it has become quite evident that there is a pressing need for the maximum utilisation of all human resources, especially the intellectual ones. According to Rogers, 'Knowledge - both constructive and distructive - is developing rapidly and

there is a need for genuinely creative adaptation, if man is to keep abreast of the changes in the world. Moreover creativity is an essential and responsible element for individual, social and cultural dynamism, and so nurturing creativity will be the one of the responses, for dealing with the great complexity and diversity, of everyday life. Torrance (1965) also believes that creative thinking is important in all areas of life. It contributes to the acquisition of information and is essential in the application of knowledge to personal and professional problems.

Emphasising the duties of education in developing and preserving creative thinking, Faure et al (1972) in his report of International Commission on the Development of Education, has said 'Education has the dual power to cultivate or stifle creativity. Recognition of its complex task in this domain is one of the most fruitful intellectual achievements of modern psychopadegogical research'. In short, for any country, to find out the creative talent and to nurture it, will be the goal of education, in near future.

In India, there is a dearth of creative talent, and this was remarked by Sing (1977) as 'A dearth of creative man-power is now felt in every branch of our national life and is probably one of the highest bottlenecks to our progress.

Poor as we are financially the poverty of creative talent is still greater'. Education Commission (1966) has also reported this point that ' In India there is a dearth of competent trained man-power'. Therefore, if the creative talent is duly discovered and developed, our large population can be our most valuable asset. Now, there seems to be little question, but that we can teach the skill of creative thinking and that the acquisition and application of these skills increases the chances that creativity will occur. It also seems clear that we can set condition in schools that will increase the chances of creative behaviour. The question is that, how can we do this ? What are the ways and means, which teachers can adopt in the classroom for enhancement of creative thinking ? What are the duties of educators and others related to education ? The conclusions of present study have some implications regarding these and many other questions. Before making any specific recommendations or suggestions for execution of new trends, the investigator submits that the generalisations based on this study are dependent upon the efficiency of the sample and tools used and are applicable to similar population. The following few suggestions having educational implications are made.

Early identification of creative talent on the basis of tests and observation is desirable. Identification should

consist of both screening and selection of creative children and it is to be functional and geared to the education programme. Kothari Commission (1966) has also supported this point as -

> '...the talent that enters school and succeeds in climbing the educational ladder, does not flourish fully because it is not discovered sufficiently early. For obtaining the best results in quality, talent has to be located early and allow to grow in the best atmosphere.'

The provision of experts' services is of immense value for making their correct identification. Seminars and workshops should be conducted for teachers' training, so that they can identify creative talent, properly.

The results of the study revealed that, there was a significant difference in the effectiveness of strategies and St_1 i.e. lecture was the least effective. This implies that traditional, stereo-typed classroom teaching throughout the year, with dominency of lecture, has no value for promoting creative thinking. Teachers should know this and they are expected to utilize different methods which are more effective for developing creative thinking. Moreover, it has been found that strategy with the use of A.V. aids was significantly effective for promoting creative thinking. This implies that some instructional aids like tapes, filmstrips, films, episcopic materials, even charts and models which are easily available in the schools should be used by teachers to nurture creative thinking, once these devices have been used, the teachers will

have more confidence in their ability to bring creative thinking and doing into being. Taylor and Williams (1965) put this as 'it is high time that creativity should become one of the major objectives of education and that suitable classroom materials are to be prepared for its development.'

From above discussion, it is seen that some of the strategies can be easily introduced into the classroom. Parnes and Meadows (1963) concluded that ' The gap between an individual's innate creative talent and actual creative out-put can be narrowed by deliberate education in creative thinking.' But for this purpose the teachers should properly be trained in the techniques of enhancing creativity, which could find the place in the schools. So the teachers should be trained to produce the agreed upon teaching strategies. Through this training process the teachers should fully know the importance and effects of certain types of teaching strategies on the development of creative thinking. The training programmes must be sure about their effectiveness and it should be conducted for both inservice and pre-service teachers.

Here, to quote, Whitman's view, will be useful. He, in his preface to the first edition of 'Leaves of Grass' said, ' we are all great poets, but only the greatest poets know it.'

like this, we are all potentially creative but only those who have become creative realize it. In short, for realizing creativity, teachers should become creative is also necessary and important. For making teachers creative, special training course should be conducted. To solve this problem of training of teachers, Centre of Extension Services in creative thinking should be started, so teachers can get ~~their~~ fair opportunity to receive instruction in specific aspects of creativity. Service of eminent creative persons can be sought in these centres.

As we know that many crores of rupees are being spent each year in our country, for scientific research and development and on many other projects, not including the additional amounts expended for the education and development of the next generation of thinkers. Atleast a small percentage of such funds should be spent for research and training to identify, develop and encourage those thinkers who will be most fruitful and especially those who will be most creative. With this money all over the country some schools can be established, just like Experimental Schools, in which the service of highly creative teachers for highly creative pupils can be utilized, to create next valuable generation - cadre of future scientists and technologists.

Even some progressive schools also can run their own programmes for nurturing creativity and they can create such

school climate in which creativity can be fostered.

Briefly, it is the duty of thinking people to sow the best seeds in that soil in order to reap the golden harvest of true and rich human culture.

5.3.1 Suggestions for Future Studies

As we know, scientific investigations on the various factors conducive to creativity are sadly lacking in our country. In fact, seen in the perspective of the overall investigations in this field, the very small proportion, suggests that the field as a whole is open for research and mostly unexplored. Perhaps, the study is the first attempt to see the effects of some common strategies on the development of creative thinking and more studies have to be carried out in this direction, to have more applicability, to teaching-learning situation. Suggestions for further research which may overcome some of the limitations of the present study and collect new information in this area of research are given below.

There are no comprehensive, well standardized batteries of tests to measure a wide spectrum of traits relating to creative thinking. Good yardsticks - valid criteria of creative thinking are needed if we are to have a sound basis for evaluating the effects of such training and environmental variables upon creative thinking.

Torrance (1971) observed that ' in our creativity research and development work, all of us have been guided consciously or unconsciously by some models'. Even today it is quite proper. Unfortunately, few of us, however, have taken the trouble to analyse and evaluate existing models or strategies. So it is expected that, like present study, future researchers should make deliberate choice of more and more existing common models or strategies or combinations of them.

If one has to find out the real outcome of certain studies, then these have to be repeatedly practised. It is also important that the work of fostering and developing creative ways of mental functioning and behaviour should not only be begun with children at primary school age, but also be continued and strengthened through all the levels of formal education. Certain common methods that any teacher can utilize in daily teaching for promoting creative thinking effectively should be investigated.

Briefly, it is recommended to conduct numerous experiments, covering a wide range of subjects, grades, and other situational factors.