CHAPTER VI
SUMMARY AND CONCLUSIONS

- Study in Retrospect
- Major Findings and Conclusions
- Tenability of the Hypothesis
- Educational Implication of the Study
- Suggestions for Further Research
CHAPTER VI

SUMMARY AND CONCLUSIONS

The concluding chapter contains the summary of the study conducted. It presents the study in retrospect, major findings, conclusions, recommendations, implications of the study and suggestions for further research. It is given in detail.

6.1 Study in Retrospect

6.1.1 Rationale behind the study

Present study is a unique of its kind not only in India but also in South East Asian Region which is faced with very grave population problems. Among the world nations, Indians are number two with 1,21,74,24,708 people on 2011March15 (Ruskin; 2011). India is the home of 17.5% of world’s population with only 2.42 per cent of the world’s land area. Among the Indian states, Kerala accounts for 1.3 per cent of India’s land area but supports 3.1 per cent of the population. At present population of Kerala is 3.34crore. Through Population Education programmes, our government is trying to solve the problem of overpopulation by developing rational and responsible behavior among the future citizens. The investigator assumes that the present methods of teaching Population Education lack futuristic vision and often failed to develop rational and responsible behavior towards the problems arising out of population explosion. From this, it is assumed that new models must be developed and implemented systematically with a view to create proper population awareness during schooling so as to enable the younger generation in future to take feasible decisions about their life. Hence, in the present study, the investigator tried to develop a new model i.e. Synthetic Model by blending Computer Assisted Instruction Model and Futures Wheel Method based on blended learning strategy for teaching Population Education at the secondary school level and tested it with the existing method of teaching. The synthetic model was found more effective than the
existing for teaching Population Education not only for the academic achievement but also for enhancing awareness of overpopulation among the secondary level students. In India it will be the first study in approaches of teaching Population Education with aims of bringing about changes in the attitudes and beliefs of the future population of India. This study is supposed to break new grounds and would establish the utility of our approaches of teaching Population Education in regard to creating an effect on the behavioral patterns of the students. This will help our nation to attain a balanced progress with maximum welfare.

6.1.2 Statement of the Problem

The problem under study was entitled as:

DEVELOPING AN INTERDISCIPLINARY SYNTHETIC MODEL FOR THE TEACHING OF POPULATION EDUCATION AT THE SECONDARY LEVEL

6.1.3 Objectives of the study

The study was mainly focused on attaining the following objectives:

1. To identify the prevailing modalities and constrains in teaching Population Education at the secondary level.

2. To find out the extent of awareness of secondary level teachers about blended learning strategies for upbringing the synchronization of select strategies like Computer Assisted Instruction Model and Futures Wheel Method for teaching Population Education.

3. To develop an Interdisciplinary Synthetic Model by synchronizing Computer Assisted Instruction Model and Futures Wheel Method for teaching Population Education at the secondary level (for total sample as well as sub samples based on gender, locale and type of management).
4. To determine the effect of the Interdisciplinary Synthetic Model over the Existing Method of curriculum transaction in enhancing the awareness about overpopulation among secondary level students (for total sample).

5. To explore the feasibility of the Synthetic Model for teaching Population Education at secondary level.

6. To analyze the receptivity of Synthetic Model for teaching Population Education at the secondary level.

7. To study the suitability of Synthetic Model for teaching Population Education at secondary level in terms of existing curricular factors:
   - Syllabus
   - Time Table
   - Evaluation.

8. To find out the willingness of the secondary school teachers to implement Synthetic Model for teaching Population Education at secondary level.

9. To identify practical difficulties likely to be encountered by teachers in the implementation of the synthetic model for teaching Population Education at secondary level.

10. To collect suggestions of teachers for the effective implementation of Synthetic Model for teaching Population Education at the secondary level.

6.1.4 Hypotheses formulated for the study

   1. The Synthetic Model developed through Blending Computer Assisted Instruction Model and Futures Wheel Method are
effective for teaching Population Education at the Secondary level.

2. The Synthetic Model is better than its component Computer Assisted Instruction Model for teaching Population Education at the Secondary level.

3. The Synthetic Model is better than its component Futures Wheel Method for teaching Population Education at the Secondary level.

4. The Synthetic Model is better than the Existing Method for teaching Population Education at the Secondary level.

5. The Synthetic Model developed through Blending Computer Assisted Instruction Method and Futures Wheel Method is better than Existing Method in enhancing the awareness about overpopulation among secondary level students.

6.1.5 Methodology in Brief

6.1.5.1 Method Selected for the Study

Considering the objectives of the study and, the nature of data required for their realization, Survey cum Experimental method is selected for the present study.

6.1.5.2 Experimental Design

The investigator selected Pre-test Post-test Non-equivalent Group Design for the present study, since the study was to develop an interdisciplinary synthetic model for teaching Population Education at the secondary level.

6.1.5.3 Sample Selected for the Study

The study has made use of 993 Secondary level students. The sample also consists of Educational Experts (N=20) and
Secondary School teachers (N=120) from different schools in Thrissur district of Kerala, selected on the basis of ‘Stratified Random Sampling Technique’. In selecting the samples, care was taken to give due representation to factors like gender, locale and type of school management.

6.1.5.4 Tools and Techniques used for the study


2. Blended Learning Strategy Awareness Inventory For secondary level Teachers.

3. Lesson Designs in Population Education based on Synthetic Model.


5. Population Awareness Test for secondary level students (Prepared by Vasuki and Regi).


7. Questionnaire for teachers to analyze the receptivity of Synthetic Model for teaching Population Education.

8. Questionnaire for Teachers to rate the suitability of the Synthetic Model for teaching Population Education.

6.1.5.5 Experimental Procedure

Before the experiment, the total sample was given a pre-test to assess their entry behavior in Population Education. The total sample divided into four groups. The first three groups were treated as experimental group who were taught by Computer Assisted Instruction, Futures Wheel Method and Synthetic Model respectively. The fourth group was treated as the control group who was taught through Existing Method. After completing experimental teaching, the same achievement test in Population Education was repeated to all four groups. A population awareness test was also administered to both experimental and control groups before and after the experimental teaching. A judgment schedule was distributed among 120 teachers and 20 experts to get their opinion regarding the comparative effectiveness of developed Model with that of Existing Method in teaching Population Education at the Secondary Level. A willingness scale was also administered among the secondary level teachers to assess their willingness to implement Synthetic Model for teaching Population Education.

6.1.6 Statistical techniques used for the study

The investigator used Analysis of Covariance, Critical Ratio, Chi-Square Test and Percentage for interpreting the data collected through survey cum experimental method.

6.2 Major Findings and Conclusions

The major findings and conclusions that emerged from the study are presented in three sections. They are given below in detail:

Section-I Findings and Conclusions Based on Needs Analysis.

Section-II Findings and Conclusions Based on experimental Study.

Section-III Findings and Conclusions Based on Receptivity Analysis.
Section-I

Findings and Conclusions Based on Needs Analysis

6.2.1 Findings and conclusions based on the Analysis of Secondary Level Teachers Prevailing Practices in Teaching Population Education.

1. The major findings that emerged from the study relating to the prevailing practices used by teachers in teaching Population Education at the secondary level through administering Population Education Prevailing Practices Questionnaire among 120 secondary school teachers are the following.

2. Lecture method seem to be one of the main method used by 68% of the secondary level teacher for Teaching Population Education s followed by group discussion (63%), role play method (29%), project method (18%) and computer assisted model (14%). The above finding leads to the conclusion that, majority of the teachers use lecture method as well as activity oriented method in teaching Population Education.

3. When the students find difficulty in comprehending a concept, 90% of the teachers change the subject matter to something more interesting, 86% teachers probe into student’s difficulties, 65% of the teachers reinforces the lesson with other teaching methods and 10% use computer assisted instruction strategies.

4. About 80% of the schools are organizing seminars on population issues for creating Population Awareness among the secondary level students followed by conducting poster making competition (65%), quiz competition (58%), celebrating world population day (35%) and elocution contest (23%).

5. Among the secondary level teachers, 9% of the teachers prepare PowerPoint presentation for teaching Population Education and 5% of the teachers use various models for teaching Population Education.
6. To improve competency in teaching Population Education, 90% of the teachers go for reading reference materials, 86% teachers consult with experts and colleagues and 80% depend on searching through internet.

7. The results of the analysis of secondary level teachers regarding the awareness about blended learning strategy revealed that, only 65% of the teachers are familiar with blended learning strategy. But, no body is using blended learning strategy for teaching Population Education.

8. Reasons for not implementing Blended Learning Strategy in class rooms are teachers lack adequate training in blended learning strategy [100%]. A great majority of teachers [86%] reported that they lack support from the authorities to experiment blended learning strategy in the classroom practices. About 85% of teacher opined that they lack theoretical knowledge about blended learning strategy. About 45% of the teachers reported that they are not confident to develop and experiment new models based on blended learning strategy.

6.2.2 Findings and conclusions based on the Analysis of Secondary Level Teachers Awareness of Blended Learning Strategy Based on Total Sample as well as Subsamples: Gender, Locality and Type of Management.

1. It is seen that, about 53% of Secondary level teachers have low awareness about blended learning strategy and 10% of Secondary level teachers have high awareness. 35% (N= 32) of secondary level teachers showed average awareness about blended learning strategy. Only 11.1% of the teachers showed high awareness about blended learning strategy.

2. The secondary level female teachers are having low awareness about Blended Learning Strategy 53.3% (N= 48) and 8.8% of (N=8) of secondary level female teachers have average awareness about Blended Learning Strategy. Only one female teacher showed high awareness about Blended Learning
Summary and Conclusions

Strategy. The secondary level male teachers are having average awareness about Blended Learning Strategy (26.6%, N= 24). 10 percentage of (N=9) of secondary level male teachers have high awareness about Blended Learning Strategy.

3. It is revealed that 27.7 percentage (N=25) of rural teachers have Low awareness of Blended Learning Strategy, were as 16.6 percent (N=15) of secondary level rural teachers showed average awareness about Blended Learning Strategy. From this, it is clear that secondary level rural teachers have low awareness about Blending Learning Strategy. It is clear that 25.5 percentage (N=23) of urban teachers have low awareness of Blended Learning Strategy, where as 18.5 percent (N=17) of secondary level urban teachers shows average awareness. About 6.6 percentage (N=6) showed high awareness of Blended Learning Strategy. From this, we can say that secondary level urban teachers have low awareness about Blending Learning Strategy.

4. The secondary level Government School Teachers are having average awareness about Blended Learning Strategy (21.1 %, N= 19). Where as 6.6 percentage of (N=6) of Secondary Level Government School Teachers have high awareness about Blended Learning Strategy.

5. The Secondary Level Government Aided Management School Teachers are having Low awareness about Blended Learning Strategy (25.5%, N=23). But, 5.5 percentage (N=5) of Secondary Level Government Aided Management School Teachers have average Awareness about Blended Learning Strategy.

6. The Secondary Level Private School Teachers are having low awareness about Blended Learning Strategy (22.2%, N=20). But, 8.8 percentage of (N=8) of Secondary Level Private School Teachers have average awareness about Blended Learning Strategy.
Section-I I

Findings and Conclusions based on experimental Study

6.2.3 Findings and Conclusions Based on the Analysis of Effectiveness of Synthetic Model for Teaching Population Education among the Secondary Level Students Based on Total Sample as well as Sub Samples: Gender, Locality and Type of Management.

Conclusion1: The Synthetic Model developed by blending, Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education at the Secondary level.

This inference is deducted by the following findings:

Comparison of pre-test and post test achievement scores of each of the Three Experimental Groups [CAI, FWM, SM] and Control Group [EM] for the total sample were subjected to Analysis of Covariance revealed that, there is significant increase in post test score after administering all the four teaching method. Here all the calculated t-values are greater than table value at 0.01 levels. Hence, reject the null hypothesis and accept the alternative hypothesis that there is significant difference in the pre and post test scores in each teaching method. Mean pre-test score for CAI was 6.83 (Standard Deviation = 2.88) which was increased to 14.42 (Standard Deviation = 3.50) with a percentage increase of 113.13. In the case FWM, mean pre-test score was 6.92 (Standard Deviation = 2.85) is increased to 14.87 (Standard Deviation = 3.74) with a percentage increase of 114.88. However in the case of SM, mean pre-test score was 7.13 (Standard Deviation = 3.01) which was increased to 17.00 (Standard Deviation = 3.77) with a percentage increase of 138.43 whereas in the case of control group, mean pre-test score was 6.82 (Standard Deviation = 2.79) which was increased to 13.27 (Standard Deviation = 3.07) with a percentage increase of 94.57.
The pre-test and post test scores of the Achievement Scores of three experimental groups [CAI, FWM, SM] and control group[EM] for the total sample were subjected to Analysis of Covariance .It was found that, $M_{y,x}$ for CAI =14.525, FWM =14.882, SM= 16.776 and Control Group EM= 13.381. Results revealed that the students of SM group has significantly higher achievement mean score (16.776) compared to all other two experimental groups and Control group. Thus, it can be concluded that the Synthetic Model is statistically more effective than the other two models and existing method of teaching, on achievement in Population Education.

**Conclusion2: The Synthetic Model is better than its component Computer Assisted Instruction Model for teaching Population Education at the Secondary level.**

This inference is deducted by the following findings:

When the adjusted mean post test achievement scores of Synthetic Model Group with Computer Assisted Instruction Model (CAI) compared, the result reveal that critical ratio obtained is 15.31, which is greater than the table value 2.58 at 0.01 levels and hence it is significant at 0.01 levels. The adjusted mean post test achievement score for SM group (16.776) was found to be significantly ($P<0.01$) greater than the mean post test scores of CAI (14.525). This concludes that new Synthetic Model is more effective than CAI method of teaching in Population Education.

**Conclusion3: The Synthetic Model is better than Futures Wheel Method for teaching Population Education at the Secondary level.**

This inference is deducted by the following findings:

When the adjusted mean post test achievement scores of Synthetic Model Group compared with the component Model Group i.e. Futures Wheel Method (FWM) for the total sample, the critical ratio obtained (13.00) is greater than the table value 2.58 at 0.01 levels. The adjusted mean post test achievement score for SM group (16.776) was found to be significantly ($P<0.01$) greater than the mean post test
scores of FWM (14.882). Hence it can be concluded from the analysis that Synthetic Model is more effective than FWM for teaching in Population Education at secondary level.

**Conclusion 4:** The Synthetic Model is better than the Existing Method of teaching Population Education at the Secondary level.

This inference is deducted by the following findings:

When the Post Test Achievement Scores of Synthetic Model Group Compared with the Control Group taught by Existing Method (EM) for the total sample, Critical ratio calculated (23.31) was found to be greater than the table value 2.58 at 0.01 levels. Mean post test achievement score for SM group (16.776) was found to be significantly (P<0.01) greater than the mean post test scores of EM (13.381). Hence it can be concluded that Synthetic Model is more effective than EM of teaching in Population Education at secondary level.

Thus the above results shows that CAI, FWM and SM are more effective that existing teaching Method. There exists significant difference in the effectiveness of CAI, FWM and SM. However, Synthetic Model of teaching was found to be significantly more effective than all the other three teaching method. Thus it can be concluded that though CAI and FWM are more effective than existing teaching method, SM is more effective than all the three methods tried for teaching Population Education at secondary level.

**Conclusion 5:** The Synthetic Model developed by blending, Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education for Girls at the Secondary level.

This inference is deducted by the following findings:

Comparison of pre-test and post test achievement scores of girls in each of the Three Experimental Groups [CAI, FWM, SM ]And Control Group[EM] were subjected to Analysis of Covariance, it was found that, \( F_yx=103.107; \ P<0.01 \); \( M_{y,x} \) for CAI=14.448, FWM=13.381, SM=16.776.
Results revealed that the girls taught with SM has significantly higher achievement mean score (16.759) compared to other two experimental groups and Control group that has significantly low achievement score. Thus, it can be concluded that the SM is statistically more effective than the other two models and existing method of teaching on achievement in Population Education for the sub sample of girls.

**Conclusion6:** The Synthetic Model is more effective than Computer Assisted Instruction Model of teaching Population Education for Girls at the Secondary level.

The above conclusion is supported by the following findings:

The critical ratio obtained for comparing the effectiveness of SM with that of CAI for the sub sample of girls (11.08) was found to be significant at 0.01 levels. This implies that there is significant difference in the adjusted means of post test achievement scores of the girls in SM and CAI groups. Adjusted mean post test scores for SM group is 16.759 and that for CAI group is 14.448. Higher adjusted mean score for SM group reveals that SM is more effective than CAI for the sub sample of girls.

**Conclusion7:** The Synthetic Model is more effective than Futures Wheel Method of teaching Population Education for Girls at the Secondary level.

The above conclusion is supported by the following findings:

Results of t-test for comparing the adjusted mean post test achievement scores of SM and FWM for the sub sample of girls (9.11) was found to be significant at 0.01 levels. This implies that there is significant difference in the adjusted means of post test achievement scores of the girls in SM and FWM groups. Adjusted mean post test scores for SM group are 16.759 and that for FWM group is 14.897. Higher adjusted mean score for SM group reveals that SM is more effective than FWM for the sub sample of girls.
Summary and Conclusions

**Conclusion 8:** *The Synthetic Model is more effective than Existing Method of teaching Population Education for Girls at the Secondary level.*

The above conclusion is supported by the following findings:

As the critical ratio, obtained (17.30) is greater than the table value 2.58 at 0.01 levels the difference in mean post test scores of SM and EM for the sub sample of girls was found to be significant. This implies that there is significant difference in the adjusted means of post test achievement scores of the girls in SM and EM groups. Mean post test achievement score for SM group (16.759) was found to be significantly (P<0.01) greater than the mean post test scores of EM (13.20). This concludes that SM model is more effective than existing teaching method of teaching in Population Education among the sub sample of girls.

**Conclusion 9:** *The Synthetic Model developed by blending, Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education for boys at the Secondary level.*

The above conclusion is supported by the following findings:

Comparison of pre-test and post test achievement scores of boys in the Three Experimental Groups [CAI, FWM, and SM] and Control Group [EM] were subjected to Analysis of Covariance. It was found that, $F_y.x=85.426; \ P<0.01; \ My.x$ for CAI=14.601, FWM =14.867, SM= 16.794 and Control Group EM=13.560. Results revealed that the Boys taught with SM has significantly higher achievement mean score (16.794) compared to other two experimental groups and Control group that has significantly low achievement score. Thus, it can be concluded that the SM is statistically more effective than the other two models and existing method of teaching, on achievement in Population Education for the sub sample of boys.
**Conclusion10:** The Synthetic Model is more effective than Computer Assisted Instruction Model of teaching Population Education for Boys at the Secondary level.

The above conclusion is supported by the following findings:

The critical ratio obtained for comparing the effectiveness of SM with that of CAI for the sub sample of boys (10.62) was found to be significant at 0.01 levels. This implies that there is significant difference in the means of post test achievement scores of the boys in SM and CAI groups. Adjusted mean post test scores for SM groups is 16.794 and that for CAI group is 14.601. Higher mean score for SM group reveals that SM is more effective than CAI for the sub sample of boys.

**Conclusion11:** The Synthetic Model is more effective than Futures Wheel Method of teaching Population Education for Boys at the Secondary level.

The above conclusion is supported by the following findings:

Results reveal that critical ratio obtained is 9.30, which is greater than the table value 2.58 at 0.01 levels. This implies that there is significant difference in the adjusted means of post test achievement scores of the boys in SM and FWM groups. Mean post test achievement score for SM group (16.794) was found to be significantly (P<0.01) greater than that of FWM (14.867). This concludes that new Synthetic Model is more effective than FWM of teaching in Population Education for the sub sample of boys.

**Conclusion12:** The Synthetic Model is more effective than Existing Method of Teaching Population Education for Boys at the Secondary level.

The above conclusion is supported by the following findings:

As the critical ratio obtained (15.66) is greater than the table value 2.58 at 0.01 levels, the difference in mean post test scores was
found to be significant. This implies that there is significant difference in the adjusted means of post test achievement scores of the boys in SM and EM groups. Adjusted mean post test achievement score for SM group (16.794) was found to be significantly (P<0.01) greater than the mean post test scores of EM (13.56). This concludes that SM model is more effective than existing method of teaching Population Education among the sub sample of boys.

**Conclusion 13: The Synthetic Model is equally effective for girls and boys in teaching Population Education at Secondary level**

The above conclusion is supported by the following findings:

As the critical ratio, obtained (0.17) is less than the table value 1.96 at 0.05 levels the difference in mean post test scores of the two groups was found to be non significant. This implies that there is no significant difference in the means of post test achievement scores of SM of boys and girls. Mean scores also reveals that Synthetic Model is equally effective among boys and girls. Comparison of effectiveness of Synthetic Model among boys and girls reveals that it is equally effective among boys and girls and no gender difference existed in the effectiveness of Synthetic Model in teaching Population Education.

**Conclusion 14: The Synthetic Model developed by blending, Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education among the Rural Secondary level Students.**

The above conclusion is supported by the following findings:

Comparison of pre-test and post test achievement scores of Rural Secondary level Students in each of the Three Experimental Groups [CAI, FWM, SM] and Control Group [EM] were subjected to Analysis of Covariance revealed the following findings. It was found that, \( F_y.x = 122.65; P<0.01; M.y.x \) for CAI=14.563, FWM =14.984, SM= 17.234 and Control Group EM=13.487. Results revealed that the rural students taught with SM has significantly higher achievement mean score (17.234) compared to other two experimental groups and
Control group that has significantly low achievement score. Thus, it can be concluded that the SM is statistically more effective than the other two models and existing method of teaching, on achievement in Population Education for the rural secondary level students.

**Conclusion15**: the Synthetic Model is more effective than Computer Assisted Instruction Model for teaching Population Education among the Rural Secondary level Students.

The above conclusion is supported by the following findings:

The critical ratio obtained for comparing the effectiveness of SM with that of CAI for the sub sample of rural students (13.11) was found to be significant at 0.01 levels. This implies that there is significant difference in the means of post test achievement scores of the rural students in SM and CAI groups. Mean post test scores for SM group is 17.234 and for CAI group is 14.563. Higher mean score for SM group reveals that SM is more effective than CAI for the sub sample of rural students.

**Conclusion16**: The Synthetic Model is more effective than Futures Wheel Method for teaching Population Education among the Urban Secondary level Students.

The above conclusion is supported by the following findings:

The results reveal that critical ratio obtained is 11.12, which is greater than the table value 2.58 at 0.01 levels. This implies that there is significant difference in the adjusted means of post test achievement scores of the rural students in SM and FWM groups. Adjusted mean post test achievement score for SM group (17.234) was found to be significantly (P<0.01) greater than that of FWM (14.984). This concludes that new Synthetic Model is more effective than FWM method of teaching in Population Education for the sub sample of rural students.
**Conclusion 17:** The Synthetic Model is more effective than Existing Method for teaching Population Education among the Urban Secondary level Students.

The above conclusion is supported by the following findings:

As the critical ratio obtained (18.66) is greater than the table value 2.58 at 0.01 levels the difference in mean post test scores was found to be significant. This implies that there is significant difference in the means of post test achievement scores of the rural students in SM and EM groups. Adjusted mean post test achievement score for SM group (17.234) was found to be significantly (P<0.01) greater than the mean post test scores of EM (13.49). This indicates that SM model is more effective than existing teaching method of teaching Population Education among the rural students.

**Conclusion 18:** The Synthetic Model developed by blending, Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education among the Urban Secondary level Students.

The above conclusion is supported by the following findings:

Comparison of pre-test and post test achievement scores of Urban Secondary level Students in the Three Experimental Groups [CAI, FWM, SM] and Control Group[EM] were subjected to Analysis of Covariance revealed the following findings. It was found that, Fy.x=71.933; P<0.01; My.x for CAI=14.483, FWM =14.781, SM=16.328 and Control Group EM=13.280. Results revealed that the urban students taught with SM has significantly higher achievement mean score (16.328) compared to other two experimental groups and Control group that has significantly low achievement score. Thus, it can be concluded that the SM is statistically more effective than the other two models and existing method of teaching, on achievement in Population Education for the sub sample of urban students.
Conclusion 19: The Synthetic Model is more effective than Computer Assisted Instruction Model for teaching Population Education among the Urban Secondary level Students.

The above conclusion is supported by the following findings:

The critical ratio obtained for comparing the effectiveness of SM with that of CAI for the sub sample of urban students (8.84) was found to be significant at 0.01 levels. This implies that there is significant difference in the adjusted means of post test achievement scores of urban students in the SM and CAI groups. Adjusted mean post test scores for SM groups are 16.328 and for CAI group is 14.483. Higher mean score for SM group reveal that SM is more effective than CAI for the sub sample of urban students.

Conclusion 20: The Synthetic Model is more effective than Futures Wheel Method for teaching Population Education among the Urban Secondary level Students.

The above conclusion is supported by the following findings:

Results reveal that critical ratio obtained is 7.47, which is greater than the table value 2.58 at 0.01 levels. This implies that there is significant difference in the means of post test achievement scores of urban students in the SM and FWM groups. The adjusted mean post test achievement score for SM group (16.328) was found to be significantly (P<0.01) greater than that of FWM (14.781). This concludes that new Synthetic Model is more effective than FWM of teaching in Population Education for the sub sample of urban students.

Conclusion 21: The Synthetic Model is more effective than Existing Method for teaching Population Education among the Urban Secondary level Students.

The above conclusion is supported by the following findings:

As the critical ratio, obtained (14.56) is greater than the table value 2.58 at 0.01 levels the difference in adjusted mean post test scores of the two groups was found to be significant. This implies that
there is significant difference in the means of post test achievement scores of urban students in the SM and EM groups. The adjusted mean post test achievement score for SM group (16.328) was found to be significantly (P<0.01) greater than the adjusted mean post test scores of EM (13.28). Thus it can be concluded that SM model is more effective than existing method of teaching in Population Education among the sub sample of urban students.

**Conclusion 22:** *The Synthetic Model is more effective for rural students than urban students in teaching Population Education Secondary level.*

The above conclusion is supported by the following findings:

As the critical ratio, obtained (4.43) is greater than the table value 2.58 at 0.01 levels the difference in mean post test scores of the two groups was found to be significant. This implies that there is significant difference in the adjusted means of post test achievement scores of SM of rural (17.234) and urban students (16.328). The adjusted mean scores also reveals that Synthetic Model is more effective for rural students than urban students.

Results of the above analysis show that Synthetic Model is effective than CAI, FWM, and EM for both the sub sample of rural and urban students. Comparison of effectiveness of Synthetic Model among rural and urban students reveals that it is equally effective for rural and urban students in teaching Population Education.

**Conclusion 23:** *The Synthetic Model developed by blending, Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education for the sub sample of Government school students at the Secondary level.*

This inference is deducted by the following findings:

Comparison of pre-test and post test achievement scores of Government school students each of the Three Experimental Groups [CAI, FWM, and SM] and Control Group [EM] were subjected to
Analysis of Covariance. It was found that, $F_{y,x}=47.102; P<0.01$; $M_{y,x}$ for CAI=14.382, FWM =14.939, SM = 16.309 and Control Group EM=13.197. Results revealed that the Government School students taught with SM has significantly higher achievement mean score (16.309) compared to other two experimental groups and Control group that has significantly low achievement score. Thus, it can be concluded that the SM is statistically more effective than the other two models and existing method of teaching, on achievement in Population Education for the sub sample of Government School students.

**Conclusion24: The Synthetic Model is more effective than Computer Assisted Instruction Model for teaching Population Education among the Government school Students.**

The above conclusion is supported by the following findings:

The critical ratio obtained for comparing the effectiveness of SM with that of CAI for the sub sample of Government school students (7.15) was found to be significant at 0.01 levels. This implies that there is significant difference in the adjusted mean post test achievement scores of the pupil in SM and CAI groups. Mean post test scores for SM group is 16.309 and that for CAI group is 14.382. Higher mean score for SM group reveals that SM is more effective than CAI for the sub sample of Government school students.

**Conclusion25: The Synthetic Model is more effective than Futures Wheel Method for teaching Population Education among the Government School Students.**

The above conclusion is supported by the following findings:

Results reveal that critical ratio obtained is 5.22, which is greater than the table value 2.58 at 0.01 levels. This implies that there is significant difference in the adjusted means of post test achievement score of the pupils in SM and FWM groups in the sub sample of Government school students. The adjusted mean post test achievement score for SM group (16.309) was found to be significantly ($P<0.01$) greater than that of FWM (14.939). This concludes that new Synthetic
Model is more effective than FWM in teaching Population Education for the sub sample of Government school students.

**Conclusion26: The Synthetic Model is more effective than Existing Method for teaching Population Education among the Government School Students.**

The above conclusion is supported by the following findings:

As the critical ratio obtained (11.71) is greater than the table value 2.58 at 0.01 levels the difference in adjusted mean post test scores was found to be significant. This implies that there is significant difference in the adjusted mean post test achievement score of the pupils in SM and EM groups of the sub sample of Government school students. Mean post test achievement score for SM group (16.309) was found to be significantly (P<0.01) greater than the mean post test scores of EM (13.20). This indicates that SM model is more effective than the existing teaching method in Population Education among the sub sample of Government school students.

**Conclusion27: The Synthetic Model developed by blending, Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education for the sub sample of Government Aided Management school students at the Secondary level.**

This inference is deducted by the following findings:

Comparison of pre-test and post test achievement scores of Government Aided Management School students each of the Three Experimental Groups [CAI, FWM, and SM] and Control Group [EM] were subjected to Analysis of Covariance. It was found that, Fy.x=84.784; P<0.01; My.x for CAI=14.690, FWM =14.346, SM=16.861 and Control Group EM=13.299. Results revealed that the Government Aided Management School students taught with SM has significantly higher achievement mean score (16.861) compared to other two experimental groups and Control group that has significantly low achievement score. Thus, it can be concluded that the SM is statistically more effective than the other two models and existing
method of teaching, on achievement in Population Education for the sub sample of Government Aided Management School students.

**Conclusion28: The Synthetic Model is more effective than Computer Assisted Instruction Model for teaching Population Education among the Government Aided Management school Students**

The above conclusion is supported by the following findings:

The critical ratio obtained for comparing the effectiveness of SM with that of CAI for the sub sample of government aided management school students (9.30) was found to be significant at 0.01 levels. This implies that there is significant difference in the adjusted means of post test achievement scores of the pupil in SM and CAI groups. Adjusted mean post test scores for SM group is 16.861 and that for CAI group is 14.69. Higher mean score for SM groups reveals that SM is more effective than CAI for the sub sample of government aided management school students.

**Conclusion29: The Synthetic Model is more effective than Futures Wheel Method for teaching Population Education among the Government Aided Management School Students.**

The above conclusion is supported by the following findings:

Results reveal that critical ratio obtained is 10.81, which is greater than the table value 2.58 at 0.01 levels. Adjusted mean post test achievement score for SM group (16.861) was found to be significantly (P<0.01) greater than that of FWM (14.346). This concludes that new Synthetic Model is more effective than FWM method of teaching in Population Education for the sub sample of government aided management school students.

**Conclusion30: The Synthetic Model is more effective than Existing Method for teaching Population Education among the Government Aided Management School Students.**

The above conclusion is supported by the following findings:
As the critical ratio, obtained (15.50) is greater than the table value 2.58 at 0.01 levels the difference in mean post test scores of the two groups was found to be significant. Adjusted mean post test achievement score for SM group (16.861) was found to be significantly (P<0.01) greater than the mean post test scores of EM (13.30). This concludes that SM model is more effective than existing teaching method in Population Education among the sub sample of aided management school students.

**Conclusion31:** The Synthetic Model developed by blending, Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education for the sub sample of Private school students at the Secondary level.

Comparison of pre-test and post test achievement scores of Private school students in the Three Experimental Groups [CAI, FWM, and SM] and Control Group [EM] were subjected to Analysis of Covariance. it was found that, $F_{y.x}=71.125$; $P<0.01$; $M_{y.x}$ for CAI=14.503, FWM =15.349, SM=17.154 and Control Group EM=13.637 Results revealed that the students taught with SM has significantly higher achievement mean score (17.154) compared to all other groups and Control group. Thus, it can be concluded that the SM is statistically more effective than the other two models and existing method of teaching, on achievement in Population Education for the sub sample of private school students.

**Conclusion32:** The Synthetic Model is more effective than Computer Assisted Instruction Model for teaching Population Education among the Private School Students.

The above conclusion is supported by the following findings:

The critical ratio obtained for comparing the effectiveness of SM with that of CAI for the sub sample of private school students (10.59) was found to be significant at 0.01 levels. This implies that there is significant difference in the means of post test achievement scores of the pupils in SM and CAI groups. Mean post test scores for SM groups
are 17.154 and that for CAI group are 14.503. Higher mean score for SM group reveals that SM is more effective than CAI for the sub sample of private school students.

**Conclusion33:** *The Synthetic Model is more effective than Futures Wheel Method for teaching Population Education among the Private School Students.*

The above conclusion is supported by the following findings:

Results reveal that critical ratio obtained is 7.17, which is greater than the table value 2.58 at 0.01 levels. This implies that there is significant difference in the adjusted means of post test achievement scores of the pupils in SM and FWM groups in the sub sample of private school students. The adjusted mean post test achievement score for SM group (17.154) was found to be significantly (P<0.01) greater than that of FWM (15.349). This concludes that new Synthetic Model is more effective than FWM of teaching in Population Education for the sub sample of private school students.

**Conclusion34:** *The Synthetic Model is more effective than Existing Method for teaching Population Education among the Private School Students.*

The above conclusion is supported by the following findings:

As the critical ratio, obtained (13.97) is greater than the table value 2.58 at 0.01 levels the difference in adjusted mean post test scores of the two groups was found to be significant for the sub sample of private school. Mean post test achievement score for SM group (17.154) was found to be significantly (P<0.01) greater than the mean post test scores of EM (13.64). This concludes that SM model is more effective than existing teaching method in Population Education among the sub sample of private school students.

For studying the difference in effectiveness of Synthetic Model among students belonging to schools of different type of management, adjusted mean post test achievement scores of SM groups of
Government School, Government Aided Management School, and Private Schools were compared pair wisely using independent t-test. As the critical ratio, obtained (2.22) is greater than the table value 1.96 at 0.05 levels the difference in adjusted mean post test scores of the government school and government aided management school students was found to be significant. The adjusted mean scores for government school students is 16.309 which is less than that of government aided management school students (16.861). It reveals that Synthetic Model is more effective for government aided management school students than government school student.

As the critical ratio, obtained (3.26) is greater than the table value 2.58 at 0.01 levels the difference in mean post test scores of the Government and private school students was found to be significant. Higher mean score for private school students reveals that Synthetic Model is more effective among private school students than government school students.

As the critical ratio, obtained (1.22) is less than the table value 1.96 at 0.05 levels the difference in adjusted mean post test scores of the government aided management schools and private school students was found to be non significant. This implies that Synthetic Model is equally effective among government aided management school and private school students.

Results of the above analyses shows that Synthetic Model is effective than CAI, FWM, and EM for the three sub sample based on type of management. Comparison of effectiveness of Synthetic Model among the type of management reveals that it is equally effective among government aided management schools and private school students. It is less effective among government school students compared to government aided management and private school students.
6.2.4 Findings and conclusions based Analysis of the Effectiveness of Synthetic Model for Enhancing Awareness about Overpopulation among the Secondary School Level Students

**Conclusion1:** The Synthetic Model developed by blending, Computer Assisted Instruction Model and Futures Wheel Method is effective for enhancing population awareness among the secondary level students.

The above conclusion is supported by the following findings:

Comparison of pre-test and post test Population Awareness scores of students in the Three Experimental Groups [CAI, FWM, and SM] and Control Group [EM] were subjected to Analysis of Covariance. The F-ratios for the two sets of scores were tested for significance using ANOVA. It was found that, the Synthetic Model is more effective than Computer Assisted Instruction Model, Futures Wheel Method and Existing Method for teaching Population Education. [Fy.x=158.648; P<0.01; My.x for CAI=16.322, FWM =16.754, SM=19.506 and Control Group EM=15.105]. Results revealed that the Secondary level students taught with SM has significantly higher adjusted mean Population Awareness Scores (19.506) compared to other two experimental groups and Control group that has significantly low adjusted mean score. Thus, it can be concluded that the SM is statistically more effective than the other two models and the existing method of teaching, on increasing awareness in Population Education for the total sample students.

**Conclusion2:** The Synthetic Model is more effective than Computer Assisted Instruction Model for enhancing population awareness among the secondary level students.

The above conclusion is supported by the following findings:

The results reveal that critical ratio obtained is 15.16, which is greater than the table value 2.58 at 0.01 levels and hence it is significant at 0.01 levels. Adjusted mean post test score of population awareness for SM group (19.511) was found to be significantly
Summary and Conclusions

(P<0.01) greater than that of CAI (16.322). This concludes that new Synthetic Model is more effective than CAI model for enhancing population awareness.

**Conclusion3: The Synthetic Model is more effective than Computer Assisted Instruction Model for enhancing population awareness among the secondary level students.**

The above conclusion is supported by the following findings:

The critical ratio obtained (13.19) is greater than the table value 2.58 at 0.01 levels. Adjusted mean post test awareness score for SM group (19.51) was found to be significantly (P<0.01) greater than the adjusted mean post test scores of FWM (16.754). Hence it can be concluded from the analysis that Synthetic Model is more effective than FWM of teaching for enhancing population awareness of students at secondary level.

**Conclusion4: The Synthetic Model is more effective than Existing Method for enhancing population awareness among the secondary level students.**

The above conclusion is supported by the following findings:

Critical ratio calculated (21.10) for comparing the effectiveness of the SM and EM was found to be greater than the table value 2.58 at 0.01 levels. Adjusted mean post test awareness score for SM group (19.51) was found to be significantly (P<0.01) greater than the adjusted mean post test scores of EM (15.11). Hence, it can be concluded that Synthetic Model is more effective than EM of teaching for enhancing population awareness at secondary level.

Thus the above results show that CAI, FWM and SM are more effective than existing teaching Method. The significant difference was noted in the effectiveness of CAI and FWM indicating that FWM method is more effective than CAI for enhancing population awareness. However, Synthetic Model of teaching was found to be significantly more effective than all the other three teaching method.
Thus, it can be concluded that though CAI and FWM are more effective than existing teaching method, SM is more effective than all the three methods tried for enhancing population awareness at secondary level.

Section-III

Findings and Conclusions Based on Receptivity Analysis

6.2.5 Findings and conclusions based on ratings of experts and teachers about the comparative effectiveness of Synthetic Model and Existing Method for teaching Population Education at the secondary level in realizing certain selected educational outcomes.

The major findings emerged from the ratings of experts and teachers about the comparative effectiveness of synthetic model and existing method for teaching Population Education at the secondary level in realizing certain selected educational outcomes are given below:

1. Majority of the experts reported that the synthetic model is effective than existing method in attaining the following educational outcomes of instruction under the cognitive dimension:

- Almost 90% of the respondents stated that the proposed model helps to motivate the students to know more about population explosion
- Majority of the respondents observed that the Synthetic model identifies the relationship between ecological balance and population changes than the EM.
- All the responding experts stated that the suggested model provides greater understands about the
relationship between overpopulation and unemployment.

- Around ninety per cent of the respondents observed that the suggested model is better than the existing models in establishing the relationships between poverty and big family
- All the respondents stated that the SM is better than EM in analyzing the causative factors of population growth
- Many acknowledged that the suggested SM provides better understanding about population dynamics than EM.
- All the respondents stated that the SM identifies relationship between overpopulation and social problems than the EM.

Therefore, it can be concluded that, the synthetic model is more effective than existing method in attaining the educational outcomes of instruction under the cognitive dimension.

2. **The secondary level teachers reported that the synthetic model is effective than existing method in attaining the following educational outcomes of instruction under the cognitive dimension:**

- Majority of the teachers stated that the suggested SM helps in motivating the students to know more about population explosion.
- It is understood that the proposed SM identifies the relationship between ecological balance and population changes better than the EM.
- Almost all the respondents acknowledged that the suggested model helps in understanding the relationship between overpopulation and unemployment better than the EM.
- All the respondents stated that the SM establishes relationship between poverty and big family better than the EM.
• Ninety eight percent of the responding teachers stated that the SM analyses the causative factors of population growth than the EM.
• Majority of the respondents acknowledged that the SM develops a good understanding about population dynamics
• More number of respondents explained that the suggested SM identifies relationship between overpopulation and social problems better than the EM.

Hence, it can be concluded that the synthetic model is effective than existing method in attaining the educational outcomes of instruction under the cognitive dimension.

3. That majority of the experts reported that the synthetic model is effective than existing method in attaining the following educational outcomes of instruction in the affective domain:

- All the respondents stated that the suggested SM clearly explains the development of positive attitude towards controlling overpopulation than the EM.
- Majority of the respondent observed that the proposed SM fairly develops interest in protecting the nature than the EM.
- Almost ninety eight percent of the respondents stated that the SM develops interest in population issues having future implications better where compared with the other EMs.
- Majority of the respondents stated that the suggested model develops interest in future forecasting, clarifies existing population related beliefs and values and also develops rational attitude towards customs and traditions.
Therefore, it can be concluded that the synthetic model is effective than existing method in attaining the educational outcomes of instruction under the affective dimension.

4. The secondary level teachers reported that, synthetic model is effective than existing method in attaining the following educational outcomes of instruction in the affective domain:

- Almost all the responding teachers suggested that the suggested model develops a positive attitude towards controlling overpopulation that the EM.

- Majority of the respondents stated that the SM develops interest in protecting the nature when compared to EM.

- Many of the respondents positively acknowledged that the SM develops interest in population issues having future implications.

- All the respondents stated that the proposed model develops interest in future forecasting, Clarifies existing population related beliefs & values and also develops rational attitude towards customs and traditions than the EM.

Therefore, from the analysis of the ratings of teachers it can be concluded that, the synthetic model is effective than existing method in attaining the educational outcomes of instruction under the affective dimension.

5. Majority of the experts reported that, synthetic model is effective than existing method in attaining the following outcomes of instruction in the psychomotor domain:

- Many of the responding experts stated that the suggested SM develops curiosity and skill in forecasting future.
• Majority of the respondents stated that the SM fairly derives the impact of overpopulation on economic development.
• Most of the respondents observed that the SM develops interest in exploring population issues having global implications.
• The respondents also pointed out that the SM appreciates small family norm, develops understanding about responsible behavior and also adequately develops thrill and interest in protecting the Mother Nature.
• It is understood from the analysis that the SM develops curiosity to know more about population phenomenon and also applies learned facts in real life situations than the EM.

Thus, the analysis of the ratings of experts it can be concluded that, the synthetic model is effective than existing method in attaining the educational outcomes of instruction in the psychomotor domain.

6. Majority of the teachers revealed that, synthetic model is effective than existing method in attaining the following educational outcomes of instruction in the psychomotor domain:

• It is learned from the respondents that the SM develops curiosity and skill in forecasting future while deriving the impact of overpopulation on economic development than the EM
• The study also shows that the proposed SM fairly develops interest in exploring population issues while considering global implications.
• The respondents also stated that the SM appreciates small family norm than the EM, develops understanding about responsible behavior and further develops thrill and interest in protecting the Mother Nature.
• Majority of the respondents stated that the SM also develops curiosity to know more about population phenomenon when compared with the EM.
Many respondents stated that the proposed SM applies learned facts in real life situations as compared to EM.

Hence, from the analysis of the ratings of teachers it can be concluded that, the synthetic model is effective than existing method in attaining the educational outcomes of instruction in the psychomotor domain.

7. **Majority of the experts reported that, synthetic model is effective than existing method in attaining the following process skills:**

- Majority of the respondents stated that the proposed SM is better than the EM while considering the factors like Observation, Classification, Formulation of hypothesis, Analyzing and Interpreting the population trends, Discovering Relationship between overpopulation and unemployment.
- The respondents also observed that the proposed model has greater strength in aspects like Problem Solving, Predicting compared to EM and also derives generalizations.

Therefore, from the analysis of the ratings of experts it can be concluded that, the synthetic model is effective than existing method in attaining the process skills.

8. **Majority of the teachers reported that, synthetic model is effective than existing method in attaining the following process skills:**

- Majority of the responding teachers stated that the proposed SM is better than the EM while considering aspects like Observation, Classification, Formulating hypothesis, Analyzing and Interpreting the population trends, Discovering Relationship between overpopulation and unemployment, problem Solving and Predicting.
• The respondents also observed that the proposed model drives generalizations better than the EM.

Thus, from the analysis of the ratings of teachers it can be concluded that, the synthetic model is effective than existing method in attaining the process skills.

**9. Majority of the experts reported that, synthetic model is effective than existing method in attaining the following Social dimensions of instruction:**

• It is understood from the responses that the proposed SM Maximizes socialization among students, Promotes sense of belongingness to a group, develops spirit of team work and oneness, provides opportunities for developing leadership quality among students, Provides Excellent situations for group discussion when compared to the EM.
• Many of the respondents stated that the SM promotes situations for social values, promotes Teacher-student interaction, develops communication skills of students and stimulates sharing of ideas in groups better than the EM.

Therefore, from the findings of the study it can be concluded that, the synthetic model is effective than existing method in attaining the social aspects of instruction.

**10. The analysis of the ratings of the teachers revealed that, synthetic model is effective than existing method in attaining the following Social dimensions of instruction:**

• Majority of the responding teachers observed and acknowledged that the proposed model maximizes socialization among students, promotes sense of belongingness to a group, and develops spirit of team work and oneness while providing opportunities for developing leadership quality among students.
• It is also learned that the synthetic model to a great extend provides excellent situations for group discussion and further Promotes situations for social values.

• Most of the responding teachers have also noted that the proposed model promotes Teacher-student interaction and develops communication skills of students.

• Another notable observation of the respondents is that the proposed model stimulates sharing of ideas in group better than the EM.

Thus, the analysis of the ratings of teachers it can be concluded that, the synthetic model is effective than existing method in attaining the social aspects of instruction.

6.2.6 Findings and conclusions based on the receptivity analysis of experts and teachers regarding the Synthetic Model for teaching Population Education at the secondary level

1. It is observed that the mean score for the relevance of the proposed synthetic model is found to be 8.71 with the standard deviation .530. A mean score of 8.71 in a 10-point scale is regarded as very high and the standard deviation is very low. The minimum rating on the scale was reported to be six and the maximum rating was nine and, hence the range is three. From the above observations, it is clear that the Synthetic Model is highly relevant for teaching Population Education.

2. It is observed that the mean score for the usability of the proposed model is found to be 8.64 with the standard deviation .741. A mean score of 8.64 in a 10-point scale is regarded as very high and the standard deviation is very low. The minimum rating on the
scale was reported to be seven and the maximum rating was ten and, hence the range is three. From the above observations, it is clear that the Synthetic Model is highly useful for teaching Population Education.

3. The responses received about the effectiveness of the model revealed that the mean score for the usability of the proposed model is found to be 8.66 with the standard deviation .745. A mean score of 8.66 in a 10-point scale is regarded as very high and the standard deviation is very low. The minimum rating on the scale was reported to be seven and the maximum rating was ten and, hence the range is three. From the above observations, it is clear that the Synthetic Model is highly useful for teaching Population Education.

4. The analysis of the perceptions of experts and teachers regarding the receptivity of Synthetic Model for teaching Population Education reveals the following findings. The mean value obtained for the overall response as 26.0071 and the standard deviation as 1.54778. From the above analysis, it is clear that the Synthetic Model is very effective for teaching Population Education to enhance awareness about overpopulation among the secondary level students. The receptivity analysis among the experts and teachers reveals their agreement in accepting and appreciating the new model for teaching Population Education among the secondary level students. They also agree that the Synthetic Model could be implemented in teaching Population Education.

Hence, the results of the receptivity analysis indicate that the Synthetic Model is acceptable in the teaching of Population Education among the secondary level students and would enhance awareness in population problems.

6.2.7 Findings and conclusions based on ratings of teachers regarding the suitability of Synthetic Model for teaching Population Education at the secondary level

1. The analysis of the data revealed that, 82% of the teachers opined that the existing syllabus is suitable to a Great Extent for teaching Population Education by using Synthetic Model. 15% of the Teachers reported that the existing syllabus is suitable to a Some
Summary and Conclusions

1. About 67% of the Teachers reported that the resources are available to Some Extent for teaching Population Education using Synthetic Model in secondary schools. 15% of the Teachers reported that resources are Not at all available whereas, 15% reported that the resources are available to a Great Extent for practicing Synthetic Model for teaching Population Education at the secondary level.

2. Regarding the extent of practice, 12% of the teachers reported that they are Not at all interested in practicing Synthetic Model. While 63% of the teachers showed interest to practice Synthetic Model to Great Extent; only 25% is interested to practice Synthetic Model to a Some Extent.
6.2.9 Findings and conclusions based on analyzing the practical difficulties likely to be encountered by teachers while practicing Synthetic Model at secondary level.

Regarding the practical difficulties likely to be encountered by teachers while practicing Synthetic Model, the greatest difficulty is recorded as lack of adequate computers (96%). It is followed by disturbances in the existing time table (87%), difficult to maintain discipline (84%), lack of support from management (82%), lack of training (80%), lack of library/reference facilities (77%) overcrowded classrooms (73%), difficulty in maintaining time table (69%), Poor maintenance of computer (68%), Excess workload for teachers (65%), lack of knowledge about innovative models (65%), and the least score was recorded for Difficult to cover syllabus (57%). The findings highlighted the need for making necessary changes in the above-mentioned areas to overcome the specified difficulties likely to be encountered by teachers for the effective use of Synthetic Model in secondary schools.

6.2.10 Findings and conclusions based on analyzing the suggestions of teachers for the successful implementation of Synthetic Model for teaching Population Education at the secondary level.

Of the total responses received, 86% teachers recommended frequent in-service training programmes for teachers about innovative learning methods. 80% of the teachers recommended about the cooperation from authorities. 77% of the teachers demanded for adequate number of computers and 75% suggested for regular timely maintenance. About 72% of the teachers recommended for the adequate encouragement from management. 69% of teachers suggested for flexibility in time table and 54% suggested for flexibility in curriculum. And lastly 47% of the teachers recommended for frequent classes by resource persons.
6.2.11 Findings and conclusions based on analyzing the willingness of secondary level teachers to implement Synthetic Model for teaching Population Education.

The teachers had shown a definite trend in favor of agreement (83.3%). They displayed a positive disposition towards the implementation of Synthetic Model for teaching Population Education. Only 16.7 teachers showed neutral opinion towards Synthetic Model. The secondary level teachers reported that the inclusion of Synthetic Model in the present educational scenario can enhance learning in Population Education. They are willing to do experiments in teaching. They were predominantly of the opinion that the implementation of Synthetic Model in teaching Population Education would be practical and there is a need for proper dissemination of Synthetic Model for teaching Population Education among the teachers at the secondary level. They acknowledged the fact that Synthetic Model is more effective than existing method of teaching Population Education. Teachers admitted that learning through Synthetic Model is an interesting and joyful experience for students.

They expressed some difficulties in the implementation of the model, as they were preoccupied with many academic and nonacademic duties assigned by the management. The impediments they expected to face in the implementation of Synthetic Model were lack of support from the authorities, time constraints, lack of adequate computer facilities, and lack of knowledge on new innovative models. They felt that adequate facilities are not available in their institutions and they need intensive training in Synthetic Model.

6.3. Tenability of the Hypotheses

The hypotheses formulated for the study are tested for tenability in relation to the findings:
Hypothesis 1. The Synthetic Model developed through Blending Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education at the Secondary level.

The following findings substantiate that this hypothesis is tenable or can be accepted. When the Pre-test and Post test achievement scores of secondary level students in the three Experimental Groups [CAI, FWM, SM] and Control Group [EM] for the total sample were subjected to Analysis of Co-Variance, it was found that, $M_{y,x}$ for CAI = 14.525, FWM = 14.882, SM = 16.776 and Control Group EM = 13.381. Results revealed that the students of SM group has significantly higher achievement mean score (16.776) compared to all other two experimental groups and Control group. Thus, it can be concluded that the Synthetic Model is statistically more effective than the other two models and existing method of teaching, on achievement in Population Education. Hence, reject the null hypothesis and accept the hypothesis that the Synthetic Model developed through Blending Computer Assisted Instruction Model and Futures Wheel Method is effective for teaching Population Education at the Secondary level.

Hypothesis 2. The Synthetic Model is better than its component Computer Assisted Instruction Model for teaching Population Education at the Secondary level.

The following findings substantiate that this hypothesis is tenable or can be accepted. The test of significance of difference in the adjusted mean post test achievement scores of CAI and SM groups revealed that the critical ratio obtained is 15.31, which is greater than the table value 2.58 at 0.01 levels and hence it is significant at 0.01 levels. Adjusted mean post test achievement score for SM group (16.776) was found to be significantly ($P<0.01$) greater than the mean post test scores of CAI (14.525). This concludes that new Synthetic Model is more effective than CAI method of teaching in Population Education. Hence, reject the null hypothesis and accept the hypothesis that the Synthetic Model is better than its component Computer Assisted Instruction Model for teaching Population Education at the Secondary level.
**Hypothesis 3. The Synthetic Model is better than its component Futures Wheel Method for teaching Population Education at the Secondary level**

The following findings substantiate that this hypothesis is tenable or can be accepted. The test of significance of difference in the adjusted mean post test achievement scores of FWM and SM groups revealed that the critical ratio obtained (13.00) is greater than the table value 2.58 at 0.01 levels. Adjusted mean post test achievement score for SM group (16.776) was found to be significantly (P<0.01) greater than the adjusted mean post test scores of FWM (14.882). So, it can be concluded from the analysis that Synthetic Model is more effective than FWM of teaching in Population Education at secondary level. Hence, reject the null hypothesis and accept the hypothesis that the Synthetic Model is better than its component Futures Wheel Method for teaching Population Education at the Secondary level.

**Hypothesis 4. The Synthetic Model is better than Existing Method for teaching Population Education at the Secondary level.**

The following findings substantiate that this hypothesis is tenable or can be accepted. The test of significance of difference in the adjusted mean post test achievement scores of SM and EM groups revealed that the critical ratio obtained (23.31) is greater than the table value 2.58 at 0.01 levels. Adjusted mean post test achievement score for SM group (16.776) was found to be significantly (P<0.01) greater than the adjusted mean post test scores of EM (13.381). So, it can be concluded from the analysis that Synthetic Model is more effective than Existing Method of teaching Population Education at secondary level. Hence, reject the null hypothesis and accept the hypothesis that the Synthetic Model is better than Existing Method for teaching Population Education at the Secondary level.
Hypothesis 5. The Synthetic Model developed through Blending Computer Assisted Instruction Method and Futures Wheel Method is better than Existing Method in enhancing the awareness about overpopulation among secondary level students.

The following findings substantiate that this hypothesis is tenable or can be accepted. When the Pre-test and Post test Population Awareness Scores of secondary level students in the three Experimental Groups [CAI, FWM, SM] and Control Group [EM] were subjected to Analysis of Co-Variance, it was found that, $F_{y.x}=158.648; \ P<0.01$; $My.x$ for CAI=16.322, FWM =16.754, SM=19.506 and Control Group EM=15.105. Results revealed that the Secondary level students taught with SM has significantly higher adjusted mean Population Awareness Scores (19.506) compared to other two experimental groups and Control group that has significantly low adjusted mean score. Thus, it can be concluded that the SM is statistically more effective than the other two models and existing method for enhancing awareness about overpopulation among the secondary lever students.

So, the findings of the study indicate that the hypotheses formulated for the study are tenable and substantiated.

6.4 Educational Implication of the Study

The present study was intended to develop Synthetic Model for teaching Population Education among the secondary level students. The findings and conclusions have revealed a number of facts which could be suggested to, educational policy makers, educational authorities, curriculum planners, school management and teachers of Population Education, to modify the classroom climate. These are summarized below.

1. India with a population of 121 cores is inching closer to China. It is the high time that, we have to realize the fresh challenge posed by population bomb in India. Considering the importance of Population Education, the educational policy makers and planners are in search of a new approach for creating awareness about population issues among the adolescent population. Overpopulation is one of the challenges
posed before mankind and every future citizen should be convinced and aware to controlling it. There is a need to develop proper futuristic vision regarding the grave problems resulted by population bomb among the youngsters. This need can be fulfilled if the synthetic model based on blended learning strategy, is introduced along with other modern methods of teaching. The synthetic model makes use of maximizing the benefits of face to face instruction with technology in a futuristic perspective. The Government may introduce this model for teaching Population Education at the secondary level.

2. The findings and conclusions of the present study indicate that, the Population Education provides a multi-disciplinary and inter-disciplinary approach in understanding population phenomenon in its all dimensions, biological, physiological, anthropological, sociological, environmental and ecological, economic, political, moral and ethical. The Synthetic Model focuses on not only to acquaint the learners about the problems of over population but also to make them confident to take responsible rational decisions about their future. From the present study it has been found that Synthetic Model is very effective in achieving the goals and objectives of Population Education. So, the Synthetic Model should be applied to teach Population Education in the present secondary level class rooms.

3. The present methods of teaching Population Education lack futuristic vision and often failed to develop rational and responsible behavior towards the problems arising out of population explosion. With a view to develop the proper awareness in population problems, the investigator prepared the Synthetic Model based on blended learning strategy to teach Population Education and tested it with the existing method of teaching. The synthetic model was found more effective than the existing method for teaching Population Education not only for the academic achievement but also for enhancing awareness of overpopulation among the secondary level students. So the educational policy makers and authorities should introduce the synthetic model for teaching Population Education at the secondary level.
4. Population Education has a great role to play in helping to re-establish the balance between man and environment. The facilities available and activities conducted for enhancing population awareness among secondary level students are very limited. Education of this type is not easy to convey. As behavior modification is the basic outcome of any discipline, its attainment is very crucial to build a strong foundation. The developed Interdisciplinary Synthetic Model is very effective for enhancing Population awareness among the secondary level students. Hence necessary changes may be made in the syllabus to prepare and practice innovative models of teaching like Synthetic Model for teaching Population Education at secondary school level.

5. Usually the teacher trainees are not getting proper exposure to innovative approaches of teaching. Hence provision should be made in teacher education programmes to give training in innovative approaches. Teachers may be encouraged to implement Synthetic Models and other innovative models. Teacher Education college lecturers also should be given training in the preparation and practice of Synthetic Model and other innovative models to give proper training to teacher-trainees in innovative methods.

6. The teacher in the classroom just makes a passing reference to the current problem of population while teaching subject in a usual manner. Teacher has to be aware of the serious nature of population issues. Teacher has to develop sensitivity to the population problems and prepare younger generation for meeting challenges of the future. The present teaching methods are inadequate to fulfill the needs of present technology world. New innovation like Synthetic Model in teaching and learning process always help the teachers to motivate the students by giving novel experience in constructing knowledge. It helps to develop interest in exploring, analyzing, and predicting an issue or a problem through attacking it from all angles. Since, synthetic model will facilitates better learning; this model should be introduced in schools.

7. The change in classroom learning atmosphere and the difficulty level of content demands more competencies and challenges to
teachers. Teachers habitually use the same approach for practically all sorts of training objectives, in all kinds of learning situations and with all types of audience. It is complex and demanding for teachers. So, teachers should be given adequate orientation regarding synthetic model so as to enable them to prepare suitable and effective experiences depending upon the level of the pupils. Teachers may be encouraged to implement Synthetic Models and other innovative models in their teaching. Hence, it is recommended that, faculty improvement programmes viz., orientation courses, seminars and workshops should be organized for teachers to acquaint them with the preparation and practice of innovative teaching model like Synthetic Model based on blending Computer Assisted Model and Futures Wheel method.

8. Most of the teachers in school are not at all practicing computer based learning strategy for teaching Population Education at secondary level. This may be due to lack of computer facilities and lack of confidence and practice in the preparation of Computer Assisted Models. The synthetic model is based on blending Computer Assisted Model and Futures Wheel method necessitates the expertise in computer technology. The computer facilities are not at all available for practicing Computer Assisted Model in secondary schools. So, this highlights the need for arranging suitable programmes for teachers to give training in the preparation and practice of computer based models. Hence, necessary steps should be taken to provide sufficient computer facilities to schools for the successful implementation of Synthetic Model. The parent-teacher associations, the management and the local organizations may be encouraged to give financial support for providing sufficient computer facilities.

9. In over-crowed classrooms it is very difficult in maintaining discipline. Hence, steps should be taken to reduce the teacher-student ratio. The existing time table is not at all suitable for teaching Population Education using Synthetic Model. Hence, the timetable should be re-structured by making it more flexible and by allotting more periods for teaching Population Education so that students get more exposed to the problems of overpopulation. This finding
highlights the need for making the time table more flexible to suit to the
use of Synthetic Model at secondary school level.

10. In most of the schools teachers lack adequate library or reference
facilities to learn more about innovative learning strategies. Hence,
secondary schools should be equipped with suitable library or reference
facilities comprising of the latest reading materials and supplementary
materials on innovative teaching-learning strategies. The school library
should be equipped with digital library. Internet facilities should also be
provided in the school library to make the teachers and students
acquaint themselves with the developments in the field of innovative
approaches in the teaching of various subjects.

11. Some weightage in evaluation should be given to the pupil
learning on population problems. If there is adequate weightage
attached to overall evaluation of student performance about population
problems, it will motivate the students to learn the population issues
very well. If the students are given an opportunity to think, discuss
and write on those problems, there will be greater awareness and
learning about population issues among future generation to solve the
problem of overpopulation in our nation.

12. The parent community should be fully informed on the subject
so that they can also have a favorable attitude towards learning by
children about population growth and control. The schools should
orient the parents of their pupils through PTA meetings about the new
trends and movements in education including Population Education.

13. The introduction of Synthetic Model in secondary schools will
cost no extra amount of money. The same resources of school could be
useful for creating a new outlook among pupils in their future life
decisions. The receptivity analysis of experts and secondary school
teachers revealed that Synthetic Model is significantly superior to
Existing Method in realizing select educational outcomes listed under
social aspect, viz., promoting teacher-pupil interaction, pupil-pupil
interaction, providing situation for discussion and providing situation
for group work.
Therefore, it is recommended that synthetic Model should be adopted for teaching Population Education at the secondary level.

**6.5. Suggestions for Further Research**

It is hoped that the present study would open avenues for further research in the area under investigation. Some of the possible lines on which further studies can be carried out are, listed below:

1. The present investigation is limited to the development of Interdisciplinary Synthetic Model for Teaching Population Education at the secondary level. Similar studies on a wider sample including more areas in population related aspects and issues would be helpful for valid generalizations.

2. Similar studies can be conducted at the Adult and Continuing Education programmes to test the effectiveness of the Interdisciplinary Synthetic Model for teaching population related issues.

3. The effectiveness of the Interdisciplinary Synthetic Model for Teaching Population Education at the secondary level was tested experimentally only on few topics of Population Education. Hence, Interdisciplinary Synthetic Model for Teaching Population Education at the secondary level may be prepared for other possible topics in Population Education for secondary school students. The related issues regarding different populations can form subject for separate lines of research as each posses immense potential for further research.

4. The experimental part of the study (based on Interdisciplinary Synthetic Model) has been confined to Ninth Standard students only. To get a clear picture of the effectiveness, Interdisciplinary Synthetic Model for other levels: Primary, Upper Primary, Secondary, Higher secondary, Collegiate may be prepared and tested.

5. The experimental part of the study has been confined to a limited sample only. The present study cannot be comprehensive and final in itself unless subjected to many variations. The sample size can be
enlarged comprising of stratification based on age, socio-economic status, family size, etc.

6. The experimental study has been confined to Thrissur district only. The experiment may be repeated by a systematic coverage of all districts of Kerala. Further research may be conducted at the state and national level so that the generalization of wider nature may be made.

7. The experimental part of the study was limited to test the effectiveness of the Inter disciplinary Synthetic Model for Teaching Population Education at the secondary level with regard to achievement and awareness in population related aspects. A study may be conducted to find out the effectiveness of the prepared models in developing positive attitude among the students.

8. Similar studies can be conducted among the tribal students and students belonging to coastal area to examine the effectiveness of the models.

10. A similar study to find the effectiveness of Inter disciplinary Synthetic Model for Teaching Population Education among slow learners and underachievers can be attempted.

11. Studies may be taken up by taking into consideration the variables which were not covered in the present study so as to identify the influence of different kinds of variables on the awareness of the samples about Population Education.

12. The Synthetic Model can be compared with different modern instructional strategies to study the difference in effectiveness.

13. The present study was confined to Population Education only. It can be repeated for learning other subject area also.

14. The investigator is of the view that the present study opens up many avenues for more studies that would in future, contribute to develop more innovative models based on blended learning strategy for teaching and learning.