CHAPTER V

FINDINGS AND CONCLUSIONS
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In this chapter, the outcome of the study has been discussed. As per the objectives, the findings have been presented: analysis of eleventh and twelfth standard zoology syllabus, zoology text books, study the size of the laboratory and availability of facilities in the zoology laboratory, study the techniques of teaching zoology in the classroom and laboratory and the analysis of eleventh and twelfth standard zoology question papers. The techniques of teaching zoology and organization of practical classes are studied in terms of sex, location of school, educational qualification, years of teaching experience, medium of instruction, types of school, types of management of school and strength of the students in eleventh and twelfth standard. Findings are presented below.

I. ANALYSIS OF ELEVENTH STANDARD ZOOLOGY SYLLABUS

The eleventh standard zoology syllabus is prescribed by state board of secondary education, Tamil Nadu. In eleventh standard zoology syllabus the topics are included both for the theory and practical. The programmes prescribed in eleventh standard zoology are child centred. In eleventh standard under the unit biotechnology, the information about the products used in medical, industry, agricultural, pollution control and the topics on the population problems are more relevant for
community. But the traditional and cultural aspects are not described. The eleventh standard syllabus does not provide adequate knowledge for the students related to their life.

Here, the vocational, technical and work experience have not been included. Unsuitable topics are included in the eleventh standard syllabus. The topics prescribed in the syllabus do not develop the utility value among the students. The topics are not in continuum and sequential based. The topics in eleventh standard are correlated with chemistry, environmental biology, biotechnology, ecology and evolution. In eleventh standard activity oriented exercises are not given at the end of all units. The modern scientific, inventions and discoveries are not included here. So the up to date information are not included in eleventh standard zoology syllabus.

**ANALYSIS OF TWELFTH STANDARD ZOOLOGY SYLLABUS:**

In twelfth standard zoology syllabus, the topics are described in simple language and easily understood by the students. The communicable and non-communicable diseases, their symptoms and preventive measures prescribed are more informative for the students. The information about the effect of over population, mutagenic agents, types of pollutions, their biological effects, preventive measures and the killer disease AIDS is much needed for the society. In twelfth standard, topics are integrated with chemistry, physics, mathematics, embryology, environmental education and society.
In twelfth standard zoology, syllabus has been constructed in vertical organization and continuity. The traditional and cultural information is not given in twelfth standard syllabus. The activity oriented exercises and learning by doing activities are not prescribed. The individual laboratory work and field experiences are not emphasized. In twelfth standard the topics are explained in a simple and easy way for the understanding of the students. The unwanted and irrelevant concepts are incorporated but the modern scientific developments, are not included in here.

II. ANALYSIS OF ELEVENTH STANDARD ZOOLOGY TEXT BOOK

The eleventh standard zoology text book is normal in size and easy to handle by the students. The text book is printed in an ordinary paper. The print is clear, letters are normal in size. Diagrams are black and white in colour but the diagrams are not properly labelled. Some diagrams are labelled in all direction. In eleventh standard zoology Tamil medium text book there are minor errors in printing. The terms used in English medium text book that is mRNA and tRNA are not translated into Tamil. Adequate margin and sufficient space is given at the bottom of each and every page of this text book. The text book is bound with ordinary thick paper. The cost of the text book is reasonable.

In eleventh standard zoology text book, conclusion is not given at the end of the topics but the summary of the topics are given
in all the units. In this text book in the second and third units (cell biology) the content was presented from simple to complex and from familiar to unfamiliar situation. In eleventh standard zoology text book practical exercises are not given. But at the end of each and every units, both objective and subjective type questions and skill based questions are given. Under each and every unit gist of the lesson is given to review the topics by the students. In this text book subject index author index and references are not mentioned. Theory guide is not prescribed but the practical guide is supplied by the State Board of Secondary Education.

ANALYSIS OF THE TWELFTH STANDARD ZOOLOGY TEXTBOOK

In twelfth standard, zoology text book is normal in size. The text book is printed in a low quality paper. The letters are printed in normal size. Print is clear and the diagrams are printed in clear cut manner. The twelfth standard zoology English medium text book has some printing errors, that is adequate space is not given in between the sentences and words. But in Tamil medium textbook, adequate space was provided. Adequate margin is not given in both English and Tamil medium text books. The text book was bound in ordinary paper, which is not durable. The price of the text book is reasonable.

In twelfth standard zoology textbook, the historical information about the topics are not given. The style of the language is simple. Under all the units, conclusion and main points of the topic are
given. Under each unit, public examination pattern model questions are given. Both the objective and subjective type and skill based questions are included in the question pattern. Under all the units, the gist of the whole topics are not given. But important points are given to remember the students.

In the text book, subject index and author index and also the reference books are not mentioned. In this text book theory guide is not supplied, but the practical guide is provided by the Secondary Board of Education, Tamil nadu. The practical guide is more valuable for the students performing the practicals in the laboratory.

III. SIZE OF THE LABORATORY AND AVAILABILITY OF FACILITIES IN ZOOLOGY LABORATORY

Size of the laboratory and the number of students in eleventh and twelfth standard in all the three districts

There was significant difference between the mean scores of the size of the laboratory requirement and the size of the laboratory needed for students in eleventh and twelfth standard zoology in Kanyakumari and Tirunelveli districts. There was no significant difference indicated between the mean scores of size of the laboratory requirement and the size of the laboratory needed for eleventh and twelfth standard zoology in Thoothukudi district.
Size of the laboratory and the types of school

There was significant difference between the mean scores of the size of the laboratory requirement and size of the laboratory needed for eleventh and twelfth standard zoology in private aided schools and eleventh standard in government schools. There was no significant difference observed in private unaided schools and twelfth standard in government schools.

Availability of items - slides and specimens and types of school in eleventh standard

Regarding the number of items - slides - amoeba and hydra, and specimens - spongilla, liver fluke, ascaris - male and female, earth worm, cockroach, pila, starfish, amphioxus, shark, mullet fish, frog, calotes, rat, tape worm, hermit crab and sea-anemone, shark and sucker fish, honey bees, queen bee, drone bee and worker bee, observed are lesser than the number of items needed for individual practicals in eleventh standard zoology, irrespective of schools in all the three districts. On the whole, a very few items - slides and specimens are available in government, private aided and private unaided schools in Kanyakumari, Tirunelveli and Thoothukudi district.

Laboratory equipments and number of students in eleventh standard zoology in all the three districts

There was significant difference between the mean scores of the number of equipments - compound microscope, dissection
microscope, dissection box, tray, water bath, hammer, nails, gloves, beaker, spirit lamp, chloroform etc., observed and the number of equipments needed for individual practicals in eleventh standard zoology in Kanyakumari, Tirunelveli and Thoothukudi district and put together. On the whole, in all the three districts, equipments are inadequately available in the laboratory for doing individual practicals.

**Availability of items - specimens and slides and types of school in twelfth standard:**

As regards the number of items - specimens - sheep - brain, heart, liver, lungs and kidney and slides - endocrine glands - pituitary, thyroid, adrenal, and pancreas, blood smear of human and frog, and the frog developmental stages - two cell, four cell and eight cell stages, blastula, gastrula and tadpole - external and internal gill stages, observed and the number of items needed for individual practicals in twelfth standard irrespective of schools in all the three districts there was significant difference. On the whole, a very few items - specimens and slides are available in government, private aided and unaided schools, in twelfth standard in Tirunelveli and Thoothukudi district.

**Laboratory equipments and number of students in twelfth standard in all the three districts:**

There was significant difference indicated between the mean scores of the number of equipments - compound microscope, dissection
microscope, dissection box, tray, water bath, hammer, nails, test tube holder, test tube stand, watch glass, beaker, test tube, glass rod, glass capillary tubes, measuring jar, spirit lamp, fehling's solutions - A and B, glucose, starch, sugar, protein, benedict solution, hydrochloric acid, sodium hydroxide, copper sulphate, coconut oil, chloroform, formalin solution, concentrated nitric acid, ammonium hydroxide, iodine solution etc. observed and number of equipments needed for individual practicals in twelfth standard zoology in Kanyakumari, Tirunelveli, Thoothukudi districts and put together. On the whole, in all the three districts, inadequate number of equipments and less amount of chemicals are available in the laboratory doing individual practical for twelfth standard zoology students.

**Basic facilities and types of school in all the three districts:**

The basic facilities - gas connection, water facilities, electric facilities, store room, demonstration table, students experimental table, sink, laboratory assistant, first aid box and fire extinguisher are needed for doing practicals in eleventh and twelfth standard. Regarding the basic facilities water and electric facilities are adequately available in majority of government, private aided and private unaided schools in all the three districts - Kanyakumari, Tirunelveli and Thoothukudi district. The basic facilities - gas connection, store room, demonstration table, students experimental table, sink and laboratory assistant are available
in majority of government and private aided schools in all the three districts except private unaided schools.

With regard to the basic facilities. First - aid box and fire - extinguisher are available in majority of the private aided schools in Tirunelveli district. But majority of the private aided schools in Kanyakumari and Thoothukudi district have first aid box. But a few government and private aided schools have the first aid box and fire extinguisher. When compared to government and private aided schools, the private unaided schools are having very few basic facilities - laboratory assistant, first - aid box and fire extinguisher. The laboratory assistant, first - aid box and fire extinguishers are very essential in zoology laboratory. On the whole, majority of the private unaided schools have the minimum basic facilities.

IV TECHNIQUES OF TEACHING ZOOLOGY

1. Sex and techniques of teaching zoology

   The techniques of teaching zoology is not influenced by sex of the respondents in all the districts in standard eleventh and twelfth.

2. Location of school and techniques of teaching zoology

   The techniques of teaching zoology is not influenced by location of school, that is the respondents those who are working in rural and urban schools in Kanyakumari, Tirunelveli, Thoothukudi districts and put together.
3. Educational qualification and techniques of teaching zoology

There was significant difference between the mean scores of the teaching techniques employed by teachers with various educational qualification particularly in handling zoology in eleventh standard in Thoothukudi district and all the three districts put together. There was no significant difference exposed between the mean scores of the teaching techniques employed by respondents with different educational qualifications in handling zoology at twelfth standard in all the three districts and put together.

4. Teaching experience and techniques of teaching zoology

There was no significant difference between the mean scores of the teaching techniques that were employed by teachers with different teaching experience in all the three districts and put together.

5. Medium of instruction and techniques of teaching zoology

There was significant difference between the mean scores of the teaching techniques that were executed by teachers in different media, particularly in handling zoology at twelfth standard in Kanyakumari district and put together. There was no significant difference exposed between the mean scores of the teaching techniques employed by teachers through different media in handling zoology at eleventh standard in all the three districts and put together.
6. Types of school and techniques of teaching zoology

There was significant difference between the mean scores of the teaching techniques that were executed by teachers from different types of school, particularly in handling zoology at twelfth standard zoology in Tirunelveli district and put together. There was no significant difference indicated between the mean scores of the teaching techniques that were employed by teachers from different types of school in handling zoology at eleventh standard in all the districts, Kanyakumari, Tirunelveli and Thoothukudi districts.

7. Types of management of school and techniques of teaching zoology

Significant difference was manifested between the mean scores of the teaching techniques that were employed by the respondents from government school and private aided school in handling zoology at twelfth standard in Tirunelveli district. There was no significant difference between the mean scores of the teaching techniques that were executed by teachers from different types of management of school in handling zoology at eleventh standard in all the three districts and put together.

8. Strength of the students in zoology and techniques of teaching zoology

There was significant difference exposed between the mean scores of the teaching techniques employed by teachers with respect to strength of the class particularly in handling zoology at eleventh standard in Kanyakumari district.
V. ORGANISATION OF PRACTICAL CLASSES

1. Sex and organization of practical classes

There was no significant difference between the organization of practical classes employed by male and female respondent. So the organization of practical classes are not influenced by sex of the respondents.

2. Location of school and organization of practical classes

There was significant difference between the organization of practical classes employed by respondents working in rural and urban schools in Thoothukudi district as well as all the districts put together.

3. Educational qualification and the organization of practical classes

There was significant difference between the mean scores of the organisation of practicals employed by respondent in different educational qualifications in Tirunelveli district. There was no significant difference between the mean scores of the organization of practical classes by respondents with different educational qualification in Kanyakumari and Thoothukudi districts and put together. The organization of practical classes is not influenced by the educational qualification of the respondents in Kanyakumari, and Thoothukudi districts and put together.
4. Teaching experience and the organization of practical classes

There was no significant difference between the organization of practical classes that were employed by respondents with different teaching experience in all the districts and put together. The organization of practical classes is not influenced by the teaching experience of the respondents.

5. Medium of instruction and the organization of practical classes

There was significant difference between the mean scores of the teaching techniques employed by respondents through different media, particularly in handling practicals at eleventh standard in Kanyakumari and Tirunelveli districts and put together.

6. Types of school and the organization of practical classes

There was no significant difference manifested in the organization of practical classes of the respondents of different types of school in Kanyakumari, Tirunelveli, Thoothukudi districts and put together. The organization of practical classes is not influenced by the respondents from different types of school in handling zoology practicals in all the three districts and put together.

7. Types of management of school and organization of practical classes

There was significant difference indicated between the mean scores of the organization of practical classes employed by the respondents
in the different types management of school particularly in Thoothukudi district and put together.

8. Strength of the students in zoology and the organization of practical classes

There was no significant difference observed between the mean scores of the organization of practical classes arranged by respondents with respect to strength of the class in Kanyakumari, Tirunelveli and Thoothukudi districts and put together. The organization of practical classes is not influenced by the strength of the classes.

VI. ANALYSIS OF ELEVENTH STANDARD ZOOLOGY PUBLIC EXAMINATION QUESTION PAPERS: TYPEWISE


The ideal weightage to subjective and objective type test items in eleventh standard zoology question paper should be 33.33% and 66.66% respectively. More weightage should be given for objective type questions. But March 1998 question paper gives more weightage for subjectivity (56.66%) and less for objectivity (43.33%) by 10%. In March 2000, question paper enriches subjectivity (50%) and decreases objectivity (50%) by 16.67%. So in eleventh standard zoology question papers in March 1998 and March 2000 gives more importance for subjective
March 2003 question paper, gives more weightage for subjectivity (54.33%) and less for objectivity (45.66%) by 11%. March 2004 question paper gives more importance for subjectivity (41.66%) and less for objectivity (58.33%) by 8.33%. In eleventh standard zoology the question paper of March 2003 and March 2004 gives more importance for subjectivity and less for objectivity. This phenomenon goes against securing more marks by the students.

ANALYSIS OF TWELFTH STANDARD ZOOLOGY PUBLIC EXAMINATION QUESTION PAPERS: TYPEWISE


September 1998 zoology question paper enriches subjectivity (46.66%) and decreases objectivity (53.33%) by 13.33%. Question paper in twelfth standard zoology in September 1998, March 2000 and March 2001, gives weightage of 53.33% and 46.66% to subjective and objective type test items. The weightage to subjective type questions was 20% more than what it deserves. On the whole, the question papers of September 1999, March 2000, and 2001 enriches subjectivity and decreases
objectivity by 20%. In March 2003 and in March 2004 question papers enrich subjectivity and decreases objectivity by 21%. This phenomenon goes against securing more marks in the public examination.

**CONTENTWISE ANALYSIS OF ELEVENTH STANDARD ZOOLOGY PUBLIC EXAMINATION QUESTION PAPERS**

The ideal weightage to the content in eleventh standard zoology question paper is on the basis of density of the content in each unit. Unit V has got 32.14%, Unit III has got 21.42%, Unit II has got 17.55, Unit I and IV have the weightage of 14.28% each. The maximum and minimum weightage is observed and the range is 18%. In March 1998 zoology question paper, more weightage is given to Unit II (47.33%) than what it deserved and less weightage was given to Unit I (6%) than what it should be. In March 2000 zoology question paper, maximum weightage was given to Unit III (33%) than what it deserved and minimum weightage was given to the Unit V (12%) than what it should be.

In March 2003 zoology question paper, more weightage was given to Unit III than what it deserves and less weightage was given to the Unit V (10.33%). In March 2004 zoology question paper, more weightage was given to Unit II (33.33%) and less weightage was given to Unit I (2.66%) than what it should be. On the whole all the question paper, that is March 1998, March 2000, march 2003 and March 2004,
questions had not been distributed as per the cluster of content in the five units. This anomaly creates disappointment among the students in the public examination.

**CONTENTWISE ANALYSIS OF TWELFTH STANDARD ZOOLOGY PUBLIC EXAMINATION QUESTION PAPERS**

The ideal weightage to the content in twelfth standard zoology question paper is prepared on the basis of density of the content in each unit. Unit - III has got 32%, the maximum weightage, Unit I and III has got 25% each, and minimum weightage was given to Unit IV (18%). The range is 14%. In September 1998 zoology question paper, maximum weightage was given to Unit I than what it deserved and less weightage was given to the Unit IV than what it should be. In September 1999, zoology question paper, maximum weightage was given to unit I than what it should be and minimum was given to the Unit IV (12%) than what it deserved. In March 2000, zoology question paper, more weightage was given to Unit I (49%) and less weightage was given to Unit IV (11%) than what it should be. In March 2001, zoology question paper, maximum weightage was given to Unit I (38%) that what it deserved and minimum weightage was given to Unit IV (11%) than what it should be.

In March 2003 zoology question paper, more weightage was given to Unit I (36.66%) and less weightage was given to Unit IV (12.33%)
than what it deserved. In March 2004, zoology question paper, maximum weightage was given to Unit I (39%) than what it deserved and minimum was given to Unit II (16%) than what it should be. On the whole the zoology question papers in September 1998, September 1999, March 2000, March 2001, March 2003 and March 2004 questions had not been distributed depending upon the density of sub units. This anomaly creates disappointment among the students in the examination.

ANALYSIS OF ELEVENTH STANDARD ZOOLOGY QUESTION PAPERS: OBJECTIVEWISE

In Eleventh standard zoology question paper, top priority was given for the objective - understanding, followed by application, knowledge and skill. But in all the zoology question papers of eleventh standard, March 1998, March 2000, March 2003 and March 2004 invariably, more weightage had been added to the objective - understanding, application type questions and less weightage should be given than that of the objective knowledge. Further to the objective knowledge had been added more than the due weightage.

ANALYSIS OF TWELFTH STANDARD ZOOLOGY QUESTION PAPER: OBJECTIVEWISE

2004 invariably more weightage had been added to the objective understanding. Application type questions had been given less weightage than that of the objective knowledge. Further weightage to the objective knowledge had been more than the due weightage. On the whole, the twelfth standard zoology question paper September 1998 and 1999, March 2000, 2001, 2003, 2004, it adversely affects the weightage due on application and skill type of questions. This needs a drastic changes in the weightage added to the different objectives of teaching zoology in higher secondary schools.

CONCLUSIONS

The above findings pertaining to the analysis of eleventh and twelfth standard zoology syllabus, analysis of eleventh and twelfth standard zoology text books, study the size of the laboratory and availability of facilities in the zoology laboratory, study the techniques of teaching zoology, study the organisation of zoology practical classes and the analysis of eleventh and twelfth standard zoology question papers enabled the investigator to arrive at the following.

1. ANALYSIS OF ZOOLOGY SYLLABUS

The syllabus for higher secondary has been prescribed by the state government. Units on biotechnology are more useful to the students. But it has failed to analyse the cultural perspectives. Further
the units in the zoology syllabus for the eleventh standard do not have continuum. Activity oriented exercises are not given in the end of all units.

In twelfth standard, topics have been chosen which are useful to life. All the topics are correlated with other disciplines such as physics, mathematics, embryology etc. Here also activity oriented exercises are not given in the end. In fact modern scientific developments related to the units in twelfth standard have not been included. This is in contrast with the findings of Desai, Shantha Devi (1986).

2. ANALYSIS OF ZOOLOGY TEXTBOOK

The diagrams in the text books are in black and white colour, which is not appealing. This is in concordance with the findings of Malaimarean (1995). Moreover they are not labelled properly. At the end of every unit, practical exercise to be carried out by the students is missing in the text books. The text book at eleventh and twelfth standard does not have subject index and author index.

3. SIZE AND AVAILABILITY OF FACILITIES IN ZOOLOGY LABORATORY

a) Size of the laboratory and strength of the students

In Kanyakumari and Tirunelveli district, the size of the laboratory matched with the strength of the students in higher secondary section. But in Thoothukudi district it was not so.
b) Size of the Laboratory and types of school

Government and private aided schools should enlarge the size of the laboratory so as to provide practicals for all students. But in private unaided schools, the size of the laboratory requirement is inadequate, based on the strength of the students.

c) Availability of facilities - Slides and specimens and types of school

Most of the items - slides and specimens are not available in all schools irrespective of the government, private aided and unaided in all the districts.

d) Laboratory equipments and strength of the students

In all the three districts, Kanyakumari, Tirunelveli and Thoothukudi, equipments are inadequately available for doing individual practicals in standard - eleventh and twelfth. This is similar to the findings of Rajput, Gupta and Vaidya (1978).

e) Availability of basic facilities

Majority of the private aided and unaided schools do not have adequate basic facilities (laboratory assistant, first - aid box and fire extinguisher) as compared to the government schools. This again confirms the findings of Rajput, Gupta and Vaidya (1978).
4. TECHNIQUES OF TEACHING ZOOLOGY

a) Educational qualification

Teachers possessing higher qualification M.Sc., B.Ed., M.Phil and M.Sc., M.Ed., M.Phil., employ the appropriate techniques of teaching zoology in higher secondary schools.

b) Medium of instruction

Teachers handling zoology in English medium employed the appropriate techniques, as compared to teachers in the Tamil medium.

c) Types of school

Teachers in the boys and girls schools were employing appropriate techniques of teaching zoology, as compared to the teachers in the co-educational schools.

d) Types of management of school

In Tirunelveli district teachers from government schools and private aided schools employed the appropriate techniques as compared to teachers from the unaided higher secondary schools.

e) Strength of the students

In Kanyakumari district, the teaching techniques that were applied by teachers according to strength of the students (21-40), higher
was the use of appropriate techniques as compared to strength of the students (less than 20) in Tirunelveli and Thoothukudi districts.

5. ORGANISATION OF PRACTICAL CLASSES

a) Location of school

In rural schools, the strength of students is lesser than the counterparts. Hence in rural school teachers are arranging practical to all students simultaneously. The reverse techniques - by rotation method, the reverse method is employed in the urban schools for the reason that more students are there in a class. Depending on the availability of equipments and number of students, techniques are varying in the rural and urban schools.

b) Educational qualification

The organisation of practical classes is not influenced by the educational qualification of the teachers in the three districts at eleventh and twelfth standard.

c) Teaching experience

The organisation of practical classes is not influenced by the teaching experience of the respondents.
d) Medium of instruction

Teachers working in the English medium schools provide individual practicals simultaneously to all the students irrespective of the districts.

e) Types of school

The types of school has not influenced the organisation of practicals in all the districts and at all levels - eleventh and twelfth standard.

f) Types of management of school

The private aided school teachers arrange for the same practical to all the students since they have adequate equipments.

g) Strength of the students

The strength of the students standard (eleventh and twelfth) and all the districts considered for the investigation did not influence the organisation of practicals that is, the same method (rotation type) has been employed in all the schools of the three districts.

6. ANALYSIS OF ELEVENTH AND TWELFTH STANDARD ZOOLOGY QUESTION PAPERS

a) ANALYSIS OF ZOOLOGY QUESTION PAPERS: TYPE WISE

In all the years taken for analysis of eleventh and twelfth standard zoology question papers, more weightage has been given to
subjective type test items, affecting the percentage of weightage on objective test items. This is in contrast with the findings of Prasana Kumar (2004). This phenomenon will affect the achievement of students in zoology in the government examination.

b) CONTENTWISE ANALYSIS

Weightage to the content will be given according to the density of content in each unit. Whenever due weightage is not given to more density oriented units, students get disappointed in the examination. The analysis of question paper concludes that the above principle has not be followed by the question setters.

c) OBJECTIVEWISE ANALYSIS

Due weightage for objective - application and skill, has not been given in the question papers. Adversely, more weightage was given to the objective-knowledge and understanding. This trend makes the learning of zoology as knowledge oriented one.

RECOMMENDATIONS

Following recommendations were made on techniques of teaching zoology in higher secondary schools.

ELEVENTH AND TWELFTH STANDARD ZOOLOGY SYLLABUS

Effort may be made to bring continuum among all units in the eleventh and twelfth standard syllabus. Every unit should have a
section on latest development in that particular sub-units or units. Further, activities for each unit to be carried out by the students may be incorporated. These improvements will make the syllabus an adequate one.

ELEVENTH AND TWELFTH STANDARD ZOOLOGY TEXT BOOKS

The text books can have diagrams in different colours having the label in one direction. Every unit should have a list of activities to be carried out by the students. Further, the text books may have author and subject index in order to have quick reference to the topics in the books.

The quality of paper may be improved so, that the printing will be more attractive. Printing errors marked here and there in the books may be avoided. A guide book for the theory text book may also be provided to the teacher having some guideline for the coverage of the content and significance of the each units.

SIZE OF THE LABORATORY AND STRENGTH OF THE STUDENTS

In Thoothukudi district, the size of the laboratory in the higher secondary schools may be increased according to the increased strength of the students. Otherwise it will not develop scientific temper and attitude among the students as per the objective of teaching zoology.
SIZE OF THE LABORATORY AND TYPES OF SCHOOL

Government should extend liberal grant to the private aided and government schools to enlarge the size of the laboratory to accommodate the additional intake of the students.

AVAILABILITY OF ITEMS LIKE SLIDES AND SPECIMENS

Liberal grants may be extended to all the higher secondary schools in all the districts to equip the laboratory in terms of slides and specimens.

LABORATORY EQUIPMENTS AND STRENGTH OF THE STUDENTS

Adequate grants may be extended to all the higher secondary schools in all the three districts to equip the laboratory to provide individual practicals.

BASIC FACILITIES AND TYPES OF SCHOOL

Aided schools may be granted financial assistance for providing basic facilities-first aid box, fire extinguisher etc. in laboratory. The unaided schools may be advised by the Chief Educational Officer and District Educational Officer to equip themselves the basic facilities with in the stipulated time.
TECHNIQUES OF TEACHING ZOOLOGY

EDUCATIONAL QUALIFICATION

Teachers with lesser qualification may observe the teaching techniques of higher qualified teachers and consciously follow it for effective teaching.

MEDIUM OF INSTRUCTION

It is suggested that the teachers in teaching zoology in Tamil medium may observe the teachers in the English medium and to try to adopt it for effective teaching.

TYPES OF SCHOOL

The teachers in the co-educational schools may observe the teaching techniques employed by the teachers in the boys and girls schools. They may try to apply the same techniques for effective teaching.

ORGANISATION OF PRACTICAL CLASSES

TYPES OF MANAGEMENT OF SCHOOL

The government may grant more aids to the government schools to purchase adequate equipments to give individual practicals for all the students simultaneously.
QUESTION PAPERS

Clear cut blue print must be prepared by the question paper setters having two-thirds weightage on objective type questions and one-thirds on subjective type questions. This guideline must be strictly followed by the paper setters. Learning of zoology must be skill and application oriented one in order to make it more productive in the field of medical, agriculture etc. Hence it is suggested that an expert committee may be appointed to scrutinise the question papers set for higher secondary examination fall in line with the blue print. This will be a step to overcome the pitfalls existing in the question papers on the government examinations.

SUGGESTIONS FOR FURTHER RESEARCH

The following suggestions are given to the future investigators in this area of specialization.

1. This study was conducted in Kanyakumari, Tirunelveli and Thoothukudi districts of Tamil Nadu. Similar investigations may be launched in other districts of Tamil Nadu and other states of our country.

2. The present investigation involves the techniques of teaching zoology in state syllabus following higher secondary schools only. Similar study may be conducted on Central Board of Secondary Education and Matriculation syllabus following higher secondary schools.
3. The present research included the techniques of teaching zoology only. Similar investigation may be undertaken in physics, chemistry, botany, mathematics, humanities and languages at higher secondary level, and

4. The current investigation covers the analysis of syllabus, analysis of textbooks, size of the laboratory and availability of facilities, techniques of teaching, organisation of practical classes and analysis of the question papers. Other than the above categories, scientific attitude of the teachers may be considered by the future investigators.