2.1 INTRODUCTION

Every research endeavour necessitates the use of certain tools and devices for collection and analysis of data. The quantitative and qualitative data obtained by various means are helpful in imparting meaning to the study undertaken and this meaning is obtained by the analysis of the data. The tools used for the collection and for analysis depend on the research undertaken and sometimes the research worker has to develop the required tools as per requirements of the problem undertaken.

This chapter deals with the different tools developed for carrying out this work. This work involved the effect of the use of Audio-visual aids in improving music education in today's schools. Development of proper audio-visual aids for this purpose was extremely important for getting success in this work. Also, the teaching methods adopted by teachers needed a change if full advantage of the new tools was to be gained. Finally the effect of these new teaching techniques with the audio-visual aids was to be compared with the normal teaching techniques followed by the teachers and some tests were needed for this purpose. Thus the tools developed for this work may be categorised as follows.

1. Audio-visual aids
2. New teaching techniques,
and 3. Various tests.

Using the Audio-visual aids and the innovative teach-
ing techniques an experiment was conducted in four different
schools with active cooperation of their teachers and the
results were compared with the normal teaching.
2.2 Audio-visual aids,

Audio-visual aids are those things which help one to
develop a clear understanding of the subject apart from the
written words. Ideally, an experience of the original object
give the right understanding. For example, one gets a true idea
of what a mango is by seeing it, by smelling it, by touching it
and finally by tasting it. But, it is not possible to get the
knowledge of every thing in this big and complex world by
direct experience. This knowledge, therefore, could be had by
their models. This gives the added advantage of scaling. For
example a child can be taught that the earth is round by the
model of a Globe which gives a picture of this earth on a small
scale. The audio-visual aids give such models of true objects
on such a scale that the child can get a feeling of how the ob-
ject actually is. These aids mainly affect two senses - vision
and hearing.

The audio-visual aids have been developed taking help
from some music maestros and also from some material available
locally. Special attention had been given to the fact that the
material is clear and one can easily grasp it and also that the
students get true knowledge.

The following psychological factors had been taken
into account while preparing the audio-visual aids.

(a) Sense Organs

It is a psychological fact that the more the student uses his sense organs in the learning process the greater the depth of understanding he gets in the subject.

In the present work a new teaching method is developed using audio-visual aids which mainly use the sense organs of hearing and seeing so that the student may grasp the finer points of classical music in the most effective way.

(b) Motivation

It is impossible to impart knowledge if the pupil is not motivated to learn. Intelligently prepared audio-visual aids automatically draw the attention of the student towards them and develop a deep motivation in their hearts to learn more.

(c) Innovation

In classroom teaching, it is a recognized psychological fact that the attention of the student is always drawn towards new things. The teacher must always adopt new methods and new tools and should constantly draw the attention of the pupil towards the subject and should not make the teaching session monotonous and dull. The audio-visual aids help the teacher in introducing new ideas and will not permit the attention of the child to go astray.
Proper atmosphere is extremely important for classroom teaching. An ideal atmosphere for classroom teaching is one which corresponds with the subject being taught. The audio-visual aids are extremely useful in creating such an atmosphere. This fact has been recognized by educationists at all times though little has been done in this direction in our country. The Educational Consultancy Commission of Scotland has noted in one of its reports in the year 1948 in praise of audio-visual aids as follows:

'The audio-visual aids are attractive. They not only equip the schools but also make them centres of happiness. They can help in improving the knowledge of our children, they can develop their interest and proper taste and make their imagination fertile.'[1]

From the above quotation it is clear that the importance of audio-visual aids has been recognized long ago. Keeping the above factors in view several types of audio-visual aids have been developed in the present work. They may be classified as given below.

1. Audio Cassettes.
   (a) Cassettes on Music appreciation,
   (b) Cassettes on Musical Knowledge,
   and (c) Cassettes on Vocal Music Practice.
3. Charts

The details of these tools is given in the following sections.

2.3 Cassettes.

The objectives of development of the various audio cassettes are listed below.

1. To teach correct methods of vocal practice to students at the High school level.
2. To develop their capacity to appreciate Music.
3. To help students in the practice and revision of their course contents.
4. To improve their Musical knowledge.

The various cassettes developed with the above objectives are described below.

2.3.1 Cassette on Music Appreciation.

In the present day music education in schools, especially in the Uttar Pradesh, the teaching methods adopted are not conducive to the development of natural attraction and appreciation among the students. It is important to develop audio cassettes on Music appreciation based on the Ragas prescribed
in the syllabus so that the student may be able to enjoy the beauty of these ragas. The cassettes developed with this objective are given below.

(a) **Rag-Katha Cassette** - [Cassette No. 1a]

In this cassette the important characteristics of the Rag Yaman have been brought forward in the form of a beautiful story. The students simply learnt by heart the important characteristics like Vadi and Samvadi and reproduced word by word in the examinations also but do not understand the practical utility of these finer points. Through the medium of this story an effort has been made to link these theoretical aspects with practice. With the help of interesting examples the important characteristics of this raga were explained in this Cassette. [Appendix-IV].

(b) **Sargam Katha** - [Cassette No. 1a]

A natural method of remembering a new topic is to link it up with another known or interesting fact. In this Cassette, the Ragas Bihag and Kaffee have been linked with a beautiful and interesting story of Sargam. This story has been presented in the voice of Sri Kashi Nath Bodus. The different parts of Sargam have been coupled nicely in this story so that the students may remember the 'Sargam Geet' through the medium of the story.

(c) **Geet and Bhajans based on Ragas** - [Cassette No. 1b]

The main aim of presenting the Geet and Bhajans based
on classical Ragas is that the student may be able to get the knowledge of the Raga in a natural way. The law of learning is that one should proceed from easy to difficult. The purpose of teaching Geet and Bhajans is to introduce classical music in an easy and interesting way.

A noted musical maestro of North India, Sri Kumar Gandharva told this research worker in an interview on some aspects of Music Education in schools as, 'Music must be taught in schools. But it should be taught in the form of Raga Sangeet rather than as classical music. That is, the classical music be taught in the form of Poems, songs and Bhajans in a simple and attractive manner. By getting entangled in the complex rules of classical music the student tends to lose his natural interest in the subject. [1]

This cassette was made with the sole objective of developing the natural interest and appreciation of the students towards classical music. Hence the ragas were not limited to the prescribed syllabus. [Appendix-4]

(d) Cassettes based on Folk Songs.

Tribal and Folk Music have their own significance in the field of music. Music, in its most natural form and in its full diversity, can be traced in the songs of simple folks.

living in our villages and forests. This forms a powerful medium for developing music appreciation. The main objectives of preparing the cassettes on Folk music for school education are given below.

1. To develop the attraction of students towards music so that they may take greater interest in learning classical music.

2. To teach the Folk music of different parts of our country in an error free manner through cassettes and literature.

3. To develop a feeling of National integration. As they start learning the music of different regions of this vast country they appreciate the various forms of our culture and develop a feeling of brotherhood.

The details of Cassettes developed are as follows.

(a) Folk Songs of India - I { Cassette No. 2a }

In this Cassette some interesting folk songs of Andhra Pradesh, Brij, Bhojpuri and Rajasthan were collected. The words are given in Hindi script and their meaning and the occasions when these songs are sung is also given. [Appendix-4]

(b) Folk Songs of India - II { Cassette No. 2b }

Few more folk songs of different regions of India are given in this Cassette. This sample is drawn from the collection of Folk songs of The Sangeet Natak Akademi, New Delhi. This cassette is prepared to show to the students how vast is
the variety of Music in our country so as to improve their general knowledge and to develop their interest in music.

2.3.2 - Cassettes on the Musical Knowledge.

It is not sufficient if the student limits his study to that prescribed in the syllabus. Only when the student gets all-round knowledge that the artistic talents of the student develop in an effective way. The Cassettes on musical knowledge were developed keeping this objective in view. It is difficult to differentiate between musical recordings for knowledge and those intended to develop music appreciation because the student develops music appreciation as his knowledge improves and the recordings for music appreciation improve the knowledge.

Two different types of Cassettes were developed. They are

1. Cassettes on General Knowledge
2. Cassettes on specific knowledge.

Cassettes on General Knowledge,

In the Innovative teaching method proposed in this work the students are exposed not only to the topics covered by their syllabus but also to topics of general knowledge in Music. In the normal teaching method followed in schools today the teaching is limited to topics covered in the syllabus only; that also rarely covered fully in the class. This type of teaching tends to be mechanical and uninteresting to the student. By presenting items of general knowledge to students through audio-visual aids leads to following benefits.
1. The student learns many things related to music in a natural way effortlessly.

2. The interest of students increases and they will be motivated to learn.

Keeping the above objectives in mind several cassettes with explanatory notes in the form of booklets were developed on various topics of general knowledge related to music and their brief description is given below.

Cassettes and books on Prominent Musicians of India

(Cassettes No. 3 to 6.)

These Cassettes contained the vocal and instrumental music of several Old and New Maestros of Music of India and the accompanying booklets give detailed description of these artists in the same order.

It is well known in the music world that hearing good music is essential if one wants to produce good music. In music of high standard, one finds a fineness apart from perfection. By hearing the music of these artists a subtle idea is formed in the unconscious mind of the student about what good music is. The student starts appreciating the beauty and diversity of the music of these great artists.

Although these cassettes do not contain ragas of their syllabus exclusively, but the students will get impressed by hearing classical music of high standard. These cassettes introduce the artist to the student and they appreciate the
standard at which the music is presented. It may, however, be noted that the aim of these cassettes is not to teach any particular Raga but to improve their general knowledge and develop the sense of appreciation.

Cassette on different styles of Vocal Music with Booklet

[ Cassette No. 7 ]

A compilation of different styles of North Indian Music by famous artists is presented in this Cassette. The accompanying booklet explains the significant points of each style in the same order. By reading this booklet and simultaneously hearing the cassette helps the students in grasping subtle differences and peculiarities of each style easily.

The above cassettes and accompanying booklets were prepared with a special objective. There has always been a complaint that in today's school education of Music there is no coordination between the theoretical and practical aspects. The two aspects remain as two exclusive spheres in the student's mind. For a complete understanding of the subject the theoretical and practical aspects should combine and they should not feel that they are independent of one another. These cassettes were made to mitigate this difference from the mind of students as their correlation is beautifully explained with examples.

Styles in Carnatic Music and their method of Practice.

[ Cassette No. 8 ]

There are only two main branches of Music in India.
It is essential that the students of one branch should get some idea of what the other branch is. This will not only improve their general knowledge but will also develop an appreciation of the other style in the minds of the students. The practice method in the Carnatic style follows a rigid pattern unlike the Hindustani Music where there is no such standardization. In this cassette the method of practice and the various styles of singing Carnatic Music is shown with examples. [Appendix No.4]

**Cassettes meant for specialized knowledge**

'One Raga and different Forms' - Raga Bhairavi  {Cassette No.9}

In this cassette the Rag Bhairavi is presented in its various forms through Vocal and Instrumental Music.

Just as a picture of a face looks different when looked at from different angles, one can observe new forms of swaras of the same Raga when heard in different forms. This cassette has been prepared with the above objective. By hearing this cassette, the student will understand the depth of the Raga and can feel its beauty in its varied forms.

**Cassette on Bandishes based on Syllabus.  { Cassette No. 10 }**

This cassette gives a collection of Bandishes based on the Ragas of the prescribed syllabus of U.P.Board for the High school classes sung by various artists. This gives a wide variety of Bandishes and enlightens the students with the depth
Educational Cassette of Bandishes based on Syllabus

{ Cassette No. 11 }

This cassette contains a compilation of Bandishes normally taught in the class based on the prescribed syllabus for high school by the U.P. Board and are in the form of Chhota Khyal, Rag Lakshan and Sargam Geet. This cassette has been specially developed to help students for their own practice at home.

This model cassette was distributed to all the students of the four selected schools so that the students can hear and revise what is taught in the school. They can practice at their homes by carefully following it. In this cassette, first the bandishes were sung at a slow rhythm and were repeated as such, then the same bandish is sung at the normal rhythm in the ideal way. It is essential to hear and sing a raga in more than one bandish if one wants to get a full knowledge of the Raga. The Ustads of the old Gharanas used to teach several Bandishes in the same Raga with a view to give complete understanding of the Raga through Bandishes.

2.3.3 Cassettes for Vocal Music Practice

The base of vocal music depends on production of true swaras. Music education is incomplete if the student is not taught proper pronunciation of each word, correct way of producing voice and singing in proper rhythm. In the school
education students are taught Aaroha and Avaroha, Pakad, Bandyash, Tan and Aalap but no attention is paid to the practice of Swara and Laya.

For proper practice of music the guidance of a teacher is important. In our schools, under the present conditions, paying individual attention to each student by the teacher is extremely difficult, if not impossible, especially due to the small contact hours. The students do not know the correct methods of practice. Incorrect methods of practice lead to faulty sound production and may, in some cases, impair the throat of the child and may stop the student's progress. But practice is essential for progress in the field of music. Hence cassettes for teaching correct methods of vocal practice were developed. The following objectives are served by these cassettes:

(a) To make them understand the importance of practice in music.
(b) To teach the correct methods of vocal practice.
(c) To make the students aware of the adverse effects of incorrect methods of vocal practice.

The details of cassettes developed for vocal practice are given below:

How to sing good music - (Cassette No. 12)

The correct methods of the practice of Swaras is given in this cassette. (Appendix - 4)
Cassette on vocal practice (Cassette No. 13a)

How to produce good sound from the point of view of the structure of our voice organ is explained in a practical manner in this cassette.

The science of voice culture is totally neglected in today's schools. There are no facilities in schools for classifying students as per their pitch and other properties of their voice and to train their voice accordingly. Every student goes through the same syllabus and same courses even if it does not coincide with the student's taste, nature or the characteristics of his or her voice. Sri Ratanjankar, Pandit Deodhar and many other musicologists have advocated the use of voice culture in music education. [Appendix - 4]

Vocal Practice of Artistes of Music (Cassette No. 13b)

In this Cassette the noted musician of Gwalior Gharana Sri Hafeez Ahmed Khan explained in detail with suitable examples how to do vocal practice.

The object of the present cassette is to teach the correct methods of practice proven by the age old practices in the Gharanas and to motivate the student to practice regularly by correct methods.

2.4 The Music Picture Book

There is an acute shortage of interesting books in Music for school children in our country. This book is prepared to cover this deficit.
There are three Chapters in this book. They are
(a) Indian Musical Instruments
(b) Indian classical dances
and (c) Swara, Laya and Singing Practice.

In the first chapter of this book, all the prominent musical instruments are shown by means of colour photographs and short description of the instrument given. In the second chapter the photographs of all the known classical dance forms of India are shown with proper descriptions. In the third chapter the Swara and Laya are explained through pictures. Correct methods of practice and incorrect methods are also explained through pictures and with explanatory notes.

This book helps tremendously in increasing the general knowledge of the student in the music and related fields. By seeing the pictures repeatedly a pictorial memory is formed in the student's mind and will not forget correct methods of practice and will be saved from wrong methods. These pictures also help in increasing the student's interest and motivates him/her to learn more.

2.5 The famous musicians of India

Another booklet to help motivation has been developed which gives the photos and life sketches of famous musicians of our country.

2.6 Charts

The charts have a special place in education. By dis-
playing charts connected with the topic that is being taught a very conducive atmosphere is created in the classroom for teaching that particular topic. The student learns the significant points brought out on the charts in a natural way. The students retain the information longer by the use of charts in teaching. With this aim certain charts were made by this worker and were displayed prominently in the class rooms when related topics were discussed during the duration of innovative teaching. The details of these charts are as follows.

1. This chart is based on the Ragas prescribed for the High School by the U.P.Board. A description of significant points of each Raga is shown in this chart.

2. A bar diagram of AAROHA and AVAROHA of the 12 notes of the Hindustani music is shown in this chart. This is meant to make the student get a feeling of the differences of the 12 notes.

3. The foundation for learning music is correct practice. Keeping this dictum in view, a chart depicting important points to be kept in mind for correct methods of vocal practice is made and prominently displayed to the students in their class room. [Appendix - 3].

2.7 Development of Innovative teaching techniques...

The following important points were observed in the process of development of the innovative teaching technique.
Special practice of Swara, Laya and Tal.

In the innovative teaching technique, a method was suggested for regular practice of Swar, Laya and Tal. Simple techniques of practice have been developed and a little time was set apart in each class for practicing them regularly and compulsorily by all students.

Development of Musical Sense.

In most of the secondary schools of Uttar Pradesh the vocal music teaching follows the pattern of the teacher giving a sample demonstration of Raga and all the students repeat the same. The stress is on cramming Tan and Alap and not on developing a sense of Swara and Tal resulting in a poor understanding of these two important aspects. In the innovative teaching technique, the teachers were first guided about the purpose of music education and special instructions were given to them to see that the students do not just repeat mechanically but develop a musical sense.

Development of a method for vocal practice

For an effective vocal practice, a method of vocal practice has been developed suitable for the level of the students. The breathing exercises are extremely important for vocal music practice. This leads to give a capability to control the breathing while singing and gives a capacity to remain steady at some swara for longer durations. But no such breathing exercise is taught to music students in schools. In the in-
innovative teaching technique breathing exercise was to be done by all students in the beginning of every practical class.

Teaching by giving individual attention.

Due to large student strength in music classes, the teachers are never able to give individual attention to their students. In the innovative teaching technique, a method is so devised that the teacher may pay individual attention by rotation so that at least once in two or three classes the teacher can hear each student and point out their mistakes.

Teaching with the help of Audio-visual aids.

Audio-visual aids are not used in the normal teaching methods. In the innovative technique one day in every week was set apart for teaching with the audio-visual aids. With the help of these aids the students were not only given the course material but also items of general knowledge.

Material help for practice at home.

Audio Cassettes with course material for practice at their respective homes were distributed to all students.

Teaching Music through Play.

A method of teaching music through play so that the students can revise the material already taught in an interesting manner has been developed.

2.8 Preparation of Tests.

In the present study three parameters were tested to compare the two methods of teaching. For this purpose the fol-
The following tests were developed.

(1) Test on Musical interest.

(2) Test on Musical Comprehension.

and (3) Practical test on Vocal Music.

The necessity for the preparation of Tests.

The tests could be of two types.

(1) The Standardized tests

and (2) The self made tests.

There is a need for building specialized tests for measuring certain parameters for a particular type of sample. In the present work a comparison of the normal teaching methods with the innovative teaching method was to be made through proper tests. The sample of students were of the standard IX and are of the age group of 14 to 15 years. There is no standardised test available for testing the Interest and Comprehension of Music for such students. Hence this worker developed tests for testing these two. A description of these tests is given in the following sections.

2.9 Test of Musical Interest

The meaning of Interest.

Dr J.P. Gilford, a noted psychologist has defined Interest in the following manner in his book, 'General Psychology'.

"The INTEREST is that nature of a person which makes one to get attracted, or like, or gets satisfaction by con-
centrating towards any thing, person or phenomenon.'[1]

The purpose of this test was to find a measure for the Interest of the student towards Music. A search through the available literature was made to identify certain common points on whose basis the interest may be measured. For the tests to be conducted after the duration of Normal teaching and after the Innovative teaching programs 25 statements each were selected which could identify the Interest of students towards music.[Appendix. 6]

The student had to tick mark one of the three possible choices as per his interest. The marking was done on a 3 point scale as shown below.

Answer : Positive Uncertain Negative
Marks : 3 2 1

Screening of Questions.

All the 25 statements were not included in the final test. A committee of Experts consisting of Two eminent musicians, One Dean of a faculty and all the four teachers of the four schools where the experimental teaching had been carried out were consulted regarding the suitability of the statements for the desired test. Only those statements were

chosen which were approved by at least 60% of the members of the committee. This reduced the statements to 20 each for the two tests.

To further screen the questions these 40 questions were included in a test and the test was administered to a batch of students of class IX of a fifth school, Kedar Nath Sakseria Girl's Inter College in Agra and the reaction of the students observed. The language of a few questions seemed to be difficult to some students to comprehend and hence those were not included in the final tests.

Finally only 15 questions each were left in the final test sheet that was administered to test the musical interest of the students constituting the sample. Thus the maximum marks in each test are 45 only and the minimum marks become 15, if the student answered all questions negative.

2.10 Musical Comprehension Test (Cassette No. 14)

Mr Benjamin B. Volman has defined the Comprehension test as follows.

"The Comprehension test is a form of Aptitude test in which the subject is asked to evaluate what he would do in a specific practical situation." [1]

In the context of Musical comprehension this test has

been designed on the basis of above definition of Benjamin. A thirty minute test was developed for the age group of 14 to 16 years to test the ability of musical comprehension for both individuals and for groups. The details of this test are given below.

Details of the Musical Comprehension Test,

The Musical Comprehension test has been prepared keeping in mind the special properties and the basic elements of music. The test is intended to find out the musical sense and the understanding developed in the student and not the knowledge. The questions are such as to find if the student can comprehend changes in Pitch, Laya, Tal and Swara. This is quite different from the knowledge acquired by students in the class room like naming the Ragas or repeating Tan.

The preliminary form of the test.

A large number of questions on the above basis have been formulated and presented before an expert committee consisting of four Musicians and two Psychologists. After mutual discussions, some changes were introduced in these questions. Then this test was administered to a group of students of class IX at Kedar Nath Sakseria Girls’ Inter College in Agra. This group was different from the four groups selected for experimental teaching. From the results of this test, it was observed that the students have missed to grasp the essence of some questions. These questions were modified or deleted as pr
the particular case and thus the final test was prepared. There were in all 10 sub-sections of varying number of questions and the maximum possible marks come out to be 43.

**Items of the Musical Comprehension Test.**

The detailed description of each of the 10 sub-sections is given below.

**Sub-section No. 1**

In this sub-section the student has to differentiate sound by its pitch. Sounds of lower and higher pitches are produced by means of a pre-recorded audio Cassette and the student has to identify the lower and higher pitch sounds and note down in the answer book provided.

**Sub-section No. 2**

This test is concerned with Laya or the speed. The student has to identify the fast and slow rhythms.

**Sub-section No. 3**

The purpose of this is to identify if two sounds are close or if they are far from one another. Three pairs of notes are played and the student has to identify the closest and the farthest pair.

**Sub-section No. 4**

This test is concerned with the identification of the Intensity of Sound. When a few pairs of sounds are produced the student has to find which one is of higher intensity in each pair.
Sub-section No. 5

This test is for the identification of Swara. From a set of three swaras the student had to find which one differs from the other two.

Sub-section No. 6

This test finds the capacity to differentiate sounds. A group of sounds is produced and the student had to identify the number of swaras.

Sub-section No. 7

The purpose of this test is to measure the ability to remember tunes instantaneously. Two sets of groups of swaras were played in succession and the student was asked to write the swaras of one group. Sometimes the first group is asked and sometimes the second. The student had to write down the corresponding swaras.

Sub-section No. 8

This test finds the capacity to appreciate the beauty of Music. The student has to identify the more beautiful tune of the given two tunes.

Sub-section No. 9

The test identifies the capacity to understand the Tal. The student hears the Tal by Tabla and then by hand. The student has to identify the Tal.

Sub-section No. 10

This test finds the capacity to identify the musical
instruments by their sound.

Marking scheme

In the first seven sub-sections except the third there are 5 questions each. In the third, eighth and ninth sub-sections there are 2 questions each and seven questions in the last sub-section. The total number of questions are, thus, 43 and one mark is awarded for each correct answer. The maximum marks in this test sheet is thus an odd number equal to 43.

2.11 Practical Test on Vocal Music.

In this test, the emphasis has been placed on the practical aspects of Music. The tests were carried out by two eminent Musicians. Dr. S.B. Sharma ji, Head, Department of Music of the Dayalbagh Educational Institute and Shri B.P. Odak, a retired teacher of Music and a Musician of repute. These tests were carried out five times during the session. The marking was done on five points, detailed below.

1. Swara,
2. Tala,
3. Quality of the voice,
4. Understanding of the Raga
and 5. General impression.

Each expert marked the candidates on each aspect out of 10 marks. The marks of both experts were added and the total marks of each test, thus, became equal to 100.
2.12 Syllabus

The topics of the syllabus to be covered in class IX were selected from the total course prescribed for classes IX and X by the U.P. Board. They are as follows:

1. The practice of Swara—both shudha and Vikrit,
2. The practice of Alankara,
3. The practice of Tala,
   (a) Knowledge of various Layas
   (b) Ek Tal, Teen Tal, Dadara, Kaharava etc.,
4. Aroha and Avaroha of all the 10 Ragas prescribed, Pakad, Chhota Khyal or Lakshan Geet, Bhajan, Folk Songs and other songs,
5. The basic theory of Swara, Saptak, Alankar, Laya, Tal and study of Ragas prescribed in Syllabus.