Abstract

INTRODUCTION

In our country, the educational planning took place during post eighteen century. However, there had been proper planning for the Science Stream in school. In 1857 three universities were functioning at Mumbai, Calcutta and Madras which were providing education through two major branches of science, medical and engineering. Science along with Mathematics appeared in school curriculum during the beginning of the nineteen century. Following the recommendations of Kothari Commission, the Higher Secondary Schools started with three main streams- Science, Commerce and Arts. In Science Stream, the subjects of Physics, Chemistry, Biology, Mathematics and two languages were compulsory.

The Gujarat Secondary and Higher Secondary Board introduced a new curriculum design consisting three groups of subjects in the Science Stream of Higher Secondary Schools of Gujarat. Among these groups, Group-A included, Mathematics, Physics and Chemistry; Group-B included Biology, Physics and Chemistry while Group-AB included Biology, Mathematics, Physics, Chemistry all subjects. The main choice of the students is between Group-A which is Mathematics group and Group-B which is Biology group because Physics and Chemistry are common in both the groups. According to the students’ career aspirations, they choose their group of subjects. Yet it is interesting to study the attitude of students for opting a specific group of subjects. The researcher being a teacher in Higher Secondary School has experience of teaching Mathematics in the Higher Secondary Classes. The researcher has observed for several years of his teaching that the students face difficulties in making their choice of the subjects. Sometimes they opt for Mathematics at their liking and interest but sometimes they are forced by certain agencies like parents, friends and others. Hence, the researcher made up his mind to undertake a scientific research to know the attitudinal facts regarding students’ opting for Mathematics group in the Higher Secondary Schools of Gujarat.
IMPORTANCE OF THE STUDY

Attitude has a great influence upon the achievement in mathematics. In the present study, the researcher has decided to undertake a scientific study to find out the attitudinal facts regarding students’ opting for Mathematics group in the Higher Secondary Schools of Gujarat. Through this, teachers could know the students’ trend towards opting the group during their study in higher secondary science stream. This will consequently help the concerned persons to know the students’ trend towards their choice of the fields of career. This study can also motivate the teachers and educationists to inquire into the reasons of their likes and dislikes and make modifications in methodology, resources and support services provided to the students.

RESEARCH PROBLEM

A STUDY OF ATTITUDE OF HIGHER SECONDARY STUDENTS OF SCIENCE STREAM OF GUJARAT TOWARDS OPTING MATHEMATICS GROUP

DEFINITIONS OF SOME OF THE TERMS

STUDY :-The word ‘Study’ here means compilation of information about the attitudes of higher secondary students of science stream of Gujarat towards opting Mathematics group.

ATTITUDE :- The examination of various definitions reveals that attitude is by and large concerned with the feeling aspect. For the present study, the score achieved on the attitude scale will be considered as attitude of an individual.

SECONDARY TEACHERS: -Teachers, teaching in secondary schools.

HIGHER SECONDARY STUDENTS :-Students who are studying in Std. XI and XII

SCIENCE STREAM :- One of the three streams leading to the choice of specific careers like medical, engineering and so on.

GUJARAT :-Gujarat is one of the states of India.
MATHEMATICS GROUP :- One of the elective Groups of subjects. This group is known as Group-A comprising Mathematics, Physics and Chemistry in the curriculum designed by Gujarat Secondary and Higher Secondary Education Board for Higher Secondary students of Science Stream.

OBJECTIVES OF THE STUDY

The objectives formulated for the research were as under.

• To construct the attitude scale to measure the attitude of the Higher secondary students towards opting Mathematics group

• To study the attitude of higher secondary students towards opting Mathematics group.

• To study the attitude of higher secondary students towards opting Mathematics group with respect to their class.

• To study the attitude of higher secondary students towards opting Mathematics group with respect to their category.

• To study the attitude of higher secondary students towards opting Mathematics group with respect to their sex.

• To study the attitude of higher secondary students towards opting Mathematics group with respect to their area.

• To study the attitude of higher secondary students towards opting Mathematics group with respect to their achievement.

VARIABLES

The various variables and their levels at which they operate in this research study are given below.

1. Class-XI and Class-XII
2. Category- Reserved and Non-reserved
3. Sex- Male, Female
4. Area- Rural and Urban where the school is situated.
5. Achievement- below 60 % and with 60 % or above 60 % achievements
The above described variables led to the following hypotheses.

**HYPOTHESES**

The hypotheses formulated for the study were as under.

1) There will be no significant difference between the mean scores achieved on the attitude scale, of the students of class-XI and class-XII towards opting Mathematics group.

2) There will be no significant difference between the mean scores achieved on the attitude scale, of the students of reserved category and non-reserved category towards opting Mathematics group.

3) There will be no significant difference between the mean scores achieved on the attitude scale, of the male and female students towards opting Mathematics group.

4) There will be no significant difference between the mean scores achieved on the attitude scale, of rural and urban students towards opting Mathematics group.

5) There will be no significant difference between the mean scores achieved on the attitude scale, of students with below 60% achievements and students with 60% or above 60% achievements in Mathematics towards opting Mathematics group.

**LIMITATIONS OF THE STUDY**

It is necessary for the investigator to keep the limitations of the research in mind for doing research in the right way and getting proper results. The limitations of the present study were as under:

1) The present study was limited only to Gujarat State.

2) It was limited only to Gujarati medium schools.

3) It was limited only to higher secondary schools.

**REVIEW OF RELATED LITERATURE**

Among studies reviewed, the first study measured the mathematical problems of class-X residential and non-residential students. This study helped the researcher to have an insight about the researches in the area of Mathematics. In the second study, the researcher studied the influence of some factors on mathematical achievement. The third study is about
teachers’ opinions about new educational approach. These studies cover either mathematical problems or factors influencing mathematical achievement. The researcher found a great help regarding research procedure, sample, tools and techniques from the studies referred by him. The attitudinal facts about students’ opting mathematics group in the science stream of higher secondary schools is an innovative effort of the investigator.

Among other studies testing attitude in one or some other way, two studies measure attitude of parents and teachers, one measures attitude of parents, teachers and students and one studies the attitude of parents, teachers and educational administrators.

Among all these studies, one study measures the attitude towards the present system of higher education, one towards the population education and two towards introduction of English from third standard and from first standard.

Out of these studies, only two studies are undertaken in Gujarat and others out of the state of Gujarat that is in Varanasi, Punjab and Rajasthan. The study undertaken in Gujarat delimits the two districts of North Gujarat, Mehsana and Patan districts.

The tools used by the researchers of all referred studies are self constructed scale and questionnaire.

The researcher found a great help regarding research procedure, sample, tools and techniques from the studies referred by him. None of the study referred by the researcher studied the attitudinal facts about students’ opting mathematics group in the science stream of higher secondary schools. So this is an innovative effort of the investigator which will be helpful to the students, teachers and policy makers of education.

Thus, the literature reviewed by the researcher to clarify the problem and understand the methodology and procedure.

**PLANNING AND PROCEDURE**

The research plan provides an inventory of what has to be done and what materials have to be collected as a preliminary step in the undertaking of the study.

The research plan is document that can be given to others for comment and criticism.

Research studies are distinguished on the basis of their purposes and approaches and that is what may be technically called difference in methods.
METHOD OF RESEARCH

Looking back at the problem and objectives of the study, the investigator has come to the conclusion that the present study falls under the area of descriptive research. This type of research involves the description, recording, analysis and interpretation of condition that exists.

TOOLS USED IN THE STUDY

The standard attitude scale is not available to measure attitude of student of science stream of higher secondary schools of Gujarat towards opting Mathematics group.

The investigator used the attitude scale for his research work prepared by himself.

ATTITUDE SCALE

The attitude scale was prepared of sixty statements to study the attitude of students of science stream of higher secondary school towards opting Mathematics group. Thirty one statements are of favourable out of sixty statements. Twenty nine statements are of unfavourable nature. Thus the attitude scale of sixty statements were made ready to measure the attitude of the students of science stream of higher secondary schools of Gujarat

SCORING KEY

The method of using the scale is simple. The user can use the scale as it is appended in appendix with its scoring key. The students should be asked to give their responses to each statement. There are sixty two statements in this scale.

The responses of the are given proper weight age by the scheme of scoring. There are sixty two statements in this scale. Maximum weight age to each statement is four. So, the maximum score of the scale would be 240. The neutral value of each statement two, so neutral value of the scale would be 120. If the test user finds total score of a student more than 120, it shows the positive attitude of a student. If he finds total score of a student less than 120, it shows the negative attitude of a student.
**SELECTION OF THE SAMPLE**

For the present study the stratified sampling method has been adopted. The following variables were considered at the time of selecting the sample.

1) Class-XI and Class-XII
2) Category- Reserved and Non-reserved
3) Sex- Male, Female
4) Area- Rural and Urban where the school is situated.
5) Achievement- below 60 % and with 60 % or above 60 % achievements

**DATA COLLECTION AND DATA ANALYSIS**

The scale has been administered to the sample selected by the investigator. The investigator also asked the students to provide necessary bio-data required for the study in the space provided in the scale. The collected data were analyzed using statistical techniques. The next chapter describes data analysis.

**ANALYSIS OF DATA**

Analysis of data, thus, involves the breaking of complex factors into simple factors, into simple parts and putting them in arrangements for the purpose of interpretation

**PROCEDURE OF ANALYSIS**

This study was undertaken for measuring the attitude of students of science stream of higher secondary schools towards opting Mathematics group in relation to their class, category, sex, area and achievement. The dependent variable in the study is attitude. The attitude of the students towards opting Mathematics group in relation to their class, category, sex, area and achievement was measured with the help of attitude scale and interpreted.

The analysis of data was done in the following order.

1. The frequency distribution of obtained score was made.
2. The mean and S.D. of all groups were computed.
3. The 't' test is used to test the significance of difference between the means of various groups.
The data was analyzed in detail to study the main effect of independent variable i.e. class, category, sex, area and students' achievement towards opting Mathematics group.

**GENERAL OBSERVATIONS**

The main observations made during this process are noted below.

1. While administering the scale, it required a good deal of time, patience and perseverance on the part of the scale administrator.

2. The task of data collection was found much more time consuming. But the heads and teachers of the respective schools and students helped the investigator sincerely in collection of data.

3. The investigator could administer the 330 scales very well. But while sharing 310 found fully responded by checking the statement and giving complete bio-data. The investigator accepted 300 scales for study looking to the equal representation in the sample.

4. The investigator visited all the schools selected in the sample personally. During the visit investigator received warm welcome from the heads, teachers and students of higher secondary schools of Gujarat and was well supported by them.

**STATISTICAL OBSERVATIONS**

During the investigation and data analysis, the following statistical observations were made.

1. Mean attitude score of the students is 170.1. The neutral value of the scale is 120. Hence, it can be concluded that the students possess positive attitude towards opting Mathematics group.

2. **ATTITUDE OF STUDENTS WITH RESPECT TO INDEPENDENT VARIABLES**

   Observation -1  - The observed 't' value is greater than 't' table value. So our null hypothesis is not accepted.

   Observation-2  - The observed 't' value is greater than 't' table value. So our null hypothesis is not accepted.
Observation-3 - The observed 't' value is less than 't' table value. So our null hypothesis is accepted.

Observation -4 - The observed 't' value is less than 't' table value.
So our null hypothesis is accepted.

Observation -5 - The observed 't' value is less than 't' table value.
So our null hypothesis is accepted.

CONCLUSIONS

Some of the major conclusions drawn from the present research study are mentioned in the following section.

1. The students have positive attitude towards opting Mathematics group.

2. The independent variable class effects on the attitude of the students. The Class-XI students have better positive attitude than Class-XII students towards opting Mathematics group.

3. The independent variable category does not affect effects on the attitude of the students.

4. The independent variable sex does not affect effects on the attitude of the students.

5. The independent variable area does not affect effects on the attitude of the students.

6. The independent variable achievement does not affect effects on the attitude of the students.

IMPLICATIONS OF THE STUDY

The implications of the study are self evident and self explanatory. However the following are some implications of this study.

1. The teacher should pay more attention to develop the attitude towards opting Mathematics group.

2. The students of class-XII should be motivated to develop the positive attitude towards opting Mathematics group.
3. The should find the reasons behind students’ choice of their group of subjects.
4. More emphasis should be laid on the development of the mathematical skills among the students during the course of their study.

**SUGGESTIONS FOR THE FURTHER RESEARCH**

The present research was merely an exploratory effort based on ‘t’ test. Hence, the recommendation cannot be generalized beyond the sample. But more intensive and reliable research work is desired to be undertaken by the research worker in the directions suggested by the investigator. A few selected studies are suggested for a further research. They are as;

1. A study of the attitude of students of science stream of higher secondary schools towards opting Mathematics group in relation to their psychological traits such as their interest, aptitude, intelligence etc.
2. A study of the attitude of the students towards opting Mathematics group in relation to teacher’s effectiveness.
3. A study of the attitude of the students towards opting Mathematics group in relation to the school environment.
4. A study of the attitude of the students towards opting Mathematics group in relation to facilities provided by the schools.
5. A comparative study of the attitude of the students towards opting subject group.
6. An inquiry into the factors affecting the attitude of the students towards opting Mathematics group.

These suggestions for further research work only mean that research on any subject has no end. Further research starts where the previous research stops.